

September 2016



# MULTILAYER CERAMIC CAPACITORS



SAMSUNG  
ELECTRO-MECHANICS



We declare that all our MLCCs are produced  
in accordance with EU RoHS and REACH Directive.



#### RoHS Compliance and restriction of Br

The following restricted materials are not used in packaging materials as well as products in compliance with the law and restriction.

- Cd, Pb, Hg, Cr6+, As, Br and the compounds, PCB, asbestos

#### No use of materials breaking Ozone layer

The following ODS materials are not used in our fabrication process.

- ODS material : Freon, Haron, 1-1-1 TCE, CCl<sub>4</sub>, HCFC

If you want more detailed Information, Please Visit Samsung Electro-mechanics Website  
<http://www.semcr.com>

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※ Remarks : Symbols in this catalog have the following definition.

- Derating** This capacitor with derating is designed for 70% of the rated voltage or less.
- dv/dt** dv/dt means Pulse(dv/dt) Guarantee Capacitor, 10,000V/us(=10V/ns) max.10,000 cycles guarantee(@Vr, Room temp)
- Ref.** Reference means that CAP & TCC have the exceptional measurement conditions for Capacitance and Temperature Characteristics of Capacitance.  
So please refer to the individual specification for CAP and the individual characteristics data for TCC on Website.

# Part Numbering System



## 1 SERIES CODE

CL = Multilayer Ceramic Capacitors

## 2 SIZE CODE

| Code | inch(mm)    | Code | inch(mm)   | Code | inch(mm)   | Code | inch(mm)   |
|------|-------------|------|------------|------|------------|------|------------|
| 02   | 01005(0402) | 10   | 0603(1608) | 32   | 1210(3225) | 55   | 2220(5750) |
| 03   | 0201(0603)  | 21   | 0805(2012) | 42   | 1808(4520) |      |            |
| 05   | 0402(1005)  | 31   | 1206(3216) | 43   | 1812(4532) |      |            |

## 3 DIELECTRIC CODE

Class I (Temperature Compensation)

| Symbol | EIA Code | Operation Temperature Range(°C) | Temperature Coefficient(ppm / °C) |
|--------|----------|---------------------------------|-----------------------------------|
| C      | C0G      | -55 ~ +125                      | 0±30                              |

Class II (High Dielectric Constant)

| Symbol | EIA Code | Operation Temperature Range(°C) | Capacitance Change(%) |
|--------|----------|---------------------------------|-----------------------|
| A      | X5R      | -55 ~ +85                       | ±15                   |
| B      | X7R      | -55 ~ +125                      | ±15                   |
| X      | X6S      | -55 ~ +105                      | ±22                   |
| F      | Y5V      | -30 ~ +85                       | -82 ~ +22             |
| Y      | X7S      | -55 ~ +125                      | ±22                   |
| Z      | X7T      | -55 ~ +125                      | -33 ~ +22             |

## 4 CAPACITANCE CODE

Capacitance expressed in pF. 2 significant digits plus number of zeros.  
example) 106=10×10<sup>6</sup>=10,000,000pF

For Values <10pF, Letter R denotes decimal point  
example) 1R5 =1.5pF

## 5 CAPACITANCE TOLERANCE CODE

| Code | Tolerance | Code | Tolerance | Code | Tolerance | Code | Tolerance |
|------|-----------|------|-----------|------|-----------|------|-----------|
| N    | ±0.03pF   | H    | +0.25pF   | F*   | ±1%       | V    | -5%       |
| A    | ±0.05pF   | L    | -0.25pF   | G    | ±2%       | K    | ±10%      |
| B    | ±0.1pF    | D    | ±0.5pF    | J    | ±5%       | M    | ±20%      |
| C    | ±0.25pF   | F    | ±1pF      | U    | +5%       | Z    | -20, +80% |

\* For Values <10pF, F = ±1pF / Values ≥ 10pF, F = ±1%

| Series | Capacitance Step |     |     |     |     |     |     |     |     |     |     |     |
|--------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| E-3    | 1.0              |     |     |     | 2.2 |     |     |     | 4.7 |     |     |     |
| E-6    | 1.0              |     | 1.5 |     | 2.2 |     | 3.3 |     | 4.7 |     | 6.8 |     |
| E-12   | 1.0              | 1.2 | 1.5 | 1.8 | 2.2 | 2.7 | 3.3 | 3.9 | 4.7 | 5.6 | 6.8 | 8.2 |
| E-24   | 1.0              | 1.2 | 1.5 | 1.8 | 2.2 | 2.7 | 3.3 | 3.9 | 4.7 | 5.6 | 6.8 | 8.2 |
|        | 1.1              | 1.3 | 1.6 | 2.0 | 2.4 | 3.0 | 3.6 | 4.3 | 5.1 | 6.2 | 7.5 | 9.1 |

## 6 RATED VOLTAGE CODE

| Code | Voltage | Code | Voltage | Code | Voltage | Code | Voltage |
|------|---------|------|---------|------|---------|------|---------|
| S    | 2.5Vdc  | O    | 16Vdc   | C    | 100Vdc  | H    | 630Vdc  |
| R    | 4.0Vdc  | A    | 25Vdc   | D    | 200Vdc  | I    | 1kVdc   |
| Q    | 6.3Vdc  | L    | 35Vdc   | E    | 250Vdc  | J    | 2kVdc   |
| P    | 10Vdc   | B    | 50Vdc   | G    | 500Vdc  | K    | 3kVdc   |

## 7 THICKNESS CODE

(Unit:mm)

| Size inch(mm) | Code | Thickness | Tolerance  | Size inch(mm) | Code | Thickness | Tolerance |
|---------------|------|-----------|------------|---------------|------|-----------|-----------|
| 01005(0402)   | 2    | 0.20      | ±0.02      | 1210(3225)    | C    | 0.85      | ±0.10*    |
| 0201(0603)    | 3    | 0.30      | ±0.03      |               | 9    | 0.90      | ±0.10*    |
| 0402(1005)    | 3    | 0.30      | ±0.03*     |               | F    | 1.25      | ±0.20     |
|               | 5    | 0.50      | ±0.05      |               | S    | 1.35      | ±0.15*    |
| 0603(1608)    | 5    | 0.50      | +0.0/-0.1* |               | H    | 1.60      | ±0.20     |
|               | 8    | 0.80      | ±0.10      |               | U    | 1.80      | ±0.20*    |
| 0805(2012)    | A    | 0.65      | ±0.10      |               | I    | 2.00      | ±0.20     |
|               | C    | 0.85      | ±0.10*     |               | J    | 2.50      | ±0.20     |
|               | C    | 0.85      | ±0.10      |               | V    | 2.50      | ±0.30     |
|               | M    | 1.15      | ±0.10      | 1808(4520)    | F    | 1.25      | ±0.20     |
|               | F    | 1.25      | ±0.10      |               | G    | 1.40      | ±0.20     |
|               | Q    | 1.25      | ±0.15      |               | I    | 2.00      | ±0.20     |
| 1206(3216)    | Y    | 1.25      | ±0.20      | 1812(4532)    | F    | 1.25      | ±0.20     |
|               | C    | 0.85      | ±0.15      |               | H    | 1.60      | ±0.20     |
|               | C    | 0.85      | ±0.10*     |               | I    | 2.00      | ±0.20     |
|               | E    | 1.10      | ±0.15      |               | J    | 2.50      | ±0.20     |
| 1206(3216)    | E    | 1.10      | ±0.10*     | L             | 3.20 | ±0.30     |           |
|               | P    | 1.15      | ±0.10*     | 2220(5750)    | H    | 1.60      | ±0.20     |
|               | M    | 1.15      | ±0.15      |               | I    | 2.00      | ±0.20     |
|               | F    | 1.25      | ±0.15      |               | J    | 2.50      | ±0.20     |
|               | H    | 1.60      | ±0.20      |               | L    | 3.20      | ±0.30     |

\* Mark is only applicable to "L", "Y", "F", 12<sup>th</sup> code in part number.

## 8 INNER ELECTRODE/TERMINATION/PLATING CODE

| Code | Thickness division | Inner electrode | Termination      | Plating material |
|------|--------------------|-----------------|------------------|------------------|
| N    | Normal             | Ni              | Cu               | Ni / Sn _100%    |
| G    | Normal             | Cu              | Cu               | Ni / Sn _100%    |
| S    | Normal             | Ni              | Soft Termination | Ni / Sn _100%    |
| C    | Normal             | Ni              | Control Code     | Ni / Sn _100%    |
| L    | Low profile        | Ni              | Cu               | Ni / Sn _100%    |
| Y    | Low profile        | Ni              | Soft Termination | Ni / Sn _100%    |
| Z    | Normal             | Ni              | Soft Termination | Ni / Sn _100%    |
| F    | Low profile        | Ni              | Soft Termination | Ni / Sn _100%    |

## 9 PRODUCT CODE OR SIZE CONTROL CODE

(Unit:mm)

N = Normal  
A = Array(2 - element)  
B = Array(4 - element)  
L = LICC  
J = SLIC

| Code | 01005(0402) | 0201(0603) | 0402(1005) | 0603(1608) | 0805(2012) | 1206(3216) |
|------|-------------|------------|------------|------------|------------|------------|
| S    | ±0.03       | ±0.05      | ±0.07      | ±0.07      |            | ±0.30      |
| Q    | ±0.05       | ±0.07      | ±0.10      | ±0.15      | ±0.15      |            |
| R    | ±0.07       | ±0.09      | ±0.15      | ±0.20      | ±0.20      |            |
| U    | ±0.09       |            | ±0.20      | ±0.25      | ±0.25      |            |
| Z    |             |            | ±0.40      | ±0.30      | ±0.30      |            |
| 9    |             |            | ±0.30      |            |            |            |

## 10 CONTROL CODE

N = Reserved for future use

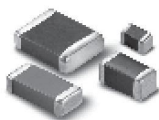
## 11 PACKAGING CODE

| Cardboard Tape (Paper) |                                      | Embossed Tape (Plastic) |                                      |
|------------------------|--------------------------------------|-------------------------|--------------------------------------|
| Code                   | Taping Type                          | Code                    | Taping Type                          |
| 8 / C / H              | Normal, 7" reel (Quantity option)    | E / G                   | Normal, 7" reel (Quantity option)    |
| J                      | 1mm Pitch, 7" reel                   | R                       | Chip aligned for horizontal, 7" reel |
| Z                      | Chip aligned for horizontal, 7" reel | W                       | Chip aligned for vertical, 7" reel   |
| Y                      | Chip aligned for vertical, 7" reel   | S                       | Normal, 10" reel                     |
| 0                      | Normal, 10" reel                     | F                       | Normal, 13" reel (Quantity option)   |
| 3 / D / L              | Normal, 13" reel (Quantity option)   |                         |                                      |
| 2                      | 1mm Pitch, 13" reel                  |                         |                                      |
| 7                      | Chip aligned for vertical, 13" reel  |                         |                                      |

※ If you want to learn the code or quantity in detail, please see p.148  
In order to move to the page directly, please click the here. ↑

# Standard & High Capacitors

## Feature

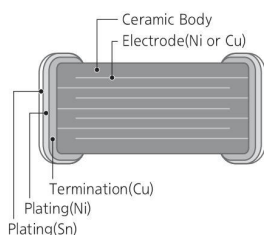
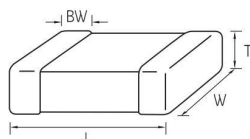


- Wide selection of size : from 0402(Inch) to 2220(Inch)
- Highly reliable tolerance and high speed automatic chip placement on PCBs
- Wide capacitance range
- Highly reliable performance
- Highly resistant termination metal
- Tape & reel for surface mount assembly

## Application

- Mobile Phone
- DC-DC Converter
- Tablet devices
- PC (Laptop, Desktop)
- HDD /SSD board
- Display

## Structure and Dimensions



| Size Code | EIA Code  | Dimension(mm) |           |                  |                |                 |
|-----------|-----------|---------------|-----------|------------------|----------------|-----------------|
|           |           | L             | W         | T                | Thickness Code | BW              |
| 05        | 0402      | 1.00±0.05     | 0.50±0.05 | 0.0975±0.0125(*) | L              | 0.25±0.075      |
|           |           | 1.00±0.10     | 0.50±0.05 | 0.19±0.03(*)     | X              |                 |
|           |           | 1.00±0.05     | 0.50±0.05 | 0.30±0.03(*)     | 3              | 0.25±0.10       |
|           |           | 1.00±0.05     | 0.50±0.05 | 0.50±0.05        | 5              |                 |
| 10        | 0603      | 1.60±0.10     | 0.80±0.10 | 0.50+0.0/-0.1(*) | 5              | 0.30±0.20       |
|           |           | 1.60±0.10     | 0.80±0.10 | 0.80±0.10        | 8              |                 |
| 21        | 0805      | 2.00±0.10     | 1.25±0.10 | 0.70±0.10(*)     | 7              | 0.50+0.20/-0.30 |
|           |           | 2.00±0.10     | 1.25±0.10 | 0.80±0.10(*)     | 8              |                 |
|           |           | 2.00±0.10     | 1.25±0.10 | 0.85±0.10        | C              |                 |
|           |           | 2.00±0.10     | 1.25±0.10 | 0.90±0.10(*)     | 9              |                 |
|           |           | 2.00±0.10     | 1.25±0.10 | 1.15±0.10        | M              |                 |
|           |           | 2.00±0.10     | 1.25±0.10 | 1.25±0.10        | F              |                 |
|           |           | 2.00±0.15     | 1.25±0.15 | 1.25±0.15        | Q              |                 |
| 2.00±0.20 | 1.25±0.20 | 1.25±0.20     | Y         |                  |                |                 |
| 31        | 1206      | 3.20±0.20     | 1.60±0.20 | 0.60±0.10(*)     | 6              | 0.50±0.30       |
|           |           | 3.20±0.15     | 1.60±0.15 | 0.85±0.15        | C              |                 |
|           |           | 3.20±0.20     | 1.60±0.20 | 0.85±0.10(*)     | C              |                 |
|           |           | 3.20±0.20     | 1.60±0.20 | 0.90±0.10(*)     | 9              |                 |
|           |           | 3.20±0.20     | 1.60±0.20 | 1.10±0.10(*)     | E              |                 |
|           |           | 3.20±0.20     | 1.60±0.20 | 1.15±0.10(*)     | M              |                 |
|           |           | 3.20±0.20     | 1.60±0.20 | 1.15±0.10(*)     | P              |                 |
|           |           | 3.20±0.15     | 1.60±0.15 | 1.25±0.15        | F              |                 |
| 3.20±0.20 | 1.60±0.20 | 1.60±0.20     | H         |                  |                |                 |
| 32        | 1210      | 3.20±0.30     | 2.50±0.20 | 0.85±0.10(*)     | C              | 0.60±0.30       |
|           |           | 3.20±0.30     | 2.50±0.20 | 0.90±0.10(*)     | 9              |                 |
|           |           | 3.20±0.30     | 2.50±0.20 | 1.60±0.20        | H              |                 |
|           |           | 3.20±0.30     | 2.50±0.20 | 1.80±0.20(*)     | U              |                 |
|           |           | 3.20±0.30     | 2.50±0.20 | 2.00±0.20        | I              |                 |
|           |           | 3.20±0.30     | 2.50±0.20 | 2.50±0.20        | J              |                 |
| 42        | 1808      | 4.50±0.40     | 2.00±0.20 | 1.25±0.20        | F              | 0.80±0.30       |
|           |           | 4.50±0.40     | 2.00±0.20 | 1.40±0.20        | G              |                 |
|           |           | 4.50±0.40     | 2.00±0.20 | 2.00±0.20        | I              |                 |
| 43        | 1812      | 4.50±0.40     | 3.20±0.30 | 1.25±0.20        | F              | 0.80±0.30       |
|           |           | 4.50±0.40     | 3.20±0.30 | 2.50±0.20        | J              |                 |
|           |           | 4.50±0.40     | 3.20±0.30 | 3.20±0.30        | L              |                 |
| 55        | 2220      | 5.70±0.40     | 5.00±0.40 | 2.50±0.20        | J              | 1.00±0.30       |
|           |           | 5.70±0.40     | 5.00±0.40 | 3.20±0.30        | L              |                 |

\* Mark is only applicable to "L", "F", 12<sup>th</sup> code in part number.



# Standard & High Capacitors

Standard & High Capacitance Table (X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |    |    |    |     |     |     |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|----|----|----|-----|-----|-----|--|
|                      |                           | nF          |     |     | uF  |     |     |    |    |    |     |     |     |  |
|                      |                           | 100         | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 |     |  |
| 0402<br>(1005)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 35                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
| 0603<br>(1608)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 35                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
| 0805<br>(2012)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 35                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
| 1206<br>(3216)       | 6.3                       |             |     |     |     |     |     |    |    |    |     |     | 150 |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 35                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 50                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
| 1210<br>(3225)       | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 35                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 50                        |             |     |     |     |     |     |    |    |    |     |     |     |  |
| 1812(4532)           | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
| 2220(5750)           | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |     |  |



Standard & High Capacitance Table (X6S)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |    |    |    |     |  |  |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|----|----|----|-----|--|--|--|
|                      |                           | nF          |     |     | uF  |     |     |    |    |    |     |  |  |  |
|                      |                           | 100         | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 |  |  |  |
| 0402<br>(1005)       | 2.5                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 4.0                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
| 0603<br>(1608)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
| 0805<br>(2012)       | 2.5                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 4.0                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
| 1206<br>(3216)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
| 1210<br>(3225)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |  |  |  |

# Standard & High Capacitors

Standard & High Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |     |     |     |    |     |    |     |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|--|
|                      |                           | nF          |     |     |     |     | uF  |     |     |     |    |     |    |     |  |
|                      |                           | 47          | 100 | 220 | 330 | 470 | 1.0 | 2.2 | 3.3 | 4.7 | 10 | 22  | 47 | 100 |  |
| 0402<br>(1005)       | 6.3                       |             |     |     |     |     | X7S |     |     |     |    |     |    |     |  |
|                      | 10                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 16                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 25                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 50                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
| 0603<br>(1608)       | 6.3                       |             |     |     |     |     |     |     |     |     |    | X7S |    |     |  |
|                      | 10                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 16                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 25                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 50                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
| 0805<br>(2012)       | 6.3                       |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 10                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 16                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 25                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 35                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 50                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
| 1206<br>(3216)       | 6.3                       |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 10                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 16                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 25                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 35                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 50                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
| 1210<br>(3225)       | 6.3                       |             |     |     |     |     |     |     |     |     |    |     |    | X7T |  |
|                      | 10                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 16                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 25                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 35                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |
|                      | 50                        |             |     |     |     |     |     |     |     |     |    |     |    |     |  |

Product Line Up (COG)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |                 |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|-----------------|-----------------------|-----------------|-----------------|
| 0.55mm         | 10Vdc         | 560pF           | ±5%                   | CL05C561JP5NNN□ | 0.55mm          | 50Vdc         | 2.2pF           | ±0.1pF                | CL05C2R2BB5NNN□ |                 |
|                |               | 16Vdc           | 33pF                  | ±5%             |                 |               | CL05C330JO5NNN□ | 2.2pF                 | ±0.25pF         | CL05C2R2CB5NNN□ |
|                |               |                 | 100pF                 | ±5%             |                 |               | CL05C101JO5NNN□ | 2.4pF                 | ±0.1pF          | CL05C2R4BB5NNN□ |
|                |               |                 | 150pF                 | ±5%             |                 |               | CL05C151JO5NNN□ | 2.4pF                 | ±0.25pF         | CL05C2R4CB5NNN□ |
|                |               |                 | 220pF                 | ±5%             |                 |               | CL05C221JO5NNN□ | 2.5pF                 | ±0.1pF          | CL05C2R5BB5NNN□ |
|                |               |                 | 470pF                 | ±5%             |                 |               | CL05C471JO5NNN□ | 2.5pF                 | ±0.25pF         | CL05C2R5CB5NNN□ |
|                | 1.0nF         | ±5%             | CL05C102JO5NNN□       | 2.7pF           |                 |               | ±0.1pF          | CL05C2R7BB5NNN□       |                 |                 |
|                | 25Vdc         | 10pF            | ±0.5pF                | CL05C100DA5NNN□ |                 |               | 2.7pF           | ±0.25pF               | CL05C2R7CB5NNN□ |                 |
|                |               |                 | ±5%                   | CL05C100JA5NNN□ |                 |               | 3.0pF           | ±0.1pF                | CL05C030BB5NNN□ |                 |
|                |               | 11pF            | ±5%                   | CL05C110JA5NNN□ |                 |               | 3.0pF           | ±0.25pF               | CL05C030CB5NNN□ |                 |
|                |               | 12pF            | ±5%                   | CL05C120JA5NNN□ |                 |               | 3.3pF           | ±0.1pF                | CL05C3R3BB5NNN□ |                 |
|                |               | 13pF            | ±5%                   | CL05C130JA5NNN□ |                 |               | 3.3pF           | ±0.25pF               | CL05C3R3CB5NNN□ |                 |
|                |               | 15pF            | ±5%                   | CL05C150JA5NNN□ |                 |               | 3.5pF           | ±0.25pF               | CL05C3R5CB5NNN□ |                 |
|                |               | 18pF            | ±2%                   | CL05C180GA5NNN□ |                 |               | 3.6pF           | ±0.25pF               | CL05C3R6CB5NNN□ |                 |
|                |               | 20pF            | ±5%                   | CL05C200JA5NNN□ |                 |               | 3.9pF           | ±0.1pF                | CL05C3R9BB5NNN□ |                 |
|                |               | 22pF            | ±5%                   | CL05C220JA5NNN□ |                 |               | 3.9pF           | ±0.25pF               | CL05C3R9CB5NNN□ |                 |
|                |               | 27pF            | ±2%                   | CL05C270GA5NNN□ |                 |               | 4.0pF           | ±0.1pF                | CL05C040BB5NNN□ |                 |
|                |               | 27pF            | ±5%                   | CL05C270JA5NNN□ |                 |               | 4.0pF           | ±0.25pF               | CL05C040CB5NNN□ |                 |
|                |               | 33pF            | ±5%                   | CL05C330JA5NNN□ |                 |               | 4.3pF           | ±0.25pF               | CL05C4R3CB5NNN□ |                 |
|                |               | 39pF            | ±5%                   | CL05C390JA5NNN□ |                 |               | 4.7pF           | ±0.1pF                | CL05C4R7BB5NNN□ |                 |
|                |               | 43pF            | ±5%                   | CL05C430JA5NNN□ |                 |               | 4.7pF           | ±0.25pF               | CL05C4R7CB5NNN□ |                 |
|                |               | 47pF            | ±5%                   | CL05C470JA5NNN□ |                 |               | 4.7pF           | ±0.5pF                | CL05C4R7DB5NNN□ |                 |
|                |               | 68pF            | ±5%                   | CL05C680JA5NNN□ |                 |               | 5.0pF           | ±0.1pF                | CL05C050BB5NNN□ |                 |
|                |               | 82pF            | ±5%                   | CL05C820JA5NNN□ |                 |               | 5.0pF           | ±0.25pF               | CL05C050CB5NNN□ |                 |
|                |               | 91pF            | ±5%                   | CL05C910JA5NNN□ |                 |               | 5.0pF           | ±0.5pF                | CL05C050DB5NNN□ |                 |
|                |               | 100pF           | ±5%                   | CL05C101JA5NNN□ |                 |               | 5.1pF           | ±0.25pF               | CL05C5R1CB5NNN□ |                 |
|                |               | 100pF           | ±10%                  | CL05C101KA5NNN□ |                 |               | 5.6pF           | ±0.1pF                | CL05C5R6BB5NNN□ |                 |
|                |               | 120pF           | ±5%                   | CL05C121JA5NNN□ |                 |               | 5.6pF           | ±0.25pF               | CL05C5R6CB5NNN□ |                 |
|                |               | 150pF           | ±5%                   | CL05C151JA5NNN□ |                 |               | 5.6pF           | ±0.5pF                | CL05C5R6DB5NNN□ |                 |
|                |               | 180pF           | ±5%                   | CL05C181JA5NNN□ |                 |               | 6.0pF           | ±0.25pF               | CL05C060CB5NNN□ |                 |
|                |               | 220pF           | ±1%                   | CL05C221FA5NNN□ |                 |               | 6.0pF           | ±0.5pF                | CL05C060DB5NNN□ |                 |
|                | 220pF         | ±5%             | CL05C221JA5NNN□       | 6.2pF           |                 |               | ±0.25pF         | CL05C6R2CB5NNN□       |                 |                 |
|                | 270pF         | ±5%             | CL05C271JA5NNN□       | 6.2pF           |                 |               | ±0.5pF          | CL05C6R2DB5NNN□       |                 |                 |
|                | 560pF         | ±5%             | CL05C561JA5NNN□       | 6.8pF           |                 |               | ±0.1pF          | CL05C6R8BB5NNN□       |                 |                 |
|                | 1.0nF         | ±5%             | CL05C102JA5NNN□       | 6.8pF           |                 |               | ±0.25pF         | CL05C6R8CB5NNN□       |                 |                 |
|                | 50Vdc         | 0.2pF           | ±0.1pF                | CL05C0R2BB5NNN□ |                 |               | 6.8pF           | ±0.5pF                | CL05C6R8DB5NNN□ |                 |
|                |               |                 | ±0.1pF                | CL05C0R3BB5NNN□ |                 |               | 7.0pF           | ±0.1pF                | CL05C070BB5NNN□ |                 |
|                |               | 0.3pF           | ±0.25pF               | CL05C0R3CB5NNN□ |                 |               | 7.0pF           | ±0.25pF               | CL05C070CB5NNN□ |                 |
|                |               |                 | ±0.1pF                | CL05C0R5BB5NNN□ |                 |               | 7.0pF           | ±0.5pF                | CL05C070DB5NNN□ |                 |
|                |               | 0.5pF           | ±0.25pF               | CL05C0R5CB5NNN□ |                 |               | 8.0pF           | ±0.25pF               | CL05C080CB5NNN□ |                 |
|                |               |                 | ±0.1pF                | CL05C0R7BB5NNN□ |                 |               | 8.0pF           | ±0.5pF                | CL05C080DB5NNN□ |                 |
|                |               | 0.75pF          | ±0.1pF                | CL05CR75BB5NNN□ |                 |               | 8.2pF           | ±0.1pF                | CL05C8R2BB5NNN□ |                 |
|                |               |                 | ±0.25pF               | CL05CR75CB5NNN□ |                 |               | 8.2pF           | ±0.25pF               | CL05C8R2CB5NNN□ |                 |
|                |               | 1.0pF           | ±0.1pF                | CL05C010BB5NNN□ |                 |               | 8.2pF           | ±0.5pF                | CL05C8R2DB5NNN□ |                 |
|                |               |                 | ±0.25pF               | CL05C010CB5NNN□ |                 |               | 9.0pF           | ±0.25pF               | CL05C090CB5NNN□ |                 |
|                |               | 1.2pF           | ±0.1pF                | CL05C1R2BB5NNN□ |                 |               | 9.0pF           | ±0.5pF                | CL05C090DB5NNN□ |                 |
|                |               |                 | ±0.25pF               | CL05C1R2CB5NNN□ |                 |               | 9.1pF           | ±0.1pF                | CL05C9R1BB5NNN□ |                 |
|                |               | 1.3pF           | ±0.1pF                | CL05C1R3BB5NNN□ |                 |               | 9.1pF           | ±0.25pF               | CL05C9R1CB5NNN□ |                 |
|                |               |                 | ±0.1pF                | CL05C1R5BB5NNN□ |                 |               | 10pF            | ±0.25pF               | CL05C100CB5NNN□ |                 |
|                | 1.5pF         | ±0.25pF         | CL05C1R5CB5NNN□       | 10pF            |                 |               | ±0.5pF          | CL05C100DB5NNN□       |                 |                 |
| ±0.1pF         |               | CL05C1R8BB5NNN□ | 10pF                  | ±5%             | CL05C100JB5NNN□ |               |                 |                       |                 |                 |
| 1.8pF          | ±0.25pF       | CL05C1R8CB5NNN□ | 11pF                  | ±5%             | CL05C110JB5NNN□ |               |                 |                       |                 |                 |
|                | ±0.1pF        | CL05C020BB5NNN□ | 12pF                  | ±2%             | CL05C120GB5NNN□ |               |                 |                       |                 |                 |
| 2.0pF          | ±0.25pF       | CL05C020CB5NNN□ | 12pF                  | ±5%             | CL05C120JB5NNN□ |               |                 |                       |                 |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
In order to move to the page directly, please click the here. ↑

# Standard & High Capacitors

## Product Line Up (COG)

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance               | Capacitance Tolerance | Part Number               |
|----------------|---------------|---------------------------|-----------------------|---------------------------|
| 0.55mm         | 50Vdc         | 13pF                      | ±5%                   | CL05C130JB5N <sup>□</sup> |
|                |               | 14pF                      | ±5%                   | CL05C140JB5N <sup>□</sup> |
|                |               | 15pF                      | ±5%                   | CL05C150JB5N <sup>□</sup> |
|                |               | 16pF                      | ±5%                   | CL05C160JB5N <sup>□</sup> |
|                |               | 17pF                      | ±5%                   | CL05C170JB5N <sup>□</sup> |
|                |               | 18pF                      | ±2%                   | CL05C180GB5N <sup>□</sup> |
|                |               | 18pF                      | ±5%                   | CL05C180JB5N <sup>□</sup> |
|                |               | 20pF                      | ±2%                   | CL05C200GB5N <sup>□</sup> |
|                |               | 20pF                      | ±5%                   | CL05C200JB5N <sup>□</sup> |
|                |               | 22pF                      | ±1%                   | CL05C220FB5N <sup>□</sup> |
|                |               | 22pF                      | ±2%                   | CL05C220GB5N <sup>□</sup> |
|                |               | 22pF                      | ±5%                   | CL05C220JB5N <sup>□</sup> |
|                |               | 24pF                      | ±5%                   | CL05C240JB5N <sup>□</sup> |
|                |               | 26pF                      | ±5%                   | CL05C260JB5N <sup>□</sup> |
|                |               | 27pF                      | ±1%                   | CL05C270FB5N <sup>□</sup> |
|                |               | 27pF                      | ±5%                   | CL05C270JB5N <sup>□</sup> |
|                |               | 30pF                      | ±5%                   | CL05C300JB5N <sup>□</sup> |
|                |               | 33pF                      | ±1%                   | CL05C330FB5N <sup>□</sup> |
|                |               | 33pF                      | ±5%                   | CL05C330JB5N <sup>□</sup> |
|                |               | 36pF                      | ±5%                   | CL05C360JB5N <sup>□</sup> |
|                |               | 39pF                      | ±2%                   | CL05C390GB5N <sup>□</sup> |
|                |               | 39pF                      | ±5%                   | CL05C390JB5N <sup>□</sup> |
|                |               | 43pF                      | ±2%                   | CL05C430GB5N <sup>□</sup> |
|                |               | 43pF                      | ±5%                   | CL05C430JB5N <sup>□</sup> |
|                |               | 47pF                      | ±1%                   | CL05C470FB5N <sup>□</sup> |
|                |               | 47pF                      | ±5%                   | CL05C470JB5N <sup>□</sup> |
|                |               | 51pF                      | ±5%                   | CL05C510JB5N <sup>□</sup> |
|                |               | 56pF                      | ±1%                   | CL05C560FB5N <sup>□</sup> |
|                |               | 56pF                      | ±5%                   | CL05C560JB5N <sup>□</sup> |
|                |               | 62pF                      | ±2%                   | CL05C620GB5N <sup>□</sup> |
|                |               | 62pF                      | ±5%                   | CL05C620JB5N <sup>□</sup> |
|                |               | 68pF                      | ±5%                   | CL05C680JB5N <sup>□</sup> |
|                |               | 75pF                      | ±5%                   | CL05C750JB5N <sup>□</sup> |
| 82pF           | ±5%           | CL05C820JB5N <sup>□</sup> |                       |                           |
| 91pF           | ±5%           | CL05C910JB5N <sup>□</sup> |                       |                           |
| 100pF          | ±1%           | CL05C101FB5N <sup>□</sup> |                       |                           |
| 100pF          | ±2%           | CL05C101GB5N <sup>□</sup> |                       |                           |
| 100pF          | ±5%           | CL05C101JB5N <sup>□</sup> |                       |                           |
| 100pF          | ±10%          | CL05C101KB5N <sup>□</sup> |                       |                           |
| 110pF          | ±5%           | CL05C111JB5N <sup>□</sup> |                       |                           |
| 120pF          | ±2%           | CL05C121GB5N <sup>□</sup> |                       |                           |
| 120pF          | ±5%           | CL05C121JB5N <sup>□</sup> |                       |                           |
| 130pF          | ±5%           | CL05C131JB5N <sup>□</sup> |                       |                           |
| 150pF          | ±5%           | CL05C151JB5N <sup>□</sup> |                       |                           |
| 160pF          | ±5%           | CL05C161JB5N <sup>□</sup> |                       |                           |
| 180pF          | ±5%           | CL05C181JB5N <sup>□</sup> |                       |                           |
| 200pF          | ±5%           | CL05C201JB5N <sup>□</sup> |                       |                           |
| 220pF          | ±1%           | CL05C221FB5N <sup>□</sup> |                       |                           |
| 220pF          | ±2%           | CL05C221GB5N <sup>□</sup> |                       |                           |
| 220pF          | ±5%           | CL05C221JB5N <sup>□</sup> |                       |                           |
| 240pF          | ±5%           | CL05C241JB5N <sup>□</sup> |                       |                           |
| 270pF          | ±5%           | CL05C271JB5N <sup>□</sup> |                       |                           |
| 300pF          | ±5%           | CL05C301JB5N <sup>□</sup> |                       |                           |
| 330pF          | ±5%           | CL05C331JB5N <sup>□</sup> |                       |                           |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number               |
|----------------|---------------|-------------|-----------------------|---------------------------|
| 0.55mm         | 50Vdc         | 390pF       | ±5%                   | CL05C391JB5N <sup>□</sup> |
|                |               | 470pF       | ±1%                   | CL05C471FB5N <sup>□</sup> |
|                |               | 470pF       | ±5%                   | CL05C471JB5N <sup>□</sup> |
|                |               | 560pF       | ±5%                   | CL05C561JB5N <sup>□</sup> |
|                |               | 680pF       | ±5%                   | CL05C681JB5N <sup>□</sup> |
|                |               | 820pF       | ±5%                   | CL05C821JB5N <sup>□</sup> |
|                |               | 1.0nF       | ±1%                   | CL05C102FB5N <sup>□</sup> |
|                |               | 1.0nF       | ±5%                   | CL05C102JB5N <sup>□</sup> |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance               | Capacitance Tolerance     | Part Number               |                           |
|----------------|---------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 0.90mm         | 16Vdc         | 68pF                      | ±1%                       | CL10C680F08N <sup>□</sup> |                           |
|                |               | 68pF                      | ±2%                       | CL10C680G08N <sup>□</sup> |                           |
|                |               | 100pF                     | ±2%                       | CL10C101G08N <sup>□</sup> |                           |
|                |               | 820pF                     | ±5%                       | CL10C821J08N <sup>□</sup> |                           |
|                |               | 1.0nF                     | ±5%                       | CL10C102J08N <sup>□</sup> |                           |
|                |               | 2.2nF                     | ±5%                       | CL10C222J08N <sup>□</sup> |                           |
|                |               | 3.9nF                     | ±5%                       | CL10C392J08N <sup>□</sup> |                           |
|                |               | 25Vdc                     | 10pF                      | ±0.5pF                    | CL10C100DA8N <sup>□</sup> |
|                |               |                           | 10pF                      | ±5%                       | CL10C100JA8N <sup>□</sup> |
|                |               |                           | 15pF                      | ±5%                       | CL10C150JA8N <sup>□</sup> |
|                |               |                           | 20pF                      | ±5%                       | CL10C200JA8N <sup>□</sup> |
|                |               |                           | 33pF                      | ±5%                       | CL10C330JA8N <sup>□</sup> |
|                | 47pF          |                           | ±5%                       | CL10C470JA8N <sup>□</sup> |                           |
|                | 68pF          |                           | ±5%                       | CL10C680JA8N <sup>□</sup> |                           |
|                | 100pF         |                           | ±5%                       | CL10C101JA8N <sup>□</sup> |                           |
|                | 100pF         |                           | ±10%                      | CL10C101KA8N <sup>□</sup> |                           |
|                | 120pF         |                           | ±5%                       | CL10C121JA8N <sup>□</sup> |                           |
|                | 150pF         |                           | ±5%                       | CL10C151JA8N <sup>□</sup> |                           |
|                | 180pF         |                           | ±5%                       | CL10C181JA8N <sup>□</sup> |                           |
|                | 270pF         |                           | ±10%                      | CL10C271KA8N <sup>□</sup> |                           |
|                | 330pF         |                           | ±10%                      | CL10C331KA8N <sup>□</sup> |                           |
|                | 390pF         |                           | ±5%                       | CL10C391JA8N <sup>□</sup> |                           |
|                | 470pF         |                           | ±5%                       | CL10C471JA8N <sup>□</sup> |                           |
|                | 560pF         |                           | ±5%                       | CL10C561JA8N <sup>□</sup> |                           |
|                | 680pF         |                           | ±5%                       | CL10C681JA8N <sup>□</sup> |                           |
|                | 820pF         | ±5%                       | CL10C821JA8N <sup>□</sup> |                           |                           |
|                | 1.5nF         | ±2%                       | CL10C152GA8N <sup>□</sup> |                           |                           |
|                | 1.5nF         | ±5%                       | CL10C152JA8N <sup>□</sup> |                           |                           |
|                | 1.8nF         | ±5%                       | CL10C182JA8N <sup>□</sup> |                           |                           |
|                | 10nF          | ±5%                       | CL10C103JA8N <sup>□</sup> |                           |                           |
|                | 1.0nF         | ±2%                       | CL10C102GA8N <sup>□</sup> |                           |                           |
|                | 1.0nF         | ±5%                       | CL10C102JA8N <sup>□</sup> |                           |                           |
|                | 2.2nF         | ±2%                       | CL10C222GA8N <sup>□</sup> |                           |                           |
| 2.2nF          | ±5%           | CL10C222JA8N <sup>□</sup> |                           |                           |                           |
| 3.3nF          | ±2%           | CL10C332GA8N <sup>□</sup> |                           |                           |                           |
| 3.3nF          | ±5%           | CL10C332JA8N <sup>□</sup> |                           |                           |                           |
| 3.9nF          | ±5%           | CL10C392JA8N <sup>□</sup> |                           |                           |                           |
| 50Vdc          | 0.2pF         | ±0.1pF                    | CL10C0R2BB8N <sup>□</sup> |                           |                           |
|                | 0.2pF         | ±0.25pF                   | CL10C0R2CB8N <sup>□</sup> |                           |                           |
|                | 0.3pF         | ±0.1pF                    | CL10C0R3BB8N <sup>□</sup> |                           |                           |
|                | 0.3pF         | ±0.25pF                   | CL10C0R3CB8N <sup>□</sup> |                           |                           |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (COG)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance       | Capacitance Tolerance | Part Number       | Thickness Max.    | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       |
|----------------|---------------|-------------------|-----------------------|-------------------|-------------------|---------------|-------------|-----------------------|-------------------|
| 0.90mm         | 50Vdc         | 0.47pF            | ±0.1pF                | CL10CR47BB8NNNN □ | 0.90mm            | 50Vdc         | 6.8pF       | ±0.25pF               | CL10C6R8CB8NNNN □ |
|                |               | 0.5pF             | ±0.1pF                | CL10C0R5BB8NNNN □ |                   |               | 6.8pF       | ±0.5pF                | CL10C6R8DB8NNNN □ |
|                |               | 0.5pF             | ±0.25pF               | CL10C0R5CB8NNNN □ |                   |               | 7.0pF       | ±0.1pF                | CL10C070BB8NNNN □ |
|                |               | 0.56pF            | ±0.1pF                | CL10CR56BB8NNNN □ |                   |               | 7.0pF       | ±0.25pF               | CL10C070CB8NNNN □ |
|                |               | 0.68pF            | ±0.1pF                | CL10CR68BB8NNNN □ |                   |               | 7.0pF       | ±0.5pF                | CL10C070DB8NNNN □ |
|                |               | 0.75pF            | ±0.1pF                | CL10CR75BB8NNNN □ |                   |               | 7.5pF       | ±0.1pF                | CL10C7R5BB8NNNN □ |
|                |               | 0.75pF            | ±0.25pF               | CL10CR75CB8NNNN □ |                   |               | 7.5pF       | ±0.25pF               | CL10C7R5CB8NNNN □ |
|                |               | 0.8pF             | ±0.1pF                | CL10C0R8BB8NNNN □ |                   |               | 7.5pF       | ±0.5pF                | CL10C7R5DB8NNNN □ |
|                |               | 0.82pF            | ±0.1pF                | CL10CR82BB8NNNN □ |                   |               | 8.0pF       | ±0.25pF               | CL10C080CB8NNNN □ |
|                |               | 1.0pF             | ±0.1pF                | CL10C010BB8NNNN □ |                   |               | 8.0pF       | ±0.5pF                | CL10C080DB8NNNN □ |
|                |               | 1.0pF             | ±0.25pF               | CL10C010CB8NNNN □ |                   |               | 8.2pF       | ±0.1pF                | CL10C8R2BB8NNNN □ |
|                |               | 1.2pF             | ±0.1pF                | CL10C1R2BB8NNNN □ |                   |               | 8.2pF       | ±0.25pF               | CL10C8R2CB8NNNN □ |
|                |               | 1.2pF             | ±0.25pF               | CL10C1R2CB8NNNN □ |                   |               | 8.2pF       | ±0.5pF                | CL10C8R2DB8NNNN □ |
|                |               | 1.5pF             | ±0.1pF                | CL10C1R5BB8NNNN □ |                   |               | 9.0pF       | ±0.25pF               | CL10C090CB8NNNN □ |
|                |               | 1.5pF             | ±0.25pF               | CL10C1R5CB8NNNN □ |                   |               | 9.0pF       | ±0.5pF                | CL10C090DB8NNNN □ |
|                |               | 1.8pF             | ±0.1pF                | CL10C1R8BB8NNNN □ |                   |               | 9.1pF       | ±0.25pF               | CL10C9R1CB8NNNN □ |
|                |               | 1.8pF             | ±0.25pF               | CL10C1R8CB8NNNN □ |                   |               | 9.1pF       | ±0.5pF                | CL10C9R1DB8NNNN □ |
|                |               | 2.0pF             | ±0.1pF                | CL10C020BB8NNNN □ |                   |               | 10pF        | ±0.1pF                | CL10C100BB8NNNN □ |
|                |               | 2.0pF             | ±0.25pF               | CL10C020CB8NNNN □ |                   |               | 10pF        | ±0.25pF               | CL10C100CB8NNNN □ |
|                |               | 2.2pF             | ±0.1pF                | CL10C2R2BB8NNNN □ |                   |               | 10pF        | ±0.5pF                | CL10C100DB8NNNN □ |
|                |               | 2.2pF             | ±0.25pF               | CL10C2R2CB8NNNN □ |                   |               | 10pF        | ±1%                   | CL10C100FB8NNNN □ |
|                |               | 2.4pF             | ±0.1pF                | CL10C2R4BB8NNNN □ |                   |               | 10pF        | ±2%                   | CL10C100GB8NNNN □ |
|                |               | 2.4pF             | ±0.25pF               | CL10C2R4CB8NNNN □ |                   |               | 10pF        | ±5%                   | CL10C100JB8NNNN □ |
|                |               | 2.5pF             | ±0.1pF                | CL10C2R5BB8NNNN □ |                   |               | 10pF        | ±10%                  | CL10C100KB8NNNN □ |
|                |               | 2.5pF             | ±0.25pF               | CL10C2R5CB8NNNN □ |                   |               | 11pF        | ±2%                   | CL10C110GB8NNNN □ |
|                |               | 2.7pF             | ±0.1pF                | CL10C2R7BB8NNNN □ |                   |               | 11pF        | ±5%                   | CL10C110JB8NNNN □ |
|                |               | 2.7pF             | ±0.25pF               | CL10C2R7CB8NNNN □ |                   |               | 12pF        | ±1%                   | CL10C120FB8NNNN □ |
|                |               | 3.0pF             | ±0.1pF                | CL10C030BB8NNNN □ |                   |               | 12pF        | ±2%                   | CL10C120GB8NNNN □ |
|                |               | 3.0pF             | ±0.25pF               | CL10C030CB8NNNN □ |                   |               | 12pF        | ±5%                   | CL10C120JB8NNNN □ |
|                |               | 3.3pF             | ±0.1pF                | CL10C3R3BB8NNNN □ |                   |               | 13pF        | ±2%                   | CL10C130GB8NNNN □ |
|                |               | 3.3pF             | ±0.25pF               | CL10C3R3CB8NNNN □ |                   |               | 13pF        | ±5%                   | CL10C130JB8NNNN □ |
|                |               | 3.5pF             | ±0.25pF               | CL10C3R5CB8NNNN □ |                   |               | 14pF        | ±5%                   | CL10C140JB8NNNN □ |
| 3.6pF          | ±0.1pF        | CL10C3R6BB8NNNN □ | 15pF                  | ±1%               | CL10C150FB8NNNN □ |               |             |                       |                   |
| 3.6pF          | ±0.25pF       | CL10C3R6CB8NNNN □ | 15pF                  | ±2%               | CL10C150GB8NNNN □ |               |             |                       |                   |
| 3.9pF          | ±0.1pF        | CL10C3R9BB8NNNN □ | 15pF                  | ±5%               | CL10C150JB8NNNN □ |               |             |                       |                   |
| 3.9pF          | ±0.25pF       | CL10C3R9CB8NNNN □ | 15pF                  | ±10%              | CL10C150KB8NNNN □ |               |             |                       |                   |
| 4.0pF          | ±0.1pF        | CL10C040BB8NNNN □ | 16pF                  | ±5%               | CL10C160JB8NNNN □ |               |             |                       |                   |
| 4.0pF          | ±0.25pF       | CL10C040CB8NNNN □ | 17pF                  | ±5%               | CL10C170JB8NNNN □ |               |             |                       |                   |
| 4.3pF          | ±0.1pF        | CL10C4R3BB8NNNN □ | 18pF                  | ±1%               | CL10C180FB8NNNN □ |               |             |                       |                   |
| 4.3pF          | ±0.25pF       | CL10C4R3CB8NNNN □ | 18pF                  | ±2%               | CL10C180GB8NNNN □ |               |             |                       |                   |
| 4.7pF          | ±0.1pF        | CL10C4R7BB8NNNN □ | 18pF                  | ±5%               | CL10C180JB8NNNN □ |               |             |                       |                   |
| 4.7pF          | ±0.25pF       | CL10C4R7CB8NNNN □ | 19pF                  | ±5%               | CL10C190JB8NNNN □ |               |             |                       |                   |
| 5.0pF          | ±0.1pF        | CL10C050BB8NNNN □ | 20pF                  | ±1%               | CL10C200FB8NNNN □ |               |             |                       |                   |
| 5.0pF          | ±0.25pF       | CL10C050CB8NNNN □ | 20pF                  | ±2%               | CL10C200GB8NNNN □ |               |             |                       |                   |
| 5.0pF          | ±0.5pF        | CL10C050DB8NNNN □ | 20pF                  | ±5%               | CL10C200JB8NNNN □ |               |             |                       |                   |
| 5.1pF          | ±0.25pF       | CL10C5R1CB8NNNN □ | 21pF                  | ±5%               | CL10C210JB8NNNN □ |               |             |                       |                   |
| 5.6pF          | ±0.1pF        | CL10C5R6BB8NNNN □ | 22pF                  | ±1%               | CL10C220FB8NNNN □ |               |             |                       |                   |
| 5.6pF          | ±0.25pF       | CL10C5R6CB8NNNN □ | 22pF                  | ±2%               | CL10C220GB8NNNN □ |               |             |                       |                   |
| 5.6pF          | ±0.5pF        | CL10C5R6DB8NNNN □ | 22pF                  | ±5%               | CL10C220JB8NNNN □ |               |             |                       |                   |
| 6.0pF          | ±0.25pF       | CL10C060CB8NNNN □ | 22pF                  | ±10%              | CL10C220KB8NNNN □ |               |             |                       |                   |
| 6.0pF          | ±0.5pF        | CL10C060DB8NNNN □ | 23pF                  | ±5%               | CL10C230JB8NNNN □ |               |             |                       |                   |
| 6.2pF          | ±0.25pF       | CL10C6R2CB8NNNN □ | 24pF                  | ±2%               | CL10C240GB8NNNN □ |               |             |                       |                   |
| 6.2pF          | ±0.5pF        | CL10C6R2DB8NNNN □ | 24pF                  | ±5%               | CL10C240JB8NNNN □ |               |             |                       |                   |
| 6.8pF          | ±0.1pF        | CL10C6R8BB8NNNN □ | 25pF                  | ±5%               | CL10C250JB8NNNN □ |               |             |                       |                   |

□ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Standard & High Capacitors

## Product Line Up (COG)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance               | Capacitance Tolerance | Part Number               | Thickness Max.            | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number               |
|----------------|---------------|---------------------------|-----------------------|---------------------------|---------------------------|---------------|-------------|-----------------------|---------------------------|
| 0.90mm         | 50Vdc         | 26pF                      | ±5%                   | CL10C260JB8N <sup>□</sup> | 0.90mm                    | 50Vdc         | 91pF        | ±5%                   | CL10C910JB8N <sup>□</sup> |
|                |               | 27pF                      | ±1%                   | CL10C270FB8N <sup>□</sup> |                           |               | 95pF        | ±5%                   | CL10C950JB8N <sup>□</sup> |
|                |               | 27pF                      | ±2%                   | CL10C270GB8N <sup>□</sup> |                           |               | 100pF       | ±1%                   | CL10C101FB8N <sup>□</sup> |
|                |               | 27pF                      | ±5%                   | CL10C270JB8N <sup>□</sup> |                           |               | 100pF       | ±2%                   | CL10C101GB8N <sup>□</sup> |
|                |               | 28pF                      | ±2%                   | CL10C280GB8N <sup>□</sup> |                           |               | 100pF       | ±5%                   | CL10C101JB8N <sup>□</sup> |
|                |               | 28pF                      | ±5%                   | CL10C280JB8N <sup>□</sup> |                           |               | 100pF       | ±10%                  | CL10C101KB8N <sup>□</sup> |
|                |               | 30pF                      | ±1%                   | CL10C300FB8N <sup>□</sup> |                           |               | 110pF       | ±5%                   | CL10C111JB8N <sup>□</sup> |
|                |               | 30pF                      | ±5%                   | CL10C300JB8N <sup>□</sup> |                           |               | 120pF       | ±1%                   | CL10C121FB8N <sup>□</sup> |
|                |               | 32pF                      | ±2%                   | CL10C320GB8N <sup>□</sup> |                           |               | 120pF       | ±2%                   | CL10C121GB8N <sup>□</sup> |
|                |               | 32pF                      | ±5%                   | CL10C320JB8N <sup>□</sup> |                           |               | 120pF       | ±5%                   | CL10C121JB8N <sup>□</sup> |
|                |               | 33pF                      | ±1%                   | CL10C330FB8N <sup>□</sup> |                           |               | 120pF       | ±10%                  | CL10C121KB8N <sup>□</sup> |
|                |               | 33pF                      | ±2%                   | CL10C330GB8N <sup>□</sup> |                           |               | 130pF       | ±1%                   | CL10C131FB8N <sup>□</sup> |
|                |               | 33pF                      | ±5%                   | CL10C330JB8N <sup>□</sup> |                           |               | 130pF       | ±5%                   | CL10C131JB8N <sup>□</sup> |
|                |               | 33pF                      | ±10%                  | CL10C330KB8N <sup>□</sup> |                           |               | 140pF       | ±5%                   | CL10C141JB8N <sup>□</sup> |
|                |               | 35pF                      | ±2%                   | CL10C350GB8N <sup>□</sup> |                           |               | 150pF       | ±2%                   | CL10C151GB8N <sup>□</sup> |
|                |               | 35pF                      | ±5%                   | CL10C350JB8N <sup>□</sup> |                           |               | 150pF       | ±5%                   | CL10C151JB8N <sup>□</sup> |
|                |               | 36pF                      | ±2%                   | CL10C360GB8N <sup>□</sup> |                           |               | 160pF       | ±5%                   | CL10C161JB8N <sup>□</sup> |
|                |               | 36pF                      | ±5%                   | CL10C360JB8N <sup>□</sup> |                           |               | 170pF       | ±2%                   | CL10C171GB8N <sup>□</sup> |
|                |               | 39pF                      | ±1%                   | CL10C390FB8N <sup>□</sup> |                           |               | 170pF       | ±5%                   | CL10C171JB8N <sup>□</sup> |
|                |               | 39pF                      | ±2%                   | CL10C390GB8N <sup>□</sup> |                           |               | 180pF       | ±1%                   | CL10C181FB8N <sup>□</sup> |
|                |               | 39pF                      | ±5%                   | CL10C390JB8N <sup>□</sup> |                           |               | 180pF       | ±2%                   | CL10C181GB8N <sup>□</sup> |
|                |               | 41pF                      | ±2%                   | CL10C410GB8N <sup>□</sup> |                           |               | 180pF       | ±5%                   | CL10C181JB8N <sup>□</sup> |
|                |               | 41pF                      | ±5%                   | CL10C410JB8N <sup>□</sup> |                           |               | 190pF       | ±5%                   | CL10C191JB8N <sup>□</sup> |
|                |               | 42pF                      | ±5%                   | CL10C420JB8N <sup>□</sup> |                           |               | 200pF       | ±1%                   | CL10C201FB8N <sup>□</sup> |
|                |               | 43pF                      | ±5%                   | CL10C430JB8N <sup>□</sup> |                           |               | 200pF       | ±5%                   | CL10C201JB8N <sup>□</sup> |
|                |               | 47pF                      | ±1%                   | CL10C470FB8N <sup>□</sup> |                           |               | 220pF       | ±1%                   | CL10C221FB8N <sup>□</sup> |
|                |               | 47pF                      | ±2%                   | CL10C470GB8N <sup>□</sup> |                           |               | 220pF       | ±2%                   | CL10C221GB8N <sup>□</sup> |
|                |               | 47pF                      | ±5%                   | CL10C470JB8N <sup>□</sup> |                           |               | 220pF       | ±5%                   | CL10C221JB8N <sup>□</sup> |
|                |               | 47pF                      | ±10%                  | CL10C470KB8N <sup>□</sup> |                           |               | 220pF       | ±10%                  | CL10C221KB8N <sup>□</sup> |
|                |               | 50pF                      | ±5%                   | CL10C500JB8N <sup>□</sup> |                           |               | 240pF       | ±5%                   | CL10C241JB8N <sup>□</sup> |
|                |               | 51pF                      | ±2%                   | CL10C510GB8N <sup>□</sup> |                           |               | 250pF       | ±5%                   | CL10C251JB8N <sup>□</sup> |
|                |               | 51pF                      | ±5%                   | CL10C510JB8N <sup>□</sup> |                           |               | 270pF       | ±1%                   | CL10C271FB8N <sup>□</sup> |
|                |               | 56pF                      | ±1%                   | CL10C560FB8N <sup>□</sup> |                           |               | 270pF       | ±2%                   | CL10C271GB8N <sup>□</sup> |
|                |               | 56pF                      | ±2%                   | CL10C560GB8N <sup>□</sup> |                           |               | 270pF       | ±5%                   | CL10C271JB8N <sup>□</sup> |
|                |               | 56pF                      | ±5%                   | CL10C560JB8N <sup>□</sup> |                           |               | 280pF       | ±5%                   | CL10C281JB8N <sup>□</sup> |
|                |               | 56pF                      | ±10%                  | CL10C560KB8N <sup>□</sup> |                           |               | 300pF       | ±5%                   | CL10C301JB8N <sup>□</sup> |
|                |               | 60pF                      | ±5%                   | CL10C600JB8N <sup>□</sup> |                           |               | 330pF       | ±0.25pF               | CL10C331CB8N <sup>□</sup> |
|                |               | 62pF                      | ±2%                   | CL10C620GB8N <sup>□</sup> |                           |               | 330pF       | ±1%                   | CL10C331FB8N <sup>□</sup> |
|                |               | 62pF                      | ±5%                   | CL10C620JB8N <sup>□</sup> |                           |               | 330pF       | ±2%                   | CL10C331GB8N <sup>□</sup> |
|                |               | 68pF                      | ±1%                   | CL10C680FB8N <sup>□</sup> |                           |               | 330pF       | ±5%                   | CL10C331JB8N <sup>□</sup> |
| 68pF           | ±2%           | CL10C680GB8N <sup>□</sup> | 350pF                 | ±5%                       | CL10C351JB8N <sup>□</sup> |               |             |                       |                           |
| 68pF           | ±5%           | CL10C680JB8N <sup>□</sup> | 360pF                 | ±5%                       | CL10C361JB8N <sup>□</sup> |               |             |                       |                           |
| 68pF           | ±10%          | CL10C680KB8N <sup>□</sup> | 390pF                 | ±1%                       | CL10C391FB8N <sup>□</sup> |               |             |                       |                           |
| 70pF           | ±2%           | CL10C700GB8N <sup>□</sup> | 390pF                 | ±2%                       | CL10C391GB8N <sup>□</sup> |               |             |                       |                           |
| 70pF           | ±5%           | CL10C700JB8N <sup>□</sup> | 390pF                 | ±5%                       | CL10C391JB8N <sup>□</sup> |               |             |                       |                           |
| 75pF           | ±2%           | CL10C750GB8N <sup>□</sup> | 390pF                 | ±10%                      | CL10C391KB8N <sup>□</sup> |               |             |                       |                           |
| 75pF           | ±5%           | CL10C750JB8N <sup>□</sup> | 430pF                 | ±5%                       | CL10C431JB8N <sup>□</sup> |               |             |                       |                           |
| 80pF           | ±2%           | CL10C800GB8N <sup>□</sup> | 470pF                 | ±1%                       | CL10C471FB8N <sup>□</sup> |               |             |                       |                           |
| 80pF           | ±5%           | CL10C800JB8N <sup>□</sup> | 470pF                 | ±2%                       | CL10C471GB8N <sup>□</sup> |               |             |                       |                           |
| 82pF           | ±1%           | CL10C820FB8N <sup>□</sup> | 470pF                 | ±5%                       | CL10C471JB8N <sup>□</sup> |               |             |                       |                           |
| 82pF           | ±2%           | CL10C820GB8N <sup>□</sup> | 470pF                 | ±10%                      | CL10C471KB8N <sup>□</sup> |               |             |                       |                           |
| 82pF           | ±5%           | CL10C820JB8N <sup>□</sup> | 500pF                 | ±5%                       | CL10C501JB8N <sup>□</sup> |               |             |                       |                           |
| 90pF           | ±5%           | CL10C900JB8N <sup>□</sup> | 510pF                 | ±5%                       | CL10C511JB8N <sup>□</sup> |               |             |                       |                           |
| 91pF           | ±2%           | CL10C910GB8N <sup>□</sup> | 560pF                 | ±1%                       | CL10C561FB8N <sup>□</sup> |               |             |                       |                           |

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Product Line Up (COG)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.90mm         | 50Vdc         | 560pF            | ±2%                   | CL10C561GB8NNN □ |
|                |               | 560pF            | ±5%                   | CL10C561JB8NNN □ |
|                |               | 560pF            | ±10%                  | CL10C561KB8NNN □ |
|                |               | 620pF            | ±5%                   | CL10C621JB8NNN □ |
|                |               | 680pF            | ±1%                   | CL10C681FB8NNN □ |
|                |               | 680pF            | ±2%                   | CL10C681GB8NNN □ |
|                |               | 680pF            | ±5%                   | CL10C681JB8NNN □ |
|                |               | 680pF            | ±10%                  | CL10C681KB8NNN □ |
|                |               | 720pF            | ±5%                   | CL10C721JB8NNN □ |
|                |               | 750pF            | ±5%                   | CL10C751JB8NNN □ |
|                |               | 820pF            | ±1%                   | CL10C821FB8NNN □ |
|                |               | 820pF            | ±2%                   | CL10C821GB8NNN □ |
|                |               | 820pF            | ±5%                   | CL10C821JB8NNN □ |
|                |               | 820pF            | ±10%                  | CL10C821KB8NNN □ |
|                |               | 910pF            | ±5%                   | CL10C911JB8NNN □ |
|                |               | 1.0nF            | ±1%                   | CL10C102FB8NNN □ |
|                |               | 1.0nF            | ±2%                   | CL10C102GB8NNN □ |
|                |               | 1.0nF            | ±5%                   | CL10C102JB8NNN □ |
|                |               | 1.2nF            | ±5%                   | CL10C122JB8NNN □ |
|                |               | 1.5nF            | ±5%                   | CL10C152JB8NNN □ |
| 1.8nF          | ±5%           | CL10C182JB8NNN □ |                       |                  |
| 2.2nF          | ±5%           | CL10C222JB8NNN □ |                       |                  |
| 2.7nF          | ±5%           | CL10C272JB8NNN □ |                       |                  |
| 3.3nF          | ±5%           | CL10C332JB8NNN □ |                       |                  |
| 4.7nF          | ±5%           | CL10C472JB8NNN □ |                       |                  |
| 5.6nF          | ±5%           | CL10C562JB8NNN □ |                       |                  |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.75mm         | 25Vdc         | 220pF            | ±2%                   | CL21C221GAANNN □ |
|                |               | 220pF            | ±5%                   | CL21C221JAANNN □ |
|                |               | 270pF            | ±5%                   | CL21C271JAANNN □ |
|                |               | 680pF            | ±5%                   | CL21C681JAANNN □ |
|                |               | 1.5nF            | ±5%                   | CL21C152JAANNN □ |
|                |               | 3.9nF            | ±5%                   | CL21C392JAANNN □ |
|                | 50Vdc         | 0.47pF           | ±0.1pF                | CL21CR47BBANNN □ |
|                |               | 0.47pF           | ±0.25pF               | CL21CR47CBANNN □ |
|                |               | 0.5pF            | ±0.1pF                | CL21C0R5BBANNN □ |
|                |               | 0.5pF            | ±0.25pF               | CL21C0R5CBANNN □ |
|                |               | 0.68pF           | ±0.1pF                | CL21CR68BBANNN □ |
|                |               | 0.75pF           | ±0.1pF                | CL21CR75BBANNN □ |
|                |               | 0.82pF           | ±0.1pF                | CL21CR82BBANNN □ |
|                |               | 0.82pF           | ±0.25pF               | CL21CR82CBANNN □ |
|                |               | 1.0pF            | ±0.1pF                | CL21C010BBANNN □ |
|                |               | 1.0pF            | ±0.25pF               | CL21C010CBANNN □ |
|                |               | 1.2pF            | ±0.1pF                | CL21C1R2BBANNN □ |
|                |               | 1.2pF            | ±0.25pF               | CL21C1R2CBANNN □ |
|                |               | 1.5pF            | ±0.1pF                | CL21C1R5BBANNN □ |
|                |               | 1.5pF            | ±0.25pF               | CL21C1R5CBANNN □ |
| 1.8pF          | ±0.1pF        | CL21C1R8BBANNN □ |                       |                  |
| 1.8pF          | ±0.25pF       | CL21C1R8CBANNN □ |                       |                  |
| 1.8pF          | ±0.5pF        | CL21C1R8DBANNN □ |                       |                  |

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.75mm         | 50Vdc         | 2.0pF            | ±0.25pF               | CL21C020CBANNN □ |
|                |               | 2.2pF            | ±0.1pF                | CL21C2R2BBANNN □ |
|                |               | 2.2pF            | ±0.25pF               | CL21C2R2CBANNN □ |
|                |               | 2.4pF            | ±0.25pF               | CL21C2R4CBANNN □ |
|                |               | 2.5pF            | ±0.25pF               | CL21C2R5CBANNN □ |
|                |               | 2.7pF            | ±0.1pF                | CL21C2R7BBANNN □ |
|                |               | 2.7pF            | ±0.25pF               | CL21C2R7CBANNN □ |
|                |               | 3.0pF            | ±0.1pF                | CL21C030BBANNN □ |
|                |               | 3.0pF            | ±0.25pF               | CL21C030CBANNN □ |
|                |               | 3.2pF            | ±0.25pF               | CL21C3R2CBANNN □ |
|                |               | 3.3pF            | ±0.1pF                | CL21C3R3BBANNN □ |
|                |               | 3.3pF            | ±0.25pF               | CL21C3R3CBANNN □ |
|                |               | 3.6pF            | ±0.1pF                | CL21C3R6BBANNN □ |
|                |               | 3.6pF            | ±0.25pF               | CL21C3R6CBANNN □ |
|                |               | 3.9pF            | ±0.1pF                | CL21C3R9BBANNN □ |
|                |               | 3.9pF            | ±0.25pF               | CL21C3R9CBANNN □ |
|                |               | 4.0pF            | ±0.1pF                | CL21C040BBANNN □ |
|                |               | 4.0pF            | ±0.25pF               | CL21C040CBANNN □ |
|                |               | 4.7pF            | ±0.1pF                | CL21C4R7BBANNN □ |
|                |               | 4.7pF            | ±0.25pF               | CL21C4R7CBANNN □ |
|                |               | 5.0pF            | ±0.1pF                | CL21C050BBANNN □ |
|                |               | 5.0pF            | ±0.25pF               | CL21C050CBANNN □ |
|                |               | 5.1pF            | ±0.25pF               | CL21C5R1CBANNN □ |
|                |               | 5.6pF            | ±0.25pF               | CL21C5R6CBANNN □ |
|                |               | 5.6pF            | ±0.5pF                | CL21C5R6DBANNN □ |
|                |               | 6.0pF            | ±0.25pF               | CL21C060CBANNN □ |
|                |               | 6.0pF            | ±0.5pF                | CL21C060DBANNN □ |
|                |               | 6.2pF            | ±0.25pF               | CL21C6R2CBANNN □ |
|                |               | 6.8pF            | ±0.25pF               | CL21C6R8CBANNN □ |
|                |               | 6.8pF            | ±0.5pF                | CL21C6R8DBANNN □ |
|                |               | 7.0pF            | ±0.25pF               | CL21C070CBANNN □ |
|                |               | 7.0pF            | ±0.5pF                | CL21C070DBANNN □ |
|                |               | 7.5pF            | ±0.25pF               | CL21C7R5CBANNN □ |
|                |               | 7.5pF            | ±0.5pF                | CL21C7R5DBANNN □ |
|                |               | 8.0pF            | ±0.25pF               | CL21C080CBANNN □ |
|                |               | 8.0pF            | ±0.5pF                | CL21C080DBANNN □ |
|                |               | 8.2pF            | ±0.1pF                | CL21C8R2BBANNN □ |
|                |               | 8.2pF            | ±0.25pF               | CL21C8R2CBANNN □ |
|                |               | 8.2pF            | ±0.5pF                | CL21C8R2DBANNN □ |
|                |               | 9.0pF            | ±0.25pF               | CL21C090CBANNN □ |
|                |               | 9.0pF            | ±0.5pF                | CL21C090DBANNN □ |
|                |               | 10pF             | ±0.1pF                | CL21C100BBANNN □ |
|                |               | 10pF             | ±0.25pF               | CL21C100CBANNN □ |
|                |               | 10pF             | ±0.5pF                | CL21C100DBANNN □ |
|                |               | 10pF             | ±1%                   | CL21C100FBANNN □ |
|                |               | 10pF             | ±2%                   | CL21C100GBANNN □ |
|                |               | 10pF             | ±5%                   | CL21C100JBANNN □ |
|                |               | 12pF             | ±1%                   | CL21C120FBANNN □ |
|                |               | 12pF             | ±2%                   | CL21C120GBANNN □ |
|                |               | 12pF             | ±5%                   | CL21C120JBANNN □ |
| 13pF           | ±5%           | CL21C130JBANNN □ |                       |                  |
| 14pF           | ±5%           | CL21C140JBANNN □ |                       |                  |
| 15pF           | ±2%           | CL21C150GBANNN □ |                       |                  |
| 15pF           | ±5%           | CL21C150JBANNN □ |                       |                  |

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# Standard & High Capacitors

## Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance    | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|----------------|-----------------------|-----------------|
| 0.75mm         | 50Vdc         | 15pF            | ±10%                  | CL21C150KBANNN□ | 0.75mm          | 50Vdc         | 75pF           | ±5%                   | CL21C750JBANNN□ |
|                |               | 16pF            | ±5%                   | CL21C160JBANNN□ |                 |               | 80pF           | ±2%                   | CL21C800GBANNN□ |
|                |               | 17pF            | ±5%                   | CL21C170JBANNN□ |                 |               | 80pF           | ±5%                   | CL21C800JBANNN□ |
|                |               | 18pF            | ±1%                   | CL21C180FBANNN□ |                 |               | 82pF           | ±1%                   | CL21C820FBANNN□ |
|                |               | 18pF            | ±2%                   | CL21C180GBANNN□ |                 |               | 82pF           | ±2%                   | CL21C820GBANNN□ |
|                |               | 18pF            | ±5%                   | CL21C180JBANNN□ |                 |               | 82pF           | ±5%                   | CL21C820JBANNN□ |
|                |               | 20pF            | ±2%                   | CL21C200GBANNN□ |                 |               | 90pF           | ±5%                   | CL21C900JBANNN□ |
|                |               | 20pF            | ±5%                   | CL21C200JBANNN□ |                 |               | 91pF           | ±5%                   | CL21C910JBANNN□ |
|                |               | 22pF            | ±1%                   | CL21C220FBANNN□ |                 |               | 100pF          | ±1%                   | CL21C101FBANNN□ |
|                |               | 22pF            | ±2%                   | CL21C220GBANNN□ |                 |               | 100pF          | ±2%                   | CL21C101GBANNN□ |
|                |               | 22pF            | ±5%                   | CL21C220JBANNN□ |                 |               | 100pF          | ±5%                   | CL21C101JBANNN□ |
|                |               | 22pF            | ±10%                  | CL21C220KBANNN□ |                 |               | 100pF          | ±10%                  | CL21C101KBANNN□ |
|                |               | 23pF            | ±5%                   | CL21C230JBANNN□ |                 |               | 110pF          | ±5%                   | CL21C111JBANNN□ |
|                |               | 24pF            | ±2%                   | CL21C240GBANNN□ |                 |               | 120pF          | ±1%                   | CL21C121FBANNN□ |
|                |               | 24pF            | ±5%                   | CL21C240JBANNN□ |                 |               | 120pF          | ±2%                   | CL21C121GBANNN□ |
|                |               | 25pF            | ±5%                   | CL21C250JBANNN□ |                 |               | 120pF          | ±5%                   | CL21C121JBANNN□ |
|                |               | 27pF            | ±1%                   | CL21C270FBANNN□ |                 |               | 120pF          | ±5%                   | CL21C121KBANNN□ |
|                |               | 27pF            | ±2%                   | CL21C270GBANNN□ |                 |               | 130pF          | ±5%                   | CL21C131JBANNN□ |
|                |               | 27pF            | ±5%                   | CL21C270JBANNN□ |                 |               | 150pF          | ±1%                   | CL21C151FBANNN□ |
|                |               | 28pF            | ±5%                   | CL21C280JBANNN□ |                 |               | 150pF          | ±2%                   | CL21C151GBANNN□ |
|                |               | 30pF            | ±5%                   | CL21C300JBANNN□ |                 |               | 150pF          | ±5%                   | CL21C151JBANNN□ |
|                |               | 32pF            | ±2%                   | CL21C320GBANNN□ |                 |               | 160pF          | ±5%                   | CL21C161JBANNN□ |
|                |               | 32pF            | ±5%                   | CL21C320JBANNN□ |                 |               | 180pF          | ±1%                   | CL21C181FBANNN□ |
|                |               | 33pF            | ±1%                   | CL21C330FBANNN□ |                 |               | 180pF          | ±2%                   | CL21C181GBANNN□ |
|                |               | 33pF            | ±2%                   | CL21C330GBANNN□ |                 |               | 180pF          | ±5%                   | CL21C181JBANNN□ |
|                |               | 33pF            | ±5%                   | CL21C330JBANNN□ |                 |               | 200pF          | ±5%                   | CL21C201JBANNN□ |
|                |               | 33pF            | ±10%                  | CL21C330KBANNN□ |                 |               | 220pF          | ±1%                   | CL21C221FBANNN□ |
|                |               | 36pF            | ±5%                   | CL21C360JBANNN□ |                 |               | 220pF          | ±2%                   | CL21C221GBANNN□ |
|                |               | 38pF            | ±2%                   | CL21C380GBANNN□ |                 |               | 220pF          | ±5%                   | CL21C221JBANNN□ |
|                |               | 38pF            | ±5%                   | CL21C380JBANNN□ |                 |               | 220pF          | ±10%                  | CL21C221KBANNN□ |
|                |               | 39pF            | ±2%                   | CL21C390GBANNN□ |                 |               | 240pF          | ±5%                   | CL21C241JBANNN□ |
|                |               | 39pF            | ±5%                   | CL21C390JBANNN□ |                 |               | 250pF          | ±5%                   | CL21C251JBANNN□ |
|                |               | 40pF            | ±2%                   | CL21C400GBANNN□ |                 |               | 260pF          | ±5%                   | CL21C261JBANNN□ |
|                |               | 40pF            | ±5%                   | CL21C400JBANNN□ |                 |               | 270pF          | ±1%                   | CL21C271FBANNN□ |
|                |               | 43pF            | ±5%                   | CL21C430JBANNN□ |                 |               | 270pF          | ±2%                   | CL21C271GBANNN□ |
|                |               | 47pF            | ±1%                   | CL21C470FBANNN□ |                 |               | 270pF          | ±5%                   | CL21C271JBANNN□ |
|                |               | 47pF            | ±2%                   | CL21C470GBANNN□ |                 |               | 300pF          | ±5%                   | CL21C301JBANNN□ |
|                |               | 47pF            | ±5%                   | CL21C470JBANNN□ |                 |               | 330pF          | ±1%                   | CL21C331FBANNN□ |
|                |               | 47pF            | ±10%                  | CL21C470KBANNN□ |                 |               | 330pF          | ±2%                   | CL21C331GBANNN□ |
|                |               | 50pF            | ±5%                   | CL21C500JBANNN□ |                 |               | 330pF          | ±5%                   | CL21C331JBANNN□ |
|                |               | 51pF            | ±2%                   | CL21C510GBANNN□ |                 |               | 360pF          | ±5%                   | CL21C361JBANNN□ |
|                |               | 51pF            | ±5%                   | CL21C510JBANNN□ |                 |               | 390pF          | ±1%                   | CL21C391FBANNN□ |
| 56pF           | ±1%           | CL21C560FBANNN□ | 390pF                 | ±2%             | CL21C391GBANNN□ |               |                |                       |                 |
| 56pF           | ±2%           | CL21C560GBANNN□ | 390pF                 | ±5%             | CL21C391JBANNN□ |               |                |                       |                 |
| 56pF           | ±5%           | CL21C560JBANNN□ | 430pF                 | ±5%             | CL21C431JBANNN□ |               |                |                       |                 |
| 60pF           | ±5%           | CL21C600JBANNN□ | 470pF                 | ±1%             | CL21C471FBANNN□ |               |                |                       |                 |
| 62pF           | ±5%           | CL21C620JBANNN□ | 470pF                 | ±2%             | CL21C471GBANNN□ |               |                |                       |                 |
| 68pF           | ±1%           | CL21C680FBANNN□ | 470pF                 | ±5%             | CL21C471JBANNN□ |               |                |                       |                 |
| 68pF           | ±2%           | CL21C680GBANNN□ | 470pF                 | ±10%            | CL21C471KBANNN□ |               |                |                       |                 |
| 68pF           | ±5%           | CL21C680JBANNN□ | 510pF                 | ±5%             | CL21C511JBANNN□ |               |                |                       |                 |
| 68pF           | ±10%          | CL21C680KBANNN□ | 560pF                 | ±1%             | CL21C561FBANNN□ |               |                |                       |                 |
| 70pF           | ±5%           | CL21C700JBANNN□ | 560pF                 | ±2%             | CL21C561GBANNN□ |               |                |                       |                 |
| 70pF           | ±10%          | CL21C700KBANNN□ | 560pF                 | ±5%             | CL21C561JBANNN□ |               |                |                       |                 |
| 75pF           | ±2%           | CL21C750GBANNN□ | 680pF                 | ±5%             | CL21C681JBANNN□ |               |                |                       |                 |
|                |               |                 | 0.95mm                | 50Vdc           | 5.0pF           | ±0.25pF       | CL21C050CBCNN□ |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.95mm         | 50Vdc         | 10pF             | ±0.1pF                | CL21C100BBCNNN □ |
|                |               | 10pF             | ±5%                   | CL21C100JBCNNN □ |
|                |               | 11pF             | ±2%                   | CL21C110GBCNNN □ |
|                |               | 11pF             | ±5%                   | CL21C110JBCNNN □ |
|                |               | 12pF             | ±2%                   | CL21C120GBCNNN □ |
|                |               | 12pF             | ±5%                   | CL21C120JBCNNN □ |
|                |               | 13pF             | ±2%                   | CL21C130GBCNNN □ |
|                |               | 15pF             | ±2%                   | CL21C150GBCNNN □ |
|                |               | 15pF             | ±5%                   | CL21C150JBCNNN □ |
|                |               | 16pF             | ±2%                   | CL21C160GBCNNN □ |
|                |               | 18pF             | ±2%                   | CL21C180GBCNNN □ |
|                |               | 18pF             | ±5%                   | CL21C180JBCNNN □ |
|                |               | 20pF             | ±2%                   | CL21C200GBCNNN □ |
|                |               | 20pF             | ±5%                   | CL21C200JBCNNN □ |
|                |               | 22pF             | ±2%                   | CL21C220GBCNNN □ |
|                |               | 22pF             | ±5%                   | CL21C220JBCNNN □ |
|                |               | 24pF             | ±2%                   | CL21C240GBCNNN □ |
|                |               | 30pF             | ±2%                   | CL21C300GBCNNN □ |
|                |               | 30pF             | ±5%                   | CL21C300JBCNNN □ |
|                |               | 36pF             | ±2%                   | CL21C360GBCNNN □ |
|                |               | 36pF             | ±5%                   | CL21C360JBCNNN □ |
|                |               | 39pF             | ±5%                   | CL21C390JBCNNN □ |
|                |               | 43pF             | ±2%                   | CL21C430GBCNNN □ |
|                |               | 43pF             | ±5%                   | CL21C430JBCNNN □ |
|                |               | 47pF             | ±5%                   | CL21C470JBCNNN □ |
|                |               | 51pF             | ±5%                   | CL21C510JBCNNN □ |
|                |               | 51pF             | ±10%                  | CL21C510KBCNNN □ |
|                |               | 56pF             | ±2%                   | CL21C560GBCNNN □ |
|                |               | 56pF             | ±5%                   | CL21C560JBCNNN □ |
|                |               | 68pF             | ±5%                   | CL21C680JBCNNN □ |
|                |               | 82pF             | ±5%                   | CL21C820JBCNNN □ |
|                |               | 100pF            | ±5%                   | CL21C101JBCNNN □ |
|                |               | 120pF            | ±1%                   | CL21C121FBCNNN □ |
|                |               | 120pF            | ±5%                   | CL21C121JBCNNN □ |
|                |               | 120pF            | ±10%                  | CL21C121KBCNNN □ |
|                |               | 150pF            | ±5%                   | CL21C151JBCNNN □ |
|                |               | 180pF            | ±5%                   | CL21C181JBCNNN □ |
|                |               | 220pF            | ±5%                   | CL21C221JBCNNN □ |
|                |               | 300pF            | ±5%                   | CL21C301JBCNNN □ |
|                |               | 330pF            | ±2%                   | CL21C331GBCNNN □ |
|                |               | 470pF            | ±5%                   | CL21C471JBCNNN □ |
|                |               | 510pF            | ±5%                   | CL21C511JBCNNN □ |
| 560pF          | ±5%           | CL21C561JBCNNN □ |                       |                  |
| 600pF          | ±5%           | CL21C601JBCNNN □ |                       |                  |
| 620pF          | ±5%           | CL21C621JBCNNN □ |                       |                  |
| 680pF          | ±1%           | CL21C681FBCNNN □ |                       |                  |
| 680pF          | ±2%           | CL21C681GBCNNN □ |                       |                  |
| 680pF          | ±5%           | CL21C681JBCNNN □ |                       |                  |
| 750pF          | ±5%           | CL21C751JBCNNN □ |                       |                  |
| 820pF          | ±1%           | CL21C821FBCNNN □ |                       |                  |
| 820pF          | ±2%           | CL21C821GBCNNN □ |                       |                  |
| 820pF          | ±5%           | CL21C821JBCNNN □ |                       |                  |
| 910pF          | ±5%           | CL21C911JBCNNN □ |                       |                  |
| 1.0nF          | ±1%           | CL21C102FBCNNN □ |                       |                  |

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |                  |
|----------------|---------------|------------------|-----------------------|------------------|------------------|
| 0.95mm         | 50Vdc         | 1.0nF            | ±2%                   | CL21C102GBCNNN □ |                  |
|                |               | 1.0nF            | ±5%                   | CL21C102JBCNNN □ |                  |
| 1.0nF          |               | ±10%             | CL21C102KBCNNN □      |                  |                  |
| 1.35mm         | 25Vdc         | 270pF            | ±5%                   | CL21C271JAFNNN □ |                  |
|                |               | 2.7nF            | ±5%                   | CL21C272JAFNNN □ |                  |
|                |               | 3.3nF            | ±5%                   | CL21C332JAFNNN □ |                  |
|                |               | 3.9nF            | ±5%                   | CL21C392JAFNNN □ |                  |
|                |               | 4.7nF            | ±5%                   | CL21C472JAFNNN □ |                  |
|                |               | 4.7nF            | ±10%                  | CL21C472KAFNNN □ |                  |
|                |               | 8.2nF            | ±5%                   | CL21C822JAFNNN □ |                  |
|                |               | 10nF             | ±2%                   | CL21C103GAFNNN □ |                  |
|                |               | 10nF             | ±5%                   | CL21C103JAFNNN □ |                  |
|                |               | 50Vdc            | 1.2nF                 | ±1%              | CL21C122FBFNNN □ |
|                |               |                  | 1.2nF                 | ±2%              | CL21C122GBFNNN □ |
|                |               |                  | 1.2nF                 | ±5%              | CL21C122JBFNNN □ |
|                | 1.3nF         |                  | ±5%                   | CL21C132JBFNNN □ |                  |
|                | 1.5nF         |                  | ±1%                   | CL21C152FBFNNN □ |                  |
|                | 1.5nF         |                  | ±2%                   | CL21C152GBFNNN □ |                  |
|                | 1.5nF         |                  | ±5%                   | CL21C152JBFNNN □ |                  |
|                | 1.6nF         |                  | ±5%                   | CL21C162JBFNNN □ |                  |
|                | 1.8nF         |                  | ±2%                   | CL21C182GBFNNN □ |                  |
|                | 1.8nF         |                  | ±5%                   | CL21C182JBFNNN □ |                  |
|                | 2.0nF         |                  | ±5%                   | CL21C202JBFNNN □ |                  |
|                | 2.2nF         |                  | ±2%                   | CL21C222GBFNNN □ |                  |
|                | 2.2nF         | ±5%              | CL21C222JBFNNN □      |                  |                  |
|                | 2.7nF         | ±5%              | CL21C272JBFNNN □      |                  |                  |
|                | 3.3nF         | ±5%              | CL21C332JBFNNN □      |                  |                  |
| 3.9nF          | ±5%           | CL21C392JBFNNN □ |                       |                  |                  |
| 4.7nF          | ±5%           | CL21C472JBFNNN □ |                       |                  |                  |
| 5.6nF          | ±5%           | CL21C562JBFNNN □ |                       |                  |                  |
| 6.8nF          | ±5%           | CL21C682JBFNNN □ |                       |                  |                  |
| 10nF           | ±5%           | CL21C103JBFNNN □ |                       |                  |                  |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 1.00mm         | 25Vdc         | 330pF       | ±5%                   | CL31C331JACNNN □ |
|                |               | 470pF       | ±10%                  | CL31C471KACNNN □ |
|                | 50Vdc         | 0.5pF       | ±0.25pF               | CL31C0R5CBCNNN □ |
|                |               | 1.0pF       | ±0.25pF               | CL31C010CBCNNN □ |
|                |               | 1.2pF       | ±0.25pF               | CL31C1R2CBCNNN □ |
|                |               | 1.8pF       | ±0.25pF               | CL31C1R8CBCNNN □ |
|                |               | 2.0pF       | ±0.25pF               | CL31C020CBCNNN □ |
|                |               | 2.2pF       | ±0.25pF               | CL31C2R2CBCNNN □ |
|                |               | 2.7pF       | ±0.1pF                | CL31C2R7CBCNNN □ |
|                |               | 2.7pF       | ±0.25pF               | CL31C2R7CBCNNN □ |
|                |               | 3.0pF       | ±0.25pF               | CL31C030CBCNNN □ |
|                |               | 3.3pF       | ±0.25pF               | CL31C3R3CBCNNN □ |
|                |               | 3.9pF       | ±0.1pF                | CL31C3R9BBCNNN □ |
|                |               | 4.3pF       | ±0.1pF                | CL31C4R3BBCNNN □ |
|                |               | 4.7pF       | ±0.25pF               | CL31C4R7CBCNNN □ |
|                |               | 5.6pF       | ±0.25pF               | CL31C5R6CBCNNN □ |
|                |               | 5.6pF       | ±0.5pF                | CL31C5R6DBCNNN □ |

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# Standard & High Capacitors

## Product Line Up (COG)

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max. | Rated Voltage   | Capacitance | Capacitance Tolerance | Part Number     |     |                 |
|----------------|---------------|-----------------|-----------------------|-----------------|----------------|-----------------|-------------|-----------------------|-----------------|-----|-----------------|
| 1.00mm         | 50Vdc         | 6.0pF           | ±0.5pF                | CL31C060DBCNNN□ | 1.00mm         | 50Vdc           | 200pF       | ±5%                   | CL31C201JBCNNN□ |     |                 |
|                |               | 6.8pF           | ±0.25pF               | CL31C6R8CBCNNN□ |                |                 | 220pF       | ±1%                   | CL31C221FBCNNN□ |     |                 |
|                |               | 8.0pF           | ±0.25pF               | CL31C080CBCNNN□ |                |                 | 220pF       | ±2%                   | CL31C221GBCNNN□ |     |                 |
|                |               | 8.2pF           | ±0.25pF               | CL31C8R2CBCNNN□ |                |                 | 220pF       | ±5%                   | CL31C221JBCNNN□ |     |                 |
|                |               | 10pF            | ±0.5pF                | CL31C100DBCNNN□ |                |                 | 240pF       | ±5%                   | CL31C241JBCNNN□ |     |                 |
|                |               | 10pF            | ±5%                   | CL31C100JBCNNN□ |                |                 | 270pF       | ±5%                   | CL31C271JBCNNN□ |     |                 |
|                |               | 11pF            | ±5%                   | CL31C110JBCNNN□ |                |                 | 300pF       | ±5%                   | CL31C301JBCNNN□ |     |                 |
|                |               | 12pF            | ±5%                   | CL31C120JBCNNN□ |                |                 | 330pF       | ±1%                   | CL31C331FBCNNN□ |     |                 |
|                |               | 13pF            | ±5%                   | CL31C130JBCNNN□ |                |                 | 330pF       | ±2%                   | CL31C331GBCNNN□ |     |                 |
|                |               | 15pF            | ±5%                   | CL31C150JBCNNN□ |                |                 | 330pF       | ±5%                   | CL31C331JBCNNN□ |     |                 |
|                |               | 15pF            | ±10%                  | CL31C150KBCNNN□ |                |                 | 360pF       | ±1%                   | CL31C361FBCNNN□ |     |                 |
|                |               | 16pF            | ±5%                   | CL31C160JBCNNN□ |                |                 | 360pF       | ±5%                   | CL31C361JBCNNN□ |     |                 |
|                |               | 18pF            | ±5%                   | CL31C180JBCNNN□ |                |                 | 390pF       | ±1%                   | CL31C391FBCNNN□ |     |                 |
|                |               | 20pF            | ±2%                   | CL31C200GBCNNN□ |                |                 | 390pF       | ±2%                   | CL31C391GBCNNN□ |     |                 |
|                |               | 20pF            | ±5%                   | CL31C200JBCNNN□ |                |                 | 390pF       | ±5%                   | CL31C391JBCNNN□ |     |                 |
|                |               | 22pF            | ±1%                   | CL31C220FBCNNN□ |                |                 | 430pF       | ±5%                   | CL31C431JBCNNN□ |     |                 |
|                |               | 22pF            | ±5%                   | CL31C220JBCNNN□ |                |                 | 470pF       | ±1%                   | CL31C471FBCNNN□ |     |                 |
|                |               | 24pF            | ±2%                   | CL31C240GBCNNN□ |                |                 | 470pF       | ±2%                   | CL31C471GBCNNN□ |     |                 |
|                |               | 24pF            | ±5%                   | CL31C240JBCNNN□ |                |                 | 470pF       | ±5%                   | CL31C471JBCNNN□ |     |                 |
|                |               | 25pF            | ±5%                   | CL31C250JBCNNN□ |                |                 | 470pF       | ±10%                  | CL31C471KBCNNN□ |     |                 |
|                |               | 27pF            | ±1%                   | CL31C270FBCNNN□ |                |                 | 510pF       | ±5%                   | CL31C511JBCNNN□ |     |                 |
|                |               | 27pF            | ±2%                   | CL31C270GBCNNN□ |                |                 | 560pF       | ±1%                   | CL31C561FBCNNN□ |     |                 |
|                |               | 27pF            | ±5%                   | CL31C270JBCNNN□ |                |                 | 560pF       | ±5%                   | CL31C561JBCNNN□ |     |                 |
|                |               | 30pF            | ±5%                   | CL31C300JBCNNN□ |                |                 | 620pF       | ±5%                   | CL31C621JBCNNN□ |     |                 |
|                |               | 33pF            | ±1%                   | CL31C330FBCNNN□ |                |                 | 680pF       | ±1%                   | CL31C681FBCNNN□ |     |                 |
|                |               | 33pF            | ±5%                   | CL31C330JBCNNN□ |                |                 | 680pF       | ±2%                   | CL31C681GBCNNN□ |     |                 |
|                |               | 36pF            | ±5%                   | CL31C360JBCNNN□ |                |                 | 680pF       | ±5%                   | CL31C681JBCNNN□ |     |                 |
|                |               | 38pF            | ±2%                   | CL31C380GBCNNN□ |                |                 | 750pF       | ±5%                   | CL31C751JBCNNN□ |     |                 |
|                |               | 39pF            | ±2%                   | CL31C390GBCNNN□ |                |                 | 820pF       | ±5%                   | CL31C821JBCNNN□ |     |                 |
|                |               | 39pF            | ±5%                   | CL31C390JBCNNN□ |                |                 | 910pF       | ±5%                   | CL31C911JBCNNN□ |     |                 |
|                |               | 43pF            | ±2%                   | CL31C430GBCNNN□ |                |                 | 1.0nF       | ±1%                   | CL31C102FBCNNN□ |     |                 |
|                |               | 43pF            | ±5%                   | CL31C430JBCNNN□ |                |                 | 1.0nF       | ±2%                   | CL31C102GBCNNN□ |     |                 |
|                |               | 47pF            | ±5%                   | CL31C470JBCNNN□ |                |                 | 1.0nF       | ±5%                   | CL31C102JBCNNN□ |     |                 |
|                |               | 47pF            | ±10%                  | CL31C470KBCNNN□ |                |                 | 1.2nF       | ±2%                   | CL31C122GBCNNN□ |     |                 |
|                |               | 51pF            | ±5%                   | CL31C510JBCNNN□ |                |                 | 1.2nF       | ±5%                   | CL31C122JBCNNN□ |     |                 |
|                |               | 56pF            | ±2%                   | CL31C560GBCNNN□ |                |                 | 1.5nF       | ±2%                   | CL31C152GBCNNN□ |     |                 |
|                |               | 56pF            | ±5%                   | CL31C560JBCNNN□ |                |                 | 1.5nF       | ±5%                   | CL31C152JBCNNN□ |     |                 |
|                |               | 62pF            | ±5%                   | CL31C620JBCNNN□ |                |                 | 1.8nF       | ±2%                   | CL31C182GBCNNN□ |     |                 |
|                |               | 68pF            | ±2%                   | CL31C680GBCNNN□ |                |                 | 1.8nF       | ±5%                   | CL31C182JBCNNN□ |     |                 |
|                |               | 68pF            | ±5%                   | CL31C680JBCNNN□ |                |                 | 2.0nF       | ±5%                   | CL31C202JBCNNN□ |     |                 |
|                |               | 82pF            | ±5%                   | CL31C820JBCNNN□ |                |                 | 2.2nF       | ±1%                   | CL31C222FBCNNN□ |     |                 |
|                |               | 91pF            | ±5%                   | CL31C910JBCNNN□ |                |                 | 2.2nF       | ±2%                   | CL31C222GBCNNN□ |     |                 |
|                |               | 100pF           | ±2%                   | CL31C101GBCNNN□ |                |                 | 2.2nF       | ±5%                   | CL31C222JBCNNN□ |     |                 |
|                |               | 100pF           | ±5%                   | CL31C101JBCNNN□ |                |                 | 1.40mm      | 25Vdc                 | 4.7nF           | ±2% | CL31C472GAFNNN□ |
|                |               | 100pF           | ±10%                  | CL31C101KBCNNN□ |                |                 |             |                       | 8.2nF           | ±2% | CL31C822GAFNNN□ |
|                |               | 110pF           | ±5%                   | CL31C111JBCNNN□ |                |                 |             |                       | 8.2nF           | ±5% | CL31C822JAFNNN□ |
|                |               | 120pF           | ±5%                   | CL31C121JBCNNN□ |                |                 |             |                       | 10nF            | ±2% | CL31C103GAFNNN□ |
|                |               | 130pF           | ±5%                   | CL31C131JBCNNN□ |                |                 |             |                       | 10nF            | ±5% | CL31C103JAFNNN□ |
| 150pF          | ±5%           | CL31C151JBCNNN□ | 50Vdc                 | 2.7nF           | ±5%            | CL31C272JBFNNN□ |             |                       |                 |     |                 |
| 160pF          | ±5%           | CL31C161JBCNNN□ |                       | 3.0nF           | ±5%            | CL31C302JBFNNN□ |             |                       |                 |     |                 |
| 160pF          | ±10%          | CL31C161KBCNNN□ |                       | 3.3nF           | ±1%            | CL31C332FBFNNN□ |             |                       |                 |     |                 |
| 180pF          | ±1%           | CL31C181FBCNNN□ |                       | 3.3nF           | ±2%            | CL31C332GBFNNN□ |             |                       |                 |     |                 |
| 180pF          | ±2%           | CL31C181GBCNNN□ |                       | 3.3nF           | ±5%            | CL31C332JBFNNN□ |             |                       |                 |     |                 |
| 180pF          | ±5%           | CL31C181JBCNNN□ |                       | 3.3nF           | ±10%           | CL31C332KBFNNN□ |             |                       |                 |     |                 |

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Product Line Up (COG)

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |                 |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|
| 1.40mm         | 50Vdc         | 3.6nF       | ±5%                   | CL31C362JBFNNN□ |                 |
|                |               | 3.9nF       | ±5%                   | CL31C392JBFNNN□ |                 |
|                |               | 4.7nF       | ±1%                   | CL31C472FBFNNN□ |                 |
|                |               | 4.7nF       | ±2%                   | CL31C472GBFNNN□ |                 |
|                |               | 4.7nF       | ±5%                   | CL31C472JBFNNN□ |                 |
| 1.80mm         | 16Vdc         | 120nF       | ±5%                   | CL31C124JOHNNN□ |                 |
|                |               | 25Vdc       | 6.8nF                 | ±2%             | CL31C682GAHNNN□ |
|                |               |             | 8.2nF                 | ±5%             | CL31C822JAHNNN□ |
|                |               |             | 10nF                  | ±5%             | CL31C103JAHNNN□ |
|                |               |             | 39nF                  | ±5%             | CL31C393JAHNNN□ |
|                |               |             | 47nF                  | ±5%             | CL31C473JAHNNN□ |
|                |               |             | 56nF                  | ±5%             | CL31C563JAHNNN□ |
|                |               |             | 68nF                  | ±5%             | CL31C683JAHNNN□ |
|                |               |             | 82nF                  | ±5%             | CL31C823JAHNNN□ |
|                | 100nF         | ±5%         | CL31C104JAHNNN□       |                 |                 |
|                | 50Vdc         | 5.6nF       | ±5%                   | CL31C562JBHNNN□ |                 |
|                |               | 6.8nF       | ±5%                   | CL31C682JBHNNN□ |                 |
|                |               | 10nF        | ±2%                   | CL31C103GBHNNN□ |                 |
|                |               | 15nF        | ±5%                   | CL31C153JBHNNN□ |                 |
|                |               | 18nF        | ±5%                   | CL31C183JBHNNN□ |                 |
|                |               | 22nF        | ±5%                   | CL31C223JBHNNN□ |                 |
|                |               | 27nF        | ±5%                   | CL31C273JBHNNN□ |                 |
|                |               | 33nF        | ±5%                   | CL31C333JBHNNN□ |                 |
|                |               | 47nF        | ±5%                   | CL31C473JBHNNN□ |                 |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 1.45mm         | 25Vdc         | 10nF        | ±5%                   | CL32C103JAFNNN□ |
|                | 50Vdc         | 1.0nF       | ±5%                   | CL32C102JBFNNN□ |
|                |               | 1.2nF       | ±5%                   | CL32C122JBFNNN□ |
|                |               | 1.5nF       | ±5%                   | CL32C152JBFNNN□ |
|                |               | 1.8nF       | ±5%                   | CL32C182JBFNNN□ |
|                |               | 2.7nF       | ±5%                   | CL32C272JBFNNN□ |
|                |               | 3.9nF       | ±5%                   | CL32C392JBFNNN□ |
|                |               | 4.7nF       | ±5%                   | CL32C472JBFNNN□ |
|                |               | 5.6nF       | ±5%                   | CL32C562JBFNNN□ |
|                |               | 6.8nF       | ±5%                   | CL32C682JBFNNN□ |
|                |               | 8.2nF       | ±1%                   | CL32C822FBFNNN□ |
|                |               | 8.2nF       | ±5%                   | CL32C822JBFNNN□ |
|                |               | 10nF        | ±1%                   | CL32C103FBFNNN□ |
|                |               | 10nF        | ±2%                   | CL32C103GBFNNN□ |
|                |               | 10nF        | ±5%                   | CL32C103JBFNNN□ |
| 1.80mm         | 50Vdc         | 11nF        | ±5%                   | CL32C113JBHNNN□ |

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# Standard & High Capacitors

## Product Line Up (X5R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance                        | Part Number      | Remark                                       | Thickness Max.  | Rated Voltage   | Capacitance                                  | Capacitance Tolerance                        | Part Number                                  | Remark                                       |  |
|----------------|---------------|------------------|--|------------------|--|-----------------|-----------------|--|--|--|--|--|
| 0.11mm         | 6.3Vdc        | 220nF            | ±20%   | CL05A224MQLHEC□  | <a href="#">Derating</a> <a href="#">Ref</a> | 0.55mm          | 16Vdc           | 100nF  | ±5%  | CL05A104JO5NINN□                             |  |  |
| 0.22mm         | 6.3Vdc        | 470nF            | ±20%   | CL05A474MQXLNN□  | <a href="#">Derating</a> <a href="#">Ref</a> |                 |                 | 100nF  | ±10%   | CL05A104KO5NINN□                             |  |  |
|                |               | 1.0uF            | ±20%   | CL05A105MQXLNN□  | <a href="#">Derating</a> <a href="#">Ref</a> |                 |                 | 100nF  | ±20%   | CL05A104MO5NINN□                             |  |  |
|                |               | 2.2uF            | ±20%   | CL05A225MR3LRN□  | <a href="#">Derating</a> <a href="#">Ref</a> |                 |                 | 220nF  | ±10%   | CL05A224KO5NINN□                             |  |  |
| 0.33mm         | 6.3Vdc        | 1.0uF            | ±20%   | CL05A105MQ3LNN□  | <a href="#">Derating</a>                     |                 |                 | 470nF  | ±10%   | CL05A474KA5NINN□                             | <a href="#">Derating</a>                     |  |
|                |               | 2.2uF            | ±20%   | CL05A225MQ3LRN□  | <a href="#">Derating</a> <a href="#">Ref</a> |                 |                 | 1.0uF  | ±10%   | CL05A105KO5NINN□                             | <a href="#">Derating</a>                     |  |
|                |               | 4.7uF            | ±20%   | CL05A475MQ3LUN□  | <a href="#">Derating</a> <a href="#">Ref</a> |                 |                 | 4.2uF  | ±10%   | CL05A425KO5LUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |
| 0.35mm         | 6.3Vdc        | 4.7uF            | ±20%   | CL05A475MQ3LUN□  | <a href="#">Derating</a> <a href="#">Ref</a> |                 |                 | 25Vdc  | 100nF  | ±10%   | CL05A104KA5NINN□                             |  |
| 0.55mm         | 4.0Vdc        | 100nF            | ±20%   | CL05A104MR5NINN□ |  |                 |                 |  | 220nF  | ±10%   | CL05A224KA5NINN□                             |  |
|                |               | 1.0uF            | ±20%   | CL05A105MR5NINN□ | <a href="#">Derating</a>                     |                 |                 |  | 330nF  | ±10%   | CL05A334KA5NINN□                             |  |
|                |               | 1.3uF            | ±10%   | CL05A135KR5NINN□ | <a href="#">Derating</a>                     | 330nF           | ±20%            |  | CL05A334MA5NINN□                             |  |  |  |
|                |               | 1.4uF            | ±10%   | CL05A145KR5NINN□ | <a href="#">Derating</a>                     | 470nF           | ±10%            |  | CL05A474KA5NINN□                             |  |  |  |
|                |               | 1.5uF            | ±10%   | CL05A155KR5NINN□ | <a href="#">Derating</a>                     | 1.0uF           | ±10%            |  | CL05A105KA5NINN□                             | <a href="#">Derating</a>                     |  |  |
|                |               | 1.7uF            | ±10%   | CL05A175KR5NINN□ | <a href="#">Derating</a>                     | 0.57mm          | 4.0Vdc          |  | 2.2uF  | ±20%   | CL05A225MR5NSN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |
|                |               | 1.8uF            | ±10%   | CL05A185KR5NINN□ | <a href="#">Derating</a>                     |                 |                 |  | 6.3Vdc                                       | 2.2uF  | ±10%   | CL05A225KQ5NSN□                              |
|                |               | 2.2uF            | ±20%   | CL05A225MR5NINN□ | <a href="#">Derating</a> <a href="#">Ref</a> |                 | 2.2uF           |  |  | ±20%   | CL05A225MQ5NSN□                              | <a href="#">Ref</a>                          |
|                |               | 3.3uF            | ±20%   | CL05A335MR5NINN□ | <a href="#">Derating</a> <a href="#">Ref</a> |                 | 10Vdc           |  | 2.2uF  | ±10%   | CL05A225KP5NSN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |
|                |               | 100nF            | ±10%   | CL05A104KQ5NINN□ |  |                 |                 | 2.2uF  | ±20%   | CL05A225MP5NSN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |
| 100nF          | ±20%          | CL05A104MQ5NINN□ |  | 0.60mm           | 4.0Vdc                                       |                 | 4.7uF           | ±20%   | CL05A475MR5NQNN□                             | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 120nF          | ±10%          | CL05A124KQ5NINN□ |  |                  |  |                 | 6.3Vdc          | 4.7uF  | ±20%   | CL05A475MQ5NQNN□                             | <a href="#">Derating</a> <a href="#">Ref</a> |  |
| 150nF          | ±10%          | CL05A154KQ5NINN□ |  |                  | 16Vdc  |                 |                 | 2.2uF  | ±10%   | CL05A225KQ5NQNN□                             | <a href="#">Derating</a> <a href="#">Ref</a> |  |
| 220nF          | ±5%           | CL05A224JQ5NINN□ |  |                  |  |                 | 2.2uF           | ±20%   | CL05A225MO5NQNN□                             | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 220nF          | ±10%          | CL05A224KQ5NINN□ |  |                  | 25Vdc  |                 | 1uF             | ±10%   | CL05A105KA5NQNN□                             | <a href="#">Derating</a>                     |  |  |
| 220nF          | ±20%          | CL05A224MQ5NINN□ |  |                  |  | 1uF             | ±20%            | CL05A105MA5NQNN□                             | <a href="#">Derating</a>                     |  |  |  |
| 330nF          | ±10%          | CL05A334KQ5NINN□ |  |                  | 0.65mm                                       | 4.0Vdc          | 10uF            | ±20%   | CL05A106MR5NRN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 330nF          | ±20%          | CL05A334MQ5NINN□ |  |                  |  |                 | 6.3Vdc          | 4.7uF  | ±10%   | CL05A475KQ5NRN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |
| 470nF          | ±10%          | CL05A474KQ5NINN□ |  |                  |  | 4.7uF           |                 | ±20%   | CL05A475MQ5NRN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 680nF          | ±10%          | CL05A684KQ5NINN□ |  |                  |  | 10uF            | ±20%            | CL05A106MQ5NRN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 1.0uF          | ±5%           | CL05A105JQ5NINN□ | <a href="#">Derating</a>                     | 10Vdc            |  | 13uF            | ±20%            | CL05A136MQ5NRN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 1.0uF          | ±10%          | CL05A105KQ5NINN□ | <a href="#">Derating</a>                     |                  |  | 4.7uF           | ±10%            | CL05A475KP5NRN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 1.0uF          | ±20%          | CL05A105MQ5NINN□ | <a href="#">Derating</a>                     | 4.7uF            |  | ±20%            | CL05A475MP5NRN□ | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |  |
| 2.2uF          | ±10%          | CL05A225KQ5NINN□ | <a href="#">Derating</a> <a href="#">Ref</a> | 10uF             |  | ±20%            | CL05A106MP5NRN□ | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |  |
| 2.2uF          | ±20%          | CL05A225MQ5NINN□ | <a href="#">Derating</a> <a href="#">Ref</a> | 35Vdc            |  | 1uF             | ±10%            | CL05A105KL5NRN□                              | <a href="#">Derating</a>                     |  |  |  |
| 10Vdc          | 10nF          | ±10%             | CL05A103KP5NINN□                             |                  |  |                 | 0.70mm          | 4.0Vdc                                       | 2.2uF  | ±20%   | CL05A225MR5NUN□                              | <a href="#">Derating</a>                     |
| 47nF           | ±10%          | CL05A473KP5NINN□ |  | 6.3Vdc           | 10uF   | ±20%            |                 |  | CL05A106MR5NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 47nF           | ±20%          | CL05A473MP5NINN□ |  |                  | 10uF   | ±20%            |                 | CL05A106MQ5NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 68nF           | ±10%          | CL05A683KP5NINN□ |  | 22uF             | ±20%   | CL05A226MQ5QUN□ |                 | <a href="#">Derating</a>                     |  |  |  |  |
| 82nF           | ±10%          | CL05A823KP5NINN□ |  | 10Vdc            | 10uF   | ±20%            |                 | CL05A106MP5NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 100nF          | ±10%          | CL05A104KP5NINN□ |  |                  | 16Vdc  | 4.7uF           |                 | ±20%   | CL05A475MO5NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 100nF          | ±20%          | CL05A104MP5NINN□ |  | 25Vdc            | 2.2uF  | ±10%            |                 | CL05A225KA5NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 150nF          | ±10%          | CL05A154KP5NINN□ |  |                  | 2.2uF  | ±20%            |                 | CL05A225MA5NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |  |
| 220nF          | ±10%          | CL05A224KP5NINN□ |  | 0.75mm           | 6.3Vdc                                       | 22uF            |                 | ±20%   | CL05A226MQ5N6J□                              | <a href="#">Derating</a>                     |  |  |
| 220nF          | ±20%          | CL05A224MP5NINN□ |  |                  |  | 0.80mm          |                 | 6.3Vdc                                       | 22uF   | ±20%   | CL05A226MQ6NUN□                              | <a href="#">Derating</a>                     |
| 330nF          | ±10%          | CL05A334KP5NINN□ |  | 10Vdc            | 10uF   |                 | ±20%            |  | CL05A106MP6NUN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |  |
| 330nF          | ±20%          | CL05A334MP5NINN□ |  | 0.85mm           | 6.3Vdc                                       | 22uF            | ±20%            | CL05A226MQ6N6J□                              | <a href="#">Derating</a>                     |  |  |  |
| 470nF          | ±10%          | CL05A474KP5NINN□ |  |                  |  | 0.90mm          | 4.0Vdc          | 22uF   | ±20%   | CL05A226MR5NZN□                              | <a href="#">Derating</a> <a href="#">Ref</a> |  |
| 1.0uF          | ±5%           | CL05A105JP5NINN□ |  |                  |  |                 |                 |  |  |  |  |  |
| 1.0uF          | ±10%          | CL05A105KP5NINN□ |  |                  |  |                 |                 |  |  |  |  |  |
| 1.0uF          | ±20%          | CL05A105MP5NINN□ |  |                  |  |                 |                 |  |  |  |  |  |
| 2.2uF          | ±10%          | CL05A225KP5NINN□ | <a href="#">Derating</a> <a href="#">Ref</a> |                  |  |                 |                 |  |  |  |  |  |
| 2.2uF          | ±20%          | CL05A225MP5NINN□ | <a href="#">Derating</a> <a href="#">Ref</a> |                  |  |                 |                 |  |  |  |  |  |
| 16Vdc          | 4.7nF         | ±10%             | CL05A472KO5NINN□                             |                  |  |                 |                 |  |  |  |  |  |
| 22nF           | ±10%          | CL05A223KO5NINN□ |  |                  |  |                 |                 |  |  |  |  |  |
| 47nF           | ±10%          | CL05A473KO5NINN□ |  |                  |  |                 |                 |  |  |  |  |  |
| 47nF           | ±20%          | CL05A473MO5NINN□ |  |                  |  |                 |                 |  |  |  |  |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X5R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance       | Capacitance Tolerance | Part Number       | Remark            | Thickness Max. | Rated Voltage | Capacitance       | Capacitance Tolerance | Part Number       | Remark            |                   |                   |
|----------------|---------------|-------------------|-----------------------|-------------------|-------------------|----------------|---------------|-------------------|-----------------------|-------------------|-------------------|-------------------|-------------------|
| 0.50mm         | 4.0Vdc        | 10uF              | ±20%                  | CL10A106MR5LQN □  | Derating Ref      | 0.90mm         | 16Vdc         | 1.0uF             | ±10%                  | CL10A105K08N1NN □ |                   |                   |                   |
|                |               | 6.3Vdc            | 2.2uF                 | ±10%              | CL10A225KQ5L1NN □ |                |               |                   | 1.0uF                 | ±20%              | CL10A105M08N1NN □ |                   |                   |
|                |               | 4.7uF             | ±10%                  | CL10A475KQ5L1NN □ |                   |                |               | 2.2uF             | ±10%                  | CL10A225K08N1NN □ |                   |                   |                   |
|                |               | 4.7uF             | ±20%                  | CL10A475MQ5L1NN □ |                   |                |               | 4.7uF             | ±10%                  | CL10A475K08N1NN □ | Derating          |                   |                   |
|                |               | 10uF              | ±20%                  | CL10A106MQ5L1RN □ | Derating Ref      |                |               | 4.7uF             | ±20%                  | CL10A475M08N1NN □ | Derating          |                   |                   |
|                | 10Vdc         | 1.0uF             | ±10%                  | CL10A105KP5L1NN □ |                   |                |               | 25Vdc             | 100nF                 | ±10%              | CL10A104K8N1NN □  |                   |                   |
|                |               | 2.2uF             | ±10%                  | CL10A225KP5L1NN □ |                   |                |               |                   | 220nF                 | ±10%              | CL10A224K8N1NN □  |                   |                   |
|                |               | 4.7uF             | ±10%                  | CL10A475KP5L1NN □ | Derating          |                |               |                   | 220nF                 | ±20%              | CL10A224M8N1NN □  |                   |                   |
|                |               | 4.7uF             | ±20%                  | CL10A475MP5L1NN □ | Derating          |                |               |                   | 330nF                 | ±10%              | CL10A334K8N1NN □  |                   |                   |
|                | 16Vdc         | 1.0uF             | ±10%                  | CL10A105K05L1NN □ |                   |                |               |                   | 470nF                 | ±10%              | CL10A474K8N1NN □  |                   |                   |
|                |               | 2.2uF             | ±10%                  | CL10A225K05L1NN □ | Derating          |                | 1.0uF         |                   | ±10%                  | CL10A105K8N1NN □  |                   |                   |                   |
|                |               | 10Vdc             | 1.0uF                 | ±10%              | CL10A105K8N1NN □  |                | Derating      |                   | 2.2uF                 | ±10%              | CL10A225K8N1NN □  | Derating          |                   |
|                | 25Vdc         | 2.2uF             | ±10%                  | CL10A225K8N1NN □  | Derating          |                | 35Vdc         |                   | 1.0uF                 | ±10%              | CL10A105K8N1NN □  |                   |                   |
|                |               | 2.2uF             | ±10%                  | CL10A225K8N1NN □  | Derating          |                |               |                   | 2.2uF                 | ±10%              | CL10A225K8N1NN □  | Derating          |                   |
|                | 0.60mm        | 6.3Vdc            | 4.7uF                 | ±10%              | CL10A475KQ5N1NN □ |                |               |                   |                       | 50Vdc             | 100nF             | ±10%              | CL10A104K8N1NN □  |
|                |               |                   | 4.7uF                 | ±20%              | CL10A475MQ5N1NN □ |                |               |                   | 220nF                 |                   | ±10%              | CL10A224K8N1NN □  |                   |
| 0.80mm         |               | 6.3Vdc            | 22uF                  | ±20%              | CL10A226MQ7LUN □  | Derating       |               | 220nF             | ±20%                  |                   | CL10A224M8N1NN □  |                   |                   |
| 10Vdc          | 22uF          | ±20%              | CL10A226MP7LUN □      | Derating          | 470nF             | ±10%           |               | CL10A474K8N1NN □  |                       |                   |                   |                   |                   |
| 16Vdc          | 22uF          | ±20%              | CL10A226M07JZN □      | Derating          | 1.0uF             | ±10%           |               | CL10A105K8N1NN □  |                       |                   |                   |                   |                   |
| 0.90mm         | 4.0Vdc        | 2.2uF             | ±20%                  | CL10A225MR8N1NN □ |                   | 0.95mm         |               | 4.0Vdc            | 22uF                  |                   | ±20%              | CL10A226MR8N1NN □ | Derating          |
|                |               | 4.7uF             | ±20%                  | CL10A475MR8N1NN □ | Derating          |                |               |                   | 6.3Vdc                |                   | 4.7uF             | ±20%              | CL10A475MQ8N1NN □ |
|                |               | 10uF              | ±10%                  | CL10A106K8N1NN □  | Derating Ref      |                |               | 10uF              |                       |                   | ±20%              | CL10A106MQ8N1NN □ |                   |
| 10uF           |               | ±20%              | CL10A106MR8N1NN □     | Derating Ref      | 16Vdc             |                | 4.7uF         | ±10%              |                       |                   | CL10A475K08N1NN □ | Derating          |                   |
| 22uF           |               | ±20%              | CL10A226MR8N1NN □     | Derating          |                   |                | 10uF          | ±10%              | CL10A106K08N1NN □     |                   | Derating Ref      |                   |                   |
| 470nF          | ±10%          | CL10A474KQ8N1NN □ |                       | 10uF              |                   |                | ±20%          | CL10A106M08N1NN □ | Derating Ref          |                   |                   |                   |                   |
| 0.90mm         | 6.3Vdc        | 470nF             | ±20%                  | CL10A474MQ8N1NN □ |                   |                | 25Vdc         | 4.7uF             | ±10%                  | CL10A475K8N1NN □  | Derating          |                   |                   |
|                |               | 680nF             | ±10%                  | CL10A684KQ8N1NN □ |                   |                |               | 4.7uF             | ±20%                  | CL10A475M8N1NN □  | Derating          |                   |                   |
|                |               | 1.0uF             | ±10%                  | CL10A105KQ8N1NN □ |                   |                |               | 1.00mm            | 4.0Vdc                | 47uF              | ±20%              | CL10A476MR8N1NN □ | Derating Ref      |
|                |               | 1.0uF             | ±20%                  | CL10A105MQ8N1NN □ |                   |                |               |                   |                       | 6.3Vdc            | 10uF              | ±20%              | CL10A106MQ8N1NN □ |
|                |               | 2.2uF             | ±10%                  | CL10A225KQ8N1NN □ |                   | 22uF           |               |                   | ±10%                  |                   | CL10A226KQ8N1NN □ | Derating          |                   |
|                |               | 2.2uF             | ±20%                  | CL10A225MQ8N1NN □ |                   | 22uF           | ±20%          |                   | CL10A226MQ8N1NN □     |                   | Derating          |                   |                   |
|                |               | 3.3uF             | ±10%                  | CL10A335KQ8N1NN □ |                   | 47uF           | ±20%          |                   | CL10A476MQ8N1NN □     | Derating          |                   |                   |                   |
|                |               | 3.3uF             | ±20%                  | CL10A335MQ8N1NN □ |                   | 10Vdc          | 22uF          |                   | ±20%                  | CL10A226MP8N1NN □ | Derating          |                   |                   |
|                |               | 4.7uF             | ±10%                  | CL10A475KQ8N1NN □ |                   |                | 25Vdc         |                   | 10uF                  | ±20%              | CL10A106M8N1NN □  | Derating Ref      |                   |
|                |               | 4.7uF             | ±20%                  | CL10A475MQ8N1NN □ |                   |                | 35Vdc         |                   | 4.7uF                 | ±10%              | CL10A475K8N1NN □  | Derating          |                   |
|                | 10uF          | ±10%              | CL10A106KQ8N1NN □     | Ref               | 4.7uF             | ±20%           |               |                   | CL10A475M8N1NN □      | Derating          |                   |                   |                   |
|                | 10uF          | ±20%              | CL10A106MQ8N1NN □     | Ref               | 1.05mm            | 6.3Vdc         | 22uF          |                   | ±20%                  | CL10A226MQ8N1NN □ | Derating          |                   |                   |
|                | 22uF          | ±20%              | CL10A226M7N1NN □      | Ref               |                   | 10Vdc          | 22uF          | ±20%              | CL10A226MP8N1NN □     | Derating          |                   |                   |                   |
|                | 0.90mm        | 10Vdc             | 220nF                 | ±10%              | CL10A224K8N1NN □  |                | 1.10mm        | 4.0Vdc            | 47uF                  | ±20%              | CL10A476MR8N1NN □ | Derating Ref      |                   |
|                |               |                   | 330nF                 | ±10%              | CL10A334K8N1NN □  |                |               | 6.3Vdc            | 47uF                  | ±20%              | CL10A476MQ8N1NN □ | Derating          |                   |
|                |               |                   | 470nF                 | ±10%              | CL10A474K8N1NN □  |                |               |                   |                       |                   |                   |                   |                   |
|                |               |                   | 680nF                 | ±10%              | CL10A684K8N1NN □  |                |               |                   |                       |                   |                   |                   |                   |
|                |               |                   | 820nF                 | ±10%              | CL10A824K8N1NN □  |                |               |                   |                       |                   |                   |                   |                   |
|                |               |                   | 1.0uF                 | ±10%              | CL10A105K8N1NN □  |                |               |                   |                       |                   |                   |                   |                   |
|                |               |                   | 1.0uF                 | ±20%              | CL10A105MP8N1NN □ |                |               |                   |                       |                   |                   |                   |                   |
| 2.2uF          |               |                   | ±10%                  | CL10A225K8N1NN □  |                   |                |               |                   |                       |                   |                   |                   |                   |
| 2.2uF          |               |                   | ±20%                  | CL10A225MP8N1NN □ |                   |                |               |                   |                       |                   |                   |                   |                   |
| 3.3uF          |               |                   | ±10%                  | CL10A335K8N1NN □  |                   |                |               |                   |                       |                   |                   |                   |                   |
| 3.3uF          |               | ±20%              | CL10A335MP8N1NN □     |                   |                   |                |               |                   |                       |                   |                   |                   |                   |
| 4.7uF          |               | ±10%              | CL10A475K8N1NN □      |                   |                   |                |               |                   |                       |                   |                   |                   |                   |
| 4.7uF          |               | ±20%              | CL10A475MP8N1NN □     |                   |                   |                |               |                   |                       |                   |                   |                   |                   |
| 10uF           |               | ±10%              | CL10A106K8N1NN □      | Derating Ref      |                   |                |               |                   |                       |                   |                   |                   |                   |
| 10uF           |               | ±20%              | CL10A106MP8N1NN □     | Derating Ref      |                   |                |               |                   |                       |                   |                   |                   |                   |
| 16Vdc          |               | 330nF             | ±10%                  | CL10A334K08N1NN □ |                   |                |               |                   |                       |                   |                   |                   |                   |
|                |               | 470nF             | ±10%                  | CL10A474K08N1NN □ |                   |                |               |                   |                       |                   |                   |                   |                   |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# Standard & High Capacitors

## Product Line Up (X5R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           | Thickness Max.   | Rated Voltage    | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |                  |                  |          |
|----------------|---------------|------------------|-----------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|------------------|------------------|------------------|------------------|----------|
| 0.70mm         | 10Vdc         | 2.2uF            | ±10%                  | CL21A225KP6LNN □ |                  | 1.35mm           | 6.3Vdc           | 2.2uF            | ±20%                  | CL21A225MQFNNN □ |                  |                  |                  |          |
|                | 16Vdc         | 1.0uF            | ±20%                  | CL21A105M06LNN □ |                  |                  |                  | 3.3uF            | ±10%                  | CL21A335KQFNNN □ |                  |                  |                  |          |
|                |               | 2.2uF            | ±10%                  | CL21A225K06LNN □ |                  |                  |                  | 3.3uF            | ±20%                  | CL21A335MQFNNN □ |                  |                  |                  |          |
| 0.80mm         |               | 6.3Vdc           | 10uF                  | ±10%             | CL21A106KQ7LQN □ |                  |                  |                  | 4.7uF                 | ±10%             | CL21A475KQFNNN □ |                  |                  |          |
|                | 47uF          |                  | ±20%                  | CL21A476MQ7FRN □ | Derating         |                  |                  | 4.7uF            | ±20%                  | CL21A475MQFNNN □ |                  |                  |                  |          |
|                | 47uF          |                  | ±20%                  | CL21A476MQ7LRN □ | Derating         |                  |                  | 6.8uF            | ±10%                  | CL21A685KQFNNN □ |                  |                  |                  |          |
| 0.90mm         | 10Vdc         | 10uF             | ±10%                  | CL21A106KP7LQN □ | Derating         |                  |                  | 10uF             | ±10%                  | CL21A106KQFNNN □ |                  |                  |                  |          |
|                |               | 6.3Vdc           | 47uF                  | ±20%             | CL21A476MQ8LRN □ |                  |                  | Derating         | 10uF                  | ±20%             | CL21A106MQFNNN □ |                  |                  |          |
|                |               |                  | 22uF                  | ±20%             | CL21A226MRCLRN □ |                  |                  | Derating         | 22uF                  | ±20%             | CL21A226MQFNNN □ |                  |                  |          |
| 0.95mm         | 4.0Vdc        |                  | 47uF                  | ±20%             | CL21A476MRCLRP □ |                  |                  | Derating         | 10Vdc                 | 1.0uF            | ±10%             | CL21A105KQFNNN □ |                  |          |
|                |               | 1.0uF            | ±10%                  | CL21A105KQCLNN □ |                  |                  |                  | 2.2uF            |                       | ±10%             | CL21A225KQFNNN □ |                  |                  |          |
|                |               | 1.0uF            | ±10%                  | CL21A105KQCLNN □ |                  |                  |                  | 2.2uF            |                       | ±20%             | CL21A225MPFNNN □ |                  |                  |          |
|                |               | 4.7uF            | ±10%                  | CL21A475KQCLNN □ |                  |                  | 3.3uF            | ±10%             |                       | CL21A335KQFNNN □ |                  |                  |                  |          |
|                |               | 4.7uF            | ±20%                  | CL21A475MQCLNN □ |                  |                  | 4.7uF            | ±10%             |                       | CL21A475KQFNNN □ |                  |                  |                  |          |
|                |               | 10uF             | ±10%                  | CL21A106KQCLNN □ |                  |                  | 4.7uF            | ±20%             |                       | CL21A475MPFNNN □ |                  |                  |                  |          |
|                | 6.3Vdc        | 10uF             | ±10%                  | CL21A106KQCLRN □ |                  |                  | 10uF             | ±10%             |                       | CL21A106KQFNNN □ |                  |                  |                  |          |
|                |               | 10uF             | ±20%                  | CL21A106MQCLNN □ |                  |                  | 10uF             | ±20%             |                       | CL21A106MPFNNN □ |                  |                  |                  |          |
|                |               | 22uF             | ±10%                  | CL21A226KQCLRN □ | Derating         |                  | 10uF             | ±10%             |                       | CL21A106KQFNNN □ |                  |                  |                  |          |
|                |               | 22uF             | ±20%                  | CL21A226MQCLQN □ | Derating         |                  | 22uF             | ±10%             |                       | CL21A226KQFNNN □ |                  |                  |                  |          |
|                |               | 22uF             | ±20%                  | CL21A226MQCLRN □ | Derating         |                  | 22uF             | ±20%             |                       | CL21A225KQFNNN □ |                  |                  |                  |          |
|                |               | 47uF             | ±20%                  | CL21A476MQCLRN □ | Derating         |                  | 2.2uF            | ±10%             |                       | CL21A225KQFNNN □ |                  |                  |                  |          |
|                |               | 10Vdc            | 2.2uF                 | ±10%             | CL21A225KPCLNN □ |                  |                  | 3.3uF            | ±10%                  | CL21A335KQFNNN □ |                  |                  |                  |          |
|                |               |                  | 4.7uF                 | ±10%             | CL21A475KPCLNN □ |                  |                  | 4.7uF            | ±10%                  | CL21A475KQFNNN □ |                  |                  |                  |          |
|                |               |                  | 4.7uF                 | ±20%             | CL21A475MPCLNN □ |                  |                  | 10uF             | ±10%                  | CL21A106KQFNNN □ | Derating         |                  |                  |          |
|                |               |                  | 10uF                  | ±10%             | CL21A106KPCLNN □ | Derating         | 10uF             | ±20%             | CL21A106KQFNNN □      |                  |                  |                  |                  |          |
|                |               |                  | 10uF                  | ±10%             | CL21A106KPCLQN □ | Derating         | 22uF             | ±10%             | CL21A226KQFNNN □      |                  |                  |                  |                  |          |
|                |               |                  | 10uF                  | ±20%             | CL21A106MPCLNN □ | Derating         | 22uF             | ±20%             | CL21A225KQFNNN □      |                  |                  |                  |                  |          |
|                | 10uF          |                  | ±20%                  | CL21A106MPCLQN □ | Derating         | 47uF             | ±10%             | CL21A475KQFNNN □ |                       |                  |                  |                  |                  |          |
|                | 22uF          |                  | ±10%                  | CL21A226KPCLRN □ | Derating         | 47uF             | ±20%             | CL21A475MPFNNN □ |                       |                  |                  |                  |                  |          |
|                | 22uF          |                  | ±20%                  | CL21A226MPCLRN □ | Derating         | 10uF             | ±10%             | CL21A106KQFNNN □ |                       |                  |                  |                  |                  |          |
|                | 22uF          |                  | ±20%                  | CL21A226MPCLRN □ | Derating         | 22uF             | ±10%             | CL21A226KQFNNN □ | Derating              |                  |                  |                  |                  |          |
|                | 22uF          |                  | +80/-20%              | CL21A226ZPCLRN □ | Derating         | 22uF             | ±20%             | CL21A226MQFNNN □ |                       |                  |                  |                  |                  |          |
|                | 16Vdc         |                  | 2.2uF                 | ±10%             | CL21A225K0CLNN □ |                  | 16Vdc            | 680nF            | ±10%                  | CL21A684KQFNNN □ |                  |                  |                  |          |
| 4.7uF          |               | ±10%             | CL21A475K0CLNN □      |                  | 1.0uF            | ±10%             |                  | CL21A105KQFNNN □ |                       |                  |                  |                  |                  |          |
| 4.7uF          |               | ±10%             | CL21A475K0CLRN □      |                  | 2.2uF            | ±10%             |                  | CL21A225KQFNNN □ |                       |                  |                  |                  |                  |          |
| 10uF           |               | ±10%             | CL21A106K0CLNN □      | Derating         | 2.2uF            | ±20%             |                  | CL21A225M0FNNN □ |                       |                  |                  |                  |                  |          |
| 10uF           |               | ±10%             | CL21A106K0CLRN □      | Derating         | 3.3uF            | ±10%             |                  | CL21A335KQFNNN □ |                       |                  |                  |                  |                  |          |
| 10uF           |               | ±10%             | CL21A106K0CLSN □      | Derating         | 4.7uF            | ±10%             |                  | CL21A475KQFNNN □ |                       |                  |                  |                  |                  |          |
| 22uF           |               | ±20%             | CL21A226M0CLRN □      | Derating         | 10uF             | ±10%             |                  | CL21A106KQFNNN □ | Derating              |                  |                  |                  |                  |          |
| 25Vdc          |               | 1.0uF            | ±10%                  | CL21A105KACLNN □ |                  | 25Vdc            |                  | 470nF            | ±20%                  | CL21A474MAFNNN □ |                  |                  |                  |          |
|                |               | 1.0uF            | ±10%                  | CL21A105KACNNN □ |                  |                  |                  | 1.0uF            | ±10%                  | CL21A105KAFNNN □ |                  |                  |                  |          |
|                |               | 2.2uF            | ±10%                  | CL21A225KACLNN □ | Derating         |                  |                  | 2.2uF            | ±10%                  | CL21A225KAFNNN □ |                  |                  |                  |          |
|                |               | 4.7uF            | ±10%                  | CL21A475KACLRN □ | Derating         |                  |                  | 1.0uF            | ±10%                  | CL21A105KBFNNN □ | Derating         |                  |                  |          |
|                |               | 10uF             | ±10%                  | CL21A106KACLRN □ | Derating         |                  |                  | 2.2uF            | ±10%                  | CL21A225KBFNNN □ | Derating         |                  |                  |          |
|                | 10uF          | ±10%             | CL21A106KACLNN □      | Derating         | 50Vdc            |                  | 1.0uF            | ±10%             | CL21A105KBFNNN □      | Derating         |                  |                  |                  |          |
| 35Vdc          | 4.7uF         | ±10%             | CL21A475KLCLQN □      | Derating         |                  | 2.2uF            | ±10%             | CL21A225KBFNNN □ | Derating              |                  |                  |                  |                  |          |
|                | 50Vdc         | 1.0uF            | ±10%                  | CL21A105KBCFN □  |                  |                  | 1.0uF            | ±10%             | CL21A105KBFNNN □      | Derating         |                  |                  |                  |          |
|                |               | 1.0uF            | ±10%                  | CL21A105KBCLNN □ |                  |                  | 2.2uF            | ±10%             | CL21A225KBFNNN □      | Derating         |                  |                  |                  |          |
|                |               | 1.00mm           | 6.3Vdc                | 33uF             |                  | ±20%             | CL21A336MQ9LRN □ | Derating         | 1.40mm                | 4.0Vdc           | 22uF             | ±20%             | CL21A226MRQNNN □ |          |
|                |               |                  |                       | 47uF             |                  | ±20%             | CL21A476MQ9LRN □ | Derating         |                       |                  | 47uF             | ±20%             | CL21A476MRQNNN □ | Derating |
|                |               |                  | 50Vdc                 | 2.2uF            | ±10%             | CL21A225KB9LNN □ | Derating         | 6.3Vdc           |                       | 4.7uF            | ±10%             | CL21A475KQQNNN □ | Derating         |          |
| 1.20mm         |               | 6.3Vdc           | 33uF                  | ±20%             | CL21A336MQELRN □ | Derating         | 10uF             |                  |                       | ±10%             | CL21A106KQQNNN □ | Derating         |                  |          |
|                | 10Vdc         |                  | 2.2uF                 | ±10%             | CL21A225KPENNN □ |                  | 22uF             |                  |                       | ±10%             | CL21A226MQQNNN □ |                  |                  |          |
| 1.25mm         | 6.3Vdc        | 47uF             | ±20%                  | CL21A476MQMNRN □ | Derating         | 10Vdc            | 22uF             | ±20%             |                       | CL21A226MPQNNN □ |                  |                  |                  |          |
|                |               | 1.35mm           | 4.0Vdc                | 10uF             | ±20%             |                  | CL21A106MRFNNN □ |                  | 10uF                  | ±10%             | CL21A106KQQNNN □ | Derating         |                  |          |
| 6.3Vdc         | 2.2uF         |                  |                       | ±10%             | CL21A225KQFNNN □ |                  |                  | 22uF             | ±10%                  | CL21A226KQQNNN □ | Derating         |                  |                  |          |
| 1.35mm         | 4.0Vdc        | 10uF             | ±20%                  | CL21A106MRFNNN □ |                  | 25Vdc            | 4.7uF            | ±10%             | CL21A475KAQNNN □      | Derating         |                  |                  |                  |          |
|                |               | 6.3Vdc           | 2.2uF                 | ±10%             | CL21A225KQFNNN □ |                  |                  | 4.7uF            | ±20%                  | CL21A475MAQNNN □ | Derating         |                  |                  |          |
| 1.35mm         | 6.3Vdc        | 47uF             | ±20%                  | CL21A476MRYNNN □ |                  |                  | 22uF             | ±20%             | CL21A226MAQNNN □      | Derating         |                  |                  |                  |          |
|                |               | 47uF             | ±10%                  | CL21A476KQYNNN □ | Derating         | 50Vdc            | 2.2uF            | ±10%             | CL21A225KBQNNN □      | Derating         |                  |                  |                  |          |
| 47uF           | ±20%          | CL21A476MQYNNN □ | Derating              | 4.7uF            | ±10%             |                  | CL21A475KBQNNN □ | Derating         |                       |                  |                  |                  |                  |          |
| 10uF           | ±10%          | CL21A106KAYNNN □ | Derating              |                  |                  |                  |                  |                  |                       |                  |                  |                  |                  |          |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X5R)

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |                 |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|-----------------|
| 0.95mm         | 6.3Vdc        | 10uF        | ±20%                  | CL31A106MQCLNN□ |                 |                 |
|                |               | 22uF        | ±10%                  | CL31A226KQCLNN□ | Derating        |                 |
|                |               | 22uF        | ±20%                  | CL31A226MQCLNN□ | Derating        |                 |
|                | 10Vdc         | 10uF        | ±10%                  | CL31A106KPCLNN□ |                 |                 |
|                |               | 10uF        | ±20%                  | CL31A106MPCLNN□ |                 |                 |
|                | 16Vdc         | 2.2uF       | ±10%                  | CL31A225KQCLNN□ |                 |                 |
|                |               | 4.7uF       | ±10%                  | CL31A475KQCLNN□ |                 |                 |
|                |               | 4.7uF       | ±20%                  | CL31A475MQCLNN□ |                 |                 |
|                |               | 10uF        | ±10%                  | CL31A106KQCLNN□ |                 |                 |
|                |               | 22uF        | ±10%                  | CL31A226KQCLNN□ | Derating        |                 |
|                |               | 22uF        | ±20%                  | CL31A226MQCLNN□ | Derating        |                 |
|                |               | 25Vdc       | 4.7uF                 | ±10%            | CL31A475KACLNN□ |                 |
|                |               | 10uF        | ±10%                  | CL31A106KACLNN□ | Derating        |                 |
|                | 1.00mm        | 35Vdc       | 4.7uF                 | ±10%            | CL31A475KL9LNN□ | Derating        |
| 50Vdc          |               | 1.0uF       | ±10%                  | CL31A105KB9LNN□ |                 |                 |
|                |               | 2.2uF       | ±10%                  | CL31A225KB9LNN□ |                 |                 |
|                |               | 4.7uF       | ±10%                  | CL31A475KB9LNN□ | Derating        |                 |
|                |               | 2.2uF       | ±10%                  | CL31A225KC9LNN□ | Derating        |                 |
| 1.20mm         | 16Vdc         | 4.7uF       | ±10%                  | CL31A475KOELNN□ |                 |                 |
| 1.25mm         | 10Vdc         | 10uF        | ±10%                  | CL31A106KPPLNN□ |                 |                 |
|                |               | 10uF        | ±20%                  | CL31A106MPPLNN□ |                 |                 |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL31A475KOPLNN□ |                 |                 |
|                |               | 4.7uF       | ±20%                  | CL31A475MOPLNN□ |                 |                 |
|                |               | 25Vdc       | 1.0uF                 | ±10%            | CL31A105KAPLNN□ |                 |
|                |               | 2.2uF       | ±10%                  | CL31A225KAPLNN□ |                 |                 |
|                |               | 4.7uF       | ±10%                  | CL31A475KAPLNN□ |                 |                 |
| 1.70mm         | 50Vdc         | 2.2uF       | ±10%                  | CL31A225KBTLNN□ |                 |                 |
| 1.80mm         | 6.3Vdc        | 3.3uF       | ±10%                  | CL31A335KQHNNN□ |                 |                 |
|                |               | 10uF        | ±10%                  | CL31A106KQHNNN□ |                 |                 |
|                |               | 10uF        | ±20%                  | CL31A106MQHNNN□ |                 |                 |
|                |               | 15uF        | ±10%                  | CL31A156KQHNNN□ |                 |                 |
|                |               | 15uF        | ±20%                  | CL31A156MQHNNN□ |                 |                 |
|                |               | 22uF        | ±10%                  | CL31A226KQHNNN□ |                 |                 |
|                |               | 22uF        | ±20%                  | CL31A226MQHNNN□ |                 |                 |
|                |               | 33uF        | ±20%                  | CL31A336MQHNNN□ |                 |                 |
|                |               | 47uF        | ±10%                  | CL31A476KQHNNN□ |                 |                 |
|                |               | 47uF        | ±20%                  | CL31A476MQHNNN□ |                 |                 |
|                |               |             | 100uF                 | ±20%            | CL31A107MQHNNN□ | Derating        |
|                | 10Vdc         | 3.3uF       | ±10%                  | CL31A335KPHNNN□ |                 |                 |
|                |               | 4.7uF       | ±10%                  | CL31A475KPHNNN□ |                 |                 |
|                |               | 10uF        | ±10%                  | CL31A106KPHNNN□ |                 |                 |
|                |               | 10uF        | ±20%                  | CL31A106MPHNNN□ |                 |                 |
|                |               | 22uF        | ±10%                  | CL31A226KPHNNN□ |                 |                 |
|                |               | 22uF        | ±20%                  | CL31A226MPHNNN□ |                 |                 |
|                |               | 47uF        | ±20%                  | CL31A476MPHNNN□ | Derating        |                 |
|                |               |             |                       | 100uF           | ±20%            | CL31A107MPHNNN□ |
|                | 16Vdc         | 2.2uF       | ±10%                  | CL31A225KOHNNN□ |                 |                 |
| 3.3uF          |               | ±10%        | CL31A335KOHNNN□       |                 |                 |                 |
| 3.3uF          |               | ±20%        | CL31A335MOHNNN□       |                 |                 |                 |
| 4.7uF          |               | ±10%        | CL31A475KOHNNN□       |                 |                 |                 |
| 4.7uF          |               | ±20%        | CL31A475MOHNNN□       |                 |                 |                 |
| 10uF           |               | ±10%        | CL31A106KOHNNN□       |                 |                 |                 |
| 10uF           |               | ±20%        | CL31A106MOHNNN□       |                 |                 |                 |
| 22uF           |               | ±10%        | CL31A226KOHNNN□       | Derating        |                 |                 |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |  |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|--|
| 1.80mm         | 16Vdc         | 22uF        | ±20%                  | CL31A226MOHNNN□ | Derating        |  |
|                |               | 2.2uF       | ±10%                  | CL31A225KAHNNN□ |                 |  |
|                | 25Vdc         | 3.3uF       | ±10%                  | CL31A335KAHNNN□ |                 |  |
|                |               | 4.7uF       | ±10%                  | CL31A475KAHNNN□ |                 |  |
|                |               | 10uF        | ±10%                  | CL31A106KAHNNN□ |                 |  |
|                |               | 10uF        | ±20%                  | CL31A106MAHNNN□ |                 |  |
|                |               | 22uF        | ±10%                  | CL31A226KAHNNN□ | Derating        |  |
|                |               | 22uF        | ±20%                  | CL31A226MAHNNN□ | Derating        |  |
|                | 35Vdc         | 2.2uF       | ±10%                  | CL31A225KLHNNN□ |                 |  |
|                |               | 50Vdc       | 2.2uF                 | ±10%            | CL31A225KBHNNN□ |  |
|                |               |             | 4.7uF                 | ±10%            | CL31A475KBHNNN□ |  |
|                |               |             | 10uF                  | ±10%            | CL31A106KBHNNN□ |  |
|                |               |             | 10uF                  | ±20%            | CL31A106MBHNNN□ |  |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |                 |  |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|-----------------|--|
| 0.95mm         | 16Vdc         | 10uF        | ±10%                  | CL32A106KOCLNN□ |                 |                 |  |
|                |               | 22uF        | ±20%                  | CL32A226MOCLNN□ | Derating        |                 |  |
| 1.00mm         | 25Vdc         | 10uF        | ±10%                  | CL32A106KA9LNN□ |                 |                 |  |
| 1.25mm         | 16Vdc         | 10uF        | ±10%                  | CL32A106KOMLNN□ |                 |                 |  |
| 1.50mm         | 10Vdc         | 22uF        | ±10%                  | CL32A226KPSLNN□ |                 |                 |  |
|                |               | 22uF        | ±20%                  | CL32A226MPSLNN□ |                 |                 |  |
|                | 25Vdc         | 6.8uF       | ±10%                  | CL32A685KASLNN□ |                 |                 |  |
| 1.70mm         | 16Vdc         | 22uF        | ±10%                  | CL32A226KOTFNN□ | Derating        |                 |  |
|                |               | 22uF        | ±20%                  | CL32A226MOTLNN□ | Derating        |                 |  |
|                | 25Vdc         | 10uF        | ±10%                  | CL32A106KATLNN□ |                 |                 |  |
|                |               | 10uF        | ±20%                  | CL32A106MATLNN□ |                 |                 |  |
| 2.00mm         | 25Vdc         | 4.7uF       | ±10%                  | CL32A475KAULNN□ |                 |                 |  |
|                |               | 10uF        | ±10%                  | CL32A106KAULNN□ |                 |                 |  |
|                | 35Vdc         | 4.7uF       | ±10%                  | CL32A475KLULNN□ |                 |                 |  |
|                |               | 10uF        | ±10%                  | CL32A106KLULNN□ |                 |                 |  |
|                |               | 10uF        | ±20%                  | CL32A106MLULNN□ |                 |                 |  |
| 2.20mm         | 10Vdc         | 10uF        | ±10%                  | CL32A106KPINNN□ |                 |                 |  |
|                | 16Vdc         | 10uF        | ±10%                  | CL32A106KOILNN□ |                 |                 |  |
|                | 25Vdc         | 2.2uF       | ±20%                  | CL32A225MAINNN□ | Derating        |                 |  |
| 4.7uF          |               | ±10%        | CL32A475KAINNN□       |                 |                 |                 |  |
|                |               | 10uF        | ±10%                  | CL32A106KAILNN□ |                 |                 |  |
|                |               | 10uF        | ±20%                  | CL32A106MAILNN□ |                 |                 |  |
| 2.70mm         | 6.3Vdc        | 22uF        | ±10%                  | CL32A226KQJNNN□ |                 |                 |  |
|                |               | 22uF        | ±20%                  | CL32A226MQJNNN□ |                 |                 |  |
|                |               | 33uF        | ±20%                  | CL32A336MQJNNN□ |                 |                 |  |
|                |               | 47uF        | ±10%                  | CL32A476KQJNNN□ |                 |                 |  |
|                |               | 47uF        | ±20%                  | CL32A476MQJNNN□ |                 |                 |  |
|                |               | 22uF        | ±10%                  | CL32A226KPJNNN□ |                 |                 |  |
|                |               | 22uF        | ±20%                  | CL32A226MPJNNN□ | Derating        |                 |  |
|                | 10Vdc         | 47uF        | ±10%                  | CL32A476KPJNNN□ | Derating        |                 |  |
|                |               | 47uF        | ±20%                  | CL32A476MPJNNN□ |                 |                 |  |
|                |               | 16Vdc       | 10uF                  | ±10%            | CL32A106KOJNNN□ |                 |  |
|                |               |             | 10uF                  | ±20%            | CL32A106MOJNNN□ |                 |  |
|                |               |             | 22uF                  | ±10%            | CL32A226KOJNNN□ |                 |  |
|                |               |             |                       | 22uF            | ±20%            | CL32A226MOJNNN□ |  |
|                |               |             |                       | 47uF            | ±10%            | CL32A476KOJNNN□ |  |




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# Standard & High Capacitors

## Product Line Up (X5R)

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark  |  |
|----------------|---------------|-------------|-----------------------|------------------|---|--|
| 2.70mm         | 16Vdc         | 47uF        | ±20%                  | CL32A476M0JNNN □ |   |  |
|                |               | 25Vdc       | 10uF                  | ±10%             | CL32A106KAJNNN □  |  |
|                | 10uF          |             | ±20%                  | CL32A106MAJNNN □ |   |  |
|                | 22uF          |             | ±10%                  | CL32A226KAJNNN □ |   |  |
|                | 22uF          |             | ±20%                  | CL32A226MAJNNN □ |   |  |
|                | 35Vdc         | 10uF        | ±10%                  | CL32A106KLJNNN □ |   |  |
|                |               | 50Vdc       | 2.2uF                 | ±10%             | CL32A225KBJNNN □  |  |
|                |               |             | 10uF                  | ±10%             | CL32A106KBJNNN □  |  |
|                |               | 10uF        | ±20%                  | CL32A106MBJNNN □ |   |  |
| 2.80mm         | 6.3Vdc        | 100uF       | ±20%                  | CL32A107MQVNNN □ |  |  |
|                |               | 150uF       | ±20%                  | CL32A157MQVNNN □ |  |  |
|                |               | 220uF       | ±20%                  | CL32A227MQVNNN □ |  |  |
|                | 10Vdc         | 100uF       | ±20%                  | CL32A107MPVNNN □ |  |  |

### ■ Size : 4.50 X 3.20mm (inch : 1812)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 2.70mm         | 6.3Vdc        | 33uF        | ±20%                  | CL43A336MQJNNN □ |        |
|                |               | 47uF        | ±10%                  | CL43A476KQJNNN □ |        |
|                |               | 47uF        | ±20%                  | CL43A476MQJNNN □ |        |
| 3.50mm         | 6.3Vdc        | 100uF       | ±20%                  | CL43A107MQLNNN □ |        |

### ■ Size : 5.70 X 5.00mm (inch : 2220)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 2.70mm         | 6.3Vdc        | 47uF        | ±20%                  | CL55A476MQJNNN □ |        |
|                |               | 68uF        | ±20%                  | CL55A686MQJNNN □ |        |
|                |               | 100uF       | ±20%                  | CL55A107MQJNNN □ |        |
|                | 10Vdc         | 47uF        | ±10%                  | CL55A476KPJNNN □ |        |

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Product Line Up (X6S)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 0.33mm         | 6.3Vdc        | 1.0uF       | ±20%                  | CL05X105MQ3LNN □ | Operating        |
| 0.55mm         | 4.0Vdc        | 2.2nF       | ±20%                  | CL05X222MR5NNN □ |                  |
|                |               | 15nF        | ±20%                  | CL05X153MR5NNN □ |                  |
|                |               | 47nF        | ±20%                  | CL05X473MR5NNN □ |                  |
|                |               | 220nF       | ±20%                  | CL05X224MR5NNN □ |                  |
|                |               | 2.2uF       | ±20%                  | CL05X225MR5NNN □ | Operating        |
|                | 6.3Vdc        | 680nF       | ±5%                   | CL05X684JQ5NNN □ | Operating        |
|                |               |             | 1.0uF                 | ±10%             | CL05X105KQ5NNN □ |
|                | 10Vdc         | 1.0uF       | ±10%                  | CL05X105KP5NNN □ | Operating        |
| 0.57mm         | 2.5Vdc        | 2.2uF       | ±20%                  | CL05X225MS5NS □  | Operating Ref.   |
| 0.60mm         | 25Vdc         | 1.0uF       | ±10%                  | CL05X105KA5NQ □  | Operating Ref.   |
| 0.70mm         | 4.0Vdc        | 4.7uF       | ±20%                  | CL05X475MR5NUN □ | Operating Ref.   |
|                |               | 10uF        | ±20%                  | CL05X106MR5NUN □ | Operating Ref.   |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark         |
|----------------|---------------|-------------|-----------------------|------------------|----------------|
| 0.90mm         | 4.0Vdc        | 1.0uF       | ±20%                  | CL10X105MR8NNN □ |                |
|                |               | 4.7uF       | ±20%                  | CL10X475MR8NNN □ | Operating      |
|                |               | 10uF        | ±10%                  | CL10X106KR8NNN □ | Operating Ref. |
|                |               | 10uF        | ±20%                  | CL10X106MR8NNN □ | Operating Ref. |
|                | 6.3Vdc        | 1.0uF       | ±20%                  | CL10X105MQ8NNN □ |                |
|                |               | 2.2uF       | ±10%                  | CL10X225KQ8NNN □ |                |
|                |               | 2.2uF       | ±20%                  | CL10X225MQ8NNN □ |                |
|                |               | 4.7uF       | ±10%                  | CL10X475KQ8NNN □ | Operating      |
|                |               | 4.7uF       | ±20%                  | CL10X475MQ8NNN □ | Operating      |
|                |               | 10uF        | ±10%                  | CL10X106KQ8NNN □ | Operating Ref. |
|                |               | 10uF        | ±20%                  | CL10X106MQ8NNN □ | Operating Ref. |
| 10Vdc          | 2.2uF         | ±10%        | CL10X225KP8NNN □      |                  |                |
| 25Vdc          | 1.0uF         | ±10%        | CL10X105KA8NNN □      |                  |                |
| 0.95mm         | 25Vdc         | 4.7uF       | ±10%                  | CL10X475KA8NQ □  | Operating      |
| 1.00mm         | 10Vdc         | 10uF        | ±20%                  | CL10X106MP8NRN □ | Operating Ref. |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL10X475KQ8NRN □ | Operating      |
|                |               | 10uF        | ±20%                  | CL10X106MQ8NRN □ | Operating Ref. |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 0.95mm         | 2.5Vdc        | 22uF        | ±20%                  | CL21X226MSCLR □  | Operating        |
|                | 4.0Vdc        | 10uF        | ±10%                  | CL21X106KRCLR □  | Operating        |
|                | 10Vdc         | 10uF        | ±10%                  | CL21X106KPCLR □  | Operating        |
| 1.35mm         | 4.0Vdc        | 4.7uF       | ±10%                  | CL21X475KRFNNN □ |                  |
|                |               | 10uF        | ±10%                  | CL21X106KRFNNN □ |                  |
|                |               | 10uF        | ±20%                  | CL21X106MRFNNN □ |                  |
|                | 16Vdc         | 2.2uF       | ±10%                  | CL21X225KOFNNN □ |                  |
|                |               |             | 2.2uF                 | ±20%             | CL21X225MQFNNN □ |
| 1.40mm         | 4.0Vdc        | 22uF        | ±20%                  | CL21X226MRQNNN □ | Operating        |
|                | 6.3Vdc        | 10uF        | ±10%                  | CL21X106KQQNNN □ | Operating        |
|                |               | 22uF        | ±20%                  | CL21X226MQQNNN □ | Operating        |
|                | 16Vdc         | 10uF        | ±10%                  | CL21X106KQQNNN □ |                  |
|                |               | 10uF        | ±20%                  | CL21X106MQQNNN □ |                  |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL21X475KAQNNN □ | Operating        |
|                |               | 4.7uF       | ±20%                  | CL21X475MAQNNN □ | Operating        |
| 1.45mm         | 2.5Vdc        | 47uF        | ±20%                  | CL21X476MSYNNN □ | Operating        |
|                | 4.0Vdc        | 47uF        | ±20%                  | CL21X476MRYNNN □ | Operating        |
|                | 10Vdc         | 10uF        | ±10%                  | CL21X106KPYNNN □ |                  |
|                | 25Vdc         | 10uF        | ±10%                  | CL21X106KAYNNN □ | Operating        |
|                |               | 10uF        | ±20%                  | CL21X106MAYNNN □ | Operating        |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark    |
|----------------|---------------|-------------|-----------------------|------------------|-----------|
| 0.95mm         | 25Vdc         | 4.7uF       | ±10%                  | CL31X475KACLNN □ |           |
| 1.80mm         | 4.0Vdc        | 10uF        | ±10%                  | CL31X106KRHNNN □ |           |
|                |               | 10uF        | ±20%                  | CL31X106MRHNNN □ |           |
|                |               | 22uF        | ±10%                  | CL31X226KRHNNN □ |           |
|                |               | 22uF        | ±20%                  | CL31X226MRHNNN □ |           |
|                |               | 47uF        | ±20%                  | CL31X476MRHNNN □ | Operating |
|                | 6.3Vdc        | 10uF        | ±10%                  | CL31X106KQHNNN □ |           |
|                |               | 10uF        | ±20%                  | CL31X106MQHNNN □ |           |
|                |               | 22uF        | ±10%                  | CL31X226KQHNNN □ |           |
|                |               | 47uF        | ±10%                  | CL31X476KQHNNN □ | Operating |
|                |               | 47uF        | ±20%                  | CL31X476MQHNNN □ | Operating |
| 16Vdc          | 22uF          | ±10%        | CL31X226KOHNNN □      | Operating        |           |
| 25Vdc          | 10uF          | ±10%        | CL31X106KAHNNN □      |                  |           |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 2.70mm         | 6.3Vdc        | 22uF        | ±20%                  | CL32X226MQJNNN □ |        |
|                | 10Vdc         | 47uF        | ±10%                  | CL32X476KPJNNN □ |        |
|                | 16Vdc         | 10uF        | ±10%                  | CL32X106KQJNNN □ |        |
| 2.80mm         | 4.0Vdc        | 100uF       | ±10%                  | CL32X107KRVNNN □ |        |
|                | 6.3Vdc        | 100uF       | ±20%                  | CL32X107MQVNNN □ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Standard & High Capacitors

## Product Line Up (X7R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           | Thickness Max.   | Rated Voltage    | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|------------------|-----------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|------------------|------------------|
| 0.33mm         | 16Vdc         | 100nF            | ±10%                  | CL05B104KO3LNN □ |                  | 0.55mm           | 16Vdc            | 47nF             | ±20%                  | CL05B473MO5NNN □ |                  |
| 0.55mm         | 6.3Vdc        | 68nF             | ±10%                  | CL05B683KQ5NNN □ |                  |                  |                  | 56nF             | ±10%                  | CL05B563KO5NNN □ |                  |
|                |               | 100nF            | ±10%                  | CL05B104KQ5NNN □ |                  |                  |                  | 68nF             | ±10%                  | CL05B683KO5NNN □ |                  |
|                |               | 470nF            | ±10%                  | CL05B474KQ5NNN □ | Ref.             |                  |                  | 82nF             | ±10%                  | CL05B823KO5NNN □ |                  |
|                |               | 10Vdc            | 1.0nF                 | ±10%             | CL05B102KP5NNN □ |                  |                  |                  | 100nF                 | ±5%              | CL05B104JO5NNN □ |
| 2.2nF          | ±20%          | CL05B222MP5NNN □ |                       | 100nF            | ±10%             |                  |                  | CL05B104KO5NNN □ |                       |                  |                  |
| 6.8nF          | ±20%          | CL05B682MP5NNN □ |                       | 100nF            | ±20%             |                  |                  | CL05B104MO5NNN □ |                       |                  |                  |
| 10nF           | ±10%          | CL05B103KP5NNN □ |                       | 150nF            | ±10%             |                  |                  | CL05B154KO5NNN □ |                       |                  |                  |
| 15nF           | ±20%          | CL05B153MP5NNN □ |                       | 220nF            | ±10%             |                  |                  | CL05B224KO5NNN □ | Ref.                  |                  |                  |
| 18nF           | ±10%          | CL05B183KP5NNN □ |                       | 25Vdc            | 220pF            |                  |                  | ±10%             | CL05B221KA5NNN □      |                  |                  |
| 22nF           | ±10%          | CL05B223KP5NNN □ |                       |                  | 270pF            |                  | ±10%             | CL05B271KA5NNN □ |                       |                  |                  |
| 27nF           | ±10%          | CL05B273KP5NNN □ |                       |                  | 330pF            |                  | ±10%             | CL05B331KA5NNN □ |                       |                  |                  |
| 33nF           | ±10%          | CL05B333KP5NNN □ |                       |                  | 470pF            |                  | ±10%             | CL05B471KA5NNN □ |                       |                  |                  |
| 47nF           | ±10%          | CL05B473KP5NNN □ |                       |                  | 560pF            |                  | ±10%             | CL05B561KA5NNN □ |                       |                  |                  |
| 47nF           | ±20%          | CL05B473MP5NNN □ |                       |                  | 1.0nF            |                  | ±10%             | CL05B102KA5NNN □ |                       |                  |                  |
| 56nF           | ±10%          | CL05B563KP5NNN □ |                       |                  | 1.5nF            |                  | ±10%             | CL05B152KA5NNN □ |                       |                  |                  |
| 68nF           | ±10%          | CL05B683KP5NNN □ |                       |                  | 1.8nF            |                  | ±10%             | CL05B182KA5NNN □ |                       |                  |                  |
| 82nF           | ±10%          | CL05B823KP5NNN □ |                       |                  | 2.2nF            |                  | ±10%             | CL05B222KA5NNN □ |                       |                  |                  |
| 100nF          | ±5%           | CL05B104JP5NNN □ |                       |                  | 2.2nF            |                  | ±20%             | CL05B222MA5NNN □ |                       |                  |                  |
| 100nF          | ±10%          | CL05B104KP5NNN □ |                       | 3.3nF            | ±5%              |                  | CL05B332JA5NNN □ |                  |                       |                  |                  |
| 100nF          | ±20%          | CL05B104MP5NNN □ |                       | 3.3nF            | ±10%             |                  | CL05B332KA5NNN □ |                  |                       |                  |                  |
| 220nF          | ±10%          | CL05B224KP5NNN □ | Ref.                  | 3.9nF            | ±10%             |                  | CL05B392KA5NNN □ |                  |                       |                  |                  |
| 470nF          | ±10%          | CL05B474KP5NNN □ |                       | 4.7nF            | ±5%              |                  | CL05B472JA5NNN □ |                  |                       |                  |                  |
| 16Vdc          | 220pF         | ±10%             | CL05B221KO5NNN □      |                  | 4.7nF            |                  | ±10%             | CL05B472KA5NNN □ |                       |                  |                  |
|                | 330pF         | ±10%             | CL05B331KO5NNN □      |                  | 5.6nF            |                  | ±10%             | CL05B562KA5NNN □ |                       |                  |                  |
|                | 820pF         | ±10%             | CL05B821KO5NNN □      |                  | 6.8nF            |                  | ±10%             | CL05B682KA5NNN □ |                       |                  |                  |
|                | 1.0nF         | ±10%             | CL05B102KO5NNN □      |                  | 8.2nF            |                  | ±10%             | CL05B822KA5NNN □ |                       |                  |                  |
|                | 2.2nF         | ±10%             | CL05B222KO5NNN □      |                  | 10nF             |                  | ±5%              | CL05B103JA5NNN □ |                       |                  |                  |
|                | 2.7nF         | ±10%             | CL05B272KO5NNN □      |                  | 10nF             |                  | ±10%             | CL05B103KA5NNN □ |                       |                  |                  |
|                | 3.9nF         | ±10%             | CL05B392KO5NNN □      |                  | 10nF             |                  | ±20%             | CL05B103MA5NNN □ |                       |                  |                  |
|                | 4.7nF         | ±10%             | CL05B472KO5NNN □      |                  | 12nF             |                  | ±10%             | CL05B123KA5NNN □ |                       |                  |                  |
|                | 4.7nF         | ±20%             | CL05B472MO5NNN □      |                  | 15nF             |                  | ±10%             | CL05B153KA5NNN □ |                       |                  |                  |
|                | 5.6nF         | ±10%             | CL05B562KO5NNN □      |                  | 18nF             |                  | ±10%             | CL05B183KA5NNN □ |                       |                  |                  |
|                | 6.8nF         | ±10%             | CL05B682KO5NNN □      |                  | 22nF             |                  | ±10%             | CL05B223KA5NNN □ |                       |                  |                  |
|                | 8.2nF         | ±10%             | CL05B822KO5NNN □      |                  | 33nF             |                  | ±10%             | CL05B333KA5NNN □ |                       |                  |                  |
|                | 10nF          | ±5%              | CL05B103JO5NNN □      |                  | 47nF             |                  | ±10%             | CL05B473KA5NNN □ |                       |                  |                  |
|                | 10nF          | ±10%             | CL05B103KO5NNN □      |                  | 100nF            |                  | ±10%             | CL05B104KA5NNN □ |                       |                  |                  |
|                | 10nF          | ±20%             | CL05B103MO5NNN □      |                  | 50Vdc            |                  | 12pF             | ±5%              | CL05B120JB5NNN □      |                  |                  |
|                | 12nF          | ±10%             | CL05B123KO5NNN □      |                  |                  |                  | 47pF             | ±5%              | CL05B470JB5NNN □      |                  |                  |
|                | 15nF          | ±5%              | CL05B153JO5NNN □      |                  |                  |                  | 100pF            | ±10%             | CL05B101KB5NNN □      |                  |                  |
|                | 15nF          | ±10%             | CL05B153KO5NNN □      |                  |                  |                  | 120pF            | ±10%             | CL05B121KB5NNN □      |                  |                  |
|                | 18nF          | ±5%              | CL05B183JO5NNN □      |                  |                  |                  | 150pF            | ±10%             | CL05B151KB5NNN □      |                  |                  |
|                | 18nF          | ±10%             | CL05B183KO5NNN □      |                  |                  |                  | 180pF            | ±10%             | CL05B181KB5NNN □      |                  |                  |
|                | 22nF          | ±5%              | CL05B223JO5NNN □      |                  |                  |                  | 200pF            | ±10%             | CL05B201KB5NNN □      |                  |                  |
|                | 22nF          | ±10%             | CL05B223KO5NNN □      |                  |                  |                  | 220pF            | ±5%              | CL05B221JB5NNN □      |                  |                  |
|                | 22nF          | ±20%             | CL05B223MO5NNN □      |                  |                  |                  | 220pF            | ±10%             | CL05B221KB5NNN □      |                  |                  |
|                | 27nF          | ±5%              | CL05B273JO5NNN □      |                  |                  |                  | 240pF            | ±10%             | CL05B241KB5NNN □      |                  |                  |
|                | 27nF          | ±10%             | CL05B273KO5NNN □      |                  | 270pF            |                  | ±5%              | CL05B271JB5NNN □ |                       |                  |                  |
|                | 33nF          | ±5%              | CL05B333JO5NNN □      |                  | 270pF            |                  | ±10%             | CL05B271KB5NNN □ |                       |                  |                  |
|                | 33nF          | ±10%             | CL05B333KO5NNN □      |                  | 300pF            |                  | ±10%             | CL05B301KB5NNN □ |                       |                  |                  |
|                | 33nF          | ±20%             | CL05B333MO5NNN □      |                  | 320pF            | ±10%             | CL05B321KB5NNN □ |                  |                       |                  |                  |
|                | 39nF          | ±10%             | CL05B393KO5NNN □      |                  | 330pF            | ±5%              | CL05B331JB5NNN □ |                  |                       |                  |                  |
|                | 47nF          | ±5%              | CL05B473JO5NNN □      |                  | 330pF            | ±10%             | CL05B331KB5NNN □ |                  |                       |                  |                  |
| 47nF           | ±10%          | CL05B473KO5NNN □ |                       | 360pF            | ±10%             | CL05B361KB5NNN □ |                  |                  |                       |                  |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X7R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark | Thickness Max.   | Rated Voltage    | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|------------------|-----------------------|------------------|--------|------------------|------------------|-------------|-----------------------|------------------|------------------|--|
| 0.55mm         | 50Vdc         | 390pF            | ±5%                   | CL05B391JB5NNN □ |        | 0.90mm           | 10Vdc            | 100nF       | ±10%                  | CL10B104KP8NNN □ |                  |  |
|                |               | 390pF            | ±10%                  | CL05B391KB5NNN □ |        |                  |                  | 150nF       | ±10%                  | CL10B154KP8NNN □ |                  |  |
|                |               | 470pF            | ±5%                   | CL05B471JB5NNN □ |        |                  |                  | 220nF       | ±5%                   | CL10B224JP8NNN □ |                  |  |
|                |               | 470pF            | ±10%                  | CL05B471KB5NNN □ |        |                  |                  | 220nF       | ±10%                  | CL10B224KP8NNN □ |                  |  |
|                |               | 510pF            | ±10%                  | CL05B511KB5NNN □ |        |                  |                  | 330nF       | ±10%                  | CL10B334KP8NNN □ |                  |  |
|                |               | 560pF            | ±5%                   | CL05B561JB5NNN □ |        |                  |                  | 470nF       | ±10%                  | CL10B474KP8NNN □ |                  |  |
|                |               | 560pF            | ±10%                  | CL05B561KB5NNN □ |        |                  |                  | 1.0uF       | ±10%                  | CL10B105KP8NNN □ |                  |  |
|                |               | 620pF            | ±10%                  | CL05B621KB5NNN □ |        |                  |                  | 2.2uF       | ±10%                  | CL10B225KP8NNN □ | Ref              |  |
|                |               | 680pF            | ±5%                   | CL05B681JB5NNN □ |        |                  |                  | 16Vdc       | 470pF                 | ±10%             | CL10B471KO8NNN □ |  |
|                |               | 680pF            | ±10%                  | CL05B681KB5NNN □ |        |                  |                  |             | 820pF                 | ±10%             | CL10B821KO8NNN □ |  |
|                |               | 750pF            | ±10%                  | CL05B751KB5NNN □ |        |                  |                  |             | 1.0nF                 | ±10%             | CL10B102KO8NNN □ |  |
|                |               | 820pF            | ±10%                  | CL05B821KB5NNN □ |        |                  |                  |             | 2.2nF                 | ±10%             | CL10B222KO8NNN □ |  |
|                |               | 1.0nF            | ±5%                   | CL05B102JB5NNN □ |        |                  |                  |             | 3.3nF                 | ±10%             | CL10B332KO8NNN □ |  |
|                |               | 1.0nF            | ±10%                  | CL05B102KB5NNN □ |        |                  |                  |             | 3.9nF                 | ±10%             | CL10B392KO8NNN □ |  |
|                |               | 1.2nF            | ±5%                   | CL05B122JB5NNN □ |        |                  | 10nF             |             | ±10%                  | CL10B103KO8NNN □ |                  |  |
|                |               | 1.2nF            | ±10%                  | CL05B122KB5NNN □ |        |                  | 15nF             |             | ±10%                  | CL10B153KO8NNN □ |                  |  |
|                |               | 1.5nF            | ±5%                   | CL05B152JB5NNN □ |        |                  | 16nF             |             | ±10%                  | CL10B163KO8NNN □ |                  |  |
|                |               | 1.5nF            | ±10%                  | CL05B152KB5NNN □ |        |                  | 18nF             |             | ±10%                  | CL10B183KO8NNN □ |                  |  |
|                |               | 1.8nF            | ±10%                  | CL05B182KB5NNN □ |        |                  | 22nF             |             | ±10%                  | CL10B223KO8NNN □ |                  |  |
|                |               | 2.0nF            | ±10%                  | CL05B202KB5NNN □ |        |                  | 27nF             |             | ±10%                  | CL10B273KO8NNN □ |                  |  |
|                |               | 2.2nF            | ±5%                   | CL05B222JB5NNN □ |        |                  | 33nF             |             | ±10%                  | CL10B333KO8NNN □ |                  |  |
|                |               | 2.2nF            | ±10%                  | CL05B222KB5NNN □ |        |                  | 39nF             |             | ±10%                  | CL10B393KO8NNN □ |                  |  |
|                |               | 2.2nF            | ±20%                  | CL05B222MB5NNN □ |        |                  | 47nF             |             | ±10%                  | CL10B473KO8NNN □ |                  |  |
|                |               | 2.4nF            | ±10%                  | CL05B242KB5NNN □ |        |                  | 56nF             |             | ±10%                  | CL10B563KO8NNN □ |                  |  |
|                |               | 2.7nF            | ±10%                  | CL05B272KB5NNN □ |        |                  | 68nF             |             | ±10%                  | CL10B683KO8NNN □ |                  |  |
|                |               | 3.0nF            | ±10%                  | CL05B302KB5NNN □ |        |                  | 68nF             |             | ±20%                  | CL10B683MO8NNN □ |                  |  |
|                |               | 3.3nF            | ±5%                   | CL05B332JB5NNN □ |        |                  | 75nF             |             | ±10%                  | CL10B753KO8NNN □ |                  |  |
|                |               | 3.3nF            | ±10%                  | CL05B332KB5NNN □ |        |                  | 82nF             | ±10%        | CL10B823KO8NNN □      |                  |                  |  |
|                |               | 3.9nF            | ±5%                   | CL05B392JB5NNN □ |        |                  | 100nF            | ±5%         | CL10B104JO8NNN □      |                  |                  |  |
|                |               | 3.9nF            | ±10%                  | CL05B392KB5NNN □ |        |                  | 100nF            | ±10%        | CL10B104KO8NNN □      |                  |                  |  |
|                |               | 4.7nF            | ±5%                   | CL05B472JB5NNN □ |        |                  | 100nF            | ±20%        | CL10B104MO8NNN □      |                  |                  |  |
|                |               | 4.7nF            | ±10%                  | CL05B472KB5NNN □ |        |                  | 120nF            | ±10%        | CL10B124KO8NNN □      |                  |                  |  |
|                |               | 4.7nF            | ±20%                  | CL05B472MB5NNN □ |        |                  | 150nF            | ±10%        | CL10B154KO8NNN □      |                  |                  |  |
| 5.6nF          | ±10%          | CL05B562KB5NNN □ |                       | 180nF            | ±10%   | CL10B184KO8NNN □ |                  |             |                       |                  |                  |  |
| 6.8nF          | ±5%           | CL05B682JB5NNN □ |                       | 220nF            | ±5%    | CL10B224JO8NNN □ |                  |             |                       |                  |                  |  |
| 6.8nF          | ±10%          | CL05B682KB5NNN □ |                       | 220nF            | ±10%   | CL10B224KO8NNN □ |                  |             |                       |                  |                  |  |
| 8.2nF          | ±10%          | CL05B822KB5NNN □ |                       | 220nF            | ±20%   | CL10B224MO8NNN □ |                  |             |                       |                  |                  |  |
| 10nF           | ±5%           | CL05B103JB5NNN □ |                       | 330nF            | ±10%   | CL10B334KO8NNN □ |                  |             |                       |                  |                  |  |
| 10nF           | ±10%          | CL05B103KB5NNN □ |                       | 470nF            | ±10%   | CL10B474KO8NNN □ |                  |             |                       |                  |                  |  |
| 10nF           | ±20%          | CL05B103MB5NNN □ |                       | 470nF            | ±20%   | CL10B474MO8NNN □ |                  |             |                       |                  |                  |  |
| 15nF           | ±10%          | CL05B153KB5NNN □ |                       | 680nF            | ±10%   | CL10B684KO8NNN □ |                  |             |                       |                  |                  |  |
| 22nF           | ±10%          | CL05B223KB5NNN □ |                       | 1.0uF            | ±10%   | CL10B105KO8NNN □ |                  |             |                       |                  |                  |  |
|                |               |                  |                       | 25Vdc            | 220pF  | ±10%             | CL10B221KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 390pF  | ±10%             | CL10B391KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 470pF  | ±10%             | CL10B471KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 1.0nF  | ±5%              | CL10B102JA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 1.0nF  | ±10%             | CL10B102KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 2.2nF  | ±10%             | CL10B222KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 4.7nF  | ±10%             | CL10B472KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 5.6nF  | ±10%             | CL10B562KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 6.8nF  | ±10%             | CL10B682KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       |                  | 8.2nF  | ±10%             | CL10B822KA8NNN □ |             |                       |                  |                  |  |
|                |               |                  |                       | 10nF             | ±10%   | CL10B103KA8NNN □ |                  |             |                       |                  |                  |  |
|                |               |                  |                       | 12nF             | ±10%   | CL10B123KA8NNN □ |                  |             |                       |                  |                  |  |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.90mm         | 6.3Vdc        | 4.7nF       | ±10%                  | CL10B472KQ8NNN □ |        |
|                |               | 470nF       | ±10%                  | CL10B474KQ8NNN □ |        |
|                |               | 680nF       | ±10%                  | CL10B684KQ8NNN □ |        |
|                |               | 820nF       | ±10%                  | CL10B824KQ8NNN □ |        |
|                |               | 1.0uF       | ±10%                  | CL10B105KQ8NNN □ |        |
|                |               | 1.0uF       | ±20%                  | CL10B105MQ8NNN □ |        |
|                |               | 2.2uF       | ±10%                  | CL10B225KQ8NNN □ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# Standard & High Capacitors

## Product Line Up (X7R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark | Thickness Max.  | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-----------------|-----------------------|-----------------|--------|-----------------|---------------|-----------------|-----------------------|-----------------|--------|
| 0.90mm         | 25Vdc         | 15nF            | ±5%                   | CL10B153JA8NNN□ |        | 0.90mm          | 50Vdc         | 1.4nF           | ±5%                   | CL10B142JB8NNN□ |        |
|                |               | 15nF            | ±10%                  | CL10B153KA8NNN□ |        |                 |               | 1.5nF           | ±5%                   | CL10B152JB8NNN□ |        |
|                |               | 18nF            | ±10%                  | CL10B183KA8NNN□ |        |                 |               | 1.5nF           | ±10%                  | CL10B152KB8NNN□ |        |
|                |               | 18nF            | ±20%                  | CL10B183MA8NNN□ |        |                 |               | 1.8nF           | ±5%                   | CL10B182JB8NNN□ |        |
|                |               | 22nF            | ±5%                   | CL10B223JA8NNN□ |        |                 |               | 1.8nF           | ±10%                  | CL10B182KB8NNN□ |        |
|                |               | 22nF            | ±10%                  | CL10B223KA8NNN□ |        |                 |               | 2.0nF           | ±10%                  | CL10B202KB8NNN□ |        |
|                |               | 27nF            | ±10%                  | CL10B273KA8NNN□ |        |                 |               | 2.2nF           | ±5%                   | CL10B222JB8NNN□ |        |
|                |               | 33nF            | ±5%                   | CL10B333JA8NNN□ |        |                 |               | 2.2nF           | ±10%                  | CL10B222KB8NNN□ |        |
|                |               | 33nF            | ±10%                  | CL10B333KA8NNN□ |        |                 |               | 2.2nF           | ±20%                  | CL10B222MB8NNN□ |        |
|                |               | 39nF            | ±10%                  | CL10B393KA8NNN□ |        |                 |               | 2.4nF           | ±10%                  | CL10B242KB8NNN□ |        |
|                |               | 47nF            | ±10%                  | CL10B473KA8NNN□ |        |                 |               | 2.7nF           | ±5%                   | CL10B272JB8NNN□ |        |
|                |               | 56nF            | ±5%                   | CL10B563JA8NNN□ |        |                 |               | 2.7nF           | ±10%                  | CL10B272KB8NNN□ |        |
|                |               | 56nF            | ±10%                  | CL10B563KA8NNN□ |        |                 |               | 2.9nF           | ±10%                  | CL10B292KB8NNN□ |        |
|                |               | 68nF            | ±10%                  | CL10B683KA8NNN□ |        |                 |               | 3.0nF           | ±10%                  | CL10B302KB8NNN□ |        |
|                |               | 82nF            | ±10%                  | CL10B823KA8NNN□ |        |                 |               | 3.0nF           | ±20%                  | CL10B302MB8NNN□ |        |
|                |               | 100nF           | ±5%                   | CL10B104JA8NNN□ |        |                 |               | 3.3nF           | ±5%                   | CL10B332JB8NNN□ |        |
|                |               | 100nF           | ±10%                  | CL10B104KA8NNN□ |        |                 |               | 3.3nF           | ±10%                  | CL10B332KB8NNN□ |        |
|                |               | 100nF           | ±20%                  | CL10B104MA8NNN□ |        |                 |               | 3.3nF           | ±20%                  | CL10B332MB8NNN□ |        |
|                |               | 150nF           | ±10%                  | CL10B154KA8NNN□ |        |                 |               | 3.6nF           | ±5%                   | CL10B362JB8NNN□ |        |
|                |               | 220nF           | ±10%                  | CL10B224KA8NNN□ |        |                 |               | 3.6nF           | ±10%                  | CL10B362KB8NNN□ |        |
| 470nF          | ±10%          | CL10B474KA8NNN□ |                       | 3.9nF           | ±10%   | CL10B392KB8NNN□ |               |                 |                       |                 |        |
| 1.0uF          | ±10%          | CL10B105KA8NNN□ |                       | 4.7nF           | ±5%    | CL10B472JB8NNN□ |               |                 |                       |                 |        |
| 50Vdc          | 50Vdc         | 100pF           | ±10%                  | CL10B101KB8NNN□ |        | 4.7nF           | ±10%          | CL10B472KB8NNN□ |                       |                 |        |
|                |               | 120pF           | ±10%                  | CL10B121KB8NNN□ |        | 4.7nF           | ±20%          | CL10B472MB8NNN□ |                       |                 |        |
|                |               | 150pF           | ±10%                  | CL10B151KB8NNN□ |        | 5.1nF           | ±10%          | CL10B512KB8NNN□ |                       |                 |        |
|                |               | 180pF           | ±10%                  | CL10B181KB8NNN□ |        | 5.6nF           | ±5%           | CL10B562JB8NNN□ |                       |                 |        |
|                |               | 200pF           | ±10%                  | CL10B201KB8NNN□ |        | 5.6nF           | ±10%          | CL10B562KB8NNN□ |                       |                 |        |
|                |               | 220pF           | ±5%                   | CL10B221JB8NNN□ |        | 5.6nF           | ±20%          | CL10B562MB8NNN□ |                       |                 |        |
|                |               | 220pF           | ±10%                  | CL10B221KB8NNN□ |        | 6.2nF           | ±5%           | CL10B622JB8NNN□ |                       |                 |        |
|                |               | 270pF           | ±5%                   | CL10B271JB8NNN□ |        | 6.2nF           | ±10%          | CL10B622KB8NNN□ |                       |                 |        |
|                |               | 270pF           | ±10%                  | CL10B271KB8NNN□ |        | 6.8nF           | ±5%           | CL10B682JB8NNN□ |                       |                 |        |
|                |               | 300pF           | ±10%                  | CL10B301KB8NNN□ |        | 6.8nF           | ±10%          | CL10B682KB8NNN□ |                       |                 |        |
|                |               | 330pF           | ±5%                   | CL10B331JB8NNN□ |        | 6.8nF           | ±20%          | CL10B682MB8NNN□ |                       |                 |        |
|                |               | 330pF           | ±10%                  | CL10B331KB8NNN□ |        | 7.5nF           | ±5%           | CL10B752JB8NNN□ |                       |                 |        |
|                |               | 360pF           | ±10%                  | CL10B361KB8NNN□ |        | 8.2nF           | ±5%           | CL10B822JB8NNN□ |                       |                 |        |
|                |               | 390pF           | ±10%                  | CL10B391KB8NNN□ |        | 8.2nF           | ±10%          | CL10B822KB8NNN□ |                       |                 |        |
|                |               | 430pF           | ±10%                  | CL10B431KB8NNN□ |        | 9.1nF           | ±5%           | CL10B912JB8NNN□ |                       |                 |        |
|                |               | 470pF           | ±5%                   | CL10B471JB8NNN□ |        | 10nF            | ±5%           | CL10B103JB8NNN□ |                       |                 |        |
|                |               | 470pF           | ±10%                  | CL10B471KB8NNN□ |        | 10nF            | ±10%          | CL10B103KB8NNN□ |                       |                 |        |
|                |               | 500pF           | ±10%                  | CL10B501KB8NNN□ |        | 10nF            | ±20%          | CL10B103MB8NNN□ |                       |                 |        |
|                |               | 510pF           | ±10%                  | CL10B511KB8NNN□ |        | 12nF            | ±5%           | CL10B123JB8NNN□ |                       |                 |        |
|                |               | 560pF           | ±5%                   | CL10B561JB8NNN□ |        | 12nF            | ±10%          | CL10B123KB8NNN□ |                       |                 |        |
|                |               | 560pF           | ±10%                  | CL10B561KB8NNN□ |        | 15nF            | ±5%           | CL10B153JB8NNN□ |                       |                 |        |
|                |               | 620pF           | ±5%                   | CL10B621JB8NNN□ |        | 15nF            | ±10%          | CL10B153KB8NNN□ |                       |                 |        |
|                |               | 680pF           | ±5%                   | CL10B681JB8NNN□ |        | 15nF            | ±20%          | CL10B153MB8NNN□ |                       |                 |        |
|                |               | 680pF           | ±10%                  | CL10B681KB8NNN□ |        | 18nF            | ±5%           | CL10B183JB8NNN□ |                       |                 |        |
|                |               | 750pF           | ±10%                  | CL10B751KB8NNN□ |        | 18nF            | ±10%          | CL10B183KB8NNN□ |                       |                 |        |
|                |               | 820pF           | ±5%                   | CL10B821JB8NNN□ |        | 20nF            | ±10%          | CL10B203KB8NNN□ |                       |                 |        |
|                |               | 820pF           | ±10%                  | CL10B821KB8NNN□ |        | 22nF            | ±5%           | CL10B223JB8NNN□ |                       |                 |        |
|                |               | 910pF           | ±5%                   | CL10B911JB8NNN□ |        | 22nF            | ±10%          | CL10B223KB8NNN□ |                       |                 |        |
|                |               | 1.0nF           | ±10%                  | CL10B102KB8NNN□ |        | 22nF            | ±20%          | CL10B223MB8NNN□ |                       |                 |        |
|                |               | 1.0nF           | ±20%                  | CL10B102MB8NNN□ |        | 27nF            | ±10%          | CL10B273KB8NNN□ |                       |                 |        |
|                |               | 1.2nF           | ±5%                   | CL10B122JB8NNN□ |        | 33nF            | ±5%           | CL10B333JB8NNN□ |                       |                 |        |
|                |               | 1.2nF           | ±10%                  | CL10B122KB8NNN□ |        | 33nF            | ±10%          | CL10B333KB8NNN□ |                       |                 |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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Product Line Up (X7R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark | Thickness Max.  | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |
|----------------|---------------|-----------------|-----------------------|-----------------|--------|-----------------|---------------|-------------|-----------------------|-----------------|-----------------|
| 0.90mm         | 50Vdc         | 39nF            | ±5%                   | CL10B393JB8NNN□ |        | 0.75mm          | 25Vdc         | 68nF        | ±10%                  | CL21B683KAANNN□ |                 |
|                |               | 39nF            | ±10%                  | CL10B393KB8NNN□ |        |                 |               | 50Vdc       | 18pF                  | ±5%             | CL21B180JBANNN□ |
|                |               | 47nF            | ±5%                   | CL10B473JB8NNN□ |        |                 | 22pF          |             | ±5%                   | CL21B220JBANNN□ |                 |
|                |               | 47nF            | ±10%                  | CL10B473KB8NNN□ |        |                 | 56pF          |             | ±5%                   | CL21B560JBANNN□ |                 |
|                |               | 47nF            | ±20%                  | CL10B473MB8NNN□ |        |                 | 100pF         |             | ±5%                   | CL21B101JBANNN□ |                 |
|                |               | 56nF            | ±5%                   | CL10B563JB8NNN□ |        |                 | 100pF         |             | ±10%                  | CL21B101KBANNN□ |                 |
|                |               | 56nF            | ±10%                  | CL10B563KB8NNN□ |        |                 | 150pF         |             | ±10%                  | CL21B151KBANNN□ |                 |
|                |               | 68nF            | ±5%                   | CL10B683JB8NNN□ |        |                 | 180pF         |             | ±10%                  | CL21B181KBANNN□ |                 |
|                |               | 68nF            | ±10%                  | CL10B683KB8NNN□ |        |                 | 200pF         |             | ±10%                  | CL21B201KBANNN□ |                 |
|                |               | 82nF            | ±5%                   | CL10B823JB8NNN□ |        |                 | 220pF         |             | ±5%                   | CL21B221JBANNN□ |                 |
|                |               | 82nF            | ±10%                  | CL10B823KB8NNN□ |        |                 | 220pF         |             | ±10%                  | CL21B221KBANNN□ |                 |
|                |               | 100nF           | ±5%                   | CL10B104JB8NNN□ |        |                 | 270pF         |             | ±10%                  | CL21B271KBANNN□ |                 |
|                |               | 100nF           | ±10%                  | CL10B104KB8NNN□ |        |                 | 300pF         |             | ±10%                  | CL21B301KBANNN□ |                 |
|                |               | 100nF           | ±20%                  | CL10B104MB8NNN□ |        |                 | 330pF         | ±5%         | CL21B331JBANNN□       |                 |                 |
| 220nF          | ±10%          | CL10B224KB8NNN□ |                       | 330pF           | ±10%   | CL21B331KBANNN□ |               |             |                       |                 |                 |
| 330nF          | ±10%          | CL10B334KB8NNN□ |                       | 360pF           | ±10%   | CL21B361KBANNN□ |               |             |                       |                 |                 |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark | Thickness Max.  | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|-----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.75mm         | 16Vdc         | 15nF        | ±10%                  | CL21B153KOANNN□ |        | 0.75mm          | 50Vdc         | 390pF       | ±5%                   | CL21B391JBANNN□ |        |
|                |               | 22nF        | ±10%                  | CL21B223KOANNN□ |        |                 |               | 390pF       | ±10%                  | CL21B391KBANNN□ |        |
|                |               | 33nF        | ±10%                  | CL21B333KOANNN□ |        |                 |               | 470pF       | ±5%                   | CL21B471JBANNN□ |        |
|                |               | 39nF        | ±10%                  | CL21B393KOANNN□ |        |                 |               | 470pF       | ±10%                  | CL21B471KBANNN□ |        |
|                |               | 47nF        | ±10%                  | CL21B473KOANNN□ |        |                 |               | 500pF       | ±10%                  | CL21B501KBANNN□ |        |
|                |               | 56nF        | ±10%                  | CL21B563KOANNN□ |        |                 |               | 510pF       | ±10%                  | CL21B511KBANNN□ |        |
|                |               | 68nF        | ±10%                  | CL21B683KOANNN□ |        |                 |               | 560pF       | ±5%                   | CL21B561JBANNN□ |        |
|                |               | 100nF       | ±5%                   | CL21B104JOANNN□ |        |                 |               | 560pF       | ±10%                  | CL21B561KBANNN□ |        |
|                |               | 100nF       | ±10%                  | CL21B104KOANNN□ |        |                 |               | 620pF       | ±10%                  | CL21B621KBANNN□ |        |
|                |               | 100nF       | ±20%                  | CL21B104MOANNN□ |        |                 |               | 680pF       | ±5%                   | CL21B681JBANNN□ |        |
|                |               | 120nF       | ±5%                   | CL21B124JOANNN□ |        |                 |               | 680pF       | ±10%                  | CL21B681KBANNN□ |        |
|                |               | 150nF       | ±10%                  | CL21B154KOANNN□ |        |                 |               | 750pF       | ±10%                  | CL21B751KBANNN□ |        |
|                |               | 180nF       | ±10%                  | CL21B184KOANNN□ |        |                 |               | 820pF       | ±10%                  | CL21B821KBANNN□ |        |
|                |               | 220pF       | ±20%                  | CL21B221MAANNN□ |        |                 |               | 910pF       | ±10%                  | CL21B911KBANNN□ |        |
|                |               | 1.0nF       | ±10%                  | CL21B102KAANNN□ |        |                 |               | 1.0nF       | ±5%                   | CL21B102JBANNN□ |        |
|                |               | 1.0nF       | ±20%                  | CL21B102MAANNN□ |        |                 |               | 1.0nF       | ±10%                  | CL21B102KBANNN□ |        |
|                |               | 2.2nF       | ±10%                  | CL21B222KAANNN□ |        |                 |               | 1.0nF       | ±20%                  | CL21B102MBANNN□ |        |
|                |               | 2.2nF       | ±20%                  | CL21B222MAANNN□ |        |                 |               | 1.2nF       | ±10%                  | CL21B122KBANNN□ |        |
|                | 4.7nF         | ±10%        | CL21B472KAANNN□       |                 | 1.3nF  |                 |               | ±5%         | CL21B132JBANNN□       |                 |        |
|                | 5.6nF         | ±10%        | CL21B562KAANNN□       |                 | 1.5nF  |                 |               | ±5%         | CL21B152JBANNN□       |                 |        |
|                | 6.8nF         | ±10%        | CL21B682KAANNN□       |                 | 1.5nF  |                 |               | ±10%        | CL21B152KBANNN□       |                 |        |
|                | 6.8nF         | ±20%        | CL21B682MAANNN□       |                 | 1.8nF  |                 |               | ±5%         | CL21B182JBANNN□       |                 |        |
|                | 10nF          | ±10%        | CL21B103KAANNN□       |                 | 1.8nF  |                 |               | ±10%        | CL21B182KBANNN□       |                 |        |
|                | 12nF          | ±10%        | CL21B123KAANNN□       |                 | 2.0nF  |                 |               | ±5%         | CL21B202JBANNN□       |                 |        |
|                | 15nF          | ±5%         | CL21B153JAANNN□       |                 | 2.0nF  |                 |               | ±10%        | CL21B202KBANNN□       |                 |        |
|                | 15nF          | ±10%        | CL21B153KAANNN□       |                 | 2.2nF  |                 |               | ±5%         | CL21B222JBANNN□       |                 |        |
|                | 18nF          | ±10%        | CL21B183KAANNN□       |                 | 2.2nF  |                 |               | ±10%        | CL21B222KBANNN□       |                 |        |
|                | 22nF          | ±10%        | CL21B223KAANNN□       |                 | 2.2nF  |                 |               | ±20%        | CL21B222MBANNN□       |                 |        |
|                | 27nF          | ±10%        | CL21B273KAANNN□       |                 | 2.4nF  |                 |               | ±10%        | CL21B242KBANNN□       |                 |        |
|                | 33nF          | ±10%        | CL21B333KAANNN□       |                 | 2.4nF  |                 |               | ±20%        | CL21B242MBANNN□       |                 |        |
|                | 39nF          | ±10%        | CL21B393KAANNN□       |                 | 2.7nF  |                 |               | ±5%         | CL21B272JBANNN□       |                 |        |
|                | 47nF          | ±10%        | CL21B473KAANNN□       |                 | 2.7nF  |                 |               | ±10%        | CL21B272KBANNN□       |                 |        |
|                | 56nF          | ±10%        | CL21B563KAANNN□       |                 | 3.0nF  |                 |               | ±5%         | CL21B302JBANNN□       |                 |        |
|                |               |             |                       |                 | 3.0nF  |                 |               | ±20%        | CL21B302MBANNN□       |                 |        |
|                |               |             |                       | 3.3nF           | ±5%    | CL21B332JBANNN□ |               |             |                       |                 |        |
|                |               |             |                       | 3.3nF           | ±10%   | CL21B332KBANNN□ |               |             |                       |                 |        |
|                |               |             |                       | 3.6nF           | ±10%   | CL21B362KBANNN□ |               |             |                       |                 |        |
|                |               |             |                       | 3.9nF           | ±5%    | CL21B392JBANNN□ |               |             |                       |                 |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# Standard & High Capacitors

## Product Line Up (X7R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark          | Thickness Max.  | Rated Voltage   | Capacitance | Capacitance Tolerance | Part Number     | Remark |                 |                 |  |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|-----------------|-----------------|-------------|-----------------------|-----------------|--------|-----------------|-----------------|--|
| 0.75mm         | 50Vdc         | 3.9nF           | ±10%                  | CL21B392KBANNN□ |                 | 0.95mm          | 50Vdc           | 2.7nF       | ±10%                  | CL21B272KBCNNN□ |        |                 |                 |  |
|                |               | 4.7nF           | ±5%                   | CL21B472JBANNN□ |                 |                 |                 | 3.3nF       | ±10%                  | CL21B332KBCNNN□ |        |                 |                 |  |
|                |               | 4.7nF           | ±10%                  | CL21B472KBANNN□ |                 |                 |                 | 4.7nF       | ±5%                   | CL21B472JBCNNN□ |        |                 |                 |  |
|                |               | 5.0nF           | ±10%                  | CL21B502KBANNN□ |                 |                 |                 | 6.8nF       | ±10%                  | CL21B682KBCNNN□ |        |                 |                 |  |
|                |               | 5.1nF           | ±10%                  | CL21B512KBANNN□ |                 |                 |                 | 10nF        | ±5%                   | CL21B103JBCNNN□ |        |                 |                 |  |
|                |               | 5.6nF           | ±5%                   | CL21B562JBANNN□ |                 |                 |                 | 10nF        | ±10%                  | CL21B103KBCNNN□ |        |                 |                 |  |
|                |               | 5.6nF           | ±10%                  | CL21B562KBANNN□ |                 |                 |                 | 18nF        | ±5%                   | CL21B183JBCNNN□ |        |                 |                 |  |
|                |               | 6.8nF           | ±5%                   | CL21B682JBANNN□ |                 |                 |                 | 22nF        | ±10%                  | CL21B223KBCNNN□ |        |                 |                 |  |
|                |               | 6.8nF           | ±10%                  | CL21B682KBANNN□ |                 |                 |                 | 24nF        | ±5%                   | CL21B243JBCNNN□ |        |                 |                 |  |
|                |               | 7.5nF           | ±10%                  | CL21B752KBANNN□ |                 |                 |                 | 33nF        | ±5%                   | CL21B333JBCNNN□ |        |                 |                 |  |
|                |               | 8.2nF           | ±5%                   | CL21B822JBANNN□ |                 |                 |                 | 39nF        | ±5%                   | CL21B393JBCNNN□ |        |                 |                 |  |
|                |               | 8.2nF           | ±10%                  | CL21B822KBANNN□ |                 |                 |                 | 39nF        | ±10%                  | CL21B393KBCNNN□ |        |                 |                 |  |
|                |               | 9.1nF           | ±10%                  | CL21B912KBANNN□ |                 |                 |                 | 47nF        | ±5%                   | CL21B473JBCNNN□ |        |                 |                 |  |
|                |               | 10nF            | ±5%                   | CL21B103JBANNN□ |                 |                 |                 | 47nF        | ±10%                  | CL21B473KBCNNN□ |        |                 |                 |  |
|                |               | 10nF            | ±10%                  | CL21B103KBANNN□ |                 |                 |                 | 47nF        | ±20%                  | CL21B473MBCNNN□ |        |                 |                 |  |
|                |               | 10nF            | ±20%                  | CL21B103MBANNN□ |                 |                 |                 | 51nF        | ±10%                  | CL21B513KBCNNN□ |        |                 |                 |  |
|                |               | 12nF            | ±5%                   | CL21B123JBANNN□ |                 |                 |                 | 56nF        | ±5%                   | CL21B563JBCNNN□ |        |                 |                 |  |
|                |               | 12nF            | ±10%                  | CL21B123KBANNN□ |                 |                 |                 | 56nF        | ±10%                  | CL21B563KBCNNN□ |        |                 |                 |  |
|                |               | 12nF            | ±20%                  | CL21B123MBANNN□ |                 |                 |                 | 68nF        | ±5%                   | CL21B683JBCNNN□ |        |                 |                 |  |
|                |               | 15nF            | ±5%                   | CL21B153JBANNN□ |                 |                 |                 | 68nF        | ±10%                  | CL21B683KBCNNN□ |        |                 |                 |  |
|                |               | 15nF            | ±10%                  | CL21B153KBANNN□ |                 |                 |                 | 82nF        | ±5%                   | CL21B823JBCNNN□ |        |                 |                 |  |
|                |               | 15nF            | ±20%                  | CL21B153MBANNN□ |                 |                 |                 | 82nF        | ±10%                  | CL21B823KBCNNN□ |        |                 |                 |  |
|                |               | 18nF            | ±10%                  | CL21B183KBANNN□ |                 |                 |                 | 100nF       | ±5%                   | CL21B104JBCNNN□ |        |                 |                 |  |
|                |               | 20nF            | ±10%                  | CL21B203KBANNN□ |                 |                 |                 | 100nF       | ±10%                  | CL21B104KBCNNN□ |        |                 |                 |  |
|                |               | 22nF            | ±5%                   | CL21B223JBANNN□ |                 |                 |                 | 100nF       | ±20%                  | CL21B104MBCNNN□ |        |                 |                 |  |
|                |               | 22nF            | ±10%                  | CL21B223KBANNN□ |                 |                 |                 | 1.0uF       | ±10%                  | CL21B105KQFNNN□ |        |                 |                 |  |
|                |               | 27nF            | ±5%                   | CL21B273JBANNN□ |                 |                 |                 | 1.35mm      | 6.3Vdc                | 2.2uF           | ±5%    | CL21B225JQFNNN□ |                 |  |
|                |               | 27nF            | ±10%                  | CL21B273KBANNN□ |                 |                 |                 |             |                       | 2.2uF           | ±10%   | CL21B225KQFNNN□ |                 |  |
|                |               | 33nF            | ±5%                   | CL21B333JBANNN□ |                 |                 |                 |             |                       | 3.3uF           | ±10%   | CL21B335KQFNNN□ |                 |  |
|                |               | 33nF            | ±10%                  | CL21B333KBANNN□ |                 |                 |                 |             |                       | 3.3uF           | ±20%   | CL21B335MQFNNN□ |                 |  |
|                |               | 33nF            | ±20%                  | CL21B333MBANNN□ |                 |                 |                 |             |                       | 4.7uF           | ±10%   | CL21B475KQFNNN□ | Ref.            |  |
|                |               | 39nF            | ±5%                   | CL21B393JBANNN□ |                 |                 |                 |             |                       | 10Vdc           | 470nF  | ±10%            | CL21B474KPFNNN□ |  |
|                |               | 39nF            | ±10%                  | CL21B393KBANNN□ |                 |                 |                 |             |                       |                 | 680nF  | ±10%            | CL21B684KPFNNN□ |  |
| 47nF           | ±10%          | CL21B473KBANNN□ |                       | 820nF           | ±10%            | CL21B824KPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 1.0uF           | ±5%             | CL21B105JPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 1.0uF           | ±10%            | CL21B105KPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 1.0uF           | ±20%            | CL21B105MPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 2.2uF           | ±10%            | CL21B225KPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 2.2uF           | ±20%            | CL21B225MPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 3.3uF           | ±10%            | CL21B335KPFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 4.7uF           | ±10%            | CL21B475KPFNNN□ | Ref.            |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 16Vdc           | 150nF           | ±10%            | CL21B154KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 220nF           | ±10%            | CL21B224KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 330nF           | ±10%            | CL21B334KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 390nF           | ±10%            | CL21B394KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 470nF           | ±5%             | CL21B474JOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 470nF           | ±10%            | CL21B474KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 470nF           | ±20%            | CL21B474MOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 680nF           | ±5%             | CL21B684JOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 680nF           | ±10%            | CL21B684KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       |                 | 1.0uF           | ±10%            | CL21B105KOFNNN□ |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 2.2uF           | ±10%            | CL21B225KOFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 2.2uF           | ±20%            | CL21B225MOFNNN□ |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 |                       | 4.7uF           | ±10%            | CL21B475KOFNNN□ | Ref.            |             |                       |                 |        |                 |                 |  |
| 0.95mm         | 16Vdc         | 150nF           | ±10%                  | CL21B154KOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 220nF           | ±5%                   | CL21B224JOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 220nF           | ±10%                  | CL21B224KOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 220nF           | ±20%                  | CL21B224MOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 270nF           | ±5%                   | CL21B274JOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 270nF           | ±10%                  | CL21B274KOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 330nF           | ±5%                   | CL21B334JOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 330nF           | ±10%                  | CL21B334KOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 1.0uF           | ±10%                  | CL21B105KOCNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 25Vdc           | 47nF                  | ±10%            | CL21B473KACNNN□ |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 | 68nF                  | ±10%            | CL21B683KACNNN□ |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               |                 | 82nF                  | ±10%            | CL21B823KACNNN□ |                 |                 |             |                       |                 |        |                 |                 |  |
|                | 100nF         |                 | ±5%                   | CL21B104JACNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                | 100nF         |                 | ±10%                  | CL21B104KACNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                | 100nF         |                 | ±20%                  | CL21B104MACNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                | 50Vdc         | 120nF           | ±5%                   | CL21B124JACNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 120nF           | ±10%                  | CL21B124KACNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
|                |               | 150nF           | ±10%                  | CL21B154KACNNN□ |                 |                 |                 |             |                       |                 |        |                 |                 |  |
| 1.0nF          |               | ±10%            | CL21B102KBCNNN□       |                 |                 |                 |                 |             |                       |                 |        |                 |                 |  |
| 2.2nF          |               | ±10%            | CL21B222KBCNNN□       |                 |                 |                 |                 |             |                       |                 |        |                 |                 |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X7R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           | Thickness Max. | Rated Voltage    | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|----------------|------------------|------------------|-----------------------|------------------|------------------|------------------|
| 1.35mm         | 25Vdc         | 18nF        | ±10%                  | CL21B183KAFNNN □ |                  | 1.00mm         | 16Vdc            | 270nF            | ±20%                  | CL31B274MOCNNN □ |                  |                  |
|                |               | 47nF        | ±10%                  | CL21B473KAFNNN □ |                  |                |                  | 330nF            | ±10%                  | CL31B334KOCNNN □ |                  |                  |
|                |               | 100nF       | ±10%                  | CL21B104KAFNNN □ |                  |                |                  | 330nF            | ±20%                  | CL31B334MOCNNN □ |                  |                  |
|                |               | 150nF       | ±10%                  | CL21B154KAFNNN □ |                  |                |                  | 390nF            | ±10%                  | CL31B394KOCNNN □ |                  |                  |
|                |               | 180nF       | ±10%                  | CL21B184KAFNNN □ |                  |                |                  | 470nF            | ±10%                  | CL31B474KOCNNN □ |                  |                  |
|                |               | 220nF       | ±5%                   | CL21B224JAFNNN □ |                  |                |                  | 560nF            | ±10%                  | CL31B564KOCNNN □ |                  |                  |
|                |               | 220nF       | ±10%                  | CL21B224KAFNNN □ |                  |                |                  | 680nF            | ±10%                  | CL31B684KOCNNN □ |                  |                  |
|                |               | 220nF       | ±20%                  | CL21B224MAFNNN □ |                  |                |                  | 25Vdc            | 4.7nF                 | ±10%             | CL31B472KACNNN □ |                  |
|                |               | 270nF       | ±10%                  | CL21B274KAFNNN □ |                  |                |                  |                  | 22nF                  | ±10%             | CL31B223KACNNN □ |                  |
|                |               | 330nF       | ±10%                  | CL21B334KAFNNN □ |                  |                |                  |                  | 47nF                  | ±10%             | CL31B473KACNNN □ |                  |
|                |               | 390nF       | ±10%                  | CL21B394KAFNNN □ |                  |                |                  |                  | 68nF                  | ±10%             | CL31B683KACNNN □ |                  |
|                |               | 470nF       | ±5%                   | CL21B474JAFNNN □ |                  |                |                  |                  | 100nF                 | ±10%             | CL31B104KACNNN □ |                  |
|                |               | 470nF       | ±10%                  | CL21B474KAFNNN □ |                  |                |                  |                  | 120nF                 | ±10%             | CL31B124KACNNN □ |                  |
|                |               | 1.0uF       | ±10%                  | CL21B105KAFNNN □ |                  |                |                  |                  | 150nF                 | ±10%             | CL31B154KACNNN □ |                  |
|                |               | 1.5uF       | ±10%                  | CL21B155KAFNNN □ |                  |                | 180nF            |                  | ±10%                  | CL31B184KACNNN □ |                  |                  |
|                |               | 2.2uF       | ±10%                  | CL21B225KAFNNN □ |                  |                | 220nF            |                  | ±5%                   | CL31B224JACNNN □ |                  |                  |
|                |               | 4.7uF       | ±10%                  | CL21B475KAFNNN □ | Ref              |                | 220nF            |                  | ±10%                  | CL31B224KACNNN □ |                  |                  |
|                |               | 35Vdc       | 1.0uF                 | ±10%             | CL21B105KLFNNN □ |                |                  |                  | 270nF                 | ±10%             | CL31B274KACNNN □ |                  |
|                |               |             | 50Vdc                 | 560pF            | ±10%             |                | CL21B561KBFNNN □ |                  |                       | 330nF            | ±10%             | CL31B334KACNNN □ |
|                | 47nF          |             |                       | ±10%             | CL21B473KBFNNN □ |                |                  |                  | 390nF                 | ±10%             | CL31B394KACNNN □ |                  |
|                | 68nF          |             |                       | ±5%              | CL21B683JBFNNN □ |                |                  |                  | 50Vdc                 | 120pF            | ±10%             | CL31B121KBCNNN □ |
|                | 68nF          |             |                       | ±10%             | CL21B683KBFNNN □ |                |                  | 180pF            |                       | ±10%             | CL31B181KBCNNN □ |                  |
|                | 75nF          |             |                       | ±10%             | CL21B753KBFNNN □ |                |                  | 220pF            |                       | ±10%             | CL31B221KBCNNN □ |                  |
|                | 82nF          |             |                       | ±10%             | CL21B823KBFNNN □ |                |                  | 270pF            |                       | ±10%             | CL31B271KBCNNN □ |                  |
|                | 100nF         |             |                       | ±5%              | CL21B104JBFNNN □ |                |                  | 330pF            |                       | ±10%             | CL31B331KBCNNN □ |                  |
|                | 100nF         |             |                       | ±10%             | CL21B104KBFNNN □ |                |                  | 390pF            |                       | ±5%              | CL31B391JBCNNN □ |                  |
|                | 100nF         |             |                       | ±20%             | CL21B104MBFNNN □ |                |                  | 390pF            |                       | ±10%             | CL31B391KBCNNN □ |                  |
|                | 120nF         |             |                       | ±10%             | CL21B124KBFNNN □ |                |                  | 470pF            |                       | ±10%             | CL31B471KBCNNN □ |                  |
|                | 150nF         |             |                       | ±10%             | CL21B154KBFNNN □ |                |                  | 560pF            |                       | ±10%             | CL31B561KBCNNN □ |                  |
|                | 220nF         |             |                       | ±5%              | CL21B224JBFNNN □ |                |                  | 680pF            |                       | ±10%             | CL31B681KBCNNN □ |                  |
|                | 220nF         |             |                       | ±10%             | CL21B224KBFNNN □ |                |                  | 820pF            |                       | ±10%             | CL31B821KBCNNN □ |                  |
|                | 270nF         |             |                       | ±10%             | CL21B274KBFNNN □ |                |                  | 1.0nF            |                       | ±5%              | CL31B102JBCNNN □ |                  |
|                | 330nF         |             |                       | ±10%             | CL21B334KBFNNN □ |                |                  | 1.0nF            |                       | ±10%             | CL31B102KBCNNN □ |                  |
|                | 470nF         |             |                       | ±10%             | CL21B474KBFNNN □ |                |                  | 1.0nF            |                       | ±20%             | CL31B102MBCNNN □ |                  |
|                | 680nF         |             |                       | ±10%             | CL21B684KBFNNN □ |                |                  | 1.2nF            | ±10%                  | CL31B122KBCNNN □ |                  |                  |
|                | 1.0uF         | ±10%        |                       | CL21B105KBFNNN □ |                  |                | 1.5nF            | ±5%              | CL31B152JBCNNN □      |                  |                  |                  |
|                | 1.0uF         | ±20%        | CL21B105MBFNNN □      |                  | 1.5nF            |                | ±10%             | CL31B152KBCNNN □ |                       |                  |                  |                  |
|                | 1.40mm        | 6.3Vdc      | 4.7uF                 | ±10%             | CL21B475KQNNN □  |                | Ref              | 1.8nF            | ±10%                  | CL31B182KBCNNN □ |                  |                  |
|                |               |             | 10uF                  | ±10%             | CL21B106KQNNN □  |                |                  | 2.0nF            | ±10%                  | CL31B202KBCNNN □ |                  |                  |
|                |               | 10Vdc       | 4.7uF                 | ±10%             | CL21B475KPQNNN □ |                | Ref              | 2.2nF            | ±10%                  | CL31B222KBCNNN □ |                  |                  |
|                |               |             | 10uF                  | ±10%             | CL21B106KPQNNN □ |                |                  | 2.4nF            | ±10%                  | CL31B242KBCNNN □ |                  |                  |
|                |               | 16Vdc       | 10uF                  | ±10%             | CL21B106KQNNN □  |                |                  | 3.0nF            | ±10%                  | CL31B302KBCNNN □ |                  |                  |
|                |               |             |                       |                  |                  |                |                  | 3.3nF            | ±5%                   | CL31B332JBCNNN □ |                  |                  |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |                  |      |                  |  |
|----------------|---------------|-------------|-----------------------|------------------|--------|------------------|------|------------------|--|
| 1.00mm         | 10Vdc         | 1.0uF       | ±10%                  | CL31B105KPCNNN □ |        |                  |      |                  |  |
|                |               | 1.2uF       | ±10%                  | CL31B125KPCNNN □ |        |                  |      |                  |  |
|                | 16Vdc         | 22nF        | ±5%                   | CL31B223JOCNNN □ |        |                  |      |                  |  |
|                |               | 100nF       | ±10%                  | CL31B104KOCNNN □ |        |                  |      |                  |  |
|                |               | 220nF       | ±10%                  | CL31B224KOCNNN □ |        |                  |      |                  |  |
|                |               | 270nF       | ±10%                  | CL31B274KOCNNN □ |        |                  |      |                  |  |
|                |               |             |                       |                  |        | 3.3nF            | ±10% | CL31B332KBCNNN □ |  |
|                |               |             |                       |                  |        | 3.9nF            | ±5%  | CL31B392JBCNNN □ |  |
|                |               |             |                       |                  |        | 3.9nF            | ±10% | CL31B392KBCNNN □ |  |
|                |               |             |                       |                  |        | 4.7nF            | ±5%  | CL31B472JBCNNN □ |  |
|                |               |             |                       | 4.7nF            | ±10%   | CL31B472KBCNNN □ |      |                  |  |
|                |               |             |                       | 5.0nF            | ±20%   | CL31B502MBCNNN □ |      |                  |  |

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# Standard & High Capacitors

## Product Line Up (X7R)

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark | Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark          |
|----------------|---------------|-----------------|-----------------------|-----------------|--------|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|
| 1.00mm         | 50Vdc         | 10nF            | ±5%                   | CL31B103JBCNNN□ |        | 1.80mm         | 6.3Vdc        | 10uF            | ±10%                  | CL31B106KQHNNN□ |                 |
|                |               | 10nF            | ±10%                  | CL31B103KBCNNN□ |        |                |               | 10uF            | ±20%                  | CL31B106MQHNNN□ |                 |
|                |               | 10nF            | ±20%                  | CL31B103MBCNNN□ |        |                |               | 22uF            | ±10%                  | CL31B226KQHNNN□ |                 |
|                |               | 15nF            | ±5%                   | CL31B153JBCNNN□ |        |                | 10Vdc         | 4.7uF           | ±10%                  | CL31B475KPHNNN□ |                 |
|                |               | 15nF            | ±10%                  | CL31B153KBCNNN□ |        |                |               | 6.8uF           | +80/-20%              | CL31B685ZPHNNN□ |                 |
|                |               | 18nF            | ±10%                  | CL31B183KBCNNN□ |        |                |               | 10uF            | ±10%                  | CL31B106KPHNNN□ |                 |
|                |               | 22nF            | ±5%                   | CL31B223JBCNNN□ |        |                |               | 22uF            | ±10%                  | CL31B226KPHNNN□ |                 |
|                |               | 22nF            | ±10%                  | CL31B223KBCNNN□ |        |                |               | 22uF            | ±20%                  | CL31B226MPHNNN□ |                 |
|                |               | 27nF            | ±5%                   | CL31B273JBCNNN□ |        |                |               | 16Vdc           | 1.0uF                 | ±20%            | CL31B105MOHNNN□ |
|                |               | 27nF            | ±10%                  | CL31B273KBCNNN□ |        |                | 2.2uF         |                 | ±10%                  | CL31B225KOHNNN□ |                 |
|                |               | 33nF            | ±5%                   | CL31B333JBCNNN□ |        |                | 2.2uF         |                 | ±20%                  | CL31B225MOHNNN□ |                 |
|                |               | 33nF            | ±10%                  | CL31B333KBCNNN□ |        |                | 3.3uF         |                 | ±10%                  | CL31B335KOHNNN□ |                 |
|                |               | 39nF            | ±5%                   | CL31B393JBCNNN□ |        |                | 4.7uF         |                 | ±10%                  | CL31B475KOHNNN□ |                 |
|                |               | 39nF            | ±10%                  | CL31B393KBCNNN□ |        |                | 10uF          |                 | ±10%                  | CL31B106KOHNNN□ |                 |
|                |               | 47nF            | ±5%                   | CL31B473JBCNNN□ |        |                | 10uF          | ±20%            | CL31B106MOHNNN□       |                 |                 |
|                |               | 47nF            | ±10%                  | CL31B473KBCNNN□ |        |                | 25Vdc         | 680nF           | ±10%                  | CL31B684KAHNNN□ |                 |
|                |               | 56nF            | ±5%                   | CL31B563JBCNNN□ |        |                |               | 1.0uF           | ±5%                   | CL31B105JAHNNN□ |                 |
|                |               | 56nF            | ±10%                  | CL31B563KBCNNN□ |        |                |               | 1.0uF           | ±10%                  | CL31B105KAHNNN□ |                 |
|                |               | 68nF            | ±10%                  | CL31B683KBCNNN□ |        |                |               | 1.0uF           | ±20%                  | CL31B105MAHNNN□ |                 |
|                |               | 82nF            | ±10%                  | CL31B823KBCNNN□ |        |                |               | 1.2uF           | ±20%                  | CL31B125MAHNNN□ |                 |
|                |               | 100nF           | ±5%                   | CL31B104JBCNNN□ |        |                |               | 2.2uF           | ±10%                  | CL31B225KAHNNN□ |                 |
|                |               | 100nF           | ±10%                  | CL31B104KBCNNN□ |        |                |               | 2.2uF           | ±20%                  | CL31B225MAHNNN□ |                 |
|                |               | 100nF           | ±20%                  | CL31B104MBCNNN□ |        |                |               | 4.7uF           | ±10%                  | CL31B475KAHNNN□ |                 |
|                |               | 120nF           | ±10%                  | CL31B124KBCNNN□ |        |                |               | 4.7uF           | ±20%                  | CL31B475MAHNNN□ |                 |
|                |               | 150nF           | ±10%                  | CL31B154KBCNNN□ |        |                |               | 10uF            | ±10%                  | CL31B106KAHNNN□ |                 |
|                |               | 220nF           | ±10%                  | CL31B224KBCNNN□ |        |                | 10uF          | ±20%            | CL31B106LHNNN□        | Ref.            |                 |
| 1.20mm         | 16Vdc         | 4.7uF           | ±10%                  | CL31B475KOELNN□ |        | 35Vdc          | 10uF          | ±10%            | CL31B106KLHNNN□       | Ref.            |                 |
| 1.25mm         | 10Vdc         | 2.2uF           | ±10%                  | CL31B225KPENNN□ |        | 50Vdc          | 4.7nF         | ±10%            | CL31B472KBHNNN□       |                 |                 |
|                |               | 2.2uF           | ±20%                  | CL31B225MPENNN□ |        |                | 390nF         | ±10%            | CL31B394KBHNNN□       |                 |                 |
| 25Vdc          | 1.0uF         | ±10%            | CL31B105KAPLNN□       |                 | 470nF  |                | ±5%           | CL31B474JBHNNN□ |                       |                 |                 |
| 1.40mm         | 10Vdc         | 1.5uF           | ±10%                  | CL31B155KPFNNN□ |        |                | 470nF         | ±10%            | CL31B474KBHNNN□       |                 |                 |
|                |               | 2.2uF           | ±10%                  | CL31B225KPFNNN□ |        |                | 680nF         | ±10%            | CL31B684KBHNNN□       |                 |                 |
|                |               | 2.2uF           | ±20%                  | CL31B225MPFNNN□ |        |                | 1.0uF         | ±10%            | CL31B105KBHNNN□       |                 |                 |
|                | 16Vdc         | 820nF           | ±10%                  | CL31B824KOFNNN□ |        |                | 2.2uF         | ±10%            | CL31B225KBHNNN□       |                 |                 |
|                |               | 1.0uF           | ±5%                   | CL31B105JOFNNN□ |        |                | 4.7uF         | ±10%            | CL31B475KBHNNN□       |                 |                 |
|                |               | 1.0uF           | ±10%                  | CL31B105KOFNNN□ |        |                | 10uF          | ±10%            | CL31B106KBHNNN□       | Ref.            |                 |
|                |               | 1.0uF           | ±20%                  | CL31B105MOFNNN□ |        |                |               |                 |                       |                 |                 |
|                | 25Vdc         | 1.5uF           | ±10%                  | CL31B155KOFNNN□ |        |                |               |                 |                       |                 |                 |
|                |               | 10nF            | ±2%                   | CL31B103GAFNNN□ |        |                |               |                 |                       |                 |                 |
|                |               | 470nF           | ±5%                   | CL31B474JAFNNN□ |        |                |               |                 |                       |                 |                 |
| 470nF          |               | ±10%            | CL31B474KAFNNN□       |                 |        |                |               |                 |                       |                 |                 |
| 470nF          |               | ±20%            | CL31B474MAFNNN□       |                 |        |                |               |                 |                       |                 |                 |
| 560nF          |               | ±10%            | CL31B564KAFNNN□       |                 |        |                |               |                 |                       |                 |                 |
| 100nF          |               | ±10%            | CL31B104KBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
| 50Vdc          | 180nF         | ±10%            | CL31B184KBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 200nF         | ±10%            | CL31B204KBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 220nF         | ±10%            | CL31B224JBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 220nF         | ±5%             | CL31B224KBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 220nF         | ±10%            | CL31B224KBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 220nF         | ±20%            | CL31B224MBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 270nF         | ±10%            | CL31B274KBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
|                | 330nF         | ±5%             | CL31B334JBFNNN□       |                 |        |                |               |                 |                       |                 |                 |
| 330nF          | ±10%          | CL31B334KBFNNN□ |                       |                 |        |                |               |                 |                       |                 |                 |
| 1.80mm         | 6.3Vdc        | 3.3uF           | ±10%                  | CL31B335KQHNNN□ |        |                |               |                 |                       |                 |                 |
|                |               | 6.8uF           | ±10%                  | CL31B685KQHNNN□ |        |                |               |                 |                       |                 |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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Product Line Up (X7R)

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           | Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|------------------|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.45mm         | 16Vdc         | 100nF       | ±10%                  | CL32B104KOFNNN □ |                  | 2.70mm         | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBJNNN □ |        |
|                |               | 220nF       | ±10%                  | CL32B224KOFNNN □ |                  |                |               | 10uF        | ±10%                  | CL32B106KBJNNN □ |        |
|                |               | 470nF       | ±10%                  | CL32B474KOFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 680nF       | ±10%                  | CL32B684KOFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 1.0uF       | ±10%                  | CL32B105KOFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 2.2uF       | ±10%                  | CL32B225KOFNNN □ |                  |                |               |             |                       |                  |        |
|                | 25Vdc         | 220nF       | ±5%                   | CL32B224JAFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 220nF       | ±10%                  | CL32B224KAFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 470nF       | ±20%                  | CL32B474MAFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 560nF       | ±5%                   | CL32B564JAFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 1.0uF       | ±10%                  | CL32B105KAFNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 50Vdc       | 47nF                  | ±10%             | CL32B473KBFNNN □ |                |               |             |                       |                  |        |
|                | 100nF         |             | ±5%                   | CL32B104JBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 100nF         |             | ±10%                  | CL32B104KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 100nF         |             | ±20%                  | CL32B104MBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 120nF         |             | ±5%                   | CL32B124JBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 120nF         |             | ±10%                  | CL32B124KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 120nF         |             | ±20%                  | CL32B124MBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 150nF         |             | ±5%                   | CL32B154JBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 150nF         |             | ±10%                  | CL32B154KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 220nF         |             | ±5%                   | CL32B224JBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 220nF         |             | ±10%                  | CL32B224KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 270nF         |             | ±10%                  | CL32B274KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 330nF         |             | ±5%                   | CL32B334JBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 330nF         |             | ±10%                  | CL32B334KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 390nF         |             | ±10%                  | CL32B394KBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 470nF         |             | ±5%                   | CL32B474JBFNNN □ |                  |                |               |             |                       |                  |        |
|                | 470nF         | ±10%        | CL32B474KBFNNN □      |                  |                  |                |               |             |                       |                  |        |
|                | 1.80mm        | 16Vdc       | 3.3uF                 | ±10%             | CL32B335KOHNNN □ |                |               |             |                       |                  |        |
|                |               | 25Vdc       | 330nF                 | ±10%             | CL32B334KAHNNN □ |                |               |             |                       |                  |        |
|                |               |             | 2.2uF                 | ±10%             | CL32B225KAHNNN □ |                |               |             |                       |                  |        |
|                |               | 50Vdc       | 820nF                 | ±10%             | CL32B824KBHNNN □ |                |               |             |                       |                  |        |
| 1.0uF          |               |             | ±10%                  | CL32B105KBHNNN □ |                  |                |               |             |                       |                  |        |
| 1.0uF          |               |             | ±20%                  | CL32B105MBHNNN □ |                  |                |               |             |                       |                  |        |
| 2.00mm         | 16Vdc         | 10uF        | ±10%                  | CL32B106KOULNN □ |                  |                |               |             |                       |                  |        |
|                | 25Vdc         | 10uF        | ±10%                  | CL32B106KAULNN □ |                  |                |               |             |                       |                  |        |
|                | 35Vdc         | 4.7uF       | ±10%                  | CL32B475KLULNN □ |                  |                |               |             |                       |                  |        |
|                |               | 10uF        | ±10%                  | CL32B106KLULNN □ |                  |                |               |             |                       |                  |        |
| 2.20mm         | 10Vdc         | 4.7uF       | ±10%                  | CL32B475KPINNN □ |                  |                |               |             |                       |                  |        |
|                |               | 10uF        | ±10%                  | CL32B106KPINNN □ |                  |                |               |             |                       |                  |        |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL32B475KOINNN □ |                  |                |               |             |                       |                  |        |
|                | 25Vdc         | 2.2uF       | ±10%                  | CL32B225KAINNN □ |                  |                |               |             |                       |                  |        |
| 2.70mm         | 6.3Vdc        | 22uF        | ±20%                  | CL32B226MQJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 47uF        | ±20%                  | CL32B476MQJNNN □ | Ref.             |                |               |             |                       |                  |        |
|                | 10Vdc         | 22uF        | ±10%                  | CL32B226KPJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 47uF        | ±20%                  | CL32B476MPJNNN □ | Ref.             |                |               |             |                       |                  |        |
|                | 16Vdc         | 10uF        | ±10%                  | CL32B106KOJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 22uF        | ±10%                  | CL32B226KOJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 22uF        | ±20%                  | CL32B226MOJNNN □ |                  |                |               |             |                       |                  |        |
|                | 25Vdc         | 3.3uF       | ±10%                  | CL32B335KAJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 10uF        | ±10%                  | CL32B106KAJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 22uF        | ±10%                  | CL32B226KAJNNN □ |                  |                |               |             |                       |                  |        |
|                | 35Vdc         | 10uF        | ±10%                  | CL32B106KLJNNN □ |                  |                |               |             |                       |                  |        |
|                |               | 50Vdc       | 2.2uF                 | ±10%             | CL32B225KBJNNN □ |                |               |             |                       |                  |        |

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# Low Profile Capacitors

## Feature

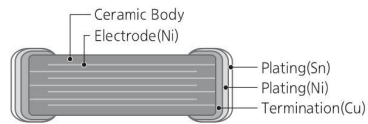
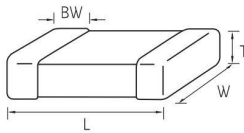


- Decoupling and filtering application where the thickness is limited
- A range of low – profile products as thin as 0.11mm in 1005mm

## Application

- Mobile phone
- Smart watch
- IC Package

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |                |                |                 |
|-----------|----------|---------------|-----------|----------------|----------------|-----------------|
|           |          | L             | W         | T              | Thickness Code | BW              |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.0975±0.0125  | L              | 0.25±0.075      |
|           |          | 1.00±0.10     | 0.50±0.05 | 0.19±0.03      | X              |                 |
|           |          | 1.00±0.05     | 0.50±0.05 | 0.30±0.03      | 3              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.50+0.0/-0.10 | 5              | 0.30±0.20       |
|           |          | 1.60±0.10     | 0.80±0.10 | 0.60±0.10      | 6              |                 |
|           |          | 1.60±0.10     | 0.80±0.10 | 0.70±0.10      | 7              |                 |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.60±0.10      | 6              | 0.50+0.20/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.70±0.10      | 7              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.80±0.10      | 8              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.85±0.10      | C              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.90±0.10      | 9              |                 |
| 31        | 1206     | 3.20±0.20     | 1.60±0.20 | 0.85±0.10      | C              | 0.50±0.30       |
|           |          | 3.20±0.20     | 1.60±0.20 | 0.90±0.10      | 9              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.10±0.10      | E              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.15±0.10      | M              |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 0.85±0.10      | C              | 0.60±0.30       |
|           |          | 3.20±0.30     | 2.50±0.20 | 0.90±0.10      | 9              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.15±0.10      | M              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.35±0.15      | S              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.60±0.10      | T              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.80±0.20      | U              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.00±0.20      | I              |                 |

Low Profile Capacitance Table (X5R)

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance(uF) |      |     |     |     |    |      |    |    |     |  |
|----------------|-------------|---------------------|-----------------|------|-----|-----|-----|----|------|----|----|-----|--|
|                |             |                     | 0.22            | 0.47 | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 | 68 | 100 |  |
| 0402 (1005)    | 0.11        | 6.3                 | 0.22            |      |     |     |     |    |      |    |    |     |  |
|                | 0.22        | 6.3                 |                 | 0.47 |     |     |     |    |      |    |    |     |  |
|                | 0.33        | 4.0                 |                 |      | 1.0 |     |     |    |      |    |    |     |  |
|                |             | 6.3                 |                 |      |     | 2.2 | 4.7 | 10 |      |    |    |     |  |
| 0603 (1608)    | 0.50        | 4.0                 |                 |      |     |     |     | 10 |      |    |    |     |  |
|                |             | 6.3                 |                 |      |     | 2.2 | 4.7 | 10 |      |    |    |     |  |
|                |             | 10                  |                 |      | 1.0 | 2.2 | 4.7 | 10 |      |    |    |     |  |
|                |             | 16                  |                 |      | 1.0 | 2.2 | 4.7 | 10 |      |    |    |     |  |
|                |             | 25                  |                 |      | 1.0 | 2.2 | 4.7 | 10 |      |    |    |     |  |
|                | 0.60        | 6.3                 |                 |      |     |     | 4.7 | 10 |      |    |    |     |  |
|                |             | 6.3                 |                 |      |     |     |     |    | 22   | 47 |    |     |  |
|                | 0.80        | 10                  |                 |      |     |     |     |    |      | 22 | 47 |     |  |
|                |             | 10                  |                 |      |     |     |     |    |      | 22 | 47 |     |  |
| 16             |             |                     |                 |      |     |     |     |    | 22   | 47 |    |     |  |
| 0805 (2012)    | 0.70        | 10                  |                 |      |     | 2.2 | 4.7 | 10 |      |    |    |     |  |
|                |             | 16                  |                 |      | 1.0 | 2.2 | 4.7 | 10 |      |    |    |     |  |
|                | 0.80        | 6.3                 |                 |      |     |     |     | 10 | 22   | 47 |    |     |  |
|                |             | 10                  |                 |      |     |     |     | 10 | 22   | 47 |    |     |  |
|                | 0.90        | 6.3                 |                 |      |     |     |     |    |      | 47 |    |     |  |
|                | 0.95        | 4.0                 |                 |      |     |     |     |    | 10   | 22 |    |     |  |
|                |             | 6.3                 |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 10                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 16                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 25                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 35                  |                 |      |     | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 50                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                | 1.00        | 6.3                 |                 |      |     |     |     |    |      |    | 47 |     |  |
|                |             | 50                  |                 |      |     | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
| 1.20           | 6.3         |                     |                 |      |     |     |     |    | 33uF |    |    |     |  |
| 1206 (3216)    | 0.95        | 6.3                 |                 |      |     |     |     | 10 | 22   | 47 |    |     |  |
|                |             | 10                  |                 |      |     |     |     | 10 | 22   | 47 |    |     |  |
|                |             | 16                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 25                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                | 1.00        | 35                  |                 |      |     |     | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 50                  |                 |      | 1.0 | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                |             | 100                 |                 |      |     | 2.2 | 4.7 | 10 | 22   | 47 |    |     |  |
|                | 1.20        | 16                  |                 |      |     |     | 4.7 | 10 | 22   | 47 |    |     |  |
|                | 1.25        | 10                  |                 |      |     |     |     |    | 10   | 22 | 47 |     |  |
| 16             |             |                     |                 |      |     |     |     | 10 | 22   | 47 |    |     |  |
| 25             |             |                     |                 | 1.0  | 2.2 | 4.7 | 10  | 22 | 47   |    |    |     |  |

# Low Profile Capacitors

Low Profile Capacitance Table (X5R)

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance(uF) |      |     |     |     |       |    |    |    |     |  |  |  |
|----------------|-------------|---------------------|-----------------|------|-----|-----|-----|-------|----|----|----|-----|--|--|--|
|                |             |                     | 0.22            | 0.47 | 1.0 | 2.2 | 4.7 | 10    | 22 | 47 | 68 | 100 |  |  |  |
| 1210 (3225)    | 0.95        | 16                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                | 1.00        | 25                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                | 1.25        | 16                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                | 1.50        | 10                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                |             | 25                  |                 |      |     |     |     | 6.8uF |    |    |    |     |  |  |  |
|                | 1.70        | 16                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                |             | 25                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                | 2.00        | 25                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                |             | 35                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
|                | 2.20        | 10                  |                 |      |     |     |     |       |    |    |    |     |  |  |  |
| 16             |             |                     |                 |      |     |     |     |       |    |    |    |     |  |  |  |
| 25             |             |                     |                 |      |     |     |     |       |    |    |    |     |  |  |  |

Low Profile Capacitance Table (X6S)

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance(uF) |      |     |     |     |     |    |     |    |     |  |  |
|----------------|-------------|---------------------|-----------------|------|-----|-----|-----|-----|----|-----|----|-----|--|--|
|                |             |                     | 0.22            | 0.47 | 1.0 | 2.2 | 4.7 | 10  | 22 | 47  | 68 | 100 |  |  |
| 0402(1005)     | 0.33        | 6.3                 |                 |      | X6S |     |     |     |    |     |    |     |  |  |
| 0805 (2012)    | 0.95        | 2.5                 |                 |      |     |     |     |     |    | X6S |    |     |  |  |
|                |             | 4.0                 |                 |      |     |     |     | X6S |    |     |    |     |  |  |
|                |             | 10                  |                 |      |     |     |     | X6S |    |     |    |     |  |  |
| 1206(3216)     | 0.95        | 25                  |                 |      |     |     | X6S |     |    |     |    |     |  |  |

Product Line Up (X5R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark        |
|----------------|---------------|-------------|-----------------------|------------------|---------------|
| 0.11mm         | 6.3Vdc        | 220nF       | ±20%                  | CL05A224MQLHEC □ | Derating Ref. |
| 0.22mm         | 6.3Vdc        | 470nF       | ±20%                  | CL05A474MQXLNN □ | Derating Ref. |
|                |               | 1.0uF       | ±20%                  | CL05A105MQXLNN □ | Derating Ref. |
|                |               | 2.2uF       | ±20%                  | CL05A225MR3LRN □ | Derating Ref. |
| 0.33mm         | 4.0Vdc        | 2.2uF       | ±20%                  | CL05A225MR3LRN □ | Derating Ref. |
|                | 6.3Vdc        | 1.0uF       | ±20%                  | CL05A105MQ3LNN □ | Derating Ref. |
|                |               | 2.2uF       | ±20%                  | CL05A225MQ3LRN □ | Derating Ref. |
| 0.35mm         | 6.3Vdc        | 4.7uF       | ±20%                  | CL05A475MQ3LUN □ | Derating Ref. |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |          |
|----------------|---------------|-------------|-----------------------|------------------|------------------|----------|
| 0.70mm         | 10Vdc         | 2.2uF       | ±10%                  | CL21A225KP6LNN □ |                  |          |
|                | 16Vdc         | 1.0uF       | ±20%                  | CL21A105M06LNN □ |                  |          |
|                |               | 2.2uF       | ±10%                  | CL21A225K06LNN □ |                  |          |
| 0.80mm         | 6.3Vdc        | 10uF        | ±10%                  | CL21A106KQ7LQN □ |                  |          |
|                |               | 47uF        | ±20%                  | CL21A476MQ7FRN □ | Derating         |          |
|                |               | 47uF        | ±20%                  | CL21A476MQ7LRN □ | Derating         |          |
|                | 10Vdc         | 10uF        | ±10%                  | CL21A106KQ7LQN □ | Derating         |          |
|                |               | 47uF        | ±20%                  | CL21A476MQ8LRN □ | Derating         |          |
| 0.90mm         | 6.3Vdc        | 47uF        | ±20%                  | CL21A476MQ8LRN □ | Derating         |          |
| 0.95mm         | 4.0Vdc        | 22uF        | ±20%                  | CL21A226MRCLRN □ | Derating         |          |
|                |               | 47uF        | ±20%                  | CL21A476MRCLRP □ | Derating         |          |
|                |               | 1.0uF       | ±10%                  | CL21A105KQCLNN □ |                  |          |
|                | 6.3Vdc        | 1.0uF       | ±10%                  | CL21A105KQCLNN □ |                  |          |
|                |               | 4.7uF       | ±10%                  | CL21A475KQCLNN □ |                  |          |
|                |               | 4.7uF       | ±20%                  | CL21A475MQCLNN □ |                  |          |
|                |               | 10uF        | ±10%                  | CL21A106KQCLNN □ |                  |          |
|                |               | 10uF        | ±10%                  | CL21A106KQCLRN □ |                  |          |
|                |               | 10uF        | ±20%                  | CL21A106MQCLNN □ |                  |          |
|                |               | 22uF        | ±10%                  | CL21A226KQCLRN □ | Derating         |          |
|                |               | 22uF        | ±20%                  | CL21A226MQCLQN □ | Derating         |          |
|                |               | 22uF        | ±20%                  | CL21A226MQCLRN □ | Derating         |          |
|                |               | 47uF        | ±20%                  | CL21A476MQCLRN □ | Derating         |          |
|                | 10Vdc         | 2.2uF       | ±10%                  | CL21A225KQCLNN □ |                  |          |
|                |               | 4.7uF       | ±10%                  | CL21A475KQCLNN □ |                  |          |
|                |               | 4.7uF       | ±20%                  | CL21A475MPCLNN □ |                  |          |
|                |               | 10uF        | ±10%                  | CL21A106KQCLNN □ |                  |          |
|                |               | 10uF        | ±10%                  | CL21A106KQCLRN □ |                  |          |
|                |               | 10uF        | ±20%                  | CL21A106MPCLNN □ |                  |          |
|                |               | 10uF        | ±20%                  | CL21A106MPCLQN □ | Derating         |          |
|                |               | 22uF        | ±10%                  | CL21A226KQCLRN □ | Derating         |          |
|                |               | 22uF        | ±20%                  | CL21A226MPCLRN □ | Derating         |          |
|                |               | 22uF        | +80/-20%              | CL21A226ZPCLRN □ | Derating         |          |
|                |               | 16Vdc       | 2.2uF                 | ±10%             | CL21A225KQCLNN □ |          |
|                |               |             | 4.7uF                 | ±10%             | CL21A475KQCLNN □ |          |
|                |               |             | 4.7uF                 | ±10%             | CL21A475KQCLRN □ |          |
|                |               |             | 10uF                  | ±10%             | CL21A106KQCLNN □ | Derating |
|                |               |             | 10uF                  | ±10%             | CL21A106KQCLRN □ | Derating |
|                |               |             | 10uF                  | ±10%             | CL21A106KQCLSN □ | Derating |
|                |               |             | 22uF                  | ±20%             | CL21A226MOCLRN □ | Derating |
|                | 25Vdc         |             | 1.0uF                 | ±10%             | CL21A105KQCLNN □ |          |
|                |               |             | 1.0uF                 | ±10%             | CL21A105KQCLNN □ | Derating |
|                |               |             | 2.2uF                 | ±10%             | CL21A225KQCLNN □ | Derating |
| 4.7uF          |               | ±10%        | CL21A475KQCLRN □      | Derating         |                  |          |
| 10uF           |               | ±10%        | CL21A106KQCLRN □      | Derating         |                  |          |
| 35Vdc          | 4.7uF         | ±10%        | CL21A475KQCLRN □      | Derating         |                  |          |
| 50Vdc          | 1.0uF         | ±10%        | CL21A105KQCLNN □      |                  |                  |          |
|                | 1.0uF         | ±10%        | CL21A105KQCLNN □      | Derating         |                  |          |
| 1.00mm         | 6.3Vdc        | 33uF        | ±20%                  | CL21A336MQ9LRN □ | Derating         |          |
|                |               | 47uF        | ±20%                  | CL21A476MQ9LRN □ | Derating         |          |
| 1.20mm         | 6.3Vdc        | 2.2uF       | ±10%                  | CL21A225KQ9LRN □ | Derating         |          |
|                |               | 33uF        | ±20%                  | CL21A336MQELRN □ | Derating         |          |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |               |
|----------------|---------------|-------------|-----------------------|------------------|------------------|---------------|
| 0.50mm         | 4.0Vdc        | 10uF        | ±20%                  | CL10A106MR5LQN □ | Derating Ref.    |               |
|                |               | 6.3Vdc      | 2.2uF                 | ±10%             | CL10A225KQ5LNN □ |               |
|                |               |             | 4.7uF                 | ±10%             | CL10A475KQ5LNN □ |               |
|                |               |             | 4.7uF                 | ±20%             | CL10A475MQ5LNN □ |               |
|                |               |             | 10uF                  | ±20%             | CL10A106MQ5LRN □ | Derating Ref. |
|                | 10Vdc         | 1.0uF       | ±10%                  | CL10A105KP5LNN □ |                  |               |
|                |               | 2.2uF       | ±10%                  | CL10A225KP5LNN □ |                  |               |
|                |               | 4.7uF       | ±10%                  | CL10A475KP5LNN □ | Derating         |               |
|                |               | 4.7uF       | ±20%                  | CL10A475MP5LNN □ | Derating         |               |
|                |               | 2.2uF       | ±10%                  | CL10A225KA5LNN □ | Derating         |               |
| 0.60mm         | 6.3Vdc        | 4.7uF       | ±10%                  | CL10A475KQ5NNN □ |                  |               |
|                |               | 4.7uF       | ±20%                  | CL10A475MQ5NNN □ |                  |               |
|                | 10Vdc         | 2.2uF       | ±20%                  | CL10A226MP7LUN □ | Derating         |               |
| 0.80mm         | 6.3Vdc        | 22uF        | ±20%                  | CL10A226MP7LUN □ | Derating         |               |
|                | 16Vdc         | 22uF        | ±20%                  | CL10A226M07JZN □ | Derating         |               |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Low Profile Capacitors

## Product Line Up (X5R)

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 0.95mm         | 6.3Vdc        | 10uF        | ±20%                  | CL31A106MQCLNN □ |          |
|                |               | 22uF        | ±10%                  | CL31A226KQCLNN □ | Derating |
|                |               | 22uF        | ±20%                  | CL31A226MQCLNN □ | Derating |
|                | 10Vdc         | 10uF        | ±10%                  | CL31A106KPCLNN □ |          |
|                |               | 10uF        | ±20%                  | CL31A106MPCLNN □ |          |
|                | 16Vdc         | 2.2uF       | ±10%                  | CL31A225KOCLNN □ |          |
|                |               | 4.7uF       | ±10%                  | CL31A475KOCLNN □ |          |
|                |               | 4.7uF       | ±20%                  | CL31A475MOCLNN □ |          |
|                |               | 10uF        | ±10%                  | CL31A106KOCLNN □ |          |
|                |               | 22uF        | ±10%                  | CL31A226KOCLNN □ | Derating |
|                |               | 22uF        | ±20%                  | CL31A226MOCLNN □ | Derating |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL31A475KACLNN □ |          |
| 10uF           |               | ±10%        | CL31A106KACLNN □      | Derating         |          |
| 1.00mm         | 35Vdc         | 4.7uF       | ±10%                  | CL31A475KL9LNN □ | Derating |
|                | 50Vdc         | 1.0uF       | ±10%                  | CL31A105KB9LNN □ |          |
|                |               | 2.2uF       | ±10%                  | CL31A225KB9LNN □ |          |
|                | 100Vdc        | 2.2uF       | ±10%                  | CL31A225KC9LNN □ | Derating |
| 1.20mm         | 16Vdc         | 4.7uF       | ±10%                  | CL31A475KOELNN □ |          |
| 1.25mm         | 10Vdc         | 10uF        | ±10%                  | CL31A106KPPLNN □ |          |
|                |               | 10uF        | ±20%                  | CL31A106MPPLNN □ |          |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL31A475KOPLNN □ |          |
|                |               | 4.7uF       | ±20%                  | CL31A475MOPLNN □ |          |
|                | 25Vdc         | 1.0uF       | ±10%                  | CL31A105KAPLNN □ |          |
|                |               | 2.2uF       | ±10%                  | CL31A225KAPLNN □ |          |
|                |               | 4.7uF       | ±10%                  | CL31A475KAPLNN □ |          |

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 0.95mm         | 16Vdc         | 10uF        | ±10%                  | CL32A106KOCLNN □ |          |
|                |               | 22uF        | ±20%                  | CL32A226MOCLNN □ | Derating |
| 1.00mm         | 25Vdc         | 10uF        | ±10%                  | CL32A106KA9LNN □ |          |
| 1.25mm         | 16Vdc         | 10uF        | ±10%                  | CL32A106KOMLNN □ |          |
|                |               | 22uF        | ±20%                  | CL32A226KPSLNN □ |          |
| 1.50mm         | 10Vdc         | 22uF        | ±10%                  | CL32A226KPSLNN □ |          |
|                |               | 22uF        | ±20%                  | CL32A226MPSLNN □ |          |
| 1.70mm         | 16Vdc         | 6.8uF       | ±10%                  | CL32A685KASLNN □ |          |
|                |               | 22uF        | ±10%                  | CL32A226KOTFNN □ | Derating |
|                | 22uF          | ±20%        | CL32A226MOTLNN □      | Derating         |          |
| 2.00mm         | 25Vdc         | 10uF        | ±10%                  | CL32A106KATLNN □ |          |
|                |               | 10uF        | ±20%                  | CL32A106MATLNN □ |          |
|                | 35Vdc         | 4.7uF       | ±10%                  | CL32A475KAULNN □ |          |
| 2.20mm         | 10Vdc         | 10uF        | ±10%                  | CL32A106KAILNN □ |          |
|                |               | 10uF        | ±20%                  | CL32A106MLLNN □  |          |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL32A475KLULNN □ |          |
|                |               | 10uF        | ±10%                  | CL32A106KLULNN □ |          |
|                |               | 10uF        | ±20%                  | CL32A106MLLNN □  |          |
| 25Vdc          | 2.2uF         | ±20%        | CL32A225MAINNN □      |                  |          |
|                |               | 4.7uF       | ±10%                  | CL32A475KAINNN □ |          |
|                |               | 10uF        | ±10%                  | CL32A106KAILNN □ |          |
|                |               | 10uF        | ±20%                  | CL32A106MAILNN □ |          |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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## Product Line Up ( X6S )

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 0.33mm         | 6.3Vdc        | 1.0uF       | ±20%                  | CL05X105MQ3LNN □ | Derating |

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 0.95mm         | 2.5Vdc        | 22uF        | ±20%                  | CL21X226MSCLRN □ | Derating |
|                | 4.0Vdc        | 10uF        | ±10%                  | CL21X106KRCLRN □ | Derating |
|                | 10Vdc         | 10uF        | ±10%                  | CL21X106KPCLRN □ | Derating |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.95mm         | 25Vdc         | 4.7uF       | ±10%                  | CL31X475KACLNN □ |        |

# Super Small Size Capacitors

## Feature

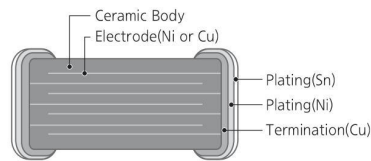
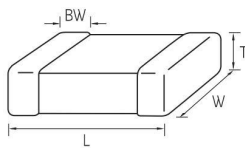


- Small size chip
- 02 and 03 Series (High - Q) MLCC shows very low ESR value
- 02 and 03 Series are suited to only reflow soldering
- 02 and 03 Series are suited to miniature RF module, portable equipment and high frequency circuit

## Application

- DC - DC Converter
- Mobile phone, Tablet devices
- PC (Laptop, Desktop)
- HDD /SSD Board

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |           |
|-----------|----------|---------------|-----------|-----------|----------------|-----------|
|           |          | L             | W         | T         | Thickness Code | BW        |
| 02        | 01005    | 0.40±0.02     | 0.20±0.02 | 0.20±0.02 | 2              | 0.10±0.03 |
| 03        | 0201     | 0.60±0.03     | 0.30±0.03 | 0.30±0.03 | 3              | 0.15±0.05 |

# Super Small Size Capacitors

Super Small Size Capacitance Table (C0G)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance(pF) |     |     |    |      |    |     |
|----------------|---------------------|-----------------|-----|-----|----|------|----|-----|
|                |                     | 0.2             | 0.5 | 1.0 | 10 | 22   | 47 | 100 |
| 01005 (0402)   | 6.3                 |                 |     |     |    |      |    |     |
|                | 16                  |                 |     |     |    |      |    |     |
|                | 25                  |                 |     |     |    | 27pF |    |     |
| 0201 (0603)    | 6.3                 |                 |     |     |    |      |    |     |
|                | 25                  |                 |     |     |    |      |    |     |
|                | 50                  |                 |     |     |    |      |    |     |

Super Small Size Capacitance Table (X5R)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|----------------|---------------------|-------------|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
|                |                     | pF          |     |     |     | nF  |     |     |     |    |    |    |    |    |    |     |     | uF  |     |     |
|                |                     | 220         | 330 | 470 | 680 | 1.0 | 2.2 | 3.3 | 4.7 | 10 | 15 | 22 | 33 | 47 | 68 | 100 | 220 | 470 | 1.0 | 2.2 |
| 01005 (0402)   | 4.0                 |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|                | 6.3                 |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|                | 10                  |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
| 0201 (0603)    | 4.0                 |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|                | 6.3                 |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|                | 10                  |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|                | 16                  |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |
|                | 25                  |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |

Super Small Size Capacitance Table (X7R)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |
|----------------|---------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|--|--|--|--|--|--|--|--|
|                |                     | pF          |     |     |     |     | nF  |     |     |     |     |    |  |  |  |  |  |  |  |  |
|                |                     | 100         | 220 | 330 | 470 | 680 | 1.0 | 2.2 | 3.3 | 4.7 | 6.8 | 10 |  |  |  |  |  |  |  |  |
| 01005(0402)    | 10                  |             |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |
| 0201 (0603)    | 6.3                 |             |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |
|                | 10                  |             |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |
|                | 16                  |             |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |
|                | 25                  |             |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |
|                | 50                  |             |     |     |     |     |     |     |     |     |     |    |  |  |  |  |  |  |  |  |

Super Small Size Capacitance Table (X6S)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance(nF) |     |     |     |    |    |    |     |  |  |  |  |
|----------------|---------------------|-----------------|-----|-----|-----|----|----|----|-----|--|--|--|--|
|                |                     | 2.2             | 3.3 | 4.7 | 6.8 | 10 | 22 | 47 | 100 |  |  |  |  |
| 01005(0402)    | 2.5                 |                 |     |     |     |    |    |    |     |  |  |  |  |
| 0201 (0603)    | 4.0                 |                 |     |     |     |    |    |    |     |  |  |  |  |
|                | 6.3                 |                 |     |     |     |    |    |    |     |  |  |  |  |



Product Line Up (COG)

■ Size : 0.40 X 0.20mm (inch : 01005)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Thickness Max.   | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|------------------|---------------|-------------|-----------------------|------------------|
| 0.22mm         | 16Vdc         | 0.2pF            | ±0.1pF                | CL02C0R2B02GNN □ | 0.22mm           | 16Vdc         | 5.1pF       | ±0.25pF               | CL02C5R1C02GNN □ |
|                |               | 0.3pF            | ±0.1pF                | CL02C0R3B02GNN □ |                  |               | 5.2pF       | ±0.1pF                | CL02C5R2B02GNN □ |
|                |               | 0.4pF            | ±0.1pF                | CL02C0R4B02GNN □ |                  |               | 5.3pF       | ±0.1pF                | CL02C5R3B02GNN □ |
|                |               | 0.5pF            | ±0.1pF                | CL02C0R5B02GNN □ |                  |               | 5.4pF       | ±0.1pF                | CL02C5R4B02GNN □ |
|                |               | 0.6pF            | ±0.1pF                | CL02C0R6B02GNN □ |                  |               | 5.5pF       | ±0.1pF                | CL02C5R5B02GNN □ |
|                |               | 0.7pF            | ±0.1pF                | CL02C0R7B02GNN □ |                  |               | 5.6pF       | ±0.1pF                | CL02C5R6B02GNN □ |
|                |               | 0.8pF            | ±0.1pF                | CL02C0R8B02GNN □ |                  |               | 5.6pF       | ±0.25pF               | CL02C5R6C02GNN □ |
|                |               | 0.9pF            | ±0.1pF                | CL02C0R9B02GNN □ |                  |               | 5.7pF       | ±0.1pF                | CL02C5R7B02GNN □ |
|                |               | 1.0pF            | ±0.1pF                | CL02C010B02GNN □ |                  |               | 5.7pF       | ±0.25pF               | CL02C5R7C02GNN □ |
|                |               | 1.1pF            | ±0.1pF                | CL02C1R1B02GNN □ |                  |               | 5.8pF       | ±0.1pF                | CL02C5R8B02GNN □ |
|                |               | 1.2pF            | ±0.1pF                | CL02C1R2B02GNN □ |                  |               | 5.9pF       | ±0.1pF                | CL02C5R9B02GNN □ |
|                |               | 1.3pF            | ±0.1pF                | CL02C1R3B02GNN □ |                  |               | 6.0pF       | ±0.1pF                | CL02C060B02GNN □ |
|                |               | 1.4pF            | ±0.1pF                | CL02C1R4B02GNN □ |                  |               | 6.1pF       | ±0.1pF                | CL02C6R1B02GNN □ |
|                |               | 1.5pF            | ±0.1pF                | CL02C1R5B02GNN □ |                  |               | 6.2pF       | ±0.1pF                | CL02C6R2B02GNN □ |
|                |               | 1.6pF            | ±0.1pF                | CL02C1R6B02GNN □ |                  |               | 6.3pF       | ±0.1pF                | CL02C6R3B02GNN □ |
|                |               | 1.7pF            | ±0.1pF                | CL02C1R7B02GNN □ |                  |               | 6.4pF       | ±0.1pF                | CL02C6R4B02GNN □ |
|                |               | 1.8pF            | ±0.1pF                | CL02C1R8B02GNN □ |                  |               | 6.5pF       | ±0.1pF                | CL02C6R5B02GNN □ |
|                |               | 1.9pF            | ±0.1pF                | CL02C1R9B02GNN □ |                  |               | 6.6pF       | ±0.1pF                | CL02C6R6B02GNN □ |
|                |               | 2.0pF            | ±0.1pF                | CL02C020B02GNN □ |                  |               | 6.7pF       | ±0.1pF                | CL02C6R7B02GNN □ |
|                |               | 2.1pF            | ±0.1pF                | CL02C2R1B02GNN □ |                  |               | 6.8pF       | ±0.1pF                | CL02C6R8B02GNN □ |
|                |               | 2.2pF            | ±0.1pF                | CL02C2R2B02GNN □ |                  |               | 6.9pF       | ±0.1pF                | CL02C6R9B02GNN □ |
|                |               | 2.3pF            | ±0.1pF                | CL02C2R3B02GNN □ |                  |               | 7.0pF       | ±0.1pF                | CL02C070B02GNN □ |
|                |               | 2.4pF            | ±0.1pF                | CL02C2R4B02GNN □ |                  |               | 7.1pF       | ±0.1pF                | CL02C7R1B02GNN □ |
|                |               | 2.5pF            | ±0.1pF                | CL02C2R5B02GNN □ |                  |               | 7.2pF       | ±0.1pF                | CL02C7R2B02GNN □ |
|                |               | 2.6pF            | ±0.1pF                | CL02C2R6B02GNN □ |                  |               | 7.3pF       | ±0.1pF                | CL02C7R3B02GNN □ |
|                |               | 2.7pF            | ±0.1pF                | CL02C2R7B02GNN □ |                  |               | 7.4pF       | ±0.1pF                | CL02C7R4B02GNN □ |
|                |               | 2.8pF            | ±0.1pF                | CL02C2R8B02GNN □ |                  |               | 7.5pF       | ±0.1pF                | CL02C7R5B02GNN □ |
|                |               | 2.9pF            | ±0.1pF                | CL02C2R9B02GNN □ |                  |               | 7.6pF       | ±0.1pF                | CL02C7R6B02GNN □ |
|                |               | 3.0pF            | ±0.1pF                | CL02C030B02GNN □ |                  |               | 7.7pF       | ±0.1pF                | CL02C7R7B02GNN □ |
|                |               | 3.1pF            | ±0.1pF                | CL02C3R1B02GNN □ |                  |               | 7.8pF       | ±0.1pF                | CL02C7R8B02GNN □ |
|                |               | 3.2pF            | ±0.1pF                | CL02C3R2B02GNN □ |                  |               | 7.9pF       | ±0.1pF                | CL02C7R9B02GNN □ |
|                |               | 3.3pF            | ±0.1pF                | CL02C3R3B02GNN □ |                  |               | 8.0pF       | ±0.1pF                | CL02C080B02GNN □ |
|                |               | 3.3pF            | ±0.25pF               | CL02C3R3C02GNN □ |                  |               | 8.0pF       | ±0.25pF               | CL02C080C02GNN □ |
|                |               | 3.4pF            | ±0.1pF                | CL02C3R4B02GNN □ |                  |               | 8.1pF       | ±0.1pF                | CL02C8R1B02GNN □ |
| 3.5pF          | ±0.1pF        | CL02C3R5B02GNN □ | 8.2pF                 | ±0.1pF           | CL02C8R2B02GNN □ |               |             |                       |                  |
| 3.5pF          | ±0.25pF       | CL02C3R5C02GNN □ | 8.2pF                 | ±0.25pF          | CL02C8R2C02GNN □ |               |             |                       |                  |
| 3.6pF          | ±0.1pF        | CL02C3R6B02GNN □ | 8.3pF                 | ±0.1pF           | CL02C8R3B02GNN □ |               |             |                       |                  |
| 3.7pF          | ±0.1pF        | CL02C3R7B02GNN □ | 8.4pF                 | ±0.1pF           | CL02C8R4B02GNN □ |               |             |                       |                  |
| 3.7pF          | ±0.25pF       | CL02C3R7C02GNN □ | 8.4pF                 | ±0.25pF          | CL02C8R4C02GNN □ |               |             |                       |                  |
| 3.8pF          | ±0.1pF        | CL02C3R8B02GNN □ | 8.5pF                 | ±0.1pF           | CL02C8R5B02GNN □ |               |             |                       |                  |
| 3.9pF          | ±0.1pF        | CL02C3R9B02GNN □ | 8.6pF                 | ±0.1pF           | CL02C8R6B02GNN □ |               |             |                       |                  |
| 4.0pF          | ±0.1pF        | CL02C040B02GNN □ | 8.7pF                 | ±0.1pF           | CL02C8R7B02GNN □ |               |             |                       |                  |
| 4.1pF          | ±0.1pF        | CL02C4R1B02GNN □ | 8.8pF                 | ±0.1pF           | CL02C8R8B02GNN □ |               |             |                       |                  |
| 4.2pF          | ±0.1pF        | CL02C4R2B02GNN □ | 8.9pF                 | ±0.1pF           | CL02C8R9B02GNN □ |               |             |                       |                  |
| 4.3pF          | ±0.1pF        | CL02C4R3B02GNN □ | 9.0pF                 | ±0.1pF           | CL02C090B02GNN □ |               |             |                       |                  |
| 4.4pF          | ±0.1pF        | CL02C4R4B02GNN □ | 9.1pF                 | ±0.1pF           | CL02C9R1B02GNN □ |               |             |                       |                  |
| 4.5pF          | ±0.1pF        | CL02C4R5B02GNN □ | 9.2pF                 | ±0.1pF           | CL02C9R2B02GNN □ |               |             |                       |                  |
| 4.6pF          | ±0.1pF        | CL02C4R6B02GNN □ | 9.3pF                 | ±0.1pF           | CL02C9R3B02GNN □ |               |             |                       |                  |
| 4.7pF          | ±0.1pF        | CL02C4R7B02GNN □ | 9.4pF                 | ±0.1pF           | CL02C9R4B02GNN □ |               |             |                       |                  |
| 4.8pF          | ±0.1pF        | CL02C4R8B02GNN □ | 9.5pF                 | ±0.1pF           | CL02C9R5B02GNN □ |               |             |                       |                  |
| 4.9pF          | ±0.1pF        | CL02C4R9B02GNN □ | 9.5pF                 | ±0.25pF          | CL02C9R5C02GNN □ |               |             |                       |                  |
| 5.0pF          | ±0.1pF        | CL02C050B02GNN □ | 9.6pF                 | ±0.1pF           | CL02C9R6B02GNN □ |               |             |                       |                  |
| 5.0pF          | ±0.25pF       | CL02C050C02GNN □ | 9.7pF                 | ±0.1pF           | CL02C9R7B02GNN □ |               |             |                       |                  |
| 5.1pF          | ±0.1pF        | CL02C5R1B02GNN □ | 9.8pF                 | ±0.1pF           | CL02C9R8B02GNN □ |               |             |                       |                  |

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# Super Small Size Capacitors

## Product Line Up (COG)

### ■ Size : 0.40 X 0.20mm (inch : 01005)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 0.22mm         | 16Vdc         | 9.9pF       | ±0.1pF                | CL02C9R9B02GNN□ |
|                |               | 10pF        | ±5%                   | CL02C100J02GNN□ |
|                |               | 18pF        | ±2%                   | CL02C180G02GNN□ |
|                |               | 22pF        | ±2%                   | CL02C220G02GNN□ |

### ■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.33mm         | 16Vdc         | 33pF            | ±5%                   | CL03C330J03GNN□ |
|                |               | 33pF            | ±5%                   | CL03C330J03NNN□ |
| 0.33mm         | 25Vdc         | 0.2pF           | ±0.1pF                | CL03C0R2BA3GNN□ |
|                |               | 0.2pF           | ±0.25pF               | CL03C0R2CA3GNN□ |
|                |               | 0.2pF           | ±0.03pF               | CL03C0R2NA3GNN□ |
|                |               | 0.3pF           | ±0.1pF                | CL03C0R3BA3GNN□ |
|                |               | 0.3pF           | ±0.25pF               | CL03C0R3CA3GNN□ |
|                |               | 0.3pF           | ±0.03pF               | CL03C0R3NA3GNN□ |
|                |               | 0.4pF           | ±0.1pF                | CL03C0R4BA3GNN□ |
|                |               | 0.4pF           | ±0.25pF               | CL03C0R4CA3GNN□ |
|                |               | 0.4pF           | ±0.03pF               | CL03C0R4NA3GNN□ |
|                |               | 0.5pF           | ±0.1pF                | CL03C0R5BA3GNN□ |
|                |               | 0.5pF           | ±0.25pF               | CL03C0R5CA3GNN□ |
|                |               | 0.5pF           | ±0.03pF               | CL03C0R5NA3GNN□ |
|                |               | 0.6pF           | ±0.1pF                | CL03C0R6BA3GNN□ |
|                |               | 0.6pF           | ±0.25pF               | CL03C0R6CA3GNN□ |
|                |               | 0.6pF           | ±0.03pF               | CL03C0R6NA3GNN□ |
|                |               | 0.7pF           | ±0.1pF                | CL03C0R7BA3GNN□ |
|                |               | 0.7pF           | ±0.03pF               | CL03C0R7NA3GNN□ |
|                |               | 0.75pF          | ±0.1pF                | CL03CR75BA3GNN□ |
|                |               | 0.8pF           | ±0.1pF                | CL03C0R8BA3GNN□ |
|                |               | 0.8pF           | ±0.25pF               | CL03C0R8CA3GNN□ |
|                |               | 0.8pF           | ±0.03pF               | CL03C0R8NA3GNN□ |
|                |               | 0.9pF           | ±0.1pF                | CL03C0R9BA3GNN□ |
|                |               | 0.9pF           | ±0.25pF               | CL03C0R9CA3GNN□ |
|                |               | 0.9pF           | ±0.03pF               | CL03C0R9NA3GNN□ |
|                |               | 1.0pF           | ±0.1pF                | CL03C010BA3GNN□ |
|                |               | 1.0pF           | ±0.25pF               | CL03C010CA3GNN□ |
|                |               | 1.0pF           | ±0.03pF               | CL03C010NA3GNN□ |
|                |               | 1.1pF           | ±0.1pF                | CL03C1R1BA3GNN□ |
|                |               | 1.1pF           | ±0.03pF               | CL03C1R1NA3GNN□ |
|                |               | 1.2pF           | ±0.1pF                | CL03C1R2BA3GNN□ |
|                |               | 1.2pF           | ±0.25pF               | CL03C1R2CA3GNN□ |
|                |               | 1.2pF           | ±0.03pF               | CL03C1R2NA3GNN□ |
|                |               | 1.3pF           | ±0.1pF                | CL03C1R3BA3GNN□ |
|                |               | 1.3pF           | ±0.25pF               | CL03C1R3CA3GNN□ |
|                |               | 1.3pF           | ±0.03pF               | CL03C1R3NA3GNN□ |
|                |               | 1.4pF           | ±0.03pF               | CL03C1R4NA3GNN□ |
| 1.5pF          | ±0.1pF        | CL03C1R5BA3GNN□ |                       |                 |
| 1.5pF          | ±0.25pF       | CL03C1R5CA3GNN□ |                       |                 |
| 1.5pF          | ±0.03pF       | CL03C1R5NA3GNN□ |                       |                 |
| 1.6pF          | ±0.05pF       | CL03C1R6AA3GNN□ |                       |                 |
| 1.6pF          | ±0.1pF        | CL03C1R6BA3GNN□ |                       |                 |
| 1.6pF          | ±0.25pF       | CL03C1R6CA3GNN□ |                       |                 |
| 1.7pF          | ±0.05pF       | CL03C1R7AA3GNN□ |                       |                 |

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.33mm         | 25Vdc         | 1.7pF           | ±0.1pF                | CL03C1R7BA3GNN□ |
|                |               | 1.7pF           | ±0.25pF               | CL03C1R7CA3GNN□ |
|                |               | 1.8pF           | ±0.05pF               | CL03C1R8AA3GNN□ |
|                |               | 1.8pF           | ±0.1pF                | CL03C1R8BA3GNN□ |
|                |               | 1.8pF           | ±0.25pF               | CL03C1R8CA3GNN□ |
|                |               | 1.9pF           | ±0.05pF               | CL03C1R9AA3GNN□ |
|                |               | 1.9pF           | ±0.1pF                | CL03C1R9BA3GNN□ |
|                |               | 1.9pF           | ±0.25pF               | CL03C1R9CA3GNN□ |
|                |               | 2.0pF           | ±0.05pF               | CL03C020AA3GNN□ |
|                |               | 2.0pF           | ±0.1pF                | CL03C020BA3GNN□ |
|                |               | 2.0pF           | ±0.25pF               | CL03C020CA3GNN□ |
|                |               | 2.0pF           | ±0.1pF                | CL03C2R0BA3GNN□ |
|                |               | 2.1pF           | ±0.05pF               | CL03C2R1AA3GNN□ |
|                |               | 2.1pF           | ±0.1pF                | CL03C2R1BA3GNN□ |
|                |               | 2.2pF           | ±0.05pF               | CL03C2R2AA3GNN□ |
|                |               | 2.2pF           | ±0.1pF                | CL03C2R2BA3GNN□ |
|                |               | 2.2pF           | ±0.25pF               | CL03C2R2CA3GNN□ |
|                |               | 2.3pF           | ±0.05pF               | CL03C2R3AA3GNN□ |
|                |               | 2.3pF           | ±0.1pF                | CL03C2R3BA3GNN□ |
|                |               | 2.4pF           | ±0.05pF               | CL03C2R4AA3GNN□ |
|                |               | 2.4pF           | ±0.1pF                | CL03C2R4BA3GNN□ |
|                |               | 2.4pF           | ±0.25pF               | CL03C2R4CA3GNN□ |
|                |               | 2.5pF           | ±0.05pF               | CL03C2R5AA3GNN□ |
|                |               | 2.5pF           | ±0.1pF                | CL03C2R5BA3GNN□ |
|                |               | 2.6pF           | ±0.05pF               | CL03C2R6AA3GNN□ |
|                |               | 2.6pF           | ±0.1pF                | CL03C2R6BA3GNN□ |
|                |               | 2.7pF           | ±0.05pF               | CL03C2R7AA3GNN□ |
|                |               | 2.7pF           | ±0.1pF                | CL03C2R7BA3GNN□ |
|                |               | 2.7pF           | ±0.25pF               | CL03C2R7CA3GNN□ |
|                |               | 2.8pF           | ±0.05pF               | CL03C2R8AA3GNN□ |
|                |               | 2.8pF           | ±0.1pF                | CL03C2R8BA3GNN□ |
|                |               | 2.9pF           | ±0.05pF               | CL03C2R9AA3GNN□ |
|                |               | 2.9pF           | ±0.1pF                | CL03C2R9BA3GNN□ |
|                |               | 3.0pF           | ±0.05pF               | CL03C030AA3GNN□ |
|                |               | 3.0pF           | ±0.1pF                | CL03C030BA3GNN□ |
|                |               | 3.0pF           | ±0.25pF               | CL03C030CA3GNN□ |
|                |               | 3.1pF           | ±0.05pF               | CL03C3R1AA3GNN□ |
|                |               | 3.1pF           | ±0.1pF                | CL03C3R1BA3GNN□ |
|                |               | 3.2pF           | ±0.05pF               | CL03C3R2AA3GNN□ |
|                |               | 3.2pF           | ±0.1pF                | CL03C3R2BA3GNN□ |
| 3.2pF          | ±0.25pF       | CL03C3R2CA3GNN□ |                       |                 |
| 3.3pF          | ±0.05pF       | CL03C3R3AA3GNN□ |                       |                 |
| 3.3pF          | ±0.1pF        | CL03C3R3BA3GNN□ |                       |                 |
| 3.3pF          | ±0.25pF       | CL03C3R3CA3GNN□ |                       |                 |
| 3.4pF          | ±0.05pF       | CL03C3R4AA3GNN□ |                       |                 |
| 3.4pF          | ±0.1pF        | CL03C3R4BA3GNN□ |                       |                 |
| 3.4pF          | ±0.25pF       | CL03C3R4CA3GNN□ |                       |                 |
| 3.5pF          | ±0.05pF       | CL03C3R5AA3GNN□ |                       |                 |
| 3.6pF          | ±0.05pF       | CL03C3R6AA3GNN□ |                       |                 |
| 3.6pF          | ±0.1pF        | CL03C3R6BA3GNN□ |                       |                 |
| 3.6pF          | ±0.25pF       | CL03C3R6CA3GNN□ |                       |                 |
| 3.7pF          | ±0.05pF       | CL03C3R7AA3GNN□ |                       |                 |
| 3.8pF          | ±0.05pF       | CL03C3R8AA3GNN□ |                       |                 |
| 3.8pF          | ±0.1pF        | CL03C3R8BA3GNN□ |                       |                 |

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Product Line Up (COG)

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|-------------|-----------------------|-----------------|
| 0.33mm         | 25Vdc         | 3.8pF           | ±0.25pF               | CL03C3R8CA3GNN□ | 0.33mm          | 25Vdc         | 6.8pF       | ±0.25pF               | CL03C6R8CA3GNN□ |
|                |               | 3.9pF           | ±0.05pF               | CL03C3R9AA3GNN□ |                 |               | 6.9pF       | ±0.05pF               | CL03C6R9AA3GNN□ |
|                |               | 3.9pF           | ±0.1pF                | CL03C3R9BA3GNN□ |                 |               | 7.0pF       | ±0.05pF               | CL03C070AA3GNN□ |
|                |               | 3.9pF           | ±0.25pF               | CL03C3R9CA3GNN□ |                 |               | 7.0pF       | ±0.1pF                | CL03C070BA3GNN□ |
|                |               | 4.0pF           | ±0.05pF               | CL03C040AA3GNN□ |                 |               | 7.0pF       | ±0.25pF               | CL03C070CA3GNN□ |
|                |               | 4.0pF           | ±0.1pF                | CL03C040BA3GNN□ |                 |               | 7.1pF       | ±0.05pF               | CL03C7R1AA3GNN□ |
|                |               | 4.0pF           | ±0.25pF               | CL03C040CA3GNN□ |                 |               | 7.2pF       | ±0.05pF               | CL03C7R2AA3GNN□ |
|                |               | 4.1pF           | ±0.05pF               | CL03C4R1AA3GNN□ |                 |               | 7.2pF       | ±0.1pF                | CL03C7R2BA3GNN□ |
|                |               | 4.2pF           | ±0.05pF               | CL03C4R2AA3GNN□ |                 |               | 7.3pF       | ±0.05pF               | CL03C7R3AA3GNN□ |
|                |               | 4.3pF           | ±0.05pF               | CL03C4R3AA3GNN□ |                 |               | 7.4pF       | ±0.05pF               | CL03C7R4AA3GNN□ |
|                |               | 4.3pF           | ±0.1pF                | CL03C4R3BA3GNN□ |                 |               | 7.5pF       | ±0.05pF               | CL03C7R5AA3GNN□ |
|                |               | 4.3pF           | ±0.25pF               | CL03C4R3CA3GNN□ |                 |               | 7.5pF       | ±0.1pF                | CL03C7R5BA3GNN□ |
|                |               | 4.4pF           | ±0.05pF               | CL03C4R4AA3GNN□ |                 |               | 7.5pF       | ±0.25pF               | CL03C7R5CA3GNN□ |
|                |               | 4.5pF           | ±0.05pF               | CL03C4R5AA3GNN□ |                 |               | 7.6pF       | ±0.05pF               | CL03C7R6AA3GNN□ |
|                |               | 4.6pF           | ±0.05pF               | CL03C4R6AA3GNN□ |                 |               | 7.7pF       | ±0.05pF               | CL03C7R7AA3GNN□ |
|                |               | 4.7pF           | ±0.05pF               | CL03C4R7AA3GNN□ |                 |               | 7.8pF       | ±0.05pF               | CL03C7R8AA3GNN□ |
|                |               | 4.7pF           | ±0.1pF                | CL03C4R7BA3GNN□ |                 |               | 7.9pF       | ±0.05pF               | CL03C7R9AA3GNN□ |
|                |               | 4.7pF           | ±0.25pF               | CL03C4R7CA3GNN□ |                 |               | 8.0pF       | ±0.05pF               | CL03C080AA3GNN□ |
|                |               | 4.8pF           | ±0.05pF               | CL03C4R8AA3GNN□ |                 |               | 8.0pF       | ±0.25pF               | CL03C080CA3GNN□ |
|                |               | 4.9pF           | ±0.05pF               | CL03C4R9AA3GNN□ |                 |               | 8.0pF       | ±0.5pF                | CL03C080DA3GNN□ |
|                |               | 5.0pF           | ±0.05pF               | CL03C050AA3GNN□ |                 |               | 8.1pF       | ±0.05pF               | CL03C8R1AA3GNN□ |
|                |               | 5.0pF           | ±0.1pF                | CL03C050BA3GNN□ |                 |               | 8.2pF       | ±0.05pF               | CL03C8R2AA3GNN□ |
|                |               | 5.0pF           | ±0.25pF               | CL03C050CA3GNN□ |                 |               | 8.2pF       | ±0.1pF                | CL03C8R2BA3GNN□ |
|                |               | 5.1pF           | ±0.05pF               | CL03C5R1AA3GNN□ |                 |               | 8.2pF       | ±0.25pF               | CL03C8R2CA3GNN□ |
|                |               | 5.1pF           | ±0.1pF                | CL03C5R1BA3GNN□ |                 |               | 8.2pF       | ±0.5pF                | CL03C8R2DA3GNN□ |
|                |               | 5.1pF           | ±0.25pF               | CL03C5R1CA3GNN□ |                 |               | 8.3pF       | ±0.05pF               | CL03C8R3AA3GNN□ |
|                |               | 5.1pF           | ±0.25pF               | CL03C5R1CA3NNN□ |                 |               | 8.4pF       | ±0.05pF               | CL03C8R4AA3GNN□ |
|                |               | 5.2pF           | ±0.05pF               | CL03C5R2AA3GNN□ |                 |               | 8.5pF       | ±0.05pF               | CL03C8R5AA3GNN□ |
|                |               | 5.3pF           | ±0.05pF               | CL03C5R3AA3GNN□ |                 |               | 8.5pF       | ±0.25pF               | CL03C8R5CA3GNN□ |
|                |               | 5.4pF           | ±0.05pF               | CL03C5R4AA3GNN□ |                 |               | 8.6pF       | ±0.05pF               | CL03C8R6AA3GNN□ |
|                |               | 5.5pF           | ±0.05pF               | CL03C5R5AA3GNN□ |                 |               | 8.7pF       | ±0.05pF               | CL03C8R7AA3GNN□ |
|                |               | 5.6pF           | ±0.05pF               | CL03C5R6AA3GNN□ |                 |               | 8.8pF       | ±0.05pF               | CL03C8R8AA3GNN□ |
|                |               | 5.6pF           | ±0.1pF                | CL03C5R6BA3GNN□ |                 |               | 8.9pF       | ±0.05pF               | CL03C8R9AA3GNN□ |
|                |               | 5.6pF           | ±0.25pF               | CL03C5R6CA3GNN□ |                 |               | 9.0pF       | ±0.05pF               | CL03C090AA3GNN□ |
|                |               | 5.7pF           | ±0.05pF               | CL03C5R7AA3GNN□ |                 |               | 9.0pF       | ±0.1pF                | CL03C090BA3GNN□ |
|                |               | 5.8pF           | ±0.05pF               | CL03C5R8AA3GNN□ |                 |               | 9.0pF       | ±0.25pF               | CL03C090CA3GNN□ |
|                |               | 5.9pF           | ±0.05pF               | CL03C5R9AA3GNN□ |                 |               | 9.0pF       | ±0.5pF                | CL03C090DA3GNN□ |
|                |               | 6.0pF           | ±0.05pF               | CL03C060AA3GNN□ |                 |               | 9.1pF       | ±0.05pF               | CL03C9R1AA3GNN□ |
|                |               | 6.0pF           | ±0.1pF                | CL03C060BA3GNN□ |                 |               | 9.1pF       | ±0.1pF                | CL03C9R1BA3GNN□ |
|                |               | 6.0pF           | ±0.25pF               | CL03C060CA3GNN□ |                 |               | 9.1pF       | ±0.25pF               | CL03C9R1CA3GNN□ |
| 6.0pF          | ±0.5pF        | CL03C060DA3GNN□ | 9.1pF                 | ±0.5pF          | CL03C9R1DA3GNN□ |               |             |                       |                 |
| 6.1pF          | ±0.05pF       | CL03C6R1AA3GNN□ | 9.2pF                 | ±0.05pF         | CL03C9R2AA3GNN□ |               |             |                       |                 |
| 6.2pF          | ±0.05pF       | CL03C6R2AA3GNN□ | 9.3pF                 | ±0.05pF         | CL03C9R3AA3GNN□ |               |             |                       |                 |
| 6.2pF          | ±0.1pF        | CL03C6R2BA3GNN□ | 9.4pF                 | ±0.05pF         | CL03C9R4AA3GNN□ |               |             |                       |                 |
| 6.2pF          | ±0.25pF       | CL03C6R2CA3GNN□ | 9.5pF                 | ±0.05pF         | CL03C9R5AA3GNN□ |               |             |                       |                 |
| 6.3pF          | ±0.05pF       | CL03C6R3AA3GNN□ | 9.6pF                 | ±0.05pF         | CL03C9R6AA3GNN□ |               |             |                       |                 |
| 6.4pF          | ±0.05pF       | CL03C6R4AA3GNN□ | 9.7pF                 | ±0.05pF         | CL03C9R7AA3GNN□ |               |             |                       |                 |
| 6.4pF          | ±0.25pF       | CL03C6R4CA3GNN□ | 9.8pF                 | ±0.05pF         | CL03C9R8AA3GNN□ |               |             |                       |                 |
| 6.5pF          | ±0.05pF       | CL03C6R5AA3GNN□ | 9.9pF                 | ±0.05pF         | CL03C9R9AA3GNN□ |               |             |                       |                 |
| 6.6pF          | ±0.05pF       | CL03C6R6AA3GNN□ | 10pF                  | ±0.05pF         | CL03C100AA3GNN□ |               |             |                       |                 |
| 6.7pF          | ±0.05pF       | CL03C6R7AA3GNN□ | 10pF                  | ±0.25pF         | CL03C100CA3GNN□ |               |             |                       |                 |
| 6.8pF          | ±0.05pF       | CL03C6R8AA3GNN□ | 10pF                  | ±0.5pF          | CL03C100DA3GNN□ |               |             |                       |                 |
| 6.8pF          | ±0.1pF        | CL03C6R8BA3GNN□ | 10pF                  | ±2%             | CL03C100GA3GNN□ |               |             |                       |                 |
| 6.8pF          | ±0.1pF        | CL03C6R8BA3NNN□ | 10pF                  | ±5%             | CL03C100JA3GNN□ |               |             |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Super Small Size Capacitors

## Product Line Up (COG)

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|----------------|---------------|-------------|-----------------------|-----------------|
| 0.33mm         | 25Vdc         | 11pF            | ±2%                   | CL03C110GA3GNN□ | 0.33mm         | 50Vdc         | 6.0pF       | ±0.5pF                | CL03C060DB3GNN□ |
|                |               | 11pF            | ±5%                   | CL03C110JA3GNN□ |                |               | 6.2pF       | ±0.1pF                | CL03C6R2BB3GNN□ |
|                |               | 12pF            | ±2%                   | CL03C120GA3GNN□ |                |               | 6.5pF       | ±0.1pF                | CL03C6R5BB3GNN□ |
|                |               | 12pF            | ±5%                   | CL03C120JA3GNN□ |                |               | 7.0pF       | ±0.1pF                | CL03C070BB3GNN□ |
|                |               | 12pF            | ±5%                   | CL03C120JA3NNN□ |                |               | 7.0pF       | ±0.5pF                | CL03C070DB3GNN□ |
|                |               | 13pF            | ±2%                   | CL03C130GA3GNN□ |                |               | 7.5pF       | ±0.1pF                | CL03C7R5BB3GNN□ |
|                |               | 13pF            | ±5%                   | CL03C130JA3GNN□ |                |               | 8.0pF       | ±0.1pF                | CL03C080BB3GNN□ |
|                |               | 15pF            | ±2%                   | CL03C150GA3GNN□ |                |               | 8.0pF       | ±0.5pF                | CL03C080DB3GNN□ |
|                |               | 15pF            | ±5%                   | CL03C150JA3GNN□ |                |               | 8.2pF       | ±0.1pF                | CL03C8R2BB3GNN□ |
|                |               | 15pF            | ±5%                   | CL03C150JA3NNN□ |                |               | 8.2pF       | ±0.5pF                | CL03C8R2DB3GNN□ |
|                |               | 16pF            | ±2%                   | CL03C160GA3GNN□ |                |               | 10pF        | ±5%                   | CL03C100JB3GNN□ |
|                |               | 16pF            | ±5%                   | CL03C160JA3GNN□ |                |               | 10pF        | ±5%                   | CL03C100JB3NNN□ |
|                |               | 16pF            | +5%                   | CL03C160UA3GNN□ |                |               | 12pF        | ±5%                   | CL03C120JB3NNN□ |
|                |               | 18pF            | ±2%                   | CL03C180GA3GNN□ |                |               | 15pF        | ±5%                   | CL03C150JB3NNN□ |
|                |               | 18pF            | ±5%                   | CL03C180JA3GNN□ |                |               | 33pF        | ±5%                   | CL03C330JB3NNN□ |
|                |               | 18pF            | ±5%                   | CL03C180JA3NNN□ |                |               | 100pF       | ±5%                   | CL03C101JB3NNN□ |
|                |               | 20pF            | ±2%                   | CL03C200GA3GNN□ |                |               |             |                       |                 |
|                |               | 20pF            | ±5%                   | CL03C200JA3GNN□ |                |               |             |                       |                 |
|                |               | 22pF            | ±2%                   | CL03C220GA3GNN□ |                |               |             |                       |                 |
|                |               | 22pF            | ±5%                   | CL03C220JA3GNN□ |                |               |             |                       |                 |
|                |               | 22pF            | ±5%                   | CL03C220JA3NNN□ |                |               |             |                       |                 |
|                |               | 24pF            | ±5%                   | CL03C240JA3GNN□ |                |               |             |                       |                 |
|                |               | 27pF            | ±5%                   | CL03C270JA3GNN□ |                |               |             |                       |                 |
|                |               | 27pF            | ±5%                   | CL03C270JA3NNN□ |                |               |             |                       |                 |
|                |               | 30pF            | ±5%                   | CL03C300JA3GNN□ |                |               |             |                       |                 |
|                |               | 33pF            | ±5%                   | CL03C330JA3GNN□ |                |               |             |                       |                 |
|                |               | 33pF            | ±5%                   | CL03C330JA3NNN□ |                |               |             |                       |                 |
|                |               | 39pF            | ±5%                   | CL03C390JA3NNN□ |                |               |             |                       |                 |
|                |               | 47pF            | ±5%                   | CL03C470JA3NNN□ |                |               |             |                       |                 |
|                |               | 56pF            | ±5%                   | CL03C560JA3NNN□ |                |               |             |                       |                 |
|                |               | 68pF            | ±5%                   | CL03C680JA3NNN□ |                |               |             |                       |                 |
|                |               | 82pF            | ±5%                   | CL03C820JA3NNN□ |                |               |             |                       |                 |
|                | 100pF         | ±5%             | CL03C101JA3NNN□       |                 |                |               |             |                       |                 |
|                | 50Vdc         | 0.5pF           | ±0.25pF               | CL03C0R5CB3GNN□ |                |               |             |                       |                 |
|                |               | 0.75pF          | ±0.1pF                | CL03CR75BB3GNN□ |                |               |             |                       |                 |
|                |               | 0.8pF           | ±0.25pF               | CL03C0R8CB3GNN□ |                |               |             |                       |                 |
|                |               | 1.0pF           | ±0.1pF                | CL03C010BB3GNN□ |                |               |             |                       |                 |
|                |               | 1.2pF           | ±0.1pF                | CL03C1R2BB3GNN□ |                |               |             |                       |                 |
|                |               | 1.2pF           | ±0.25pF               | CL03C1R2CB3GNN□ |                |               |             |                       |                 |
|                |               | 1.5pF           | ±0.1pF                | CL03C1R5BB3GNN□ |                |               |             |                       |                 |
|                |               | 1.5pF           | ±0.25pF               | CL03C1R5CB3GNN□ |                |               |             |                       |                 |
|                |               | 1.8pF           | ±0.1pF                | CL03C1R8BB3GNN□ |                |               |             |                       |                 |
|                |               | 2.0pF           | ±0.1pF                | CL03C020BB3GNN□ |                |               |             |                       |                 |
|                |               | 2.0pF           | ±0.25pF               | CL03C020CB3GNN□ |                |               |             |                       |                 |
| 2.2pF          |               | ±0.05pF         | CL03C2R2AB3GNN□       |                 |                |               |             |                       |                 |
| 2.7pF          |               | ±0.1pF          | CL03C2R7BB3GNN□       |                 |                |               |             |                       |                 |
| 3.0pF          |               | ±0.1pF          | CL03C030BB3GNN□       |                 |                |               |             |                       |                 |
| 3.0pF          |               | ±0.25pF         | CL03C030CB3GNN□       |                 |                |               |             |                       |                 |
| 3.3pF          |               | ±0.1pF          | CL03C3R3BB3GNN□       |                 |                |               |             |                       |                 |
| 4.0pF          |               | ±0.1pF          | CL03C040BB3GNN□       |                 |                |               |             |                       |                 |
| 4.7pF          |               | ±0.1pF          | CL03C4R7BB3GNN□       |                 |                |               |             |                       |                 |
| 5.0pF          | ±0.1pF        | CL03C050BB3GNN□ |                       |                 |                |               |             |                       |                 |
| 5.6pF          | ±0.1pF        | CL03C5R6BB3GNN□ |                       |                 |                |               |             |                       |                 |
| 6.0pF          | ±0.1pF        | CL03C060BB3GNN□ |                       |                 |                |               |             |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X5R)

■ Size : 0.40 X 0.20mm (inch : 01005)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark    |
|----------------|---------------|-------------|-----------------------|------------------|-----------|
| 0.22mm         | 4.0Vdc        | 15nF        | ± 10%                 | CL02A153KR2N11 □ |           |
|                |               | 33nF        | ± 10%                 | CL02A333KR2N11 □ |           |
|                |               | 47nF        | ± 10%                 | CL02A473KR2N11 □ |           |
|                |               | 100nF       | ± 10%                 | CL02A104KR2N11 □ | Operating |
|                |               | 100nF       | ± 20%                 | CL02A104MR2N11 □ | Operating |
|                | 6.3Vdc        | 680pF       | ± 10%                 | CL02A681KQ2N11 □ |           |
|                |               | 820pF       | ± 10%                 | CL02A821KQ2N11 □ |           |
|                |               | 1.0nF       | ± 10%                 | CL02A102KQ2N11 □ |           |
|                |               | 1.2nF       | ± 10%                 | CL02A122KQ2N11 □ |           |
|                |               | 1.8nF       | ± 10%                 | CL02A182KQ2N11 □ |           |
|                |               | 2.2nF       | ± 10%                 | CL02A222KQ2N11 □ |           |
|                |               | 2.7nF       | ± 10%                 | CL02A272KQ2N11 □ |           |
|                |               | 3.9nF       | ± 10%                 | CL02A392KQ2N11 □ |           |
|                |               | 5.6nF       | ± 10%                 | CL02A562KQ2N11 □ |           |
|                |               | 10nF        | ± 10%                 | CL02A103KQ2N11 □ |           |
|                |               | 15nF        | ± 10%                 | CL02A153KQ2N11 □ | Operating |
|                |               | 33nF        | ± 10%                 | CL02A333KQ2N11 □ | Operating |
|                |               | 47nF        | ± 10%                 | CL02A473KQ2N11 □ | Operating |
|                |               | 68nF        | ± 10%                 | CL02A683KQ2N11 □ | Operating |
|                |               | 100nF       | ± 10%                 | CL02A104KQ2N11 □ | Operating |
|                | 100nF         | ± 20%       | CL02A104MQ2N11 □      | Operating        |           |
|                | 10Vdc         | 470pF       | ± 10%                 | CL02A471KP2N11 □ |           |
|                |               | 820pF       | ± 10%                 | CL02A821KP2N11 □ |           |
|                |               | 1.0nF       | ± 10%                 | CL02A102KP2N11 □ |           |
|                |               | 2.2nF       | ± 10%                 | CL02A222KP2N11 □ |           |
|                |               | 5.6nF       | ± 10%                 | CL02A562KP2N11 □ |           |
|                |               | 10nF        | ± 10%                 | CL02A103KP2N11 □ |           |

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark         |
|----------------|---------------|-------------|-----------------------|------------------|----------------|
| 0.33mm         | 4.0Vdc        | 100nF       | ± 10%                 | CL03A104KR3N11 □ |                |
|                |               | 470nF       | ± 10%                 | CL03A474KR3N11 □ | Ref.           |
|                |               | 470nF       | ± 20%                 | CL03A474MR3N11 □ | Ref.           |
|                | 6.3Vdc        | 330pF       | ± 10%                 | CL03A331KQ3N11 □ |                |
|                |               | 10nF        | ± 10%                 | CL03A103KQ3N11 □ |                |
|                |               | 12nF        | ± 10%                 | CL03A123KQ3N11 □ |                |
|                |               | 15nF        | ± 10%                 | CL03A153KQ3N11 □ |                |
|                |               | 22nF        | ± 5%                  | CL03A223JQ3N11 □ |                |
|                |               | 22nF        | ± 10%                 | CL03A223KQ3N11 □ |                |
|                |               | 33nF        | ± 10%                 | CL03A333KQ3N11 □ |                |
|                |               | 47nF        | ± 10%                 | CL03A473KQ3N11 □ |                |
|                |               | 82nF        | ± 10%                 | CL03A823KQ3N11 □ |                |
|                |               | 100nF       | ± 5%                  | CL03A104JQ3N11 □ | Operating      |
|                |               | 100nF       | ± 10%                 | CL03A104KQ3N11 □ | Operating      |
|                |               | 100nF       | ± 20%                 | CL03A104MQ3N11 □ | Operating      |
|                |               | 220nF       | ± 10%                 | CL03A224KQ3N11 □ | Operating Ref. |
|                |               | 220nF       | ± 20%                 | CL03A224MQ3N11 □ | Operating Ref. |
|                |               | 470nF       | ± 5%                  | CL03A474JQ3N11 □ | Operating Ref. |
|                |               | 470nF       | ± 10%                 | CL03A474KQ3N11 □ | Operating Ref. |
|                |               | 470nF       | ± 20%                 | CL03A474MQ3N11 □ | Operating Ref. |
|                |               | 1.5uF       | ± 20%                 | CL03A155MQ3N11 □ | Operating Ref. |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |                  |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------------------|------------------|
| 0.33mm         | 6.3Vdc        | 1.0uF       | ± 10%                 | CL03A105KQ3C11 □ | Operating Ref.   |                  |                  |
|                |               | 1.0uF       | ± 10%                 | CL03A105MQ3C11 □ | Operating Ref.   |                  |                  |
|                | 10Vdc         | 330pF       | ± 20%                 | CL03A331KP3N11 □ |                  |                  |                  |
|                |               | 1.5nF       | ± 10%                 | CL03A152KP3N11 □ |                  |                  |                  |
|                |               | 2.2nF       | ± 20%                 | CL03A222KP3N11 □ |                  |                  |                  |
|                |               | 3.3nF       | ± 5%                  | CL03A332KP3N11 □ |                  |                  |                  |
|                |               | 4.7nF       | ± 10%                 | CL03A472KP3N11 □ |                  |                  |                  |
|                |               | 8.2nF       | ± 20%                 | CL03A822KP3N11 □ |                  |                  |                  |
|                |               | 10nF        | ± 10%                 | CL03A103KP3N11 □ |                  |                  |                  |
|                |               | 15nF        | ± 10%                 | CL03A153KP3N11 □ |                  |                  |                  |
|                |               | 22nF        | ± 10%                 | CL03A223KP3N11 □ | Operating        |                  |                  |
|                |               | 33nF        | ± 10%                 | CL03A333KP3N11 □ | Operating        |                  |                  |
|                |               | 47nF        | ± 20%                 | CL03A473KP3N11 □ | Operating        |                  |                  |
|                |               | 100nF       | ± 5%                  | CL03A104KP3N11 □ | Operating        |                  |                  |
|                |               | 100nF       | ± 10%                 | CL03A104MP3N11 □ | Operating        |                  |                  |
|                |               | 220nF       | ± 10%                 | CL03A224KP3N11 □ | Operating Ref.   |                  |                  |
|                |               | 220nF       | ± 5%                  | CL03A224MP3N11 □ | Operating Ref.   |                  |                  |
|                | 470nF         | ± 10%       | CL03A474KP3N11 □      | Operating Ref.   |                  |                  |                  |
|                | 470nF         | ± 20%       | CL03A474MP3N11 □      | Operating Ref.   |                  |                  |                  |
|                | 16Vdc         | 220pF       | ± 10%                 | CL03A221KQ3N11 □ | Operating        |                  |                  |
|                |               | 330pF       | ± 10%                 | CL03A331KQ3N11 □ | Operating        |                  |                  |
|                |               | 470pF       | ± 10%                 | CL03A471KQ3N11 □ | Operating        |                  |                  |
|                |               | 10nF        | ± 10%                 | CL03A103KQ3N11 □ | Operating        |                  |                  |
|                |               | 22nF        | ± 10%                 | CL03A223KQ3N11 □ | Operating        |                  |                  |
|                |               | 47nF        | ± 20%                 | CL03A473KQ3N11 □ | Operating        |                  |                  |
|                |               | 100nF       | ± 10%                 | CL03A104KQ3N11 □ | Operating        |                  |                  |
|                |               | 100nF       | ± 10%                 | CL03A104M3N11 □  | Operating        |                  |                  |
|                |               | 100nF       | ± 10%                 | CL03A104MO3N11 □ | Operating        |                  |                  |
|                |               | 25Vdc       | 1.0nF                 | ± 10%            | CL03A102KA3N11 □ | Operating        |                  |
|                |               |             | 4.7nF                 | ± 10%            | CL03A472KA3N11 □ | Operating        |                  |
|                |               |             | 10nF                  | ± 20%            | CL03A103KA3N11 □ | Operating        |                  |
|                |               |             | 22nF                  | ± 10%            | CL03A223KA3N11 □ | Operating        |                  |
|                |               |             | 100nF                 | ± 10%            | CL03A104KA3N11 □ | Operating        |                  |
|                |               |             | 100nF                 | ± 10%            | CL03A104MA3N11 □ | Operating        |                  |
|                | 100nF         |             | ± 10%                 | CL03A104MO3N11 □ | Operating        |                  |                  |
|                | 0.35mm        | 4.0Vdc      | 1.0uF                 | ± 20%            | CL03A105MR3CS1 □ | Operating Ref.   |                  |
|                |               |             | 6.3Vdc                | 1.0uF            | ± 10%            | CL03A105KQ3CS1 □ | Operating Ref.   |
|                |               |             |                       | 1.0uF            | ± 20%            | CL03A105MQ3NS1 □ | Operating Ref.   |
|                |               | 10Vdc       | 2.2uF                 | ± 20%            | CL03A225MQ3CS1 □ | Operating Ref.   |                  |
|                |               |             | 1.0uF                 | ± 20%            | CL03A105MP3NS1 □ | Operating Ref.   |                  |
|                |               |             | 0.39mm                | 6.3Vdc           | 2.2uF            | ± 20%            | CL03A225MQ3CR1 □ |
|                |               | 2.2uF       |                       |                  | ± 20%            | CL03A225MQ3CR6 □ | Operating Ref.   |
|                |               | 10Vdc       |                       | 2.2uF            | ± 20%            | CL03A225MP3CR1 □ | Operating Ref.   |
|                |               | 16Vdc       | 1.0uF                 | ± 20%            | CL03A105MO3NR1 □ | Operating Ref.   |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# Super Small Size Capacitors

## Product Line Up (X6S)

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number               | Remark       | Thickness Max. | Rated Voltage | Capacitance               | Capacitance Tolerance     | Part Number               | Remark |
|----------------|---------------|-------------|-----------------------|---------------------------|--------------|----------------|---------------|---------------------------|---------------------------|---------------------------|--------|
| 0.33mm         | 4.0Vdc        | 2.2nF       | ±20%                  | CL03X222MR3N <sup>□</sup> |              | 0.33mm         | 16Vdc         | 390pF                     | ±10%                      | CL03B391K03N <sup>□</sup> |        |
|                |               | 4.7nF       | ±20%                  | CL03X472MR3N <sup>□</sup> |              |                |               | 470pF                     | ±10%                      | CL03B471K03N <sup>□</sup> |        |
|                |               | 6.8nF       | ±20%                  | CL03X682MR3N <sup>□</sup> |              |                |               | 560pF                     | ±10%                      | CL03B561K03N <sup>□</sup> |        |
|                |               | 15nF        | ±20%                  | CL03X153MR3N <sup>□</sup> |              |                |               | 820pF                     | ±10%                      | CL03B821K03N <sup>□</sup> |        |
|                |               | 22nF        | ±20%                  | CL03X223MR3N <sup>□</sup> |              |                |               | 1.0nF                     | ±10%                      | CL03B102K03N <sup>□</sup> |        |
|                |               | 47nF        | ±20%                  | CL03X473MR3N <sup>□</sup> |              |                |               | 3.3nF                     | ±10%                      | CL03B332K03N <sup>□</sup> |        |
|                |               | 100nF       | ±10%                  | CL03X104KR3N <sup>□</sup> | Derating     |                |               | 10nF                      | ±10%                      | CL03B103K03N <sup>□</sup> |        |
|                | 6.3Vdc        | 100nF       | ±10%                  | CL03X104KQ3N <sup>□</sup> | Derating     |                | 25Vdc         | 120pF                     | ±10%                      | CL03B121KA3N <sup>□</sup> |        |
| 0.39mm         | 4.0Vdc        | 1.0uF       | ±20%                  | CL03X105MR3N <sup>□</sup> | Derating Ref |                |               | 150pF                     | ±10%                      | CL03B151KA3N <sup>□</sup> |        |
|                |               | 180pF       | ±10%                  | CL03B181KA3N <sup>□</sup> |              |                |               | 200pF                     | ±10%                      | CL03B201KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 220pF                     | ±10%                      | CL03B221KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 270pF                     | ±10%                      | CL03B271KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 330pF                     | ±10%                      | CL03B331KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 390pF                     | ±10%                      | CL03B391KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 470pF                     | ±10%                      | CL03B471KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 680pF                     | ±5%                       | CL03B681JA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 680pF                     | ±10%                      | CL03B681KA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              |                |               | 1.0nF                     | ±5%                       | CL03B102JA3N <sup>□</sup> |        |
|                |               |             |                       |                           |              | 1.0nF          | ±10%          | CL03B102KA3N <sup>□</sup> |                           |                           |        |
|                |               |             |                       |                           |              | 50Vdc          | 220pF         | ±10%                      | CL03B221KB3N <sup>□</sup> |                           |        |
|                |               |             |                       |                           |              |                | 330pF         | ±10%                      | CL03B331KB3N <sup>□</sup> |                           |        |

## Product Line Up (X7R)

■ Size : 0.40 X 0.20mm (inch : 01005)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number               | Remark |
|----------------|---------------|-------------|-----------------------|---------------------------|--------|
| 0.22mm         | 6.3Vdc        | 1.0nF       | ±10%                  | CL02B102KQ2N <sup>□</sup> |        |
|                | 10Vdc         | 100pF       | ±10%                  | CL02B101KP2N <sup>□</sup> |        |
|                |               | 120pF       | ±10%                  | CL02B121KP2N <sup>□</sup> |        |
|                |               | 180pF       | ±10%                  | CL02B181KP2N <sup>□</sup> |        |
|                |               | 220pF       | ±10%                  | CL02B221KP2N <sup>□</sup> |        |
|                |               | 330pF       | ±10%                  | CL02B331KP2N <sup>□</sup> |        |
|                |               | 390pF       | ±10%                  | CL02B391KP2N <sup>□</sup> |        |
|                |               | 1.0nF       | ±10%                  | CL02B102KP2N <sup>□</sup> |        |

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance               | Capacitance Tolerance | Part Number               | Remark |
|----------------|---------------|---------------------------|-----------------------|---------------------------|--------|
| 0.33mm         | 6.3Vdc        | 2.2nF                     | ±10%                  | CL03B222KQ3N <sup>□</sup> |        |
|                |               | 3.3nF                     | ±10%                  | CL03B332KQ3N <sup>□</sup> |        |
|                |               | 4.7nF                     | ±10%                  | CL03B472KQ3N <sup>□</sup> |        |
|                |               | 6.8nF                     | ±10%                  | CL03B682KQ3N <sup>□</sup> |        |
|                |               | 10nF                      | ±10%                  | CL03B103KQ3N <sup>□</sup> |        |
|                | 10Vdc         | 470pF                     | ±10%                  | CL03B471KP3N <sup>□</sup> |        |
|                |               | 1.5nF                     | ±10%                  | CL03B152KP3N <sup>□</sup> |        |
|                |               | 2.2nF                     | ±10%                  | CL03B222KP3N <sup>□</sup> |        |
|                |               | 3.3nF                     | ±10%                  | CL03B332KP3N <sup>□</sup> |        |
|                |               | 4.7nF                     | ±10%                  | CL03B472KP3N <sup>□</sup> |        |
|                |               | 6.8nF                     | ±10%                  | CL03B682KP3N <sup>□</sup> |        |
|                | 16Vdc         | 10nF                      | ±10%                  | CL03B103KP3N <sup>□</sup> |        |
|                |               | 10nF                      | ±20%                  | CL03B103MP3N <sup>□</sup> |        |
|                |               | 100pF                     | ±10%                  | CL03B101K03N <sup>□</sup> |        |
|                |               | 120pF                     | ±10%                  | CL03B121K03N <sup>□</sup> |        |
|                |               | 150pF                     | ±10%                  | CL03B151K03N <sup>□</sup> |        |
|                |               | 180pF                     | ±10%                  | CL03B181K03N <sup>□</sup> |        |
|                |               | 220pF                     | ±10%                  | CL03B221K03N <sup>□</sup> |        |
| 270pF          | ±10%          | CL03B271K03N <sup>□</sup> |                       |                           |        |
| 330pF          | ±10%          | CL03B331K03N <sup>□</sup> |                       |                           |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# High Q Capacitors

## Feature

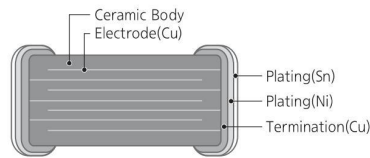
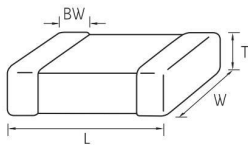


- High Q and low ESR in high frequency range
- Tight tolerance available
- High efficiency and low power consumption in RF circuit

## Application

- Mobile Phone
- Set Top Box
- Wireless Equipment
- GPS, Bluetooth

## Structure and Dimensions



| Size Code | EIA Code | Rated Voltage (Vdc) | Dimension(mm) |           |           |           |
|-----------|----------|---------------------|---------------|-----------|-----------|-----------|
|           |          |                     | L             | W         | T         | BW        |
| 02        | 01005    | 16                  | 0.40±0.02     | 0.20±0.02 | 0.20±0.02 | 0.10±0.03 |
| 03        | 0201     | 25 / 50             | 0.60±0.03     | 0.30±0.03 | 0.30±0.03 | 0.15±0.05 |

## High Q Capacitance Table (COG)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance(pF) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------|---------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                |                     | 0.2             | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 3.0 | 3.2 | 3.4 | 3.6 | 3.8 | 4.0 |
| 01005(0402)    | 16                  |                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0201 (0603)    | 25                  |                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                | 50                  |                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance(pF) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------|---------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                |                     | 4.2             | 4.4 | 4.6 | 4.8 | 5.0 | 5.2 | 5.4 | 5.6 | 5.8 | 6.0 | 6.2 | 6.4 | 6.6 | 6.8 | 7.0 | 7.2 | 7.4 | 7.6 | 7.8 | 8.0 |
| 01005(0402)    | 16                  |                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0201 (0603)    | 25                  |                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                | 50                  |                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance(pF) |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------|---------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|
|                |                     | 8.2             | 8.4 | 8.6 | 8.8 | 9.0 | 9.2 | 9.4 | 9.7 | 10 | 11 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 27 | 30 | 33 |
| 01005(0402)    | 16                  |                 |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |
| 0201 (0603)    | 25                  |                 |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |
|                | 50                  |                 |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |

# High Q Capacitors

## Product Line Up (COG)

■ Size : 0.40 X 0.20mm (inch : 01005)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|-------------|-----------------------|-----------------|
| 0.22mm         | 16Vdc         | 0.2pF           | ±0.1pF                | CL02C0R2B02GNN□ | 0.22mm          | 16Vdc         | 5.1pF       | ±0.25pF               | CL02C5R1C02GNN□ |
|                |               | 0.3pF           | ±0.1pF                | CL02C0R3B02GNN□ |                 |               | 5.2pF       | ±0.1pF                | CL02C5R2B02GNN□ |
|                |               | 0.4pF           | ±0.1pF                | CL02C0R4B02GNN□ |                 |               | 5.3pF       | ±0.1pF                | CL02C5R3B02GNN□ |
|                |               | 0.5pF           | ±0.1pF                | CL02C0R5B02GNN□ |                 |               | 5.4pF       | ±0.1pF                | CL02C5R4B02GNN□ |
|                |               | 0.6pF           | ±0.1pF                | CL02C0R6B02GNN□ |                 |               | 5.5pF       | ±0.1pF                | CL02C5R5B02GNN□ |
|                |               | 0.7pF           | ±0.1pF                | CL02C0R7B02GNN□ |                 |               | 5.6pF       | ±0.1pF                | CL02C5R6B02GNN□ |
|                |               | 0.8pF           | ±0.1pF                | CL02C0R8B02GNN□ |                 |               | 5.6pF       | ±0.25pF               | CL02C5R6C02GNN□ |
|                |               | 0.9pF           | ±0.1pF                | CL02C0R9B02GNN□ |                 |               | 5.7pF       | ±0.1pF                | CL02C5R7B02GNN□ |
|                |               | 1.0pF           | ±0.1pF                | CL02C0I0B02GNN□ |                 |               | 5.7pF       | ±0.25pF               | CL02C5R7C02GNN□ |
|                |               | 1.1pF           | ±0.1pF                | CL02C1R1B02GNN□ |                 |               | 5.8pF       | ±0.1pF                | CL02C5R8B02GNN□ |
|                |               | 1.2pF           | ±0.1pF                | CL02C1R2B02GNN□ |                 |               | 5.9pF       | ±0.1pF                | CL02C5R9B02GNN□ |
|                |               | 1.3pF           | ±0.1pF                | CL02C1R3B02GNN□ |                 |               | 6.0pF       | ±0.1pF                | CL02C060B02GNN□ |
|                |               | 1.4pF           | ±0.1pF                | CL02C1R4B02GNN□ |                 |               | 6.1pF       | ±0.1pF                | CL02C6R1B02GNN□ |
|                |               | 1.5pF           | ±0.1pF                | CL02C1R5B02GNN□ |                 |               | 6.2pF       | ±0.1pF                | CL02C6R2B02GNN□ |
|                |               | 1.6pF           | ±0.1pF                | CL02C1R6B02GNN□ |                 |               | 6.3pF       | ±0.1pF                | CL02C6R3B02GNN□ |
|                |               | 1.7pF           | ±0.1pF                | CL02C1R7B02GNN□ |                 |               | 6.4pF       | ±0.1pF                | CL02C6R4B02GNN□ |
|                |               | 1.8pF           | ±0.1pF                | CL02C1R8B02GNN□ |                 |               | 6.5pF       | ±0.1pF                | CL02C6R5B02GNN□ |
|                |               | 1.9pF           | ±0.1pF                | CL02C1R9B02GNN□ |                 |               | 6.6pF       | ±0.1pF                | CL02C6R6B02GNN□ |
|                |               | 2.0pF           | ±0.1pF                | CL02C020B02GNN□ |                 |               | 6.7pF       | ±0.1pF                | CL02C6R7B02GNN□ |
|                |               | 2.1pF           | ±0.1pF                | CL02C2R1B02GNN□ |                 |               | 6.8pF       | ±0.1pF                | CL02C6R8B02GNN□ |
|                |               | 2.2pF           | ±0.1pF                | CL02C2R2B02GNN□ |                 |               | 6.9pF       | ±0.1pF                | CL02C6R9B02GNN□ |
|                |               | 2.3pF           | ±0.1pF                | CL02C2R3B02GNN□ |                 |               | 7.0pF       | ±0.1pF                | CL02C070B02GNN□ |
|                |               | 2.4pF           | ±0.1pF                | CL02C2R4B02GNN□ |                 |               | 7.1pF       | ±0.1pF                | CL02C7R1B02GNN□ |
|                |               | 2.5pF           | ±0.1pF                | CL02C2R5B02GNN□ |                 |               | 7.2pF       | ±0.1pF                | CL02C7R2B02GNN□ |
|                |               | 2.6pF           | ±0.1pF                | CL02C2R6B02GNN□ |                 |               | 7.3pF       | ±0.1pF                | CL02C7R3B02GNN□ |
|                |               | 2.7pF           | ±0.1pF                | CL02C2R7B02GNN□ |                 |               | 7.4pF       | ±0.1pF                | CL02C7R4B02GNN□ |
|                |               | 2.8pF           | ±0.1pF                | CL02C2R8B02GNN□ |                 |               | 7.5pF       | ±0.1pF                | CL02C7R5B02GNN□ |
|                |               | 2.9pF           | ±0.1pF                | CL02C2R9B02GNN□ |                 |               | 7.6pF       | ±0.1pF                | CL02C7R6B02GNN□ |
|                |               | 3.0pF           | ±0.1pF                | CL02C030B02GNN□ |                 |               | 7.7pF       | ±0.1pF                | CL02C7R7B02GNN□ |
|                |               | 3.1pF           | ±0.1pF                | CL02C3R1B02GNN□ |                 |               | 7.8pF       | ±0.1pF                | CL02C7R8B02GNN□ |
|                |               | 3.2pF           | ±0.1pF                | CL02C3R2B02GNN□ |                 |               | 7.9pF       | ±0.1pF                | CL02C7R9B02GNN□ |
| 3.3pF          | ±0.1pF        | CL02C3R3B02GNN□ | 8.0pF                 | ±0.1pF          | CL02C080B02GNN□ |               |             |                       |                 |
| 3.3pF          | ±0.25pF       | CL02C3R3C02GNN□ | 8.0pF                 | ±0.25pF         | CL02C080C02GNN□ |               |             |                       |                 |
| 3.4pF          | ±0.1pF        | CL02C3R4B02GNN□ | 8.1pF                 | ±0.1pF          | CL02C8R1B02GNN□ |               |             |                       |                 |
| 3.5pF          | ±0.1pF        | CL02C3R5B02GNN□ | 8.2pF                 | ±0.1pF          | CL02C8R2B02GNN□ |               |             |                       |                 |
| 3.5pF          | ±0.25pF       | CL02C3R5C02GNN□ | 8.2pF                 | ±0.25pF         | CL02C8R2C02GNN□ |               |             |                       |                 |
| 3.6pF          | ±0.1pF        | CL02C3R6B02GNN□ | 8.3pF                 | ±0.1pF          | CL02C8R3B02GNN□ |               |             |                       |                 |
| 3.7pF          | ±0.1pF        | CL02C3R7B02GNN□ | 8.4pF                 | ±0.1pF          | CL02C8R4B02GNN□ |               |             |                       |                 |
| 3.7pF          | ±0.25pF       | CL02C3R7C02GNN□ | 8.4pF                 | ±0.25pF         | CL02C8R4C02GNN□ |               |             |                       |                 |
| 3.8pF          | ±0.1pF        | CL02C3R8B02GNN□ | 8.5pF                 | ±0.1pF          | CL02C8R5B02GNN□ |               |             |                       |                 |
| 3.9pF          | ±0.1pF        | CL02C3R9B02GNN□ | 8.6pF                 | ±0.1pF          | CL02C8R6B02GNN□ |               |             |                       |                 |
| 4.0pF          | ±0.1pF        | CL02C040B02GNN□ | 8.7pF                 | ±0.1pF          | CL02C8R7B02GNN□ |               |             |                       |                 |
| 4.1pF          | ±0.1pF        | CL02C4R1B02GNN□ | 8.8pF                 | ±0.1pF          | CL02C8R8B02GNN□ |               |             |                       |                 |
| 4.2pF          | ±0.1pF        | CL02C4R2B02GNN□ | 8.9pF                 | ±0.1pF          | CL02C8R9B02GNN□ |               |             |                       |                 |
| 4.3pF          | ±0.1pF        | CL02C4R3B02GNN□ | 9.0pF                 | ±0.1pF          | CL02C090B02GNN□ |               |             |                       |                 |
| 4.4pF          | ±0.1pF        | CL02C4R4B02GNN□ | 9.1pF                 | ±0.1pF          | CL02C9R1B02GNN□ |               |             |                       |                 |
| 4.5pF          | ±0.1pF        | CL02C4R5B02GNN□ | 9.2pF                 | ±0.1pF          | CL02C9R2B02GNN□ |               |             |                       |                 |
| 4.6pF          | ±0.1pF        | CL02C4R6B02GNN□ | 9.3pF                 | ±0.1pF          | CL02C9R3B02GNN□ |               |             |                       |                 |
| 4.7pF          | ±0.1pF        | CL02C4R7B02GNN□ | 9.4pF                 | ±0.1pF          | CL02C9R4B02GNN□ |               |             |                       |                 |
| 4.8pF          | ±0.1pF        | CL02C4R8B02GNN□ | 9.5pF                 | ±0.1pF          | CL02C9R5B02GNN□ |               |             |                       |                 |
| 4.9pF          | ±0.1pF        | CL02C4R9B02GNN□ | 9.5pF                 | ±0.25pF         | CL02C9R5C02GNN□ |               |             |                       |                 |
| 5.0pF          | ±0.1pF        | CL02C050B02GNN□ | 9.6pF                 | ±0.1pF          | CL02C9R6B02GNN□ |               |             |                       |                 |
| 5.0pF          | ±0.25pF       | CL02C050C02GNN□ | 9.7pF                 | ±0.1pF          | CL02C9R7B02GNN□ |               |             |                       |                 |
| 5.1pF          | ±0.1pF        | CL02C5R1B02GNN□ | 9.8pF                 | ±0.1pF          | CL02C9R8B02GNN□ |               |             |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up ( COG )

■ Size : 0.40 X 0.20mm (inch : 01005)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.22mm         | 16Vdc         | 9.9pF       | ±0.1pF                | CL02C9R9B02GNN □ |
|                |               | 10pF        | ±5%                   | CL02C100J02GNN □ |
|                |               | 18pF        | ±2%                   | CL02C180G02GNN □ |
|                |               | 22pF        | ±2%                   | CL02C220G02GNN □ |

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.33mm         | 25Vdc         | 0.2pF            | ±0.1pF                | CL03C0R2BA3GNN □ |
|                |               | 0.2pF            | ±0.25pF               | CL03C0R2CA3GNN □ |
|                |               | 0.2pF            | ±0.03pF               | CL03C0R2NA3GNN □ |
|                |               | 0.3pF            | ±0.1pF                | CL03C0R3BA3GNN □ |
|                |               | 0.3pF            | ±0.25pF               | CL03C0R3CA3GNN □ |
|                |               | 0.3pF            | ±0.03pF               | CL03C0R3NA3GNN □ |
|                |               | 0.4pF            | ±0.1pF                | CL03C0R4BA3GNN □ |
|                |               | 0.4pF            | ±0.25pF               | CL03C0R4CA3GNN □ |
|                |               | 0.4pF            | ±0.03pF               | CL03C0R4NA3GNN □ |
|                |               | 0.5pF            | ±0.1pF                | CL03C0R5BA3GNN □ |
|                |               | 0.5pF            | ±0.25pF               | CL03C0R5CA3GNN □ |
|                |               | 0.5pF            | ±0.03pF               | CL03C0R5NA3GNN □ |
|                |               | 0.6pF            | ±0.1pF                | CL03C0R6BA3GNN □ |
|                |               | 0.6pF            | ±0.25pF               | CL03C0R6CA3GNN □ |
|                |               | 0.6pF            | ±0.03pF               | CL03C0R6NA3GNN □ |
|                |               | 0.7pF            | ±0.1pF                | CL03C0R7BA3GNN □ |
|                |               | 0.7pF            | ±0.03pF               | CL03C0R7NA3GNN □ |
|                |               | 0.75pF           | ±0.1pF                | CL03CR75BA3GNN □ |
|                |               | 0.8pF            | ±0.1pF                | CL03C0R8BA3GNN □ |
|                |               | 0.8pF            | ±0.25pF               | CL03C0R8CA3GNN □ |
|                |               | 0.8pF            | ±0.03pF               | CL03C0R8NA3GNN □ |
|                |               | 0.9pF            | ±0.1pF                | CL03C0R9BA3GNN □ |
|                |               | 0.9pF            | ±0.25pF               | CL03C0R9CA3GNN □ |
|                |               | 0.9pF            | ±0.03pF               | CL03C0R9NA3GNN □ |
|                |               | 1.0pF            | ±0.1pF                | CL03C010BA3GNN □ |
|                |               | 1.0pF            | ±0.25pF               | CL03C010CA3GNN □ |
|                |               | 1.0pF            | ±0.03pF               | CL03C010NA3GNN □ |
|                |               | 1.1pF            | ±0.1pF                | CL03C1R1BA3GNN □ |
|                |               | 1.1pF            | ±0.03pF               | CL03C1R1NA3GNN □ |
|                |               | 1.2pF            | ±0.1pF                | CL03C1R2BA3GNN □ |
|                |               | 1.2pF            | ±0.25pF               | CL03C1R2CA3GNN □ |
|                |               | 1.2pF            | ±0.03pF               | CL03C1R2NA3GNN □ |
|                |               | 1.3pF            | ±0.1pF                | CL03C1R3BA3GNN □ |
|                |               | 1.3pF            | ±0.25pF               | CL03C1R3CA3GNN □ |
|                |               | 1.3pF            | ±0.03pF               | CL03C1R3NA3GNN □ |
|                |               | 1.4pF            | ±0.03pF               | CL03C1R4NA3GNN □ |
|                |               | 1.5pF            | ±0.1pF                | CL03C1R5BA3GNN □ |
|                |               | 1.5pF            | ±0.25pF               | CL03C1R5CA3GNN □ |
|                |               | 1.5pF            | ±0.03pF               | CL03C1R5NA3GNN □ |
|                |               | 1.6pF            | ±0.05pF               | CL03C1R6AA3GNN □ |
| 1.6pF          | ±0.1pF        | CL03C1R6BA3GNN □ |                       |                  |
| 1.6pF          | ±0.25pF       | CL03C1R6CA3GNN □ |                       |                  |
| 1.7pF          | ±0.05pF       | CL03C1R7AA3GNN □ |                       |                  |
| 1.7pF          | ±0.1pF        | CL03C1R7BA3GNN □ |                       |                  |
| 1.7pF          | ±0.25pF       | CL03C1R7CA3GNN □ |                       |                  |

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.33mm         | 25Vdc         | 1.8pF            | ±0.05pF               | CL03C1R8AA3GNN □ |
|                |               | 1.8pF            | ±0.1pF                | CL03C1R8BA3GNN □ |
|                |               | 1.8pF            | ±0.25pF               | CL03C1R8CA3GNN □ |
|                |               | 1.9pF            | ±0.05pF               | CL03C1R9AA3GNN □ |
|                |               | 1.9pF            | ±0.1pF                | CL03C1R9BA3GNN □ |
|                |               | 1.9pF            | ±0.25pF               | CL03C1R9CA3GNN □ |
|                |               | 2.0pF            | ±0.05pF               | CL03C020AA3GNN □ |
|                |               | 2.0pF            | ±0.1pF                | CL03C020BA3GNN □ |
|                |               | 2.0pF            | ±0.25pF               | CL03C020CA3GNN □ |
|                |               | 2.0pF            | ±0.1pF                | CL03C2R0BA3GNN □ |
|                |               | 2.1pF            | ±0.05pF               | CL03C2R1AA3GNN □ |
|                |               | 2.1pF            | ±0.1pF                | CL03C2R1BA3GNN □ |
|                |               | 2.2pF            | ±0.05pF               | CL03C2R2AA3GNN □ |
|                |               | 2.2pF            | ±0.1pF                | CL03C2R2BA3GNN □ |
|                |               | 2.2pF            | ±0.25pF               | CL03C2R2CA3GNN □ |
|                |               | 2.3pF            | ±0.05pF               | CL03C2R3AA3GNN □ |
|                |               | 2.3pF            | ±0.1pF                | CL03C2R3BA3GNN □ |
|                |               | 2.4pF            | ±0.05pF               | CL03C2R4AA3GNN □ |
|                |               | 2.4pF            | ±0.1pF                | CL03C2R4BA3GNN □ |
|                |               | 2.4pF            | ±0.25pF               | CL03C2R4CA3GNN □ |
|                |               | 2.5pF            | ±0.05pF               | CL03C2R5AA3GNN □ |
|                |               | 2.5pF            | ±0.1pF                | CL03C2R5BA3GNN □ |
|                |               | 2.6pF            | ±0.05pF               | CL03C2R6AA3GNN □ |
|                |               | 2.6pF            | ±0.1pF                | CL03C2R6BA3GNN □ |
|                |               | 2.7pF            | ±0.05pF               | CL03C2R7AA3GNN □ |
|                |               | 2.7pF            | ±0.1pF                | CL03C2R7BA3GNN □ |
|                |               | 2.7pF            | ±0.25pF               | CL03C2R7CA3GNN □ |
|                |               | 2.8pF            | ±0.05pF               | CL03C2R8AA3GNN □ |
|                |               | 2.8pF            | ±0.1pF                | CL03C2R8BA3GNN □ |
|                |               | 2.9pF            | ±0.05pF               | CL03C2R9AA3GNN □ |
|                |               | 2.9pF            | ±0.1pF                | CL03C2R9BA3GNN □ |
|                |               | 3.0pF            | ±0.05pF               | CL03C030AA3GNN □ |
|                |               | 3.0pF            | ±0.1pF                | CL03C030BA3GNN □ |
|                |               | 3.0pF            | ±0.25pF               | CL03C030CA3GNN □ |
|                |               | 3.1pF            | ±0.05pF               | CL03C3R1AA3GNN □ |
|                |               | 3.1pF            | ±0.1pF                | CL03C3R1BA3GNN □ |
|                |               | 3.2pF            | ±0.05pF               | CL03C3R2AA3GNN □ |
|                |               | 3.2pF            | ±0.1pF                | CL03C3R2BA3GNN □ |
|                |               | 3.2pF            | ±0.25pF               | CL03C3R2CA3GNN □ |
|                |               | 3.3pF            | ±0.05pF               | CL03C3R3AA3GNN □ |
| 3.3pF          | ±0.1pF        | CL03C3R3BA3GNN □ |                       |                  |
| 3.3pF          | ±0.25pF       | CL03C3R3CA3GNN □ |                       |                  |
| 3.4pF          | ±0.05pF       | CL03C3R4AA3GNN □ |                       |                  |
| 3.4pF          | ±0.1pF        | CL03C3R4BA3GNN □ |                       |                  |
| 3.4pF          | ±0.25pF       | CL03C3R4CA3GNN □ |                       |                  |
| 3.5pF          | ±0.05pF       | CL03C3R5AA3GNN □ |                       |                  |
| 3.6pF          | ±0.05pF       | CL03C3R6AA3GNN □ |                       |                  |
| 3.6pF          | ±0.1pF        | CL03C3R6BA3GNN □ |                       |                  |
| 3.6pF          | ±0.25pF       | CL03C3R6CA3GNN □ |                       |                  |
| 3.7pF          | ±0.05pF       | CL03C3R7AA3GNN □ |                       |                  |
| 3.8pF          | ±0.05pF       | CL03C3R8AA3GNN □ |                       |                  |
| 3.8pF          | ±0.1pF        | CL03C3R8BA3GNN □ |                       |                  |
| 3.8pF          | ±0.25pF       | CL03C3R8CA3GNN □ |                       |                  |
| 3.9pF          | ±0.05pF       | CL03C3R9AA3GNN □ |                       |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# High Q Capacitors

## Product Line Up (COG)

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|-------------|-----------------------|-----------------|
| 0.33mm         | 25Vdc         | 3.9pF           | ±0.1pF                | CL03C3R9BA3GNN□ | 0.33mm          | 25Vdc         | 7.0pF       | ±0.25pF               | CL03C070CA3GNN□ |
|                |               | 3.9pF           | ±0.25pF               | CL03C3R9CA3GNN□ |                 |               | 7.1pF       | ±0.05pF               | CL03C7R1AA3GNN□ |
|                |               | 4.0pF           | ±0.05pF               | CL03C040AA3GNN□ |                 |               | 7.2pF       | ±0.05pF               | CL03C7R2AA3GNN□ |
|                |               | 4.0pF           | ±0.1pF                | CL03C040BA3GNN□ |                 |               | 7.2pF       | ±0.1pF                | CL03C7R2BA3GNN□ |
|                |               | 4.0pF           | ±0.25pF               | CL03C040CA3GNN□ |                 |               | 7.3pF       | ±0.05pF               | CL03C7R3AA3GNN□ |
|                |               | 4.1pF           | ±0.05pF               | CL03C4R1AA3GNN□ |                 |               | 7.4pF       | ±0.05pF               | CL03C7R4AA3GNN□ |
|                |               | 4.2pF           | ±0.05pF               | CL03C4R2AA3GNN□ |                 |               | 7.5pF       | ±0.05pF               | CL03C7R5AA3GNN□ |
|                |               | 4.3pF           | ±0.05pF               | CL03C4R3AA3GNN□ |                 |               | 7.5pF       | ±0.1pF                | CL03C7R5BA3GNN□ |
|                |               | 4.3pF           | ±0.1pF                | CL03C4R3BA3GNN□ |                 |               | 7.5pF       | ±0.25pF               | CL03C7R5CA3GNN□ |
|                |               | 4.3pF           | ±0.25pF               | CL03C4R3CA3GNN□ |                 |               | 7.6pF       | ±0.05pF               | CL03C7R6AA3GNN□ |
|                |               | 4.4pF           | ±0.05pF               | CL03C4R4AA3GNN□ |                 |               | 7.7pF       | ±0.05pF               | CL03C7R7AA3GNN□ |
|                |               | 4.5pF           | ±0.05pF               | CL03C4R5AA3GNN□ |                 |               | 7.8pF       | ±0.05pF               | CL03C7R8AA3GNN□ |
|                |               | 4.6pF           | ±0.05pF               | CL03C4R6AA3GNN□ |                 |               | 7.9pF       | ±0.05pF               | CL03C7R9AA3GNN□ |
|                |               | 4.7pF           | ±0.05pF               | CL03C4R7AA3GNN□ |                 |               | 8.0pF       | ±0.05pF               | CL03C080AA3GNN□ |
|                |               | 4.7pF           | ±0.1pF                | CL03C4R7BA3GNN□ |                 |               | 8.0pF       | ±0.25pF               | CL03C080CA3GNN□ |
|                |               | 4.7pF           | ±0.25pF               | CL03C4R7CA3GNN□ |                 |               | 8.0pF       | ±0.5pF                | CL03C080DA3GNN□ |
|                |               | 4.8pF           | ±0.05pF               | CL03C4R8AA3GNN□ |                 |               | 8.1pF       | ±0.05pF               | CL03C8R1AA3GNN□ |
|                |               | 4.9pF           | ±0.05pF               | CL03C4R9AA3GNN□ |                 |               | 8.2pF       | ±0.05pF               | CL03C8R2AA3GNN□ |
|                |               | 5.0pF           | ±0.05pF               | CL03C050AA3GNN□ |                 |               | 8.2pF       | ±0.1pF                | CL03C8R2BA3GNN□ |
|                |               | 5.0pF           | ±0.1pF                | CL03C050BA3GNN□ |                 |               | 8.2pF       | ±0.25pF               | CL03C8R2CA3GNN□ |
|                |               | 5.0pF           | ±0.25pF               | CL03C050CA3GNN□ |                 |               | 8.2pF       | ±0.5pF                | CL03C8R2DA3GNN□ |
|                |               | 5.1pF           | ±0.05pF               | CL03C5R1AA3GNN□ |                 |               | 8.3pF       | ±0.05pF               | CL03C8R3AA3GNN□ |
|                |               | 5.1pF           | ±0.1pF                | CL03C5R1BA3GNN□ |                 |               | 8.4pF       | ±0.05pF               | CL03C8R4AA3GNN□ |
|                |               | 5.1pF           | ±0.25pF               | CL03C5R1CA3GNN□ |                 |               | 8.5pF       | ±0.05pF               | CL03C8R5AA3GNN□ |
|                |               | 5.2pF           | ±0.05pF               | CL03C5R2AA3GNN□ |                 |               | 8.5pF       | ±0.25pF               | CL03C8R5CA3GNN□ |
|                |               | 5.3pF           | ±0.05pF               | CL03C5R3AA3GNN□ |                 |               | 8.6pF       | ±0.05pF               | CL03C8R6AA3GNN□ |
|                |               | 5.4pF           | ±0.05pF               | CL03C5R4AA3GNN□ |                 |               | 8.7pF       | ±0.05pF               | CL03C8R7AA3GNN□ |
|                |               | 5.5pF           | ±0.05pF               | CL03C5R5AA3GNN□ |                 |               | 8.8pF       | ±0.05pF               | CL03C8R8AA3GNN□ |
|                |               | 5.6pF           | ±0.05pF               | CL03C5R6AA3GNN□ |                 |               | 8.9pF       | ±0.05pF               | CL03C8R9AA3GNN□ |
|                |               | 5.6pF           | ±0.1pF                | CL03C5R6BA3GNN□ |                 |               | 9.0pF       | ±0.05pF               | CL03C090AA3GNN□ |
|                |               | 5.6pF           | ±0.25pF               | CL03C5R6CA3GNN□ |                 |               | 9.0pF       | ±0.1pF                | CL03C090BA3GNN□ |
|                |               | 5.7pF           | ±0.05pF               | CL03C5R7AA3GNN□ |                 |               | 9.0pF       | ±0.25pF               | CL03C090CA3GNN□ |
|                |               | 5.8pF           | ±0.05pF               | CL03C5R8AA3GNN□ |                 |               | 9.0pF       | ±0.5pF                | CL03C090DA3GNN□ |
|                |               | 5.9pF           | ±0.05pF               | CL03C5R9AA3GNN□ |                 |               | 9.1pF       | ±0.05pF               | CL03C9R1AA3GNN□ |
|                |               | 6.0pF           | ±0.05pF               | CL03C060AA3GNN□ |                 |               | 9.1pF       | ±0.1pF                | CL03C9R1BA3GNN□ |
|                |               | 6.0pF           | ±0.1pF                | CL03C060BA3GNN□ |                 |               | 9.1pF       | ±0.25pF               | CL03C9R1CA3GNN□ |
|                |               | 6.0pF           | ±0.25pF               | CL03C060CA3GNN□ |                 |               | 9.1pF       | ±0.5pF                | CL03C9R1DA3GNN□ |
|                |               | 6.0pF           | ±0.5pF                | CL03C060DA3GNN□ |                 |               | 9.2pF       | ±0.05pF               | CL03C9R2AA3GNN□ |
|                |               | 6.1pF           | ±0.05pF               | CL03C6R1AA3GNN□ |                 |               | 9.3pF       | ±0.05pF               | CL03C9R3AA3GNN□ |
|                |               | 6.2pF           | ±0.05pF               | CL03C6R2AA3GNN□ |                 |               | 9.4pF       | ±0.05pF               | CL03C9R4AA3GNN□ |
| 6.2pF          | ±0.1pF        | CL03C6R2BA3GNN□ | 9.5pF                 | ±0.05pF         | CL03C9R5AA3GNN□ |               |             |                       |                 |
| 6.2pF          | ±0.25pF       | CL03C6R2CA3GNN□ | 9.6pF                 | ±0.05pF         | CL03C9R6AA3GNN□ |               |             |                       |                 |
| 6.3pF          | ±0.05pF       | CL03C6R3AA3GNN□ | 9.7pF                 | ±0.05pF         | CL03C9R7AA3GNN□ |               |             |                       |                 |
| 6.4pF          | ±0.05pF       | CL03C6R4AA3GNN□ | 9.8pF                 | ±0.05pF         | CL03C9R8AA3GNN□ |               |             |                       |                 |
| 6.4pF          | ±0.25pF       | CL03C6R4CA3GNN□ | 9.9pF                 | ±0.05pF         | CL03C9R9AA3GNN□ |               |             |                       |                 |
| 6.5pF          | ±0.05pF       | CL03C6R5AA3GNN□ | 10pF                  | ±0.05pF         | CL03C100AA3GNN□ |               |             |                       |                 |
| 6.6pF          | ±0.05pF       | CL03C6R6AA3GNN□ | 10pF                  | ±0.25pF         | CL03C100CA3GNN□ |               |             |                       |                 |
| 6.7pF          | ±0.05pF       | CL03C6R7AA3GNN□ | 10pF                  | ±0.5pF          | CL03C100DA3GNN□ |               |             |                       |                 |
| 6.8pF          | ±0.05pF       | CL03C6R8AA3GNN□ | 10pF                  | ±2%             | CL03C100GA3GNN□ |               |             |                       |                 |
| 6.8pF          | ±0.1pF        | CL03C6R8BA3GNN□ | 10pF                  | ±5%             | CL03C100JA3GNN□ |               |             |                       |                 |
| 6.8pF          | ±0.25pF       | CL03C6R8CA3GNN□ | 11pF                  | ±2%             | CL03C110GA3GNN□ |               |             |                       |                 |
| 6.9pF          | ±0.05pF       | CL03C6R9AA3GNN□ | 11pF                  | ±5%             | CL03C110JA3GNN□ |               |             |                       |                 |
| 7.0pF          | ±0.05pF       | CL03C070AA3GNN□ | 12pF                  | ±2%             | CL03C120GA3GNN□ |               |             |                       |                 |
| 7.0pF          | ±0.1pF        | CL03C070BA3GNN□ | 12pF                  | ±5%             | CL03C120JA3GNN□ |               |             |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (COG)

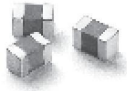
■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |                  |
|----------------|---------------|------------------|-----------------------|------------------|------------------|
| 0.33mm         | 25Vdc         | 13pF             | ±2%                   | CL03C130GA3GNN □ |                  |
|                |               | 13pF             | ±5%                   | CL03C130JA3GNN □ |                  |
|                |               | 15pF             | ±2%                   | CL03C150GA3GNN □ |                  |
|                |               | 15pF             | ±5%                   | CL03C150JA3GNN □ |                  |
|                |               | 16pF             | ±2%                   | CL03C160GA3GNN □ |                  |
|                |               | 16pF             | ±5%                   | CL03C160JA3GNN □ |                  |
|                |               | 16pF             | ±5%                   | CL03C160UA3GNN □ |                  |
|                |               | 18pF             | ±2%                   | CL03C180GA3GNN □ |                  |
|                |               | 18pF             | ±5%                   | CL03C180JA3GNN □ |                  |
|                |               | 20pF             | ±2%                   | CL03C200GA3GNN □ |                  |
|                |               | 20pF             | ±5%                   | CL03C200JA3GNN □ |                  |
|                |               | 22pF             | ±2%                   | CL03C220GA3GNN □ |                  |
|                |               | 22pF             | ±5%                   | CL03C220JA3GNN □ |                  |
|                |               | 24pF             | ±5%                   | CL03C240JA3GNN □ |                  |
|                |               | 27pF             | ±5%                   | CL03C270JA3GNN □ |                  |
|                |               | 30pF             | ±5%                   | CL03C300JA3GNN □ |                  |
|                |               | 33pF             | ±5%                   | CL03C330JA3GNN □ |                  |
|                |               | 50Vdc            | 0.5pF                 | ±0.25pF          | CL03C0R5CB3GNN □ |
|                |               |                  | 0.75pF                | ±0.1pF           | CL03CR75BB3GNN □ |
|                |               |                  | 0.8pF                 | ±0.25pF          | CL03C0R8CB3GNN □ |
|                | 1.0pF         |                  | ±0.1pF                | CL03C010BB3GNN □ |                  |
|                | 1.2pF         |                  | ±0.1pF                | CL03C1R2BB3GNN □ |                  |
|                | 1.2pF         |                  | ±0.25pF               | CL03C1R2CB3GNN □ |                  |
|                | 1.5pF         |                  | ±0.1pF                | CL03C1R5BB3GNN □ |                  |
|                | 1.5pF         |                  | ±0.25pF               | CL03C1R5CB3GNN □ |                  |
|                | 1.8pF         |                  | ±0.1pF                | CL03C1R8BB3GNN □ |                  |
|                | 2.0pF         |                  | ±0.1pF                | CL03C020BB3GNN □ |                  |
|                | 2.0pF         |                  | ±0.25pF               | CL03C020CB3GNN □ |                  |
|                | 2.2pF         |                  | ±0.05pF               | CL03C2R2AB3GNN □ |                  |
|                | 2.7pF         |                  | ±0.1pF                | CL03C2R7BB3GNN □ |                  |
|                | 3.0pF         |                  | ±0.1pF                | CL03C030BB3GNN □ |                  |
|                | 3.0pF         |                  | ±0.25pF               | CL03C030CB3GNN □ |                  |
|                | 3.3pF         |                  | ±0.1pF                | CL03C3R3BB3GNN □ |                  |
|                | 4.0pF         |                  | ±0.1pF                | CL03C040BB3GNN □ |                  |
|                | 4.7pF         |                  | ±0.1pF                | CL03C4R7BB3GNN □ |                  |
|                | 5.0pF         |                  | ±0.1pF                | CL03C050BB3GNN □ |                  |
|                | 5.6pF         |                  | ±0.1pF                | CL03C5R6BB3GNN □ |                  |
|                | 6.0pF         |                  | ±0.1pF                | CL03C060BB3GNN □ |                  |
|                | 6.0pF         |                  | ±0.5pF                | CL03C060DB3GNN □ |                  |
|                | 6.2pF         |                  | ±0.1pF                | CL03C6R2BB3GNN □ |                  |
|                | 6.5pF         | ±0.1pF           | CL03C6R5BB3GNN □      |                  |                  |
|                | 7.0pF         | ±0.1pF           | CL03C070BB3GNN □      |                  |                  |
|                | 7.0pF         | ±0.5pF           | CL03C070DB3GNN □      |                  |                  |
| 7.5pF          | ±0.1pF        | CL03C7R5BB3GNN □ |                       |                  |                  |
| 8.0pF          | ±0.1pF        | CL03C080BB3GNN □ |                       |                  |                  |
| 8.0pF          | ±0.5pF        | CL03C080DB3GNN □ |                       |                  |                  |
| 8.2pF          | ±0.1pF        | CL03C8R2BB3GNN □ |                       |                  |                  |
| 8.2pF          | ±0.5pF        | CL03C8R2DB3GNN □ |                       |                  |                  |
| 10pF           | ±5%           | CL03C100JB3GNN □ |                       |                  |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Medium – High Voltage Capacitors

## Feature

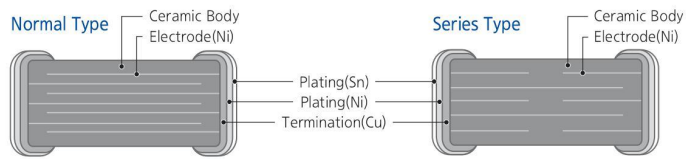
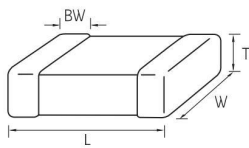


- Highly reliable performance
- Operating at high voltage level
- Wide voltage level : from 100V to 3kV
- High withstanding voltage
- Tape & reel surface mount assembly

## Application

- Switching Power Circuit (SMPS)
- Lighting Ballast, LCD Back Lighting Inverter
- DC – DC converter input filter, Snubber Circuit
- Network (IEEE802.3)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.65±0.10 | A              | 0.50+0.20/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.15±0.10 | M              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              |                 |
| 31        | 1206     | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | C              | 0.50±0.30       |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.25±0.15 | F              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | H              |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 1.25±0.20 | F              | 0.60±0.30       |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.60±0.20 | H              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.00±0.20 | I              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.50±0.20 | J              |                 |
| 42        | 1808     | 4.50±0.40     | 2.00±0.20 | 1.25±0.20 | F              | 0.80±0.30       |
|           |          | 4.50±0.40     | 2.00±0.20 | 1.60±0.20 | H              |                 |
|           |          | 4.50±0.40     | 2.00±0.20 | 2.00±0.20 | I              |                 |
| 43        | 1812     | 4.50±0.40     | 3.20±0.30 | 1.25±0.20 | F              | 0.80±0.30       |
|           |          | 4.50±0.40     | 3.20±0.30 | 1.60±0.20 | H              |                 |
|           |          | 4.50±0.40     | 3.20±0.30 | 2.00±0.20 | I              |                 |
|           |          | 4.50±0.40     | 3.20±0.30 | 2.50±0.20 | J              |                 |
| 55        | 2220     | 5.70±0.40     | 5.00±0.40 | 2.50±0.20 | J              | 1.00±0.30       |

Medium – High Voltage Capacitance Table (COG)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance   |     |     |     |     |     |     |     |     |     |     |     |   |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|----------------------|---------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|
|                      |                           | pF  |     |     |     |     |     |     |     |     |     |     |     | nF  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      |                           | 47  | 100 | 120 | 150 | 180 | 220 | 270 | 330 | 390 | 470 | 560 | 680 | 820   | 1.0 | 1.2 | 1.5 | 1.8 | 2.2 | 2.7 | 3.3 | 3.9 | 4.7 | 5.6 | 6.8 | 8.2 | 10 | 12 | 15 | 18 | 22 | 27 | 33 | 47 |
| 0402(1005)           | 100                       | [Bar chart showing capacitance values for 0402(1005) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0402(1005) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 0603<br>(1608)       | 100                       | [Bar chart showing capacitance values for 0603(1608) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0603(1608) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 200                       | [Bar chart showing capacitance values for 0603(1608) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0603(1608) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 250                       | [Bar chart showing capacitance values for 0603(1608) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0603(1608) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 0805<br>(2012)       | 100                       | [Bar chart showing capacitance values for 0805(2012) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0805(2012) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 200                       | [Bar chart showing capacitance values for 0805(2012) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0805(2012) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 250                       | [Bar chart showing capacitance values for 0805(2012) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0805(2012) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 500                       | [Bar chart showing capacitance values for 0805(2012) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0805(2012) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 630                       | [Bar chart showing capacitance values for 0805(2012) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 0805(2012) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 1206<br>(3216)       | 100                       | [Bar chart showing capacitance values for 1206(3216) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 200                       | [Bar chart showing capacitance values for 1206(3216) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 250                       | [Bar chart showing capacitance values for 1206(3216) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 500                       | [Bar chart showing capacitance values for 1206(3216) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 630                       | [Bar chart showing capacitance values for 1206(3216) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 1k                        | [Bar chart showing capacitance values for 1206(3216) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 2k                        | [Bar chart showing capacitance values for 1206(3216) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1206(3216) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 1210<br>(3225)       | 100                       | [Bar chart showing capacitance values for 1210(3225) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 200                       | [Bar chart showing capacitance values for 1210(3225) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 250                       | [Bar chart showing capacitance values for 1210(3225) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 500                       | [Bar chart showing capacitance values for 1210(3225) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 630                       | [Bar chart showing capacitance values for 1210(3225) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 1k                        | [Bar chart showing capacitance values for 1210(3225) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 2k                        | [Bar chart showing capacitance values for 1210(3225) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1210(3225) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 1808<br>(4520)       | 2k                        | [Bar chart showing capacitance values for 1808(4520) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1808(4520) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 3k                        | [Bar chart showing capacitance values for 1808(4520) at 3kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1808(4520) at 3kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 1812<br>(4532)       | 100                       | [Bar chart showing capacitance values for 1812(4532) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 200                       | [Bar chart showing capacitance values for 1812(4532) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 250                       | [Bar chart showing capacitance values for 1812(4532) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 500                       | [Bar chart showing capacitance values for 1812(4532) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 630                       | [Bar chart showing capacitance values for 1812(4532) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 1k                        | [Bar chart showing capacitance values for 1812(4532) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 2k                        | [Bar chart showing capacitance values for 1812(4532) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 3k                        | [Bar chart showing capacitance values for 1812(4532) at 3kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 1812(4532) at 3kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| 2220<br>(5750)       | 100                       | [Bar chart showing capacitance values for 2220(5750) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 100Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 200                       | [Bar chart showing capacitance values for 2220(5750) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 200Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 250                       | [Bar chart showing capacitance values for 2220(5750) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 250Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 500                       | [Bar chart showing capacitance values for 2220(5750) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 500Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 630                       | [Bar chart showing capacitance values for 2220(5750) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 630Vdc] |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 1k                        | [Bar chart showing capacitance values for 2220(5750) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 1kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 2k                        | [Bar chart showing capacitance values for 2220(5750) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 2kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|                      | 3k                        | [Bar chart showing capacitance values for 2220(5750) at 3kVdc]  |     |     |     |     |     |     |     |     |     |     |     | [Bar chart showing capacitance values for 2220(5750) at 3kVdc]  |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |

# Medium – High Voltage Capacitors

Medium – High Voltage Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
|                      |                           | nF          |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     | uF  |     |     |     |     |     |     |  |  |
|                      |                           | 1.0         | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 | 150 | 220 | 330 | 470 | 680 | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 |  |  |
| 0603(1608)           | 100                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 200                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 0805<br>(2012)       | 100                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 200                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 250                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 1206<br>(3216)       | 100                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 200                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 250                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 350                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 500                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 630                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 1k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 2k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 1210<br>(3225)       | 100                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 200                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 250                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 500                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 630                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 1k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 2k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 1808<br>(4520)       | 2k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 3k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 1812<br>(4532)       | 100                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 200                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 250                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 500                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 630                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 1k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 2k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
| 2220<br>(5750)       | 100                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 200                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 250                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 500                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 630                       |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 1k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |
|                      | 2k                        |             |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |  |  |

Product Line Up (COG)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.55mm         | 100Vdc        | 1.8pF       | ±0.25pF               | CL05C1R8CC5N111□ |
|                |               | 2.2pF       | ±0.25pF               | CL05C2R2CC5N111□ |
|                |               | 3.0pF       | ±0.25pF               | CL05C030CC5N111□ |
|                |               | 3.3pF       | ±0.25pF               | CL05C3R3CC5N111□ |
|                |               | 4.0pF       | ±0.25pF               | CL05C040CC5N111□ |
|                |               | 15pF        | ±5%                   | CL05C150JC5N111□ |
|                |               | 33pF        | ±5%                   | CL05C330JC5N111□ |
|                |               | 39pF        | ±5%                   | CL05C390JC5N111□ |
|                |               | 47pF        | ±5%                   | CL05C470JC5N111□ |
|                |               | 82pF        | ±5%                   | CL05C820JC5N111□ |
|                |               | 100pF       | ±5%                   | CL05C101JC5N111□ |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.90mm         | 100Vdc        | 270pF       | ±5%                   | CL10C271JC8N111□ |
|                |               | 330pF       | ±5%                   | CL10C331JC8N111□ |
|                |               | 390pF       | ±5%                   | CL10C391JC8N111□ |
|                |               | 470pF       | ±5%                   | CL10C471JC8N111□ |
|                |               | 1.0nF       | ±5%                   | CL10C102JC8N111□ |
|                | 200Vdc        | 220pF       | ±10%                  | CL10C221KD8N111□ |
|                | 250Vdc        | 470pF       | ±5%                   | CL10C471JE8N111□ |

■ Size : 2.00 X 1.25mm (inch : 0805)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.90mm         | 100Vdc        | 10pF             | ±0.25pF               | CL10C100CC8N111□ |
|                |               | 10pF             | ±0.5pF                | CL10C100DC8N111□ |
|                |               | 10pF             | ±5%                   | CL10C100JC8N111□ |
|                |               | 12pF             | ±5%                   | CL10C120JC8N111□ |
|                |               | 13pF             | ±5%                   | CL10C130JC8N111□ |
|                |               | 15pF             | ±5%                   | CL10C150JC8N111□ |
|                |               | 18pF             | ±5%                   | CL10C180JC8N111□ |
|                |               | 20pF             | ±5%                   | CL10C200JC8N111□ |
|                |               | 22pF             | ±5%                   | CL10C220JC8N111□ |
|                |               | 24pF             | ±5%                   | CL10C240JC8N111□ |
|                |               | 27pF             | ±5%                   | CL10C270JC8N111□ |
|                |               | 30pF             | ±5%                   | CL10C300JC8N111□ |
|                |               | 32pF             | ±2%                   | CL10C320GC8N111□ |
|                |               | 33pF             | ±1%                   | CL10C330FC8N111□ |
|                |               | 33pF             | ±5%                   | CL10C330JC8N111□ |
|                |               | 39pF             | ±1%                   | CL10C390FC8N111□ |
|                |               | 39pF             | ±5%                   | CL10C390JC8N111□ |
|                |               | 47pF             | ±5%                   | CL10C470JC8N111□ |
|                |               | 50pF             | ±5%                   | CL10C500JC8N111□ |
|                |               | 52pF             | ±5%                   | CL10C520JC8N111□ |
|                |               | 56pF             | ±5%                   | CL10C560JC8N111□ |
|                |               | 62pF             | ±5%                   | CL10C620JC8N111□ |
|                |               | 62pF             | ±10%                  | CL10C620KC8N111□ |
|                |               | 68pF             | ±2%                   | CL10C680GC8N111□ |
|                |               | 68pF             | ±5%                   | CL10C680JC8N111□ |
|                |               | 82pF             | ±5%                   | CL10C820JC8N111□ |
|                |               | 91pF             | ±5%                   | CL10C910JC8N111□ |
|                |               | 95pF             | ±5%                   | CL10C950JC8N111□ |
|                |               | 100pF            | ±5%                   | CL10C101JC8N111□ |
|                |               | 110pF            | ±5%                   | CL10C111JC8N111□ |
|                |               | 120pF            | ±5%                   | CL10C121JC8N111□ |
|                |               | 150pF            | ±5%                   | CL10C151JC8N111□ |
|                |               | 180pF            | ±5%                   | CL10C181JC8N111□ |
| 180pF          | ±10%          | CL10C181KC8N111□ |                       |                  |
| 190pF          | ±5%           | CL10C191JC8N111□ |                       |                  |
| 200pF          | ±5%           | CL10C201JC8N111□ |                       |                  |
| 220pF          | ±5%           | CL10C221JC8N111□ |                       |                  |
| 220pF          | ±10%          | CL10C221KC8N111□ |                       |                  |

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.75mm         | 100Vdc        | 2.7pF            | ±0.25pF               | CL21C2R7CCAN111□ |
|                |               | 4.7pF            | ±0.1pF                | CL21C4R7BCAN111□ |
|                |               | 10pF             | ±0.25pF               | CL21C100CCAN111□ |
|                |               | 10pF             | ±5%                   | CL21C100JCAN111□ |
|                |               | 11pF             | ±2%                   | CL21C110GCAN111□ |
|                |               | 11pF             | ±5%                   | CL21C110JCAN111□ |
|                |               | 12pF             | ±2%                   | CL21C120GCAN111□ |
|                |               | 13pF             | ±2%                   | CL21C130GCAN111□ |
|                |               | 13pF             | ±5%                   | CL21C130JCAN111□ |
|                |               | 14pF             | ±5%                   | CL21C140JCAN111□ |
|                |               | 15pF             | ±5%                   | CL21C150JCAN111□ |
|                |               | 16pF             | ±2%                   | CL21C160GCAN111□ |
|                |               | 16pF             | ±5%                   | CL21C160JCAN111□ |
|                |               | 17pF             | ±5%                   | CL21C170JCAN111□ |
|                |               | 18pF             | ±2%                   | CL21C180GCAN111□ |
|                |               | 18pF             | ±5%                   | CL21C180JCAN111□ |
|                |               | 20pF             | ±5%                   | CL21C200JCAN111□ |
|                |               | 22pF             | ±5%                   | CL21C220JCAN111□ |
|                |               | 24pF             | ±2%                   | CL21C240GCAN111□ |
|                |               | 24pF             | ±5%                   | CL21C240JCAN111□ |
|                |               | 25pF             | ±5%                   | CL21C250JCAN111□ |
|                |               | 27pF             | ±5%                   | CL21C270JCAN111□ |
|                |               | 30pF             | ±5%                   | CL21C300JCAN111□ |
|                |               | 33pF             | ±2%                   | CL21C330GCAN111□ |
|                |               | 33pF             | ±5%                   | CL21C330JCAN111□ |
|                |               | 36pF             | ±5%                   | CL21C360JCAN111□ |
|                |               | 38pF             | ±2%                   | CL21C380GCAN111□ |
|                |               | 39pF             | ±2%                   | CL21C390GCAN111□ |
|                |               | 39pF             | ±5%                   | CL21C390JCAN111□ |
|                |               | 39pF             | ±10%                  | CL21C390KCAN111□ |
|                |               | 40pF             | ±2%                   | CL21C400GCAN111□ |
|                |               | 43pF             | ±2%                   | CL21C430GCAN111□ |
|                |               | 43pF             | ±5%                   | CL21C430JCAN111□ |
|                |               | 47pF             | ±5%                   | CL21C470JCAN111□ |
|                |               | 51pF             | ±2%                   | CL21C510GCAN111□ |
|                |               | 51pF             | ±5%                   | CL21C510JCAN111□ |
|                |               | 56pF             | ±5%                   | CL21C560JCAN111□ |
|                |               | 62pF             | ±5%                   | CL21C620JCAN111□ |
|                |               | 68pF             | ±5%                   | CL21C680JCAN111□ |
|                |               | 75pF             | ±5%                   | CL21C750JCAN111□ |
| 82pF           | ±5%           | CL21C820JCAN111□ |                       |                  |
| 91pF           | ±2%           | CL21C910GCAN111□ |                       |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
In order to move to the page directly, please click the here. ↑

# Medium – High Voltage Capacitors

## Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance   | Capacitance Tolerance | Part Number    |
|----------------|---------------|---------------|-----------------------|----------------|
| 0.75mm         | 100Vdc        | 91pF          | ±5%                   | CL21C910JCANN□ |
|                |               | 100pF         | ±5%                   | CL21C101JCANN□ |
|                |               | 110pF         | ±5%                   | CL21C111JCANN□ |
|                |               | 120pF         | ±5%                   | CL21C121JCANN□ |
|                |               | 130pF         | ±5%                   | CL21C131JCANN□ |
|                |               | 150pF         | ±1%                   | CL21C151FCANN□ |
|                |               | 150pF         | ±5%                   | CL21C151JCANN□ |
|                |               | 160pF         | ±5%                   | CL21C161JCANN□ |
|                |               | 180pF         | ±2%                   | CL21C181GCANN□ |
|                |               | 180pF         | ±5%                   | CL21C181JCANN□ |
|                |               | 200pF         | ±5%                   | CL21C201JCANN□ |
|                |               | 220pF         | ±5%                   | CL21C221JCANN□ |
|                |               | 240pF         | ±5%                   | CL21C241JCANN□ |
|                |               | 270pF         | ±5%                   | CL21C271JCANN□ |
|                |               | 270pF         | ±10%                  | CL21C271KCANN□ |
|                |               | 300pF         | ±5%                   | CL21C301JCANN□ |
|                |               | 330pF         | ±5%                   | CL21C331JCANN□ |
|                |               | 360pF         | ±5%                   | CL21C361JCANN□ |
|                |               | 390pF         | ±5%                   | CL21C391JCANN□ |
|                |               | 0.95mm        | 100Vdc                | 15pF           |
| 470pF          | ±2%           |               |                       | CL21C471GCCN□  |
| 470pF          | ±5%           |               |                       | CL21C471JCCN□  |
| 510pF          | ±5%           |               |                       | CL21C511JCCN□  |
| 560pF          | ±1%           |               |                       | CL21C561FCCN□  |
| 620pF          | ±5%           |               |                       | CL21C621JCCN□  |
| 680pF          | ±5%           |               |                       | CL21C681JCCN□  |
| 100pF          | ±5%           |               |                       | CL21C101JDAN□  |
| 200Vdc         | 10pF          |               | ±0.5pF                | CL21C100DDCN□  |
|                | 15pF          |               | ±5%                   | CL21C150JDCN□  |
|                | 18pF          |               | ±2%                   | CL21C180GDCN□  |
|                | 18pF          |               | ±5%                   | CL21C180JDCN□  |
|                | 20pF          |               | ±2%                   | CL21C200GDCN□  |
|                | 36pF          |               | ±2%                   | CL21C360GDCN□  |
|                | 39pF          |               | ±2%                   | CL21C390GDCN□  |
|                | 43pF          |               | ±2%                   | CL21C430GDCN□  |
|                | 47pF          |               | ±5%                   | CL21C470JDCN□  |
|                | 51pF          |               | ±5%                   | CL21C510JDCN□  |
|                | 56pF          |               | ±2%                   | CL21C560GDCN□  |
|                | 56pF          |               | ±5%                   | CL21C560JDCN□  |
| 62pF           | ±2%           | CL21C620GDCN□ |                       |                |
| 100pF          | ±2%           | CL21C101GDCN□ |                       |                |
| 100pF          | ±5%           | CL21C101JDCN□ |                       |                |
| 120pF          | ±5%           | CL21C121JDCN□ |                       |                |
| 150pF          | ±5%           | CL21C151JDCN□ |                       |                |
| 200pF          | ±5%           | CL21C201JDCN□ |                       |                |
| 220pF          | ±5%           | CL21C221JDCN□ |                       |                |
| 250Vdc         | 100pF         | ±10%          | CL21C101KECN□         |                |
| 1.35mm         | 100Vdc        | 100pF         | ±5%                   | CL21C101JCFN□  |
|                |               | 1.0nF         | ±2%                   | CL21C102GCFN□  |
|                |               | 1.0nF         | ±5%                   | CL21C102JCFN□  |
|                |               | 1.2nF         | ±5%                   | CL21C122JCFN□  |
|                |               | 2.2nF         | ±5%                   | CL21C222JCFN□  |
|                | 200Vdc        | 470pF         | ±5%                   | CL21C471JDFN□  |
|                |               | 1.0nF         | ±5%                   | CL21C102JDFN□  |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number   |
|----------------|---------------|-------------|-----------------------|---------------|
| 1.35mm         | 250Vdc        | 1.0nF       | ±5%                   | CL21C102JEFN□ |
|                | 630Vdc        | 27pF        | ±5%                   | CL21C270JHFN□ |
|                |               | 33pF        | ±5%                   | CL21C330JHFN□ |
|                |               | 68pF        | ±5%                   | CL21C680JHFN□ |
|                |               | 150pF       | ±5%                   | CL21C151JHFN□ |
|                |               | 560pF       | ±5%                   | CL21C561JHFN□ |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance  | Capacitance Tolerance | Part Number   |
|----------------|---------------|--------------|-----------------------|---------------|
| 1.00mm         | 100Vdc        | 10pF         | ±0.25pF               | CL31C100CCN□  |
|                |               | 10pF         | ±0.5pF                | CL31C100DCN□  |
|                |               | 10pF         | ±5%                   | CL31C100JCN□  |
|                |               | 11pF         | ±5%                   | CL31C110JCN□  |
|                |               | 12pF         | ±2%                   | CL31C120GCCN□ |
|                |               | 12pF         | ±5%                   | CL31C120JCN□  |
|                |               | 15pF         | ±2%                   | CL31C150GCCN□ |
|                |               | 15pF         | ±5%                   | CL31C150JCN□  |
|                |               | 18pF         | ±2%                   | CL31C180GCCN□ |
|                |               | 18pF         | ±5%                   | CL31C180JCN□  |
|                |               | 20pF         | ±5%                   | CL31C200JCN□  |
|                |               | 22pF         | ±5%                   | CL31C220JCN□  |
|                |               | 24pF         | ±5%                   | CL31C240JCN□  |
|                |               | 27pF         | ±1%                   | CL31C270FCCN□ |
|                |               | 27pF         | ±2%                   | CL31C270GCCN□ |
|                |               | 27pF         | ±5%                   | CL31C270JCN□  |
|                |               | 30pF         | ±2%                   | CL31C300GCCN□ |
|                |               | 30pF         | ±5%                   | CL31C300JCN□  |
|                |               | 30pF         | ±10%                  | CL31C300KCN□  |
|                |               | 33pF         | ±5%                   | CL31C330JCN□  |
|                |               | 36pF         | ±5%                   | CL31C360JCN□  |
|                |               | 39pF         | ±5%                   | CL31C390JCN□  |
|                |               | 43pF         | ±5%                   | CL31C430JCN□  |
|                |               | 51pF         | ±5%                   | CL31C510JCN□  |
|                |               | 56pF         | ±5%                   | CL31C560JCN□  |
|                |               | 62pF         | ±5%                   | CL31C620JCN□  |
|                |               | 68pF         | ±5%                   | CL31C680JCN□  |
|                |               | 75pF         | ±5%                   | CL31C750JCN□  |
|                |               | 82pF         | ±5%                   | CL31C820JCN□  |
|                |               | 91pF         | ±1%                   | CL31C910FCCN□ |
|                |               | 91pF         | ±2%                   | CL31C910GCCN□ |
|                |               | 91pF         | ±5%                   | CL31C910JCN□  |
|                |               | 100pF        | ±5%                   | CL31C101JCN□  |
|                |               | 110pF        | ±5%                   | CL31C111JCN□  |
|                |               | 120pF        | ±5%                   | CL31C121JCN□  |
|                |               | 130pF        | ±5%                   | CL31C131JCN□  |
|                |               | 180pF        | ±1%                   | CL31C181FCCN□ |
|                |               | 180pF        | ±5%                   | CL31C181JCN□  |
|                |               | 200pF        | ±5%                   | CL31C201JCN□  |
|                |               | 220pF        | ±5%                   | CL31C221JCN□  |
| 240pF          | ±5%           | CL31C241JCN□ |                       |               |
| 270pF          | ±5%           | CL31C271JCN□ |                       |               |
| 300pF          | ±5%           | CL31C301JCN□ |                       |               |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (COG)

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark | Thickness Max. | Rated Voltage   | Capacitance     | Capacitance Tolerance | Part Number     | Remark          |  |
|----------------|---------------|-----------------|-----------------------|-----------------|--------|----------------|-----------------|-----------------|-----------------------|-----------------|-----------------|--|
| 1.00mm         | 100Vdc        | 330pF           | ±1%                   | CL31C331FCCNNN□ |        | 1.40mm         | 500Vdc          | 470pF           | ±10%                  | CL31C471KGFNNN□ |                 |  |
|                |               | 330pF           | ±5%                   | CL31C331JCCNNN□ |        |                |                 | 560pF           | ±2%                   | CL31C561GGFNNN□ |                 |  |
|                |               | 360pF           | ±5%                   | CL31C361JCCNNN□ |        |                |                 | 560pF           | ±5%                   | CL31C561JGFNNN□ |                 |  |
|                |               | 390pF           | ±5%                   | CL31C391JCCNNN□ |        |                |                 | 630Vdc          | 10pF                  | ±5%             | CL31C100JHFNNN□ |  |
|                |               | 390pF           | ±10%                  | CL31C391KCCNNN□ |        |                | 12pF            |                 | ±5%                   | CL31C120JHFNNN□ |                 |  |
|                |               | 470pF           | ±1%                   | CL31C471FCCNNN□ |        |                | 15pF            |                 | ±5%                   | CL31C150JHFNNN□ |                 |  |
|                |               | 470pF           | ±2%                   | CL31C471GCCNNN□ |        |                | 18pF            |                 | ±5%                   | CL31C180JHFNNN□ |                 |  |
|                |               | 470pF           | ±5%                   | CL31C471JCCNNN□ |        |                | 22pF            |                 | ±5%                   | CL31C220JHFNNN□ |                 |  |
|                |               | 470pF           | ±10%                  | CL31C471KCCNNN□ |        |                | 22pF            |                 | ±5%                   | CL31C220JHFNNC□ | dv/dt           |  |
|                |               | 510pF           | ±5%                   | CL31C511JCCNNN□ |        |                | 27pF            |                 | ±5%                   | CL31C270JHFNNN□ |                 |  |
|                |               | 560pF           | ±5%                   | CL31C561JCCNNN□ |        |                | 33pF            |                 | ±5%                   | CL31C330JHFNNN□ |                 |  |
|                |               | 680pF           | ±5%                   | CL31C681JCCNNN□ |        |                | 39pF            |                 | ±5%                   | CL31C390JHFNNN□ |                 |  |
|                |               | 750pF           | ±5%                   | CL31C751JCCNNN□ |        |                | 47pF            |                 | ±2%                   | CL31C470GHFNNN□ |                 |  |
|                |               | 820pF           | ±1%                   | CL31C821FCCNNN□ |        |                | 47pF            |                 | ±5%                   | CL31C470JHFNNN□ |                 |  |
|                |               | 910pF           | ±5%                   | CL31C911JCCNNN□ |        |                | 47pF            |                 | ±5%                   | CL31C470JHFNNC□ | dv/dt           |  |
|                |               | 1.0nF           | ±5%                   | CL31C102JCCNNN□ |        |                | 47pF            |                 | ±10%                  | CL31C470KHFNNN□ |                 |  |
|                |               | 1.2nF           | ±5%                   | CL31C122JCCNNN□ |        |                | 56pF            |                 | ±5%                   | CL31C560JHFNNN□ |                 |  |
|                |               | 1.5nF           | ±5%                   | CL31C152JCCNNN□ |        |                | 68pF            |                 | ±5%                   | CL31C680JHFNNN□ |                 |  |
|                |               | 1.8nF           | ±5%                   | CL31C182JCCNNN□ |        |                | 82pF            |                 | ±5%                   | CL31C820JHFNNN□ |                 |  |
|                |               | 2.2nF           | ±5%                   | CL31C222JCCNNN□ |        |                | 100pF           | ±5%             | CL31C101JHFNNN□       |                 |                 |  |
|                | 200Vdc        | 10pF            | ±0.5pF                | CL31C100DDCNNN□ |        |                | 120pF           | ±5%             | CL31C121JHFNNN□       |                 |                 |  |
|                |               | 15pF            | ±5%                   | CL31C150JDCNNN□ |        |                | 150pF           | ±5%             | CL31C151JHFNNN□       |                 |                 |  |
|                |               | 36pF            | ±5%                   | CL31C360JDCNNN□ |        |                | 180pF           | ±5%             | CL31C181JHFNNN□       |                 |                 |  |
|                |               | 51pF            | ±5%                   | CL31C510JDCNNN□ |        |                | 220pF           | ±5%             | CL31C221JHFNNN□       |                 |                 |  |
| 100pF          |               | ±5%             | CL31C101JDCNNN□       |                 | 220pF  | ±10%           | CL31C221KHFNNN□ |                 |                       |                 |                 |  |
| 200pF          |               | ±5%             | CL31C201JDCNNN□       |                 | 330pF  | ±5%            | CL31C331JHFNNN□ |                 |                       |                 |                 |  |
| 220pF          |               | ±5%             | CL31C221JDCNNN□       |                 | 390pF  | ±5%            | CL31C391JHFNNN□ |                 |                       |                 |                 |  |
| 470pF          |               | ±5%             | CL31C471JHFNNN□       |                 | 470pF  | ±5%            | CL31C471JHFNNN□ |                 |                       |                 |                 |  |
| 1.30mm         | 630Vdc        | 1.0nF           | ±5%                   | CL31C102JHMLNN□ |        | 1kVdc          | 10pF            | ±5%             | CL31C100JIFNNN□       |                 |                 |  |
| 1.40mm         | 200Vdc        | 1.0nF           | ±5%                   | CL31C102JDFNNN□ |        |                | 12pF            | ±5%             | CL31C120JIFNNN□       |                 |                 |  |
|                |               | 1.5nF           | ±5%                   | CL31C152JDFNNN□ |        |                | 15pF            | ±5%             | CL31C150JIFNNN□       |                 |                 |  |
|                | 500Vdc        | 10pF            | ±5%                   | CL31C100JGFNNN□ |        |                | 18pF            | ±5%             | CL31C180JIFNNN□       |                 |                 |  |
|                |               | 15pF            | ±2%                   | CL31C150GGFNNN□ |        |                | 22pF            | ±5%             | CL31C220JIFNNN□       |                 |                 |  |
|                |               | 15pF            | ±5%                   | CL31C150JGFNNN□ |        |                | 33pF            | ±5%             | CL31C330JIFNNN□       |                 |                 |  |
|                |               | 20pF            | ±5%                   | CL31C200JGFNNN□ |        |                | 39pF            | ±5%             | CL31C390JIFNNN□       |                 |                 |  |
|                |               | 22pF            | ±5%                   | CL31C220JGFNNN□ |        |                | 47pF            | ±5%             | CL31C470JIFNNN□       |                 |                 |  |
|                |               | 39pF            | ±2%                   | CL31C390GGFNNN□ |        |                | 56pF            | ±5%             | CL31C560JIFNNN□       |                 |                 |  |
|                |               | 39pF            | ±5%                   | CL31C390JGFNNN□ |        |                | 68pF            | ±5%             | CL31C680JIFNNN□       |                 |                 |  |
|                |               | 47pF            | ±2%                   | CL31C470GGFNNN□ |        |                | 82pF            | ±5%             | CL31C820JIFNNN□       |                 |                 |  |
|                |               | 47pF            | ±5%                   | CL31C470JGFNNN□ |        |                | 100pF           | ±5%             | CL31C101JIFNNN□       |                 |                 |  |
|                |               | 68pF            | ±2%                   | CL31C680GGFNNN□ |        |                | 100pF           | ±5%             | CL31C101JIFNNC□       | dv/dt           |                 |  |
|                |               | 68pF            | ±5%                   | CL31C680JGFNNN□ |        |                | 120pF           | ±5%             | CL31C121JIFNNN□       |                 |                 |  |
|                |               | 82pF            | ±5%                   | CL31C820JGFNNN□ |        |                | 150pF           | ±5%             | CL31C151JIFNNN□       |                 |                 |  |
| 100pF          | ±2%           | CL31C101GGFNNN□ |                       | 470pF           | ±5%    |                | CL31C471JIFNNN□ |                 |                       |                 |                 |  |
| 100pF          | ±5%           | CL31C101JGFNNN□ |                       | 1.80mm          | 100Vdc | 3.9nF          | ±5%             | CL31C392JCHNNN□ |                       |                 |                 |  |
| 100pF          | ±10%          | CL31C101KGFNNN□ |                       |                 |        | 4.7nF          | ±5%             | CL31C472JCHNNN□ |                       |                 |                 |  |
| 150pF          | ±5%           | CL31C151JGFNNN□ |                       |                 |        | 10nF           | ±5%             | CL31C103JCHNNN□ |                       |                 |                 |  |
| 220pF          | ±2%           | CL31C221GGFNNN□ |                       |                 |        | 200Vdc         | 2.2nF           | ±5%             | CL31C222JDHNNN□       |                 |                 |  |
| 220pF          | ±5%           | CL31C221JGFNNN□ |                       |                 | 2.2nF  |                | ±10%            | CL31C222KDHNNN□ |                       |                 |                 |  |
| 220pF          | ±10%          | CL31C221KGFNNN□ |                       |                 | 250Vdc |                | 2.2nF           | ±5%             | CL31C222JEHNNN□       |                 |                 |  |
| 270pF          | ±2%           | CL31C271GGFNNN□ |                       |                 |        |                | 3.9nF           | ±5%             | CL31C392JEHNNN□       |                 |                 |  |
| 270pF          | ±5%           | CL31C271JGFNNN□ |                       |                 |        | 4.7nF          | ±5%             | CL31C472JEHNNN□ |                       |                 |                 |  |
| 330pF          | ±5%           | CL31C331JGFNNN□ |                       |                 |        | 5.6nF          | ±5%             | CL31C562JEHNNN□ |                       |                 |                 |  |
| 470pF          | ±2%           | CL31C471GGFNNN□ |                       |                 | 6.8nF  | ±5%            | CL31C682JEHNNN□ |                 |                       |                 |                 |  |
| 470pF          | ±5%           | CL31C471JGFNNN□ |                       |                 |        |                |                 |                 |                       |                 |                 |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# Medium – High Voltage Capacitors

## Product Line Up (COG)

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 1.80mm         | 250Vdc        | 8.2nF       | ±5%                   | CL31C822JEHNNN □ |                  |  |
|                |               | 500Vdc      | 1.0nF                 | ±2%              | CL31C102GGHNNN □ |  |
|                |               |             | 1.0nF                 | ±5%              | CL31C102JGHNNN □ |  |
|                |               |             | 1.5nF                 | ±5%              | CL31C152JGHNNN □ |  |
|                | 630Vdc        | 2.2nF       | ±5%                   | CL31C222JGHNNN □ |                  |  |
|                |               | 680pF       | ±5%                   | CL31C681JHHNNN □ |                  |  |
|                |               | 1.0nF       | ±5%                   | CL31C102JHHNNN □ |                  |  |
|                |               | 1.0nF       | ±5%                   | CL31C102JHHNNC □ | dv/dt            |  |
|                |               | 1.2nF       | ±5%                   | CL31C122JHHNNN □ |                  |  |
|                |               | 1.5nF       | ±5%                   | CL31C152JHHNNN □ |                  |  |
|                |               | 2.2nF       | ±5%                   | CL31C222JHHNNN □ |                  |  |
|                |               | 2.7nF       | ±5%                   | CL31C272JHHNNN □ |                  |  |
|                |               | 3.3nF       | ±5%                   | CL31C332JHHNNN □ |                  |  |
|                |               | 1kVdc       | 33pF                  | ±5%              | CL31C330JHHNNN □ |  |
|                |               |             | 150pF                 | ±5%              | CL31C151JHHNNN □ |  |
|                |               |             | 180pF                 | ±5%              | CL31C181JHHNNN □ |  |
|                | 220pF         |             | ±5%                   | CL31C221JHHNNN □ |                  |  |
|                | 220pF         |             | ±5%                   | CL31C221JHHNNC □ | dv/dt            |  |
|                | 270pF         |             | ±5%                   | CL31C271JHHNNN □ |                  |  |
|                | 270pF         |             | ±5%                   | CL31C271JHHNNC □ | dv/dt            |  |
|                | 330pF         |             | ±5%                   | CL31C331JHHNNN □ |                  |  |
|                | 330pF         |             | ±5%                   | CL31C331JHHNNC □ | dv/dt            |  |
|                | 470pF         |             | ±5%                   | CL31C471JHHNNN □ |                  |  |
|                | 470pF         |             | ±5%                   | CL31C471JHHNNC □ | dv/dt            |  |
|                | 2kVdc         |             | 10pF                  | ±5%              | CL31C100JHHNNN □ |  |
|                |               | 10pF        | ±5%                   | CL31C100JHHNNC □ | dv/dt            |  |
|                |               | 15pF        | ±5%                   | CL31C150JHHNNN □ |                  |  |
|                |               | 22pF        | ±5%                   | CL31C220JHHNNN □ |                  |  |
|                |               | 33pF        | ±5%                   | CL31C330JHHNNN □ |                  |  |
|                |               | 47pF        | ±5%                   | CL31C470JHHNNN □ |                  |  |
|                |               | 47pF        | ±5%                   | CL31C470JHHNNC □ | dv/dt            |  |
|                |               | 68pF        | ±5%                   | CL31C680JHHNNN □ |                  |  |
|                | 100pF         | ±5%         | CL31C101JHHNNN □      |                  |                  |  |

### ■ Size : 4.50 X 2.00mm (inch : 1808)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------------------|
| 1.45mm         | 3kVdc         | 5pF         | ±5%                   | CL42C050JKFNNN □ |                  |                  |
|                |               | 10pF        | ±5%                   | CL42C100JKFNNN □ |                  |                  |
|                |               | 12pF        | ±5%                   | CL42C120JKFNNN □ |                  |                  |
|                |               | 15pF        | ±5%                   | CL42C150JKFNNN □ |                  |                  |
|                |               | 18pF        | ±5%                   | CL42C180JKFNNN □ |                  |                  |
|                |               | 22pF        | ±5%                   | CL42C220JKFNNN □ |                  |                  |
|                |               | 27pF        | ±5%                   | CL42C270JKFNNN □ |                  |                  |
|                |               | 33pF        | ±5%                   | CL42C330JKFNNN □ |                  |                  |
|                |               | 47pF        | ±5%                   | CL42C470JKFNNN □ |                  |                  |
|                |               | 68pF        | ±5%                   | CL42C680JKFNNN □ |                  |                  |
|                |               | 100pF       | ±5%                   | CL42C101JKFNNN □ |                  |                  |
|                |               | 1.80mm      | 2kVdc                 | 220pF            | ±5%              | CL42C221JHHNNN □ |
|                | 2.20mm        | 3kVdc       | 150pF                 | ±5%              | CL42C151JKINNN □ |                  |

### ■ Size : 4.50 X 3.20mm (inch : 1812)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 1.45mm         | 100Vdc        | 10nF        | ±5%                   | CL43C103JCFNNN □ |                  |
| 1.80mm         | 1kVdc         | 820pF       | ±5%                   | CL43C821JHHNNN □ |                  |
|                |               | 1.0nF       | ±5%                   | CL43C102JHHNNN □ |                  |
| 2.20mm         | 1kVdc         | 1.2nF       | ±5%                   | CL43C122JHHNNN □ |                  |
| 2.70mm         | 630Vdc        | 22nF        | ±5%                   | CL43C223JHHNNN □ |                  |
|                |               | 1kVdc       | 1.3nF                 | ±5%              | CL43C132JHHNNN □ |
|                | 1kVdc         | 1.5nF       | ±5%                   | CL43C152JHHNNN □ |                  |
|                |               | 1.6nF       | ±5%                   | CL43C162JHHNNN □ |                  |
|                |               | 1.8nF       | ±5%                   | CL43C182JHHNNN □ |                  |

### ■ Size : 5.70 X 5.00mm (inch : 2220)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 2.70mm         | 3kVdc         | 1.0nF       | ±5%                   | CL55C102JKJNNN □ |        |

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.45mm         | 100Vdc        | 1.0nF       | ±10%                  | CL32C102KCFNNN □ |        |
|                |               | 1.5nF       | ±10%                  | CL32C152KCFNNN □ |        |
|                |               | 4.7nF       | ±5%                   | CL32C472JCFNNN □ |        |
|                | 500Vdc        | 680pF       | ±5%                   | CL32C681JGFNNN □ |        |
|                | 1kVdc         | 330pF       | ±5%                   | CL32C331JIFNNN □ |        |
|                | 2kVdc         | 100pF       | ±5%                   | CL32C101JFFNNN □ |        |
|                |               | 100pF       | ±10%                  | CL32C101KJFNNN □ |        |
| 150pF          |               | ±5%         | CL32C151JFFNNN □      |                  |        |
| 1.80mm         | 630Vdc        | 1.8nF       | ±5%                   | CL32C182JHHNNN □ |        |
|                | 1kVdc         | 470pF       | ±5%                   | CL32C471JHHNNN □ |        |
|                | 2kVdc         | 220pF       | ±5%                   | CL32C221JHHNNN □ |        |
| 2.20mm         | 2kVdc         | 330pF       | ±5%                   | CL32C331JJJNNN □ |        |
| 2.70mm         | 630Vdc        | 6.8nF       | ±10%                  | CL32C682KHJNNN □ |        |
|                |               | 8.2nF       | ±5%                   | CL32C822JHHNNN □ |        |
|                | 2kVdc         | 470pF       | ±5%                   | CL32C471JJJNNN □ |        |

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Product Line Up (X7R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.90mm         | 100Vdc        | 220pF       | ±10%                  | CL10B221KC8NNN□ |        |
|                |               | 470pF       | ±10%                  | CL10B471KC8NNN□ |        |
|                |               | 680pF       | ±5%                   | CL10B681JC8NNN□ |        |
|                |               | 1.0nF       | ±10%                  | CL10B102KC8NNN□ |        |
|                |               | 1.5nF       | ±10%                  | CL10B152KC8NNN□ |        |
|                |               | 1.8nF       | ±10%                  | CL10B182KC8NNN□ |        |
|                |               | 2.2nF       | ±10%                  | CL10B222KC8NNN□ |        |
|                |               | 2.7nF       | ±10%                  | CL10B272KC8NNN□ |        |
|                |               | 3.3nF       | ±5%                   | CL10B332JC8NNN□ |        |
|                |               | 3.3nF       | ±10%                  | CL10B332KC8NNN□ |        |
|                |               | 3.9nF       | ±10%                  | CL10B392KC8NNN□ |        |
|                |               | 4.7nF       | ±10%                  | CL10B472KC8NNN□ |        |
|                |               | 10nF        | ±10%                  | CL10B103KC8NNN□ |        |
|                |               | 100nF       | ±10%                  | CL10B104KC8NNN□ |        |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.35mm         | 100Vdc        | 100nF       | ±10%                  | CL21B104KCFNNN□ |        |
|                |               | 220nF       | ±10%                  | CL21B224KCFNNN□ |        |
|                | 250Vdc        | 4.7nF       | ±10%                  | CL21B472KEFNNN□ |        |
|                |               | 10nF        | ±10%                  | CL21B103KEFNNN□ |        |
|                |               | 15nF        | ±10%                  | CL21B153KEFNNN□ |        |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |                 |  |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|-----------------|--|
| 1.00mm         | 100Vdc        | 330pF       | ±10%                  | CL31B331KCCNNN□ |                 |                 |  |
|                |               | 470pF       | ±10%                  | CL31B471KCCNNN□ |                 |                 |  |
|                |               | 1.0nF       | ±10%                  | CL31B102KCCNNN□ |                 |                 |  |
|                |               | 1.5nF       | ±10%                  | CL31B152KCCNNN□ |                 |                 |  |
|                |               | 2.2nF       | ±10%                  | CL31B222KCCNNN□ |                 |                 |  |
|                |               | 2.7nF       | ±5%                   | CL31B272JCCNNN□ |                 |                 |  |
|                |               | 3.3nF       | ±10%                  | CL31B332KCCNNN□ |                 |                 |  |
|                |               | 3.9nF       | ±10%                  | CL31B392KCCNNN□ |                 |                 |  |
|                |               | 4.7nF       | ±10%                  | CL31B472KCCNNN□ |                 |                 |  |
|                |               | 6.8nF       | ±10%                  | CL31B682KCCNNN□ |                 |                 |  |
|                |               | 10nF        | ±10%                  | CL31B103KCCNNN□ |                 |                 |  |
|                |               | 18nF        | ±10%                  | CL31B183KCCNNN□ |                 |                 |  |
|                |               | 22nF        | ±10%                  | CL31B223KCCNNN□ |                 |                 |  |
|                |               | 33nF        | ±10%                  | CL31B333KCCNNN□ |                 |                 |  |
|                |               | 47nF        | ±5%                   | CL31B473JCCNNN□ |                 |                 |  |
|                |               | 47nF        | ±10%                  | CL31B473KCCNNN□ |                 |                 |  |
|                |               | 47nF        | ±20%                  | CL31B473MCCNNN□ |                 |                 |  |
|                |               | 200Vdc      | 470pF                 | ±10%            | CL31B471KDCNNN□ |                 |  |
|                | 680pF         |             | ±10%                  | CL31B681KDCNNN□ |                 |                 |  |
|                | 1.0nF         |             | ±10%                  | CL31B102KDCNNN□ |                 |                 |  |
|                | 2.2nF         |             | ±10%                  | CL31B222KDCNNN□ |                 |                 |  |
|                | 3.3nF         |             | ±10%                  | CL31B332KDCNNN□ |                 |                 |  |
|                | 4.7nF         |             | ±10%                  | CL31B472KDCNNN□ |                 |                 |  |
|                | 6.8nF         |             | ±10%                  | CL31B682KDCNNN□ |                 |                 |  |
|                | 10nF          |             | ±10%                  | CL31B103KDCNNN□ |                 |                 |  |
|                | 15nF          |             | ±10%                  | CL31B153KDCNNN□ |                 |                 |  |
|                | 18nF          |             | ±10%                  | CL31B183KDCNNN□ |                 |                 |  |
|                | 22nF          |             | ±5%                   | CL31B223JDCNNN□ |                 |                 |  |
|                | 22nF          |             | ±10%                  | CL31B223KDCNNN□ |                 |                 |  |
|                | 1.40mm        |             | 100Vdc                | 470pF           | ±10%            | CL31B471KCFNNN□ |  |
|                |               |             |                       | 100nF           | ±5%             | CL31B104JCFNNN□ |  |
|                |               |             |                       | 100nF           | ±10%            | CL31B104KCFNNN□ |  |
|                |               |             | 200Vdc                | 33nF            | ±10%            | CL31B333KDFNNN□ |  |
|                |               | 47nF        |                       | ±10%            | CL31B473KDFNNN□ |                 |  |
| 250Vdc         |               | 22nF        | ±10%                  | CL31B223KEFNNN□ |                 |                 |  |
|                |               | 500Vdc      | 220pF                 | ±10%            | CL31B221KGFNNN□ |                 |  |
|                |               |             | 470pF                 | ±10%            | CL31B471KGFNNN□ |                 |  |
|                |               |             | 470pF                 | ±20%            | CL31B471MGFNNN□ |                 |  |
|                |               |             | 560pF                 | ±10%            | CL31B561KGFNNN□ |                 |  |
| 100Vdc         | 680pF         | ±10%        | CL31B681KGFNNN□       |                 |                 |                 |  |
|                | 1.0nF         | ±10%        | CL31B102KGFNNN□       |                 |                 |                 |  |
|                | 1.0nF         | ±20%        | CL31B102MGFNNN□       |                 |                 |                 |  |
|                | 1.5nF         | ±10%        | CL31B152KGFNNN□       |                 |                 |                 |  |
|                | 1.8nF         | ±5%         | CL31B182JGFNNN□       |                 |                 |                 |  |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |                 |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|-----------------|
| 0.75mm         | 100Vdc        | 100pF       | ±5%                   | CL21B101JCANNN□ |                 |                 |
|                |               | 220pF       | ±10%                  | CL21B221KCANNN□ |                 |                 |
|                |               | 270pF       | ±10%                  | CL21B271KCANNN□ |                 |                 |
|                |               | 330pF       | ±5%                   | CL21B331JCANNN□ |                 |                 |
|                |               | 330pF       | ±10%                  | CL21B331KCANNN□ |                 |                 |
|                |               | 470pF       | ±10%                  | CL21B471KCANNN□ |                 |                 |
|                |               | 1.0nF       | ±5%                   | CL21B102JCANNN□ |                 |                 |
|                |               | 1.0nF       | ±10%                  | CL21B102KCANNN□ |                 |                 |
|                |               | 1.5nF       | ±10%                  | CL21B152KCANNN□ |                 |                 |
|                |               | 2.2nF       | ±10%                  | CL21B222KCANNN□ |                 |                 |
|                |               | 3.3nF       | ±10%                  | CL21B332KCANNN□ |                 |                 |
|                |               | 3.9nF       | ±10%                  | CL21B392KCANNN□ |                 |                 |
|                |               | 4.7nF       | ±10%                  | CL21B472KCANNN□ |                 |                 |
|                |               | 6.8nF       | ±10%                  | CL21B682KCANNN□ |                 |                 |
|                |               | 8.2nF       | ±10%                  | CL21B822KCANNN□ |                 |                 |
|                |               | 10nF        | ±5%                   | CL21B103JCANNN□ |                 |                 |
|                |               | 10nF        | ±10%                  | CL21B103KCANNN□ |                 |                 |
|                |               | 0.95mm      | 100Vdc                | 15nF            | ±10%            | CL21B153KCCNNN□ |
| 200Vdc         | 330pF         |             |                       | ±10%            | CL21B331KDCNNN□ |                 |
|                | 470pF         |             |                       | ±10%            | CL21B471KDCNNN□ |                 |
|                | 560pF         |             |                       | ±10%            | CL21B561KDCNNN□ |                 |
|                | 1.0nF         |             |                       | ±5%             | CL21B102JDCNNN□ |                 |
|                | 1.0nF         |             |                       | ±10%            | CL21B102KDCNNN□ |                 |
|                | 1.5nF         |             |                       | ±10%            | CL21B152KDCNNN□ |                 |
| 2.2nF          | ±10%          |             | CL21B222KDCNNN□       |                 |                 |                 |
| 250Vdc         | 3.3nF         |             | ±10%                  | CL21B332KDCNNN□ |                 |                 |
|                | 4.7nF         |             | ±10%                  | CL21B472KDCNNN□ |                 |                 |
|                | 6.8nF         |             | ±10%                  | CL21B682KDCNNN□ |                 |                 |
|                | 10nF          |             | ±10%                  | CL21B103KDCNNN□ |                 |                 |
|                | 560pF         |             | ±10%                  | CL21B561KECNNN□ |                 |                 |
|                | 100Vdc        |             | 22nF                  | ±10%            | CL21B223KCFNNN□ |                 |
|                |               | 27nF        | ±10%                  | CL21B273KCFNNN□ |                 |                 |
| 33nF           |               | ±10%        | CL21B333KCFNNN□       |                 |                 |                 |
| 47nF           |               | ±10%        | CL21B473KCFNNN□       |                 |                 |                 |
| 68nF           |               | ±10%        | CL21B683KCFNNN□       |                 |                 |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Medium – High Voltage Capacitors

## Product Line Up (X7R)

■ Size : 3.20 X 1.60mm (inch : 1206)

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           | Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |                  |
|----------------|---------------|------------------|-----------------------|------------------|------------------|----------------|---------------|------------------|-----------------------|------------------|------------------|------------------|
| 1.40mm         | 500Vdc        | 1.8nF            | ±10%                  | CL31B182KGFNNN □ |                  | 1.45mm         | 100Vdc        | 2.2nF            | ±10%                  | CL32B222KCFNNN □ |                  |                  |
|                |               | 2.2nF            | ±10%                  | CL31B222KGFNNN □ |                  |                |               | 4.7nF            | ±10%                  | CL32B472KCFNNN □ |                  |                  |
|                |               | 2.2nF            | ±20%                  | CL31B222MGFNNN □ |                  |                |               | 10nF             | ±10%                  | CL32B103KCFNNN □ |                  |                  |
|                |               | 2.7nF            | ±10%                  | CL31B272KGFNNN □ |                  |                |               | 47nF             | ±10%                  | CL32B473KCFNNN □ |                  |                  |
|                |               | 3.3nF            | ±10%                  | CL31B332KGFNNN □ |                  |                |               | 100nF            | ±5%                   | CL32B104JCFNNN □ |                  |                  |
|                |               | 4.7nF            | ±10%                  | CL31B472KGFNNN □ |                  |                |               | 100nF            | ±10%                  | CL32B104KCFNNN □ |                  |                  |
|                |               | 6.8nF            | ±10%                  | CL31B682KGFNNN □ |                  |                |               | 150nF            | ±10%                  | CL32B154KCFNNN □ |                  |                  |
|                |               | 8.2nF            | ±10%                  | CL31B822KGFNNN □ |                  |                |               | 200Vdc           | 10nF                  | ±10%             | CL32B103KDFNNN □ |                  |
|                |               | 10nF             | ±10%                  | CL31B103KGFNNN □ |                  |                |               |                  | 500Vdc                | 1.8nF            | ±5%              | CL32B182JGFNNN □ |
|                |               | 12nF             | ±10%                  | CL31B123KGFNNN □ |                  |                | 10nF          |                  |                       | ±10%             | CL32B103KGFNNN □ |                  |
|                |               | 15nF             | ±10%                  | CL31B153KGFNNN □ |                  |                | 10nF          | ±20%             |                       | CL32B103MGFNNN □ |                  |                  |
|                |               | 630Vdc           | 220pF                 | ±10%             | CL31B221KHFNNN □ |                |               | 15nF             | ±20%                  | CL32B153MGFNNN □ |                  |                  |
|                |               |                  |                       | ±10%             | CL31B331KHFNNN □ |                |               | 22nF             | ±10%                  | CL32B223KGFNNN □ |                  |                  |
|                |               |                  |                       | ±10%             | CL31B471KHFNNN □ |                |               | 630Vdc           | 4.7nF                 | ±20%             | CL32B472MHFNNN □ |                  |
|                |               |                  |                       | ±10%             | CL31B561KHFNNN □ |                |               |                  | 1kVdc                 | 4.7nF            | ±10%             | CL32B472KJFNNN □ |
|                | ±10%          |                  |                       | CL31B681KHFNNN □ |                  | 2kVdc          | 1.0nF         |                  | ±10%                  | CL32B102KJFNNN □ |                  |                  |
|                | ±10%          |                  |                       | CL31B102KHFNNN □ |                  | 1.80mm         | 100Vdc        | 220nF            | ±5%                   | CL32B224JCHNNN □ |                  |                  |
|                | ±10%          |                  |                       | CL31B152KHFNNN □ |                  |                |               | 220nF            | ±10%                  | CL32B224KCHNNN □ |                  |                  |
|                | ±10%          |                  |                       | CL31B222KHFNNN □ |                  |                |               | 330nF            | ±10%                  | CL32B334KCHNNN □ |                  |                  |
|                | ±10%          |                  |                       | CL31B332KHFNNN □ |                  |                | 250Vdc        | 47nF             | ±10%                  | CL32B473KEHNNN □ |                  |                  |
|                | ±10%          |                  | CL31B472KHFNNN □      |                  | 500Vdc           |                | 47nF          | ±10%             | CL32B473KGHNNN □      |                  |                  |                  |
|                | ±10%          |                  | CL31B682KHFNNN □      |                  | 630Vdc           |                | 33nF          | ±10%             | CL32B333KHHNNN □      |                  |                  |                  |
|                | ±5%           |                  | CL31B822JHFNNN □      |                  | 2.20mm           |                | 100Vdc        | 330nF            | ±10%                  | CL32B334KJFNNN □ |                  |                  |
|                | ±10%          |                  | CL31B103KHFNNN □      |                  |                  |                |               | 470nF            | ±10%                  | CL32B474KJFNNN □ |                  |                  |
|                | ±10%          |                  | CL31B153KHFNNN □      |                  |                  |                | 2.70mm        | 100Vdc           | 430nF                 | ±10%             | CL32B434KJFNNN □ |                  |
|                | ±10%          |                  | CL31B681KJFNNN □      | Derating         | 430nF            | ±20%           |               |                  | CL32B434MJFNNN □      |                  |                  |                  |
|                | ±10%          |                  | CL31B102KJFNNN □      | Derating         | 470nF            | ±10%           |               |                  | CL32B474KJFNNN □      |                  |                  |                  |
|                | ±10%          |                  | CL31B222KJFNNN □      | Derating         | 1.0uF            | ±10%           |               | CL32B105KJFNNN □ |                       |                  |                  |                  |
|                | ±10%          |                  | CL31B252KJFNNN □      | Derating         | 250Vdc           | 100nF          |               | ±10%             | CL32B104KEJNNN □      |                  |                  |                  |
|                | ±5%           | CL31B332JFNNN □  | Derating              | 150nF            |                  | ±10%           |               | CL32B154KEJNNN □ |                       |                  |                  |                  |
|                | ±10%          | CL31B472KJFNNN □ | Derating              |                  |                  |                |               |                  |                       |                  |                  |                  |
|                | 1.80mm        | 100Vdc           | 150nF                 | ±10%             | CL31B154KCHNNN □ |                |               |                  |                       |                  |                  |                  |
|                |               |                  | 220nF                 | ±10%             | CL31B224KCHNNN □ |                |               |                  |                       |                  |                  |                  |
| 470nF          |               |                  | ±10%                  | CL31B474KCHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
| 1.0uF          |               |                  | ±10%                  | CL31B105KCHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
| 200Vdc         |               | 68nF             | ±10%                  | CL31B683KDHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
|                |               | 100nF            | ±10%                  | CL31B104KDHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
| 250Vdc         |               | 33nF             | ±10%                  | CL31B333KEHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
|                |               | 39nF             | ±10%                  | CL31B393KEHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
|                |               | 47nF             | ±10%                  | CL31B473KEHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
| 500Vdc         |               | 100nF            | ±10%                  | CL31B104KEHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
|                |               | 33nF             | ±10%                  | CL31B333KGHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
| 630Vdc         |               | 22nF             | ±10%                  | CL31B223KHHNNN □ |                  |                |               |                  |                       |                  |                  |                  |
| 2kVdc          |               | 220pF            | ±10%                  | CL31B221KJHNNN □ | Derating         |                |               |                  |                       |                  |                  |                  |
|                |               | 470pF            | ±10%                  | CL31B471KJHNNN □ | Derating         |                |               |                  |                       |                  |                  |                  |
|                |               | 1.0nF            | ±10%                  | CL31B102KJHNNN □ | Derating         |                |               |                  |                       |                  |                  |                  |
|                |               | 1.0nF            | ±20%                  | CL31B102MJHNNN □ | Derating         |                |               |                  |                       |                  |                  |                  |
|                |               | 1.5nF            | ±10%                  | CL31B152KJHNNN □ | Derating         |                |               |                  |                       |                  |                  |                  |

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Product Line Up (X7R)

■ Size : 4.50 X 2.00mm (inch : 1808)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 1.45mm         | 1kVdc         | 1.0nF       | ±10%                  | CL42B102KIFNNN □ | Derating |
|                | 2kVdc         | 1.0nF       | ±10%                  | CL42B102KJFNNN □ | Derating |

■ Size : 4.50 X 3.20mm (inch : 1812)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 1.45mm         | 100Vdc        | 100nF       | ±10%                  | CL43B104KCFNNN □ |          |
|                |               | 100nF       | ±20%                  | CL43B104MCFNNN □ |          |
|                |               | 220nF       | ±10%                  | CL43B224KCFNNN □ |          |
|                |               | 330nF       | ±10%                  | CL43B334KCFNNN □ |          |
|                | 200Vdc        | 1.0nF       | ±10%                  | CL43B102KDFNNN □ |          |
|                |               | 47nF        | ±10%                  | CL43B473KDFNNN □ |          |
|                |               | 47nF        | ±20%                  | CL43B473MDFNNN □ |          |
|                |               | 100nF       | ±10%                  | CL43B104KDFNNN □ |          |
|                | 500Vdc        | 3.3nF       | ±10%                  | CL43B332KGFNNN □ |          |
|                |               | 10nF        | ±10%                  | CL43B103KGFNNN □ |          |
|                |               | 22nF        | ±10%                  | CL43B223KGFNNN □ |          |
|                |               | 33nF        | ±10%                  | CL43B333KGFNNN □ |          |
|                | 1kVdc         | 47nF        | ±10%                  | CL43B473KGFNNN □ |          |
|                |               | 1.0nF       | ±10%                  | CL43B102KIFNNN □ | Derating |
|                |               | 1.5nF       | ±10%                  | CL43B152KIFNNN □ | Derating |
|                |               | 2.2nF       | ±10%                  | CL43B222KIFNNN □ | Derating |
|                |               | 2.7nF       | ±10%                  | CL43B272KIFNNN □ | Derating |
|                |               | 3.3nF       | ±10%                  | CL43B332KIFNNN □ | Derating |
|                |               | 4.7nF       | ±10%                  | CL43B472KIFNNN □ | Derating |
|                |               | 5.0nF       | ±10%                  | CL43B502KIFNNN □ | Derating |
|                |               | 10nF        | ±10%                  | CL43B103KIFNNN □ | Derating |
|                |               | 10nF        | ±20%                  | CL43B103MIFNNN □ | Derating |
|                | 2kVdc         | 1.0nF       | ±10%                  | CL43B102KJFNNN □ | Derating |
|                |               | 1.5nF       | ±10%                  | CL43B152KJFNNN □ | Derating |
| 2.2nF          |               | ±10%        | CL43B222KJFNNN □      | Derating         |          |
| 1.80mm         | 100Vdc        | 470nF       | ±10%                  | CL43B474KCHNNN □ |          |
|                |               | 470nF       | ±20%                  | CL43B474MCHNNN □ |          |
| 2.20mm         | 500Vdc        | 100nF       | ±10%                  | CL43B104KGINNN □ |          |
| 2.70mm         | 100Vdc        | 680nF       | ±10%                  | CL43B684KJNNN □  |          |
|                |               | 820nF       | ±10%                  | CL43B824KJNNN □  |          |
|                |               | 1.0uF       | ±10%                  | CL43B105KJNNN □  |          |
|                | 200Vdc        | 470nF       | ±10%                  | CL43B474KDJNNN □ |          |
|                |               | 220nF       | ±10%                  | CL43B224KEJNNN □ |          |
|                | 250Vdc        | 220nF       | ±20%                  | CL43B224MEJNNN □ |          |
|                |               | 470nF       | ±10%                  | CL43B474KEJNNN □ |          |

■ Size : 5.70 X 5.00mm (inch : 2220)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 1.80mm         | 100Vdc        | 820nF       | ±10%                  | CL55B824KCHNNN □ |          |
|                | 2kVdc         | 10nF        | ±10%                  | CL55B103KJHNNN □ | Derating |
| 2.70mm         | 100Vdc        | 470nF       | ±10%                  | CL55B474KJNNN □  |          |
|                |               | 2.2uF       | ±10%                  | CL55B225KJNNN □  |          |
|                |               | 3.3uF       | ±10%                  | CL55B335KJNNN □  |          |
|                |               | 4.7uF       | ±10%                  | CL55B475KJNNN □  |          |
|                | 630Vdc        | 220nF       | ±10%                  | CL55B224KHJNNN □ |          |

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# Soft – term Capacitors

## Feature

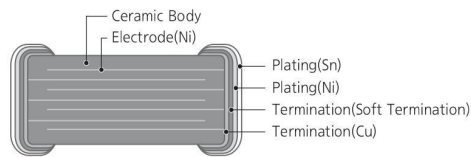
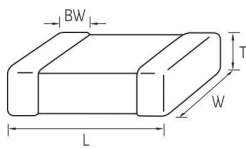


- Soft – Termination relaxes the applied thermal/mechanical stresses by ductile properties of metal-polymer composites.
- Excellent bending strength
- Durability against thermal shock / cycles.

## Application

- Mobile Phone
- DC – DC Converter
- Tablet devices
- PC (Laptop, Desktop)
- HDD /SSD board
- Display

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |               |
|-----------|----------|---------------|-----------|-----------|----------------|---------------|
|           |          | L             | W         | T         | Thickness Code | BW            |
| 03        | 0201     | 0.60±0.03     | 0.30±0.03 | 0.30±0.03 | 3              | 0.15±0.05     |
|           |          | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              |               |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.60±0.10 | 6              | 0.25±0.10     |
|           |          | 1.00±0.05     | 0.50±0.05 | 0.70±0.10 | 7              |               |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20     |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.60±0.10 | 6              | 0.50+0.2/-0.3 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              |               |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              |               |
|           |          | 2.00±0.15     | 1.25±0.15 | 1.25±0.15 | Q              |               |
| 31        | 1206     | 2.00±0.20     | 1.25±0.20 | 1.25±0.20 | Y              | 0.50±0.30     |
|           |          | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | C              |               |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.10±0.15 | E              |               |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.15±0.10 | P              |               |

Soft - term Capacitance Table (X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |     |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|
|                      |                           | nF          |     |     |     |     |     | uF  |     |     |     |     |     |    |    |    |    |    |    |     |
|                      |                           | 100         | 150 | 220 | 330 | 470 | 680 | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
| 0201<br>(0603)       | 6.3                       |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
|                      | 10                        |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
| 0402<br>(1005)       | 6.3                       |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
|                      | 10                        |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
| 0603<br>(1608)       | 6.3                       |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
|                      | 10                        |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
| 1206(3216)           | 25                        |             |     |     |     |     |     | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |

Soft - term Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------------|---------------------------|-------------|-----|-----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                      |                           | nF          |     |     |    |    |    |    |    |     | uF  |     |     |     |     |     |     |     |     |     |     |     |
|                      |                           | 1.0         | 1.5 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68  | 100 | 150 | 220 | 330 | 470 | 680 | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 |
| 0805(2012)           | 250                       |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
| 1206<br>(3216)       | 25                        |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
|                      | 50                        |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
|                      | 100                       |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
|                      | 250                       |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
|                      | 350                       |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
| 1210<br>(3225)       | 35                        |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
|                      | 50                        |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |
|                      | 100                       |             |     |     |    |    |    |    |    | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10  | 15  | 22  | 33  | 47  | 68  | 100 |

# Soft – term Capacitors

## Product Line Up (X5R)

### ■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark                                       |
|----------------|---------------|-------------|-----------------------|------------------|--|
| 0.33mm         | 10Vdc         | 100nF       | ±10%                  | CL03A104KP3ZNN □ | <a href="#">Derating</a>                     |
| 0.35mm         | 6.3Vdc        | 1.0uF       | ±20%                  | CL03A105MQ3ZSN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
|                | 10Vdc         | 1.0uF       | ±20%                  | CL03A105MP3ZSN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
| 0.39mm         | 6.3Vdc        | 2.2uF       | ±20%                  | CL03A225MQ3ZRN □ | <a href="#">Derating</a> <a href="#">Ref</a> |

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark                                       |
|----------------|---------------|-------------|-----------------------|------------------|--|
| 0.57mm         | 10Vdc         | 2.2uF       | ±10%                  | CL05A225KP5ZSN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
|                | 6.3Vdc        | 4.7uF       | ±20%                  | CL05A475MQ5ZRN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
| 0.65mm         | 10Vdc         | 4.7uF       | ±10%                  | CL05A475KP5ZRN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
|                | 6.3Vdc        | 10uF        | ±20%                  | CL05A106MQ5ZUN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
| 0.70mm         | 10Vdc         | 10uF        | ±20%                  | CL05A106MP5ZUN □ | <a href="#">Derating</a> <a href="#">Ref</a> |
|                | 6.3Vdc        | 22uF        | ±20%                  | CL05A226MQ6ZUN □ | <a href="#">Derating</a>                     |
| 0.80mm         | 6.3Vdc        | 22uF        | ±20%                  | CL05A226MQ7ZUN □ | <a href="#">Derating</a>                     |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark                   |
|----------------|---------------|-------------|-----------------------|------------------|--------------------------|
| 0.95mm         | 6.3Vdc        | 10uF        | ±20%                  | CL10A106MQ8ZQN □ | <a href="#">Ref</a>      |
| 1.05mm         | 6.3Vdc        | 22uF        | ±20%                  | CL10A226MQ8ZUN □ | <a href="#">Derating</a> |
|                | 10Vdc         | 22uF        | ±20%                  | CL10A226MP8ZUN □ | <a href="#">Derating</a> |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.80mm         | 25Vdc         | 22uF        | ±10%                  | CL31A226KAHSNN □ |        |
|                |               | 22uF        | ±10%                  | CL31A226KAHZNN □ |        |

## Product Line Up (X7R)

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.95mm         | 250Vdc        | 1.0nF       | ±10%                  | CL21B102KECSNN □ |        |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 1.00mm         | 350Vdc        | 10nF        | ±10%                  | CL31B103KFCSNN □ |                  |
|                |               | 22nF        | ±10%                  | CL31B223KFCSNN □ |                  |
| 1.25mm         | 350Vdc        | 33nF        | ±10%                  | CL31B333KFESNN □ |                  |
| 1.80mm         | 25Vdc         | 10uF        | ±10%                  | CL31B106KAHSNN □ |                  |
|                |               | 50Vdc       | 1.0uF                 | ±10%             | CL31B105KBHSNN □ |
|                | 100Vdc        | 220nF       | ±10%                  | CL31B224KCHSNN □ |                  |
|                |               | 1.0uF       | ±10%                  | CL31B105KCHSNN □ |                  |
|                |               | 2.2uF       | ±10%                  | CL31B225KCHSNN □ |                  |
|                |               | 250Vdc      | 100nF                 | ±10%             | CL31B104KEHSNN □ |

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 2.00mm         | 35Vdc         | 4.7uF       | ±10%                  | CL32B475KLUYNN □ |        |
|                | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBUYNN □ |        |
| 2.70mm         | 100Vdc        | 1.0uF       | ±10%                  | CL32B105KJJSNN □ |        |
|                |               | 2.2uF       | ±10%                  | CL32B225KJJSNN □ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
In order to move to the page directly, please click the here. ↑



# Low Acoustic Noise Capacitor

## Feature

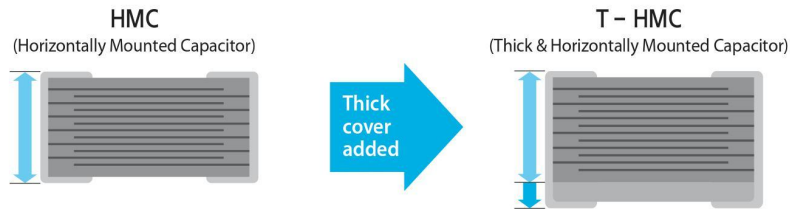


- Equivalent electrical characteristics as general products.
- Reduced acoustic noise due to the thick bottom cover.
- Pin-to-pin replacement without changing the substrate land pattern.

## Application

- PAM (GSM / TD-SCDMA / TDD-LTE)
- PMIC
- DC-DC Converter
- Tablet devices
- PC (Laptop, Desktop)
- HDD / SSD board

## Structure and Dimensions



### Structure (Size & Thickness)

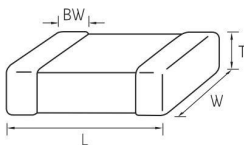
Same Dielectric Thickness as Standard MLCC  
Normal Bottom Cover

Same Dielectric Thickness as Standard MLCC  
Thick Bottom Cover

### Performance

Acoustic Noise Reduction without Changing Layout

Significant Acoustic Noise Reduction without Changing Layout



| Size Code | EIA Code | Dimension(mm) |           |           |                |                |                    |
|-----------|----------|---------------|-----------|-----------|----------------|----------------|--------------------|
|           |          | L             | W         | T         | Thickness Code | Size Tol. Code | BW                 |
| 03        | 0201     | 0.60±0.05     | 0.30±0.05 | 0.30±0.05 | 3              | S              | 0.15±0.05          |
| 05        | 0402     | 1.00±0.07     | 0.50±0.07 | 0.50±0.07 | 5              | S              | 0.25±0.10          |
|           |          | 1.00±0.15     | 0.50±0.15 | 0.50±0.15 | 5              | R              |                    |
|           |          | 1.00±0.20     | 0.50±0.20 | 0.50±0.20 | 5              | U              |                    |
|           |          | 1.00±0.07     | 0.50±0.07 | 0.70±0.10 | 7              | S              |                    |
|           |          | 1.00±0.15     | 0.50±0.15 | 0.70±0.10 | 7              | R              |                    |
| 10        | 0603     | 1.00±0.20     | 0.50±0.20 | 0.80±0.10 | 8              | U              | 0.30±0.20          |
|           |          | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | N              |                    |
|           |          | 1.60±0.20     | 0.80±0.20 | 0.80±0.20 | 8              | R              |                    |
|           |          | 1.60±0.25     | 0.80±0.25 | 0.80±0.25 | 8              | U              |                    |
|           |          | 1.60±0.10     | 0.80±0.10 | 0.90±0.10 | 9              | H              |                    |
|           |          | 1.60±0.20     | 0.80±0.20 | 0.85±0.10 | C              | R              |                    |
|           |          | 1.60±0.25     | 0.80±0.25 | 0.85±0.10 | C              | U              |                    |
|           |          | 1.60±0.10     | 0.80±0.10 | 0.95±0.10 | N              | H              |                    |
| 21        | 0805     | 1.60±0.25     | 0.80±0.25 | 1.05±0.10 | O              | U              | 0.50 +0.20 / -0.30 |
|           |          | 1.60±0.20     | 0.80±0.20 | 1.10±0.10 | E              | R              |                    |
|           |          | 2.00±0.20     | 1.25±0.20 | 1.10±0.10 | E              | R              |                    |
|           |          | 2.00±0.15     | 1.25±0.15 | 1.25±0.15 | Q              | N              |                    |

# Low Acoustic Noise Capacitor

Low Acoustic Noise Capacitance Table (HMC\* / X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(uF) |     |    |    |    |
|----------------------|---------------------------|-----------------|-----|----|----|----|
|                      |                           | 2.2             | 4.7 | 10 | 22 | 47 |
| 0402<br>(1005)       | 6.3                       |                 |     |    |    |    |
|                      | 10                        |                 |     |    |    |    |
| 0603<br>(1608)       | 6.3                       |                 |     |    |    |    |
|                      | 10                        |                 |     |    |    |    |
| 0805<br>(2012)       | 6.3                       |                 |     |    |    |    |
|                      | 25                        |                 |     |    |    |    |

\* HMC : Horizontally Mounted Capacitor

Low Acoustic Noise Capacitance Table (T - HMC\* / X5R)

| Size<br>inch<br>(mm) | T max.<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(uF) |     |    |    |    |
|----------------------|----------------|---------------------------|-----------------|-----|----|----|----|
|                      |                |                           | 2.2             | 4.7 | 10 | 22 | 47 |
| 0402<br>(1005)       | 0.8            | 6.3                       |                 |     |    |    |    |
|                      |                | 10                        |                 |     |    |    |    |
|                      | 0.9            | 6.3                       |                 |     |    |    |    |
|                      |                | 10                        |                 |     |    |    |    |
| 0603<br>(1608)       | 0.95           | 10                        |                 |     |    |    |    |
|                      | 1.0            | 10                        |                 |     |    |    |    |
|                      | 1.05           | 6.3                       |                 |     |    |    |    |
|                      |                | 10                        |                 |     |    |    |    |
|                      | 1.2            | 6.3                       |                 |     |    |    |    |
|                      | 1.25           | 10                        |                 |     |    |    |    |
| 0805<br>(2012)       | 1.2            | 25                        |                 |     |    |    |    |
|                      | 1.7            | 25                        |                 |     |    |    |    |

\* T- HMC : Thick & Horizontally Mounted Capacitor

Product Line Up (HMC\* / X5R)

| Size<br>L x W<br>(mm / inch) | Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     | Remark          |
|------------------------------|-------------------|------------------|-------------|--------------------------|-----------------|-----------------|
| 0.6 x 0.3 (0201)             | 0.35mm            | 10Vdc            | 1.0uF       | ±20%                     | CL03A105MP3NSNZ | Derating Ref.   |
| 1.0 x 0.5 (0402)             | 0.57mm            | 6.3Vdc           | 2.2uF       | ±20%                     | CL05A225MQ5NSNZ | Ref.            |
|                              |                   | 10Vdc            | 2.2uF       | ±10%                     | CL05A225KP5NSNZ | Derating Ref.   |
|                              | 0.65mm            | 6.3Vdc           | 4.7uF       | ±20%                     | CL05A475MQ5NRNZ | Derating Ref.   |
|                              |                   | 10Vdc            | 4.7uF       | ±10%                     | CL05A475KP5NRNZ | Derating Ref.   |
|                              | 0.70mm            | 6.3Vdc           | 10uF        | ±20%                     | CL05A106MQ5NUNZ | Derating Ref.   |
|                              |                   | 10Vdc            | 10uF        | ±20%                     | CL05A106MP5NUNZ | Derating Ref.   |
| 25Vdc                        |                   | 2.2uF            | ±20%        | CL05A225MA5NUNZ          | Derating Ref.   |                 |
| 1.6 x 0.8 (0603)             | 0.90mm            | 6.3Vdc           | 2.2uF       | ±10%                     | CL10A225KQ8NNNZ |                 |
|                              |                   |                  | 4.7uF       | ±10%                     | CL10A475KQ8NNNZ |                 |
|                              |                   | 10Vdc            | 2.2uF       | ±10%                     | CL10A225KP8NNNZ |                 |
|                              |                   |                  | 4.7uF       | ±10%                     | CL10A475KP8NNNZ |                 |
|                              |                   |                  | 10uF        | ±10%                     | CL10A106KP8NNNZ | Derating Ref.   |
|                              | 1.00mm            | 6.3Vdc           | 22uF        | ±20%                     | CL10A226MQ8NRNR | Derating        |
|                              |                   | 10Vdc            | 22uF        | ±20%                     | CL10A226MP8NUNR | Derating        |
|                              | 2.0 x 1.25 (0805) | 1.35mm           | 6.3Vdc      | 47uF                     | ±20%            | CL21A476MQMNRNR |
| 6.3Vdc                       |                   |                  | 22uF        | ±20%                     | CL21A226MQQNNNR |                 |
| 1.40mm                       |                   | 25Vdc            | 4.7uF       | ±10%                     | CL21A475KAQNNNR | Derating        |

\* HMC : Horizontally Mounted Capacitor

Product Line Up ( T – HMC\* / X5R)

| Size<br>L x W<br>(mm / inch) | Thickness<br>Max.<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance | Capacitance<br>Tolerance | Part Number     | Remark        |
|------------------------------|---------------------------|---------------------------|-------------|--------------------------|-----------------|---------------|
| 1.0 x 0.5 (0402)             | 0.80mm                    | 6.3Vdc                    | 2.2uF       | ±10%                     | CL05A225KQ7NSB8 | Ref.          |
|                              |                           |                           | 4.7uF       | ±20%                     | CL05A475MQ7NRB8 | Derating Ref. |
|                              |                           | 10Vdc                     | 2.2uF       | ±10%                     | CL05A225KP7NSB8 | Derating Ref. |
|                              |                           |                           | 4.7uF       | ±20%                     | CL05A475MP7NRB8 | Derating Ref. |
|                              | 0.90mm                    | 6.3Vdc                    | 10uF        | ±20%                     | CL05A106MQ8NUB8 | Derating Ref. |
|                              |                           | 10Vdc                     | 10uF        | ±20%                     | CL05A106MP8NUB8 | Derating Ref. |
| 1.6 x 0.8 (0603)             | 0.95mm                    | 6.3Vdc                    | 22uF        | ±20%                     | CL10A226MQCNRBE | Derating      |
|                              |                           | 10Vdc                     | 22uF        | ±20%                     | CL10A226MPCNUBE | Derating      |
|                              | 1.00mm                    | 10Vdc                     | 4.7uF       | ±10%                     | CL10A475KP9NHBC |               |
|                              |                           | 6.3Vdc                    | 10uF        | ±20%                     | CL10A106MQNNHBC | Ref.          |
|                              | 1.05mm                    | 10Vdc                     | 10uF        | ±20%                     | CL10A106MPNNHBC | Derating Ref. |
|                              |                           | 6.3Vdc                    | 22uF        | ±20%                     | CL10A226MQONUBE | Derating      |
|                              | 1.20mm                    | 6.3Vdc                    | 47uF        | ±20%                     | CL10A476MQENRBE | Derating      |
|                              | 1.25mm                    | 10Vdc                     | 22uF        | ±20%                     | CL10A226MPMNUBE | Derating      |
|                              |                           | 6.3Vdc                    | 22uF        | ±20%                     | CL10A226MQMNUBE | Derating      |
| 2.0 x 1.25 (0805)            | 1.20mm                    | 25Vdc                     | 10uF        | ±10%                     | CL21A106KAENRBE | Derating      |

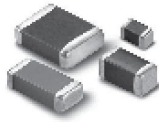
\* T- HMC : Thick & Horizontally Mounted Capacitor

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

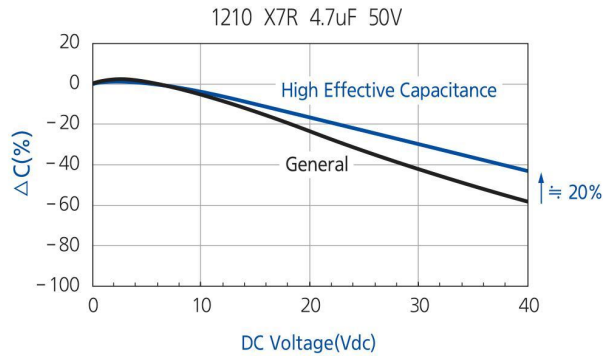
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# High Effective Capacitance Capacitors

## Feature



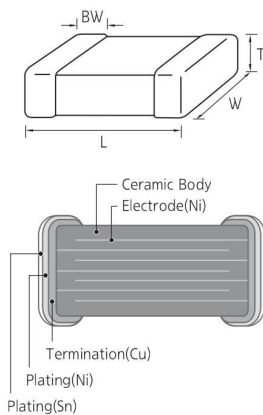
- Wide selection of size : from 0402(inch) to 1210(inch)
- When a DC bias is applied, a capacitance is higher than conventional products.
- Highly reliable performance
- Reduced capacitance degradation by bias and aging
- DC - bias performance (Graph) :



## Application

- HDD / SSD board
- Display
- Digital Camera
- Lighting
- Mobile Phone
- PC (Laptop, Desktop)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |              |                |                |
|-----------|----------|---------------|-----------|--------------|----------------|----------------|
|           |          | L             | W         | T            | Thickness Code | BW             |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05    | 5              | 0.25±0.10      |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10    | 8              | 0.30±0.20      |
| 21        | 0805     | 2.00±0.20     | 1.25±0.20 | 0.85±0.10(*) | C              | 0.50+0.2/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10    | F              |                |
|           |          | 2.00±0.15     | 1.25±0.15 | 1.25±0.15    | Q              |                |
| 31        | 1206     | 3.20±0.20     | 1.60±0.20 | 0.85±0.10(*) | C              | 0.50±0.30      |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.60±0.20    | H              |                |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 1.80±0.20(*) | U              | 0.60±0.30      |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.50±0.20    | J              |                |

\* Mark is only applicable to "L", "Y", "F", 12<sup>th</sup> code in part number.

### High Effective Capacitance Table (X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(nF) |     | Capacitance(uF) |     |     |    |    |
|----------------------|---------------------------|-----------------|-----|-----------------|-----|-----|----|----|
|                      |                           | 680             | 820 | 1.0             | 2.2 | 4.7 | 10 | 22 |
| 0402<br>(1005)       | 6.3                       |                 |     | 1.0             |     |     |    |    |
|                      | 16                        |                 |     | 1.0             |     |     |    |    |
| 0603<br>(1608)       | 6.3                       |                 |     | 1.0             | 2.2 |     | 10 | 22 |
|                      | 10                        |                 |     | 1.0             | 2.2 |     | 10 | 22 |
|                      | 16                        |                 |     | 1.0             | 2.2 |     | 10 | 22 |
|                      | 25                        |                 |     | 1.0             |     |     |    |    |
| 0805<br>(2012)       | 4.0                       |                 |     | 1.0             | 2.2 | 4.7 | 10 | 22 |
|                      | 6.3                       |                 |     | 1.0             | 2.2 | 4.7 | 10 | 22 |
|                      | 10                        |                 |     | 1.0             | 2.2 | 4.7 | 10 | 22 |
|                      | 16                        |                 |     | 1.0             | 2.2 | 4.7 | 10 | 22 |
| 1206<br>(3216)       | 16                        |                 |     |                 |     |     | 10 | 22 |
|                      | 25                        |                 |     |                 |     | 4.7 | 10 | 22 |

### High Effective Capacitance Table (X6S)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(uF) |     |     |    |    |
|----------------------|---------------------------|-----------------|-----|-----|----|----|
|                      |                           | 1.0             | 2.2 | 4.7 | 10 | 22 |
| 0402(1005)           | 10                        | 1.0             |     |     |    |    |
| 0603<br>(1608)       | 6.3                       |                 |     | 4.7 |    |    |
|                      | 10                        |                 |     | 4.7 |    |    |
|                      | 16                        |                 | 2.2 | 4.7 |    |    |
|                      | 25                        |                 | 2.2 | 4.7 |    |    |
| 1206<br>(3216)       | 10                        |                 |     |     | 10 | 22 |
|                      | 16                        |                 |     |     | 10 | 22 |
|                      | 25                        |                 |     |     | 10 | 22 |

### High Effective Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(uF) |     |     |    |    |
|----------------------|---------------------------|-----------------|-----|-----|----|----|
|                      |                           | 1.0             | 2.2 | 4.7 | 10 | 22 |
| 0805<br>(2012)       | 10                        |                 |     | 4.7 |    |    |
|                      | 25                        |                 | 2.2 |     |    |    |
|                      | 50                        |                 | 2.2 |     |    |    |
| 1206<br>(3216)       | 10                        |                 |     |     | 10 | 22 |
|                      | 50                        |                 |     | 4.7 |    |    |
| 1210<br>(3225)       | 25                        |                 |     |     | 10 | 22 |
|                      | 50                        |                 |     | 4.7 |    |    |

# High Effective Capacitance Capacitors

## Product Line Up (X5R)

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.90mm         | 6.3Vdc        | 1.0uF       | ±10%                  | CL10A105KQ8N3N□ |        |
|                | 10Vdc         | 680nF       | ±10%                  | CL10A684KP8N3N□ |        |
|                |               | 820nF       | ±10%                  | CL10A824KP8N3N□ |        |
|                | 16Vdc         | 1.0uF       | ±10%                  | CL10A105KQ8N3N□ |        |
|                |               | 2.2uF       | ±10%                  | CL10A225KQ8N3N□ |        |

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark    |
|----------------|---------------|-------------|-----------------------|-----------------|-----------|
| 0.95mm         | 6.3Vdc        | 10uF        | ±10%                  | CL21A106KQCL3R□ |           |
|                | 10Vdc         | 10uF        | ±10%                  | CL21A106KPCL3R□ | Operating |
|                | 16Vdc         | 10uF        | ±10%                  | CL21A106KOCL3R□ | Operating |
| 1.35mm         | 6.3Vdc        | 10uF        | ±10%                  | CL21A106KQFN3N□ |           |
|                | 10Vdc         | 10uF        | ±10%                  | CL21A106KPFN3N□ |           |
|                | 16Vdc         | 10uF        | ±10%                  | CL21A106KOFN3N□ | Operating |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL21A475KAFN3N□ | Operating |
|                |               | 10uF        | ±10%                  | CL21A106KAFN3N□ | Operating |
| 1.40mm         | 4.0Vdc        | 10uF        | ±10%                  | CL21A106KQRN3N□ |           |
|                | 6.3Vdc        | 4.7uF       | ±10%                  | CL21A475KQRN3N□ | Ref.      |
|                |               | 10uF        | ±10%                  | CL21A106KQRN3N□ | Ref.      |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark    |
|----------------|---------------|-------------|-----------------------|-----------------|-----------|
| 0.95mm         | 16Vdc         | 10uF        | ±10%                  | CL31A106KOCL3N□ | Operating |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL31A475KACL3N□ |           |
|                |               | 10uF        | ±10%                  | CL31A106KACL3N□ | Operating |
| 1.80mm         | 25Vdc         | 22uF        | ±10%                  | CL31A226KAHN3N□ | Operating |

## Product Line Up (X6S)

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark    |
|----------------|---------------|-------------|-----------------------|-----------------|-----------|
| 0.95mm         | 25Vdc         | 10uF        | ±10%                  | CL31X106KACL3N□ | Operating |
| 1.80mm         | 10Vdc         | 22uF        | ±10%                  | CL31X226KPHN3N□ | Operating |
|                | 16Vdc         | 22uF        | ±10%                  | CL31X226KOHN3N□ | Operating |
|                | 25Vdc         | 22uF        | ±10%                  | CL31X226KAHN3N□ | Operating |

## Product Line Up (X7R)

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.35mm         | 10Vdc         | 4.7uF       | ±10%                  | CL21B475KPFN3N□ | Ref.   |
|                | 25Vdc         | 1.0uF       | ±10%                  | CL21B105KAFN3N□ |        |
|                |               | 2.2uF       | ±10%                  | CL21B225KAFN3N□ |        |
|                | 50Vdc         | 1.0uF       | ±10%                  | CL21B105KBFN3N□ |        |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.80mm         | 10Vdc         | 10uF        | ±10%                  | CL31B106KPHN3N□ |        |
|                | 50Vdc         | 4.7uF       | ±10%                  | CL31B475KBHN3N□ |        |

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 2.00mm         | 25Vdc         | 10uF        | ±10%                  | CL32B106KAUL3N□ |        |
| 2.70mm         | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBJN3N□ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Low ESL Capacitors \_ LICC

Low Inductance Ceramic Capacitor

## Feature

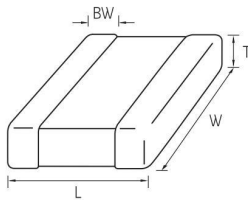


- Low ESL, good for noise reduction for high frequency
- Highly reliable performance
- Tape & reel for surface mount assembly

## Application

- High Speed Microprocessor
- High Frequency Digital Equipment

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |                 |                |           |
|-----------|----------|---------------|-----------|-----------------|----------------|-----------|
|           |          | L             | W         | T               | Thickness Code | BW        |
| L5        | 0204     | 0.52±0.05     | 1.00±0.05 | 0.30±0.05       | 3              | 0.18±0.06 |
| L6        | 0304     | 0.60±0.05     | 1.00±0.05 | 0.40±0.05       | 4              | 0.18±0.10 |
| 01        | 0306     | 0.80±0.05     | 1.60±0.20 | 0.50+0.05/-0.10 | 5              | 0.25±0.15 |

## Low ESL Capacitance Table

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance(uF) |     |      |      |     |     |     |
|----------------|---------------------|-----------------|-----|------|------|-----|-----|-----|
|                |                     | 0.01            | 0.1 | 0.22 | 0.47 | 1.0 | 2.2 | 4.3 |
| 0204 (0510)    | 2.5                 |                 |     |      |      | X7S |     |     |
|                | 4.0                 |                 |     |      | X6S  |     |     |     |
|                | 6.3                 |                 | X7T |      |      |     |     |     |
| 0304(0610)     | 4.0                 |                 |     |      |      |     |     | X5R |
| 0306 (0816)    | 4.0                 |                 |     | X7S  |      |     |     |     |
|                | 6.3                 |                 | X7R |      |      |     |     |     |
|                | 10                  |                 | X7R |      |      |     |     |     |
|                | 25                  | X7R             |     |      |      |     |     |     |

## Product Line Up

| EIA Code | Size L × W      | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------|-----------------|----------------|---------------|---------|-------------|-----------------------|------------------|----------|
| 0204     | 0.50mm × 1.00mm | 0.35mm         | 2.5Vdc        | X7T     | 1.0uF       | ±20%                  | CLL5Z105MS3NLN □ | Derating |
|          |                 |                | 4.0Vdc        | X6S     | 470nF       | ±20%                  | CLL5X474MR3NLN □ | Derating |
|          |                 |                |               | X6S     | 1.0uF       | ±20%                  | CLL5X105MR3NLN □ | Derating |
|          |                 |                | 6.3Vdc        | X7S     | 100nF       | ±20%                  | CLL5Y104MQ3NLN □ |          |
| 0304     | 0.60mm × 1.00mm | 0.45mm         | 4.0Vdc        | X5R     | 4.3uF       | ±20%                  | CLL6A435MR4NLN □ | Derating |
| 0306     | 0.80mm × 1.60mm | 0.55mm         | 4.0Vdc        | X7S     | 100nF       | ±20%                  | CL01Y104MR5NLN □ |          |
|          |                 |                |               | X7S     | 1.0uF       | ±20%                  | CL01Y105MR5NLN □ | Derating |
|          |                 |                | 6.3Vdc        | X7R     | 100nF       | ±10%                  | CL01B104KQ5NLN □ |          |
|          |                 |                | 10Vdc         | X7R     | 100nF       | ±10%                  | CL01B104KP5NLN □ |          |
|          |                 |                | 25Vdc         | X7R     | 10nF        | ±10%                  | CL01B103KA5NLN □ |          |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Low ESL Capacitors \_ SLIC

Super Low Inductance Capacitor

## Feature

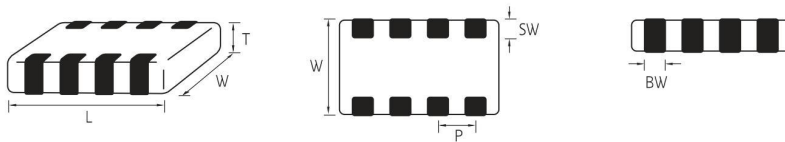


- Low ESL, good for noise reduction for high frequency
- Highly reliable performance
- Tape & reel for surface mount assembly

## Application

- High Speed Microprocessor
- High Frequency Digital Equipment

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |                 |                |                 |                 |           |
|-----------|----------|---------------|-----------|-----------------|----------------|-----------------|-----------------|-----------|
|           |          | L             | W         | T               | Thickness Code | BW              | SW              | P         |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.50+0.05/-0.10 | 5              | 0.25±0.10       | 0.15±0.10       | 0.40±0.10 |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.50+0.05/-0.10 | 5              | 0.25+0.15/-0.10 | 0.20+0.15/-0.10 | 0.50±0.10 |

## Low ESL Capacitance Table

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance(μF) |      |      |      |     |     |     |
|----------------|-------------|---------------------|-----------------|------|------|------|-----|-----|-----|
|                |             |                     | 0.1             | 0.22 | 0.47 | 0.68 | 1.0 | 2.2 | 4.3 |
| 0603(1608)     | 0.55        | 4.0                 |                 | X7S  |      |      |     | X7S |     |
| 0805(2012)     | 0.55        | 4.0                 |                 |      | X7R  |      |     | X7S |     |

## Product Line Up

| EIA Code | Size L × W      | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number     |
|----------|-----------------|----------------|---------------|---------|-------------|-----------------------|-----------------|
| 0603     | 1.60mm × 0.80mm | 0.55mm         | 4.0Vdc        | X7S     | 100nF       | ±20%                  | CL10Y104MR5NJN□ |
|          |                 |                |               | X7S     | 470nF       | ±20%                  | CL10Y474MR5NJN□ |
|          |                 |                |               | X7S     | 1.0μF       | ±20%                  | CL10Y105MR5NJN□ |
|          |                 |                |               | X7S     | 2.2μF       | ±20%                  | CL10Y225MR5NJN□ |
| 0805     | 2.00mm × 1.25mm | 0.55mm         | 4.0Vdc        | X7S     | 2.2μF       | ±20%                  | CL21Y225MR5NJN□ |
|          |                 |                | 6.3Vdc        | X7R     | 470nF       | ±20%                  | CL21B474MQ5NJN□ |
|          |                 |                |               | X7R     | 680nF       | ±20%                  | CL21B684MQ5NJN□ |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Low ESL Capacitors \_ 3T

## 3-Terminal Capacitor

### Feature

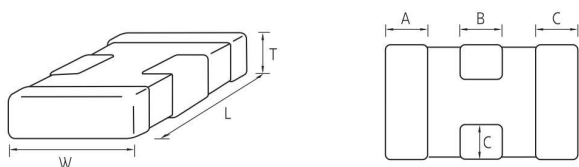


- Low ESL, good for noise reduction for high frequency
- Highly reliable performance
- Tape & reel for surface mount assembly

### Application

- High Speed Microprocessor
  - CPU / GPU for PC & Game console
  - AP for Smartphone
  - Network IC
- High Frequency Digital Equipment

### Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |           |           |           |
|-----------|----------|---------------|-----------|-----------|----------------|-----------|-----------|-----------|
|           |          | L             | W         | T         | Thickness Code | BW        |           |           |
|           |          |               |           |           |                | A         | B         | C         |
| 05        | 0402     | 1.05±0.05     | 0.65±0.05 | 0.45±0.05 | 5              | 0.17±0.10 | 0.35±0.10 | 0.15±0.10 |
| 19        | 0503     | 1.20±0.05     | 0.90±0.05 | 0.75±0.05 | 7              | 0.15±0.10 | 0.50±0.10 | 0.20±0.10 |

### Low ESL Capacitance Table

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance(μF) |     |     |    |     |    |
|----------------|-------------|---------------------|-----------------|-----|-----|----|-----|----|
|                |             |                     | 1.0             | 2.2 | 4.3 | 10 | 22  | 47 |
| 0402(1005)     | 0.5         | 4.0                 |                 |     | X5R |    |     |    |
| 0503(1209)     | 0.8         | 4.0                 |                 |     |     |    | X5R |    |

### Product Line Up

| EIA Code | Size L × W      | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number     |
|----------|-----------------|----------------|---------------|---------|-------------|-----------------------|-----------------|
| 0402     | 1.00mm × 0.50mm | 0.50mm         | 4.0Vdc        | X5R     | 4.3μF       | ±20%                  | CL05A435MR5NWN□ |
| 0503     | 1.20mm × 0.90mm | 0.80mm         | 4.0Vdc        | X5R     | 22μF        | ±20%                  | CL19A226MR7NWN□ |

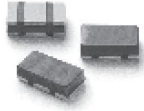
※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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# Low ESL Capacitors \_ VLC

## Vertically Laminated Capacitor

### Feature

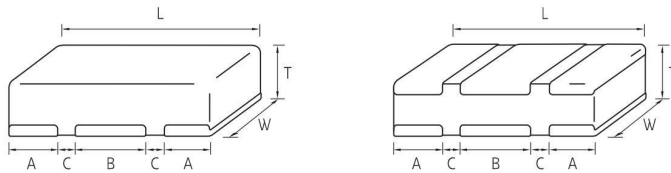


- Lowest ESL, good for noise reduction for high frequency
- Highly reliable performance
- Tape & reel for surface mount assembly

### Application

- High Speed Microprocessor
  - CPU / GPU for PC & Game console
  - AP for Smartphone
  - Network IC
- High Frequency Digital Equipment

### Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |                        |                |            |           |           |
|-----------|----------|---------------|-----------|------------------------|----------------|------------|-----------|-----------|
|           |          | L             | W         | T                      | Thickness Code | Band Width |           | Band Gap  |
|           |          |               |           |                        |                | A          | B         | C         |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.70±0.10<br>0.90±0.10 | 7<br>9         | 0.42±0.10  | 0.74±0.10 | 0.21±0.05 |

### Low ESL Capacitance Table

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance(µF) |     |     |     |    |    |     |
|----------------|-------------|---------------------|-----------------|-----|-----|-----|----|----|-----|
|                |             |                     | 1.0             | 2.2 | 3.3 | 4.7 | 10 | 22 | 47  |
| 0805(2012)     | 0.8         | 4.0                 |                 |     |     |     |    |    | X5R |
|                | 1.0         | 4.0                 |                 |     |     |     |    |    | X5R |

### Product Line Up

| EIA Code | Size L x W      | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number     |
|----------|-----------------|----------------|---------------|---------|-------------|-----------------------|-----------------|
| 0805     | 2.00mm x 1.25mm | 0.80mm         | 4.0Vdc        | X5R     | 47µF        | ±20%                  | CL21A476MR7NVN□ |
|          |                 | 1.00mm         |               | X5R     | 47µF        | ±20%                  | CL21A476MR9NVN□ |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Low ESL Capacitors \_ X2Y®

## Feature

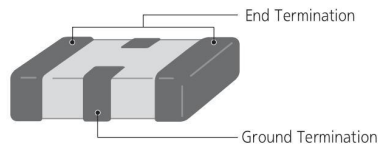
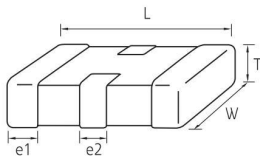


- One device for EMI suppression or decoupling
- Differential and common mode attenuation
- Matched capacitance line to ground, both lines

## Application

- Amplifier Filter & Decoupling
- High Speed Data Filtering
- EMC I / O Filtering
- FPGA / ASIC / u - P Decoupling
- DDR Memory Decoupling

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |           |           |
|-----------|----------|---------------|-----------|-----------|----------------|-----------|-----------|
|           |          | L             | W         | T         | Thickness Code | e1        | e2        |
| 10        | 0603     | 1.60±0.15     | 0.80±0.10 | 0.60±0.10 | 6              | 0.25±0.15 | 0.45±0.15 |

## Low ESL Capacitance Table

| Size inch (mm) | T max. (mm) | Rated Voltage (Vdc) | Capacitance |     |     |     |      |      |     |     |
|----------------|-------------|---------------------|-------------|-----|-----|-----|------|------|-----|-----|
|                |             |                     | nF          |     |     | uF  |      |      |     |     |
|                |             |                     | 1.0         | 2.2 | 4.7 | 0.1 | 0.22 | 0.47 | 1.0 |     |
| 0603 (1608)    | 0.7         | 6.3                 |             |     |     |     | X7R  |      |     | X5R |
|                |             | 10                  |             |     |     |     |      |      | X5R |     |
|                |             | 16                  |             |     |     |     | X7R  |      |     |     |
|                |             | 25                  |             |     |     |     |      |      |     |     |
|                |             | 50                  | X7R         |     |     |     |      |      |     |     |
|                |             | 100                 |             |     | X7R |     |      |      |     |     |

## Product Line Up

| EIA Code | Size L x W      | Thickness Max. | Rated Voltage | TC Code         | Capacitance | Capacitance Tolerance | Part Number     |
|----------|-----------------|----------------|---------------|-----------------|-------------|-----------------------|-----------------|
| 0603     | 1.60mm x 0.80mm | 0.70mm         | 6.3Vdc        | X7R             | 220nF       | ±20%                  | CL10B224MQ6NXN□ |
|          |                 |                |               | X5R             | 1.0uF       | ±20%                  | CL10A105MQ6NXN□ |
|          |                 |                | 10Vdc         | X5R             | 470nF       | ±20%                  | CL10A474MP6NXN□ |
|          |                 |                |               | X5R             | 1.0uF       | ±20%                  | CL10A105MP6NXN□ |
|          |                 |                | 16Vdc         | X7R             | 100nF       | ±20%                  | CL10B104MO6NXN□ |
|          |                 |                |               | X7R             | 220nF       | ±20%                  | CL10B224MO6NXN□ |
|          |                 |                | 50Vdc         | X7R             | 1.0nF       | ±20%                  | CL10B102MB6NXN□ |
|          |                 |                | 100Vdc        | X7R             | 2.2nF       | ±20%                  | CL10B222MC6NXN□ |
| X7R      | 4.7nF           | ±20%           |               | CL10B472MC6NXN□ |             |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
 In order to move to the page directly, please click the here. †

# Array Type Capacitors

## Feature



- Reduction in required space (more than 50%)
- Reduction in cost and time for replacement of PCB
- Reduction in amount of solder joints
- Easier PCB design
- Reduced waste from tape and reel packaging process
- It protect EMI bypassing digital signal line nose

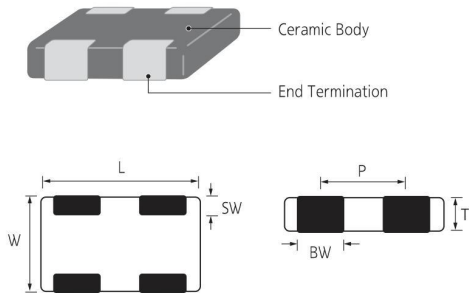
## Application

- A bypass for digital and analog signal line noise generated by telecommunication equipment and other common electronic circuits

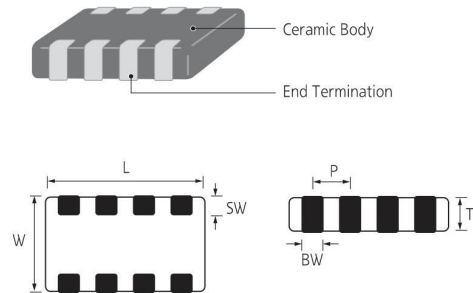
## Structure and Dimensions

|           |           |          |            |          |          |          |          |          |          |          |
|-----------|-----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| <b>CL</b> | <b>14</b> | <b>A</b> | <b>105</b> | <b>M</b> | <b>A</b> | <b>5</b> | <b>N</b> | <b>A</b> | <b>N</b> | <b>C</b> |
| 1         | 2         | 3        | 4          | 5        | 6        | 7        | 8        | 9        | 10       | 11       |

### ■ A : ARRAY (2 - element)



### ■ B : ARRAY (4 - element)



| Code | Size (mm) | EIA Code | Dimension(mm) |           |           |           |           |           |
|------|-----------|----------|---------------|-----------|-----------|-----------|-----------|-----------|
|      |           |          | L             | W         | T         | BW        | SW        | P         |
| A    | 0906      | 0302     | 0.90±0.05     | 0.60±0.05 | 0.45±0.05 | 0.25±0.05 | 0.15±0.10 | 0.45±0.05 |
| A    | 1410      | 0504     | 1.37±0.15     | 1.00±0.15 | 0.35±0.05 | 0.36±0.10 | 0.20±0.10 | 0.64±0.10 |
|      |           |          |               |           | 0.50±0.05 |           |           |           |
|      |           |          |               |           | 0.60±0.06 |           |           |           |
|      |           |          |               |           | 0.80±0.08 |           |           |           |
| A    | 2012      | 0805     | 2.00±0.15     | 1.25±0.15 | 0.85±0.10 | 0.50±0.20 | 0.25±0.15 | 1.00±0.10 |
| B    | 2012      | 0805     | 2.00±0.15     | 1.25±0.15 | 0.85±0.10 | 0.25±0.10 | 0.25±0.15 | 0.50±0.10 |
| B    | 3216      | 1206     | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | 0.40±0.20 | 0.30±0.15 | 0.80±0.20 |

Array Type capacitance Table (COG / X5R / X7R)

| TC  | Size inch (mm) | Type        | Rated Voltage (Vdc) | T max. (mm) | Capacitance(pF) |    |    |    |     |     |  |
|-----|----------------|-------------|---------------------|-------------|-----------------|----|----|----|-----|-----|--|
|     |                |             |                     |             | 10              | 22 | 27 | 47 | 100 | 470 |  |
| COG | 0504(1410)     | 2 - element | 25                  | 0.88        |                 |    |    |    |     |     |  |
|     | 1206(3216)     | 4 - element | 50                  | 1.00        |                 |    |    |    |     |     |  |

| TC  | Size inch (mm) | Type        | Rated Voltage (Vdc) | T max. (mm) | Capacitance(nF) |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|-----|----------------|-------------|---------------------|-------------|-----------------|-----|-----|----|----|----|-----|-----|-----|------|------|--|--|--|--|--|--|--|
|     |                |             |                     |             | 1.0             | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 | 470 | 1000 | 2200 |  |  |  |  |  |  |  |
| X5R | 0302(0906)     | 2 - element | 4.0                 | 0.50        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 6.3                 |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 10                  |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     | 0504(1410)     | 2 - element | 6.3                 | 0.88        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.66        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.55        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.40        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 10          | 0.88            |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     |             | 0.66            |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 0.55                |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 16                  | 0.40        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.88        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.66        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.55        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.40        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.88        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 25                  | 0.66        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             |                     | 0.55        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     | 0.40           |             |                     |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     | 0805(2012)     | 2 - element | 6.3                 | 0.95        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 10                  |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
| 16  |                |             |                     |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
| X7R | 0805(2012)     | 4 - element | 10                  | 0.95        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 16                  |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     | 1206(3216)     | 4 - element | 16                  | 1.00        |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 25                  |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |
|     |                |             | 50                  |             |                 |     |     |    |    |    |     |     |     |      |      |  |  |  |  |  |  |  |

# Array Type Capacitors

## Product Line Up (COG / X5R)

### ■ Size : 0.90 X 0.60mm (inch : 0302)

| Element Type | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|--------------|----------------|---------------|---------|-------------|-----------------------|------------------|----------|
| 2-Array      | 0.50mm         | 4.0Vdc        | X5R     | 1.0uF       | ±20%                  | CL09A105MR4NAN □ | Derating |
|              |                | 6.3Vdc        | X5R     | 100nF       | ±10%                  | CL09A104KQ4SAN □ | Derating |
|              |                |               | X5R     | 1.0uF       | ±20%                  | CL09A105MQ4NAN □ | Derating |
|              |                | 10Vdc         | X5R     | 100nF       | ±10%                  | CL09A104KP4SAN □ |          |

### ■ Size : 1.40 X 1.00mm (inch : 0504)

| Element Type | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|--------------|----------------|---------------|---------|-------------|-----------------------|------------------|----------|
| 2-Array      | 0.66mm         | 25Vdc         | COG     | 27pF        | ±10%                  | CL14C270KA6NAN □ |          |
|              | 0.40mm         | 10Vdc         | X5R     | 1.0uF       | ±20%                  | CL14A105MP3NAN □ | Derating |
|              |                | 16Vdc         | X5R     | 1.0uF       | ±20%                  | CL14A105MO3NAN □ | Derating |
|              | 0.55mm         | 25Vdc         | X5R     | 1.0uF       | ±20%                  | CL14A105MA5NAN □ | Derating |
|              | 0.66mm         | 10Vdc         | X5R     | 100nF       | ±10%                  | CL14A104KP6NAN □ |          |
|              |                | 25Vdc         | X5R     | 100nF       | ±10%                  | CL14A104KA6NAN □ |          |
|              | 0.88mm         | 10Vdc         | X5R     | 1.0uF       | ±10%                  | CL14A105KP8NAN □ | Derating |
|              |                |               | X5R     | 2.2uF       | ±10%                  | CL14A225KP8NAN □ | Derating |
|              |                | 16Vdc         | X5R     | 1.0uF       | ±20%                  | CL14A105MO8NAN □ | Derating |

## Product Line Up (COG / X5R / X7R)

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Element Type | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|--------------|----------------|---------------|---------|-------------|-----------------------|------------------|--------|
| 2-Array      | 0.95mm         | 10Vdc         | X5R     | 1.0uF       | ±20%                  | CL21A105MPCNAN □ |        |
|              |                | 16Vdc         | X5R     | 1.0uF       | ±10%                  | CL21A105KOCNAN □ |        |
| 4-Array      | 0.95mm         | 10Vdc         | X7R     | 100nF       | ±20%                  | CL21B104MPCNBN □ |        |
|              |                | 16Vdc         | X7R     | 100nF       | ±10%                  | CL21B104KOCNBN □ |        |
|              |                | 50Vdc         | X7R     | 470pF       | ±10%                  | CL21B471KBCNBN □ |        |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Element Type | Thickness Max. | Rated Voltage | TC Code | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|--------------|----------------|---------------|---------|-------------|-----------------------|------------------|------------------|--|
| 4-Array      | 1.00mm         | 50Vdc         | COG     | 10pF        | ±5%                   | CL31C100JBCNBN □ |                  |  |
|              |                |               | COG     | 15pF        | ±5%                   | CL31C150JBCNBN □ |                  |  |
|              |                |               | COG     | 22pF        | ±5%                   | CL31C220JBCNBN □ |                  |  |
|              |                |               | COG     | 27pF        | ±5%                   | CL31C270JBCNBN □ |                  |  |
|              |                |               | COG     | 33pF        | ±10%                  | CL31C330KBCNBN □ |                  |  |
|              |                |               | COG     | 39pF        | ±10%                  | CL31C390KBCNBN □ |                  |  |
|              |                |               | COG     | 68pF        | ±5%                   | CL31C680JBCNBN □ |                  |  |
|              |                |               | COG     | 82pF        | ±5%                   | CL31C820JBCNBN □ |                  |  |
|              |                |               | COG     | 100pF       | ±5%                   | CL31C101JBCNBN □ |                  |  |
|              |                |               | COG     | 150pF       | ±10%                  | CL31C151KBCNBN □ |                  |  |
|              |                |               | COG     | 180pF       | ±5%                   | CL31C181JBCNBN □ |                  |  |
|              |                |               | COG     | 330pF       | ±5%                   | CL31C331JBCNBN □ |                  |  |
|              |                |               | COG     | 470pF       | ±5%                   | CL31C471JBCNBN □ |                  |  |
|              | 1.00mm         | 16Vdc         | X7R     | 100nF       | ±10%                  | CL31B104KOCNBN □ |                  |  |
|              |                |               | 25Vdc   | X7R         | 47nF                  | ±10%             | CL31B473KACNBN □ |  |
|              |                |               |         | X7R         | 100nF                 | ±10%             | CL31B104KACNBN □ |  |
|              |                | 50Vdc         | X7R     | 1.0nF       | ±20%                  | CL31B102MBCNBN □ |                  |  |
|              |                |               | X7R     | 10nF        | ±20%                  | CL31B103MBCNBN □ |                  |  |
|              |                |               | X7R     | 15nF        | ±10%                  | CL31B153KBCNBN □ |                  |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.143

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# Industrial Capacitors Part Numbering System

|           |           |          |            |          |          |          |          |          |           |           |
|-----------|-----------|----------|------------|----------|----------|----------|----------|----------|-----------|-----------|
| <b>CL</b> | <b>32</b> | <b>B</b> | <b>106</b> | <b>K</b> | <b>A</b> | <b>J</b> | <b>N</b> | <b>N</b> | <b>W</b>  | <b>E</b>  |
| <b>1</b>  | <b>2</b>  | <b>3</b> | <b>4</b>   | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> |

\* SEMCO MLCC use 15 – digit Part Numbering system.

|                             | 8 9 10 Code     | Meaning  |
|-----------------------------|-----------------|--|
| Standard Termination        | NNW             | Industrial Capacitors (Networks, Power, etc)             |
|                             | NFN             | Industrial Capacitors for Power Application              |
|                             | GQW / GNW       | High Q Industrial Capacitors                             |
|                             | N3W             | High Effective Capacitance Industrial Capacitors         |
| Soft Termination            | ZW6 / SW6       | Soft – Termination(3mm) Industrial Capacitors            |
|                             | ZNW / SNW       | Soft – termination Industrial Capacitors                 |
|                             | ZFN / SFN / YFN | Soft – termination Capacitors for Power Application      |
| Reinforced Soft Termination | Z46             | Reinforced Soft – Termination(3mm) Industrial Capacitors |
|                             | Z4J             | Reinforced Soft – Termination(5mm) Industrial Capacitors |

\* For the meaning of 8 (N, G, S, Z, and Y), please refer to the Page 05 (Part Numbering System).

## Feature

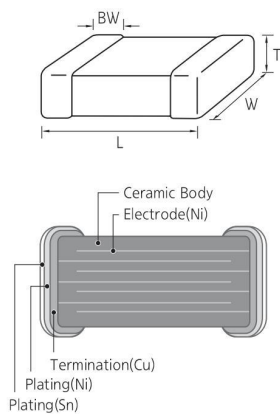


- Rated voltage 6.3V~250V  
temperature range -55°C to +125°C (X7R/COG), -55°C to +85°C (X5R),  
case size 0201 to 2220
- Special outgoing inspection for industrial application (HALT, etc)

## Application

- Network, Power application and etc.
- Ideal for decoupling and filtering applications (Class II : X5R/X7R/X6S)
- Impedance matching, tuning, coupling in high frequency circuit (Class I : COG)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 03        | 0201     | 0.60±0.03     | 0.30±0.03 | 0.30±0.03 | 3              | 0.15±0.05       |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 |                | 0.25±0.10       |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.65±0.10 | A              | 0.50+0.20/-0.30 |
|           |          |               |           | 0.85±0.10 | C              |                 |
|           |          |               |           | 1.15±0.10 | M              |                 |
|           |          |               |           | 1.25±0.10 | F              |                 |
| 31        | 1206     | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | C              | 0.50±0.30       |
|           |          |               |           | 1.25±0.15 | F              |                 |
|           |          |               |           | 3.20±0.20 | 1.60±0.20      |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 1.25±0.20 | F              | 0.60±0.30       |
|           |          |               |           | 1.60±0.20 | H              |                 |
|           |          |               |           | 2.00±0.20 | I              |                 |
|           |          |               |           | 2.50±0.20 | J              |                 |
| 42        | 1808     | 4.50±0.40     | 2.00±0.20 | 1.25±0.20 | F              | 0.80±0.30       |
|           |          |               |           | 1.60±0.20 | H              |                 |
|           |          |               |           | 2.00±0.20 | I              |                 |
| 43        | 1812     | 4.50±0.40     | 3.20±0.30 | 1.25±0.20 | F              | 0.80±0.30       |
|           |          |               |           | 1.60±0.20 | H              |                 |
|           |          |               |           | 2.00±0.20 | I              |                 |
| 55        | 2220     | 5.70±0.40     | 5.00±0.40 | 2.50±0.20 | J              | 1.00±0.30       |
|           |          |               |           | 2.50±0.20 | J              |                 |





Industrial Capacitance Table (X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|--|
|                      |                           | pF          |     |     |     | nF  |     |     |     |    |    |    |    | uF |    |     |     |     |     |     |     |     |  |
|                      |                           | 220         | 330 | 470 | 680 | 1.0 | 2.2 | 3.3 | 4.7 | 10 | 15 | 22 | 33 | 47 | 68 | 100 | 220 | 470 | 1.0 | 2.2 | 3.3 | 4.7 |  |
| 0201<br>(0603)       | 4.0                       |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |  |
|                      | 6.3                       |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |     |    |    |    |    |    |    |     |     |     |     |     |     |     |  |

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|----|----|----|-----|-----|--|--|--|--|--|--|--|--|--|--|
|                      |                           | nF          |     |     | uF  |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      |                           | 100         | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 |  |  |  |  |  |  |  |  |  |  |
| 0402<br>(1005)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
| 0603<br>(1608)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
| 0805<br>(2012)       | 4.0                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
| 1206<br>(3216)       | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
| 1210<br>(3225)       | 6.3                       |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 10                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 16                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |
|                      | 25                        |             |     |     |     |     |     |    |    |    |     |     |  |  |  |  |  |  |  |  |  |  |

Industrial Capacitance Table (X6S)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(uF) |      |      |     |     |     |    |    |    |     |     |  |
|----------------------|---------------------------|-----------------|------|------|-----|-----|-----|----|----|----|-----|-----|--|
|                      |                           | 0.1             | 0.22 | 0.47 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 |  |
| 0402<br>(1005)       | 4.0                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 6.3                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 10                        |                 |      |      |     |     |     |    |    |    |     |     |  |
| 0603<br>(1608)       | 4.0                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 6.3                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 10                        |                 |      |      |     |     |     |    |    |    |     |     |  |
| 0805<br>(2012)       | 4.0                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 6.3                       |                 |      |      |     |     |     |    |    |    |     |     |  |
| 1206(3216)           | 4.0                       |                 |      |      |     |     |     |    |    |    |     |     |  |
| 1210<br>(3225)       | 6.3                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 10                        |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      |                           |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 16                        |                 |      |      |     |     |     |    |    |    |     |     |  |

Industrial Capacitance Table (X7R / X7S)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |     |     |     |     |    |    |    |     |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|-----|
|                      |                           | pF          |     |     |     |     |     | nF  |     |     |     |    |    |    |     |
|                      |                           | 100         | 220 | 330 | 470 | 680 | 1.0 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 22 | 47 | 100 |
| 0201<br>(0603)       | 10                        |             |     |     |     |     |     |     |     |     |     |    |    |    |     |
|                      | 16                        |             |     |     |     |     |     |     |     |     |     |    |    |    |     |
|                      | 25                        |             |     |     |     |     |     |     |     |     |     |    |    |    |     |

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|----------------------|---------------------------|-------------|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|-----|--|
|                      |                           | nF          |    |    |    |    |    |    |     |     |     | uF  |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      |                           | 4.7         | 10 | 15 | 22 | 33 | 47 | 68 | 100 | 120 | 150 | 220 | 330 | 470 | 680 | 1.0 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 22 | 47 | 100 |  |
| 0402<br>(1005)       | 6.3                       |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 10                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 16                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 25                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 50                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
| 0603<br>(1608)       | 6.3                       |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 10                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 16                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 25                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 50                        |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |
|                      | 100                       |             |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |     |  |

Industrial Capacitance Table (X7R/X7S)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|----------------------|---------------------------|-------------|----------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
|                      |                           | nF          |          |    |    |    |    |    |     |     |     | uF  |     |     |     |     |     |     |     |     |    |    |
|                      |                           | 4.7         | 10       | 15 | 22 | 33 | 47 | 68 | 100 | 120 | 150 | 220 | 330 | 470 | 680 | 1.0 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 22 |
| 0805<br>(2012)       | 6.3                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 10                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 16                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 25                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 50                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 100                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 200                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 1206<br>(3216)       | 6.3                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 10                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 16                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 25                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 35                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 50                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 100                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 200                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 250                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 500                       | 6.8         | [Shaded] |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 2k                        | 2.2         | [Shaded] |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 1210<br>(3225)       | 6.3                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 10                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 16                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 25                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 50                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 100                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 200                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 500                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 630                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 2k                        | 1           | [Shaded] |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 1812<br>(4532)       | 100                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 200                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 500                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 630                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|                      | 1k                        | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 2220(5750)           | 100                       | [Shaded]    |          |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |    |    |

## Product Line Up (COG)

### ■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.33mm         | 25Vdc         | 4.7pF           | ±0.25pF               | CL03C4R7CA3GNW□ |
|                |               | 10pF            | ±0.50pF               | CL03C100DA3GNW□ |
|                |               | 12pF            | ±5%                   | CL03C120JA3NNW□ |
|                |               | 15pF            | ±5%                   | CL03C150JA3NNW□ |
|                |               | 27pF            | ±5%                   | CL03C270JA3NNW□ |
|                |               | 33pF            | ±5%                   | CL03C330JA3NNW□ |
|                |               | 47pF            | ±5%                   | CL03C470JA3NNW□ |
|                |               | 56pF            | ±5%                   | CL03C560JA3NNW□ |
|                |               | 68pF            | ±5%                   | CL03C680JA3NNW□ |
|                |               | 82pF            | ±5%                   | CL03C820JA3NNW□ |
| 100pF          | ±5%           | CL03C101JA3NNW□ |                       |                 |

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 0.55mm         | 25Vdc         | 82pF        | ±10%                  | CL05C820KA5NNW□ |
|                |               | 150pF       | ±5%                   | CL05C151JA5NNW□ |
|                |               | 220pF       | ±5%                   | CL05C221JA5NNW□ |
| 0.55mm         | 50Vdc         | 0.1pF       | ±0.05pF               | CL05C0R1AB5GNW□ |
|                |               | 0.1pF       | ±0.1pF                | CL05C0R1BB5GNW□ |
|                |               | 0.2pF       | ±0.05pF               | CL05C0R2AB5GNW□ |
|                |               | 0.2pF       | ±0.1pF                | CL05C0R2BB5GNW□ |
|                |               | 0.3pF       | ±0.05pF               | CL05C0R3AB5GNW□ |
|                |               | 0.3pF       | ±0.1pF                | CL05C0R3BB5GNW□ |
|                |               | 0.4pF       | ±0.05pF               | CL05C0R4AB5GNW□ |
|                |               | 0.4pF       | ±0.1pF                | CL05C0R4BB5GNW□ |
|                |               | 0.5pF       | ±0.05pF               | CL05C0R5AB5GNW□ |
|                |               | 0.5pF       | ±0.1pF                | CL05C0R5BB5GNW□ |
|                |               | 0.6pF       | ±0.05pF               | CL05C0R6AB5GNW□ |
|                |               | 0.6pF       | ±0.1pF                | CL05C0R6BB5GNW□ |
|                |               | 0.7pF       | ±0.05pF               | CL05C0R7AB5GNW□ |
|                |               | 0.7pF       | ±0.1pF                | CL05C0R7BB5GNW□ |
|                |               | 0.8pF       | ±0.05pF               | CL05C0R8AB5GNW□ |
|                |               | 0.8pF       | ±0.1pF                | CL05C0R8BB5GNW□ |
|                |               | 0.9pF       | ±0.05pF               | CL05C0R9AB5GNW□ |
|                |               | 0.9pF       | ±0.1pF                | CL05C0R9BB5GNW□ |
|                |               | 1.0pF       | ±0.05pF               | CL05C010AB5GNW□ |
|                |               | 1.0pF       | ±0.1pF                | CL05C010BB5GNW□ |
|                |               | 1.0pF       | ±0.25pF               | CL05C010CB5NNW□ |
|                |               | 1.0pF       | ±0.25pF               | CL05C010CB5GNW□ |
|                |               | 1.1pF       | ±0.05pF               | CL05C1R1AB5GNW□ |
|                |               | 1.1pF       | ±0.1pF                | CL05C1R1BB5GNW□ |
|                |               | 1.1pF       | ±0.25pF               | CL05C1R1CB5GNW□ |
|                |               | 1.2pF       | ±0.05pF               | CL05C1R2AB5GNW□ |
|                |               | 1.2pF       | ±0.1pF                | CL05C1R2BB5GNW□ |
|                |               | 1.2pF       | ±0.25pF               | CL05C1R2CB5GNW□ |
|                |               | 1.3pF       | ±0.05pF               | CL05C1R3AB5GNW□ |
|                |               | 1.3pF       | ±0.1pF                | CL05C1R3BB5GNW□ |
|                |               | 1.3pF       | ±0.25pF               | CL05C1R3CB5GNW□ |
|                |               | 1.5pF       | ±0.05pF               | CL05C1R5AB5GNW□ |
|                |               | 1.5pF       | ±0.1pF                | CL05C1R5BB5GNW□ |
|                |               | 1.5pF       | ±0.25pF               | CL05C1R5CB5GNW□ |
|                |               | 1.6pF       | ±0.05pF               | CL05C1R6AB5GNW□ |

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.55mm         | 50Vdc         | 1.6pF           | ±0.1pF                | CL05C1R6BB5GNW□ |
|                |               | 1.6pF           | ±0.25pF               | CL05C1R6CB5GNW□ |
|                |               | 1.8pF           | ±0.05pF               | CL05C1R8AB5GNW□ |
|                |               | 1.8pF           | ±0.1pF                | CL05C1R8BB5NNW□ |
|                |               | 1.8pF           | ±0.1pF                | CL05C1R8BB5GNW□ |
|                |               | 1.8pF           | ±0.25pF               | CL05C1R8CB5GNW□ |
|                |               | 2.0pF           | ±0.05pF               | CL05C020AB5GNW□ |
|                |               | 2.0pF           | ±0.1pF                | CL05C020BB5GNW□ |
|                |               | 2.0pF           | ±0.25pF               | CL05C020CB5GNW□ |
|                |               | 2.2pF           | ±0.05pF               | CL05C2R2AB5GNW□ |
|                |               | 2.2pF           | ±0.1pF                | CL05C2R2BB5NNW□ |
|                |               | 2.2pF           | ±0.25pF               | CL05C2R2CB5GNW□ |
|                |               | 2.4pF           | ±0.05pF               | CL05C2R4AB5GNW□ |
|                |               | 2.4pF           | ±0.1pF                | CL05C2R4BB5NNW□ |
|                |               | 2.4pF           | ±0.1pF                | CL05C2R4BB5GNW□ |
|                |               | 2.4pF           | ±0.25pF               | CL05C2R4CB5GNW□ |
|                |               | 2.7pF           | ±0.05pF               | CL05C2R7AB5GNW□ |
|                |               | 2.7pF           | ±0.1pF                | CL05C2R7BB5NNW□ |
|                |               | 2.7pF           | ±0.1pF                | CL05C2R7BB5GNW□ |
|                |               | 2.7pF           | ±0.25pF               | CL05C2R7CB5NNW□ |
|                |               | 2.7pF           | ±0.25pF               | CL05C2R7CB5GNW□ |
|                |               | 3.0pF           | ±0.05pF               | CL05C030AB5GNW□ |
|                |               | 3.0pF           | ±0.1pF                | CL05C030BB5GNW□ |
|                |               | 3.0pF           | ±0.25pF               | CL05C030CB5GNW□ |
|                |               | 3.3pF           | ±0.05pF               | CL05C3R3AB5GNW□ |
|                |               | 3.3pF           | ±0.1pF                | CL05C3R3BB5NNW□ |
|                |               | 3.3pF           | ±0.1pF                | CL05C3R3BB5GNW□ |
|                |               | 3.3pF           | ±0.25pF               | CL05C3R3CB5NNW□ |
|                |               | 3.3pF           | ±0.25pF               | CL05C3R3CB5GNW□ |
|                |               | 3.6pF           | ±0.05pF               | CL05C3R6AB5GNW□ |
|                |               | 3.6pF           | ±0.1pF                | CL05C3R6BB5NNW□ |
|                |               | 3.6pF           | ±0.1pF                | CL05C3R6BB5GNW□ |
|                |               | 3.6pF           | ±0.25pF               | CL05C3R6CB5GNW□ |
|                |               | 3.9pF           | ±0.05pF               | CL05C3R9AB5GNW□ |
|                |               | 3.9pF           | ±0.1pF                | CL05C3R9BB5GNW□ |
|                |               | 3.9pF           | ±0.25pF               | CL05C3R9CB5GNW□ |
|                |               | 4.0pF           | ±0.05pF               | CL05C040AB5GNW□ |
|                |               | 4.0pF           | ±0.1pF                | CL05C040BB5GNW□ |
|                |               | 4.0pF           | ±0.25pF               | CL05C040CB5GNW□ |
|                |               | 4.3pF           | ±0.05pF               | CL05C4R3AB5GNW□ |
|                |               | 4.3pF           | ±0.1pF                | CL05C4R3BB5GNW□ |
|                |               | 4.3pF           | ±0.25pF               | CL05C4R3CB5GNW□ |
|                |               | 4.7pF           | ±0.05pF               | CL05C4R7AB5GNW□ |
|                |               | 4.7pF           | ±0.1pF                | CL05C4R7BB5GNW□ |
|                |               | 4.7pF           | ±0.25pF               | CL05C4R7CB5NNW□ |
|                |               | 4.7pF           | ±0.25pF               | CL05C4R7CB5GNW□ |
|                |               | 5.0pF           | ±0.05pF               | CL05C050AB5GNW□ |
|                |               | 5.0pF           | ±0.1pF                | CL05C050BB5GNW□ |
|                |               | 5.0pF           | ±0.25pF               | CL05C050CB5GNW□ |
|                |               | 5.1pF           | ±0.05pF               | CL05C5R1AB5GNW□ |
| 5.1pF          | ±0.1pF        | CL05C5R1BB5GNW□ |                       |                 |
| 5.1pF          | ±0.25pF       | CL05C5R1CB5GNW□ |                       |                 |
| 5.1pF          | ±0.5pF        | CL05C5R1DB5GNW□ |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
 In order to move to the page directly, please click the here. ↑

Product Line Up (COG)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance       | Capacitance Tolerance | Part Number       | Thickness Max.    | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       |
|----------------|---------------|-------------------|-----------------------|-------------------|-------------------|---------------|-------------|-----------------------|-------------------|
| 0.55mm         | 50Vdc         | 5.6pF             | ±0.05pF               | CL05C5R6AB5GNW □  | 0.55mm            | 50Vdc         | 12pF        | ±5%                   | CL05C120JB5NNDW □ |
|                |               | 5.6pF             | ±0.1pF                | CL05C5R6BB5GNW □  |                   |               | 12pF        | ±5%                   | CL05C120JB5GNW □  |
|                |               | 5.6pF             | ±0.25pF               | CL05C5R6CB5NNDW □ |                   |               | 15pF        | ±1%                   | CL05C150FB5GNW □  |
|                |               | 5.6pF             | ±0.25pF               | CL05C5R6CB5GNW □  |                   |               | 15pF        | ±2%                   | CL05C150GB5GNW □  |
|                |               | 5.6pF             | ±0.5pF                | CL05C5R6DB5GNW □  |                   |               | 15pF        | ±5%                   | CL05C150JB5GNW □  |
|                |               | 6.0pF             | ±0.05pF               | CL05C060AB5GNW □  |                   |               | 18pF        | ±1%                   | CL05C180FB5GNW □  |
|                |               | 6.0pF             | ±0.1pF                | CL05C060BB5GNW □  |                   |               | 18pF        | ±2%                   | CL05C180GB5GNW □  |
|                |               | 6.0pF             | ±0.25pF               | CL05C060CB5GNW □  |                   |               | 18pF        | ±5%                   | CL05C180JB5NNDW □ |
|                |               | 6.0pF             | ±0.5pF                | CL05C060DB5GNW □  |                   |               | 18pF        | ±5%                   | CL05C180JB5GNW □  |
|                |               | 6.2pF             | ±0.05pF               | CL05C6R2AB5GNW □  |                   |               | 20pF        | ±1%                   | CL05C200FB5GNW □  |
|                |               | 6.2pF             | ±0.1pF                | CL05C6R2BB5GNW □  |                   |               | 20pF        | ±2%                   | CL05C200GB5GNW □  |
|                |               | 6.2pF             | ±0.25pF               | CL05C6R2CB5GNW □  |                   |               | 20pF        | ±5%                   | CL05C200JB5GNW □  |
|                |               | 6.2pF             | ±0.5pF                | CL05C6R2DB5GNW □  |                   |               | 22pF        | ±1%                   | CL05C220FB5GNW □  |
|                |               | 6.8pF             | ±0.05pF               | CL05C6R8AB5GNW □  |                   |               | 22pF        | ±2%                   | CL05C220GB5GNW □  |
|                |               | 6.8pF             | ±0.1pF                | CL05C6R8BB5NNDW □ |                   |               | 22pF        | ±5%                   | CL05C220JB5NNDW □ |
|                |               | 6.8pF             | ±0.1pF                | CL05C6R8BB5GNW □  |                   |               | 22pF        | ±5%                   | CL05C220JB5GNW □  |
|                |               | 6.8pF             | ±0.25pF               | CL05C6R8CB5NNDW □ |                   |               | 24pF        | ±1%                   | CL05C240FB5GNW □  |
|                |               | 6.8pF             | ±0.25pF               | CL05C6R8CB5GNW □  |                   |               | 24pF        | ±2%                   | CL05C240GB5GNW □  |
|                |               | 6.8pF             | ±0.5pF                | CL05C6R8DB5GNW □  |                   |               | 24pF        | ±5%                   | CL05C240JB5NNDW □ |
|                |               | 7.0pF             | ±0.05pF               | CL05C070AB5GNW □  |                   |               | 24pF        | ±5%                   | CL05C240JB5GNW □  |
|                |               | 7.0pF             | ±0.1pF                | CL05C070BB5GNW □  |                   |               | 27pF        | ±1%                   | CL05C270FB5GNW □  |
|                |               | 7.0pF             | ±0.25pF               | CL05C070CB5GNW □  |                   |               | 27pF        | ±2%                   | CL05C270GB5GNW □  |
|                |               | 7.0pF             | ±0.5pF                | CL05C070DB5GNW □  |                   |               | 27pF        | ±5%                   | CL05C270JB5NNDW □ |
|                |               | 7.5pF             | ±0.05pF               | CL05C7R5AB5GNW □  |                   |               | 27pF        | ±5%                   | CL05C270JB5GNW □  |
|                |               | 7.5pF             | ±0.1pF                | CL05C7R5BB5GNW □  |                   |               | 33pF        | ±1%                   | CL05C330FB5GNW □  |
|                |               | 7.5pF             | ±0.25pF               | CL05C7R5CB5GNW □  |                   |               | 33pF        | ±2%                   | CL05C330GB5GNW □  |
|                |               | 7.5pF             | ±0.5pF                | CL05C7R5DB5GNW □  |                   |               | 33pF        | ±5%                   | CL05C330JB5NNDW □ |
|                |               | 8.0pF             | ±0.05pF               | CL05C080AB5GNW □  |                   |               | 33pF        | ±5%                   | CL05C330JB5GNW □  |
|                |               | 8.0pF             | ±0.1pF                | CL05C080BB5GNW □  |                   |               | 39pF        | ±1%                   | CL05C390FB5GNW □  |
|                |               | 8.0pF             | ±0.25pF               | CL05C080CB5GNW □  |                   |               | 39pF        | ±2%                   | CL05C390GB5GNW □  |
|                |               | 8.0pF             | ±0.5pF                | CL05C080DB5GNW □  |                   |               | 39pF        | ±5%                   | CL05C390JB5NNDW □ |
|                |               | 8.2pF             | ±0.05pF               | CL05C8R2AB5GNW □  |                   |               | 39pF        | ±5%                   | CL05C390JB5GNW □  |
|                |               | 8.2pF             | ±0.1pF                | CL05C8R2BB5NNDW □ |                   |               | 47pF        | ±1%                   | CL05C470FB5GNW □  |
|                |               | 8.2pF             | ±0.1pF                | CL05C8R2BB5GNW □  |                   |               | 47pF        | ±2%                   | CL05C470GB5GNW □  |
|                |               | 8.2pF             | ±0.25pF               | CL05C8R2CB5GNW □  |                   |               | 47pF        | ±5%                   | CL05C470JB5NNDW □ |
|                |               | 8.2pF             | ±0.5pF                | CL05C8R2DB5GNW □  |                   |               | 47pF        | ±5%                   | CL05C470JB5GNW □  |
|                |               | 9.0pF             | ±0.05pF               | CL05C090AB5GNW □  |                   |               | 51pF        | ±5%                   | CL05C510JB5NNDW □ |
|                |               | 9.0pF             | ±0.1pF                | CL05C090BB5GNW □  |                   |               | 56pF        | ±5%                   | CL05C560JB5NNDW □ |
|                |               | 9.0pF             | ±0.25pF               | CL05C090CB5GNW □  |                   |               | 68pF        | ±5%                   | CL05C680JB5NNDW □ |
|                |               | 9.0pF             | ±0.5pF                | CL05C090DB5GNW □  |                   |               | 82pF        | ±5%                   | CL05C820JB5NNDW □ |
| 9.1pF          | ±0.05pF       | CL05C9R1AB5GNW □  | 82pF                  | ±10%              | CL05C820KB5NNDW □ |               |             |                       |                   |
| 9.1pF          | ±0.1pF        | CL05C9R1BB5GNW □  | 100pF                 | ±5%               | CL05C101JB5NNDW □ |               |             |                       |                   |
| 9.1pF          | ±0.25pF       | CL05C9R1CB5GNW □  | 120pF                 | ±5%               | CL05C121JB5NNDW □ |               |             |                       |                   |
| 9.1pF          | ±0.5pF        | CL05C9R1DB5GNW □  | 150pF                 | ±5%               | CL05C151JB5NNDW □ |               |             |                       |                   |
| 10pF           | ±1%           | CL05C100FB5GNW □  | 180pF                 | ±5%               | CL05C181JB5NNDW □ |               |             |                       |                   |
| 10pF           | ±2%           | CL05C100GB5GNW □  | 270pF                 | ±1%               | CL05C271FB5NNDW □ |               |             |                       |                   |
| 10pF           | ±5%           | CL05C100JB5NNDW □ | 270pF                 | ±5%               | CL05C271JB5NNDW □ |               |             |                       |                   |
| 10pF           | ±5%           | CL05C100JB5GNW □  | 330pF                 | ±5%               | CL05C331JB5NNDW □ |               |             |                       |                   |
| 11pF           | ±1%           | CL05C110FB5GNW □  | 390pF                 | ±1%               | CL05C391FB5NNDW □ |               |             |                       |                   |
| 11pF           | ±2%           | CL05C110GB5GNW □  | 390pF                 | ±5%               | CL05C391JB5NNDW □ |               |             |                       |                   |
| 11pF           | ±5%           | CL05C110JB5GNW □  | 470pF                 | ±1%               | CL05C471FB5NNDW □ |               |             |                       |                   |
| 12pF           | ±1%           | CL05C120FB5GNW □  | 470pF                 | ±5%               | CL05C471JB5NNDW □ |               |             |                       |                   |
| 12pF           | ±2%           | CL05C120GB5NNDW □ | 560pF                 | ±5%               | CL05C561JB5NNDW □ |               |             |                       |                   |
| 12pF           | ±2%           | CL05C120GB5GNW □  | 680pF                 | ±5%               | CL05C681JB5NNDW □ |               |             |                       |                   |

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## Product Line Up (COG)

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 0.55mm         | 50Vdc         | 820pF       | ±5%                   | CL05C821JB5NNW□ |
|                |               | 1.0nF       | ±5%                   | CL05C102JB5NNW□ |
|                | 100Vdc        | 47pF        | ±5%                   | CL05C470JC5NNW□ |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.90mm         | 50Vdc         | 1.0pF           | ±0.25pF               | CL10C010CB8NNW□ |
|                |               | 1.2pF           | ±0.25pF               | CL10C1R2CB8NNW□ |
|                |               | 1.5pF           | ±0.1pF                | CL10C1R5BB8NNW□ |
|                |               | 1.5pF           | ±0.25pF               | CL10C1R5CB8NNW□ |
|                |               | 2.2pF           | ±0.1pF                | CL10C2R2BB8NNW□ |
|                |               | 2.2pF           | ±0.25pF               | CL10C2R2CB8NNW□ |
|                |               | 2.7pF           | ±0.1pF                | CL10C2R7BB8NNW□ |
|                |               | 2.7pF           | ±0.25pF               | CL10C2R7CB8NNW□ |
|                |               | 3.3pF           | ±0.1pF                | CL10C3R3BB8NNW□ |
|                |               | 3.3pF           | ±0.25pF               | CL10C3R3CB8NNW□ |
|                |               | 3.3pF           | ±0.5pF                | CL10C3R3DB8NNW□ |
|                |               | 3.6pF           | ±0.25pF               | CL10C3R6CB8NNW□ |
|                |               | 3.9pF           | ±0.1pF                | CL10C3R9BB8NNW□ |
|                |               | 3.9pF           | ±0.25pF               | CL10C3R9CB8NNW□ |
|                |               | 4.7pF           | ±0.1pF                | CL10C4R7BB8NNW□ |
|                |               | 4.7pF           | ±0.25pF               | CL10C4R7CB8NNW□ |
|                |               | 4.7pF           | ±0.5pF                | CL10C4R7DB8NNW□ |
|                |               | 5.0pF           | ±0.1pF                | CL10C050BB8NNW□ |
|                |               | 5.6pF           | ±0.25pF               | CL10C5R6CB8NNW□ |
|                |               | 6.2pF           | ±0.25pF               | CL10C6R2CB8NNW□ |
|                |               | 6.8pF           | ±0.25pF               | CL10C6R8CB8NNW□ |
|                |               | 6.8pF           | ±0.5pF                | CL10C6R8DB8NNW□ |
|                |               | 8.2pF           | ±0.25pF               | CL10C8R2CB8NNW□ |
|                |               | 9.0pF           | ±5%                   | CL10C090JB8NNW□ |
|                |               | 10pF            | ±0.25pF               | CL10C100CB8NNW□ |
|                |               | 10pF            | ±5%                   | CL10C100JB8NNW□ |
|                |               | 15pF            | ±1%                   | CL10C150FB8NNW□ |
|                |               | 15pF            | ±5%                   | CL10C150JB8NNW□ |
|                |               | 20pF            | ±5%                   | CL10C200JB8NNW□ |
|                |               | 22pF            | ±1%                   | CL10C220FB8NNW□ |
|                |               | 22pF            | ±2%                   | CL10C220GB8NNW□ |
|                |               | 22pF            | ±5%                   | CL10C220JB8NNW□ |
|                |               | 27pF            | ±5%                   | CL10C270JB8NNW□ |
|                |               | 30pF            | ±5%                   | CL10C300JB8NNW□ |
|                |               | 33pF            | ±5%                   | CL10C330JB8NNW□ |
|                |               | 33pF            | ±10%                  | CL10C330KB8NNW□ |
|                |               | 47pF            | ±5%                   | CL10C470JB8NNW□ |
|                |               | 47pF            | ±10%                  | CL10C470KB8NNW□ |
|                |               | 56pF            | ±5%                   | CL10C560JB8NNW□ |
|                |               | 68pF            | ±5%                   | CL10C680JB8NNW□ |
|                |               | 82pF            | ±1%                   | CL10C820FB8NNW□ |
|                |               | 82pF            | ±5%                   | CL10C820JB8NNW□ |
| 100pF          | ±1%           | CL10C101FB8NNW□ |                       |                 |
| 100pF          | ±5%           | CL10C101JB8NNW□ |                       |                 |
| 100pF          | ±10%          | CL10C101KB8NNW□ |                       |                 |
| 120pF          | ±5%           | CL10C121JB8NNW□ |                       |                 |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 0.90mm         | 50Vdc         | 150pF       | ±1%                   | CL10C151FB8NNW□ |
|                |               | 150pF       | ±2%                   | CL10C151GB8NNW□ |
|                |               | 150pF       | ±5%                   | CL10C151JB8NNW□ |
|                |               | 180pF       | ±5%                   | CL10C181JB8NNW□ |
|                |               | 220pF       | ±2%                   | CL10C221GB8NNW□ |
|                |               | 220pF       | ±5%                   | CL10C221JB8NNW□ |
|                |               | 270pF       | ±1%                   | CL10C271FB8NNW□ |
|                |               | 270pF       | ±5%                   | CL10C271JB8NNW□ |
|                |               | 330pF       | ±5%                   | CL10C331JB8NNW□ |
|                |               | 390pF       | ±5%                   | CL10C391JB8NNW□ |
|                |               | 390pF       | ±10%                  | CL10C391KB8NNW□ |
|                |               | 470pF       | ±5%                   | CL10C471JB8NNW□ |
|                |               | 680pF       | ±5%                   | CL10C681JB8NNW□ |
|                |               | 820pF       | ±10%                  | CL10C821KB8NNW□ |
|                |               | 1.0nF       | ±5%                   | CL10C102JB8NNW□ |
|                |               | 1.2nF       | ±5%                   | CL10C122JB8NNW□ |
|                |               | 1.5nF       | ±5%                   | CL10C152JB8NNW□ |
|                |               | 100Vdc      | 10pF                  | ±5%             |
|                | 33pF          |             | ±5%                   | CL10C330JC8NNW□ |
|                | 47pF          |             | ±5%                   | CL10C470JC8NNW□ |
|                | 82pF          |             | ±5%                   | CL10C820JC8NNW□ |
|                | 100pF         |             | ±5%                   | CL10C101JC8NNW□ |
|                | 150pF         |             | ±5%                   | CL10C151JC8NNW□ |
|                | 220pF         |             | ±5%                   | CL10C221JC8NNW□ |
|                | 270pF         |             | ±5%                   | CL10C271JC8NNW□ |
|                | 330pF         |             | ±5%                   | CL10C331JC8NNW□ |

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |     |                 |
|----------------|---------------|-------------|-----------------------|-----------------|-----|-----------------|
| 0.75mm         | 50Vdc         | 1.0pF       | ±0.25pF               | CL21C010CBANNW□ |     |                 |
|                |               | 1.5pF       | ±0.1pF                | CL21C1R5BBANNW□ |     |                 |
|                |               | 10pF        | ±0.5pF                | CL21C100DBANNW□ |     |                 |
|                |               | 10pF        | ±5%                   | CL21C100JBANNW□ |     |                 |
|                |               | 15pF        | ±5%                   | CL21C150JBANNW□ |     |                 |
|                |               | 22pF        | ±1%                   | CL21C220FBANNW□ |     |                 |
|                |               | 22pF        | ±5%                   | CL21C220JBANNW□ |     |                 |
|                |               | 33pF        | ±5%                   | CL21C330JBANNW□ |     |                 |
|                |               | 47pF        | ±5%                   | CL21C470JBANNW□ |     |                 |
|                |               | 47pF        | ±10%                  | CL21C470KBANNW□ |     |                 |
|                |               | 100pF       | ±2%                   | CL21C101GBANNW□ |     |                 |
|                |               | 100pF       | ±5%                   | CL21C101JBANNW□ |     |                 |
|                |               | 120pF       | ±5%                   | CL21C121JBANNW□ |     |                 |
|                |               | 150pF       | ±5%                   | CL21C151JBANNW□ |     |                 |
|                |               | 220pF       | ±5%                   | CL21C221JBANNW□ |     |                 |
|                |               | 220pF       | ±10%                  | CL21C221KBANNW□ |     |                 |
|                |               | 330pF       | ±1%                   | CL21C331FBANNW□ |     |                 |
|                |               | 1.0nF       | ±5%                   | CL21C102JBANNW□ |     |                 |
|                | 100Vdc        | 15pF        | ±5%                   | CL21C150JCANNW□ |     |                 |
|                |               | 100pF       | ±5%                   | CL21C101JCANNW□ |     |                 |
|                |               | 150pF       | ±5%                   | CL21C151JCANNW□ |     |                 |
|                |               | 0.95mm      | 50Vdc                 | 680pF           | ±5% | CL21C681JBCNNW□ |
|                |               |             |                       | 1.0nF           | ±5% | CL21C102JBCNNW□ |

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Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage    | Capacitance      | Capacitance Tolerance | Part Number      | Thickness Max.   | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|------------------|------------------|-----------------------|------------------|------------------|---------------|-------------|-----------------------|------------------|
| 0.95mm         | 100Vdc           | 470pF            | ±5%                   | CL21C471JCCNNW □ | 0.95mm           | 250Vdc        | 3.3pF       | ±0.05pF               | CL21C3R3AECGNW □ |
|                |                  | 680pF            | ±5%                   | CL21C681JCCNNW □ |                  |               | 3.3pF       | ±0.1pF                | CL21C3R3BECGNW □ |
|                | 200Vdc<br>250Vdc | 220pF            | ±5%                   | CL21C221JDCNNW □ |                  |               | 3.3pF       | ±0.25pF               | CL21C3R3CECGNW □ |
|                |                  | 0.5pF            | ±0.05pF               | CL21C0R5AECGNW □ |                  |               | 3.6pF       | ±0.05pF               | CL21C3R6AECGNW □ |
|                |                  | 0.5pF            | ±0.1pF                | CL21C0R5BECGNW □ |                  |               | 3.6pF       | ±0.1pF                | CL21C3R6BECGNW □ |
|                |                  | 0.5pF            | ±0.25pF               | CL21C0R5CECGNW □ |                  |               | 3.6pF       | ±0.25pF               | CL21C3R6CECGNW □ |
|                |                  | 0.6pF            | ±0.05pF               | CL21C0R6AECGNW □ |                  |               | 3.9pF       | ±0.05pF               | CL21C3R9AECGNW □ |
|                |                  | 0.6pF            | ±0.1pF                | CL21C0R6BECGNW □ |                  |               | 3.9pF       | ±0.1pF                | CL21C3R9BECGNW □ |
|                |                  | 0.6pF            | ±0.25pF               | CL21C0R6CECGNW □ |                  |               | 3.9pF       | ±0.25pF               | CL21C3R9CECGNW □ |
|                |                  | 0.7pF            | ±0.05pF               | CL21C0R7AECGNW □ |                  |               | 4.0pF       | ±0.05pF               | CL21C040AECGNW □ |
|                |                  | 0.7pF            | ±0.1pF                | CL21C0R7BECGNW □ |                  |               | 4.0pF       | ±0.1pF                | CL21C040BECGNW □ |
|                |                  | 0.7pF            | ±0.25pF               | CL21C0R7CECGNW □ |                  |               | 4.0pF       | ±0.25pF               | CL21C040CECGNW □ |
|                |                  | 0.8pF            | ±0.05pF               | CL21C0R8AECGNW □ |                  |               | 4.3pF       | ±0.05pF               | CL21C4R3AECGNW □ |
|                |                  | 0.8pF            | ±0.1pF                | CL21C0R8BECGNW □ |                  |               | 4.3pF       | ±0.1pF                | CL21C4R3BECGNW □ |
|                |                  | 0.8pF            | ±0.25pF               | CL21C0R8CECGNW □ |                  |               | 4.3pF       | ±0.25pF               | CL21C4R3CECGNW □ |
|                |                  | 0.9pF            | ±0.05pF               | CL21C0R9AECGNW □ |                  |               | 4.7pF       | ±0.05pF               | CL21C4R7AECGNW □ |
|                |                  | 0.9pF            | ±0.1pF                | CL21C0R9BECGNW □ |                  |               | 4.7pF       | ±0.1pF                | CL21C4R7BECGNW □ |
|                |                  | 0.9pF            | ±0.25pF               | CL21C0R9CECGNW □ |                  |               | 4.7pF       | ±0.25pF               | CL21C4R7CECGNW □ |
|                |                  | 1.0pF            | ±0.05pF               | CL21C010AECGNW □ |                  |               | 5.0pF       | ±0.05pF               | CL21C050AECGNW □ |
|                |                  | 1.0pF            | ±0.1pF                | CL21C010BECGNW □ |                  |               | 5.0pF       | ±0.1pF                | CL21C050BECGNW □ |
|                |                  | 1.0pF            | ±0.25pF               | CL21C010CECGNW □ |                  |               | 5.0pF       | ±0.25pF               | CL21C050CECGNW □ |
|                |                  | 1.1pF            | ±0.05pF               | CL21C1R1AECGNW □ |                  |               | 5.1pF       | ±0.05pF               | CL21C5R1AECGNW □ |
|                |                  | 1.1pF            | ±0.1pF                | CL21C1R1BECGNW □ |                  |               | 5.1pF       | ±0.1pF                | CL21C5R1BECGNW □ |
|                |                  | 1.1pF            | ±0.25pF               | CL21C1R1CECGNW □ |                  |               | 5.1pF       | ±0.25pF               | CL21C5R1CECGNW □ |
|                |                  | 1.2pF            | ±0.05pF               | CL21C1R2AECGNW □ |                  |               | 5.1pF       | ±0.5pF                | CL21C5R1DECGNW □ |
|                |                  | 1.2pF            | ±0.1pF                | CL21C1R2BECGNW □ |                  |               | 5.6pF       | ±0.05pF               | CL21C5R6AECGNW □ |
|                |                  | 1.2pF            | ±0.25pF               | CL21C1R2CECGNW □ |                  |               | 5.6pF       | ±0.1pF                | CL21C5R6BECGNW □ |
|                |                  | 1.3pF            | ±0.05pF               | CL21C1R3AECGNW □ |                  |               | 5.6pF       | ±0.25pF               | CL21C5R6CECGNW □ |
|                |                  | 1.3pF            | ±0.1pF                | CL21C1R3BECGNW □ |                  |               | 5.6pF       | ±0.5pF                | CL21C5R6DECGNW □ |
|                |                  | 1.3pF            | ±0.25pF               | CL21C1R3CECGNW □ |                  |               | 6.0pF       | ±0.05pF               | CL21C060AECGNW □ |
|                |                  | 1.5pF            | ±0.05pF               | CL21C1R5AECGNW □ |                  |               | 6.0pF       | ±0.1pF                | CL21C060BECGNW □ |
|                |                  | 1.5pF            | ±0.1pF                | CL21C1R5BECGNW □ |                  |               | 6.0pF       | ±0.25pF               | CL21C060CECGNW □ |
|                |                  | 1.5pF            | ±0.25pF               | CL21C1R5CECGNW □ |                  |               | 6.0pF       | ±0.5pF                | CL21C060DECGNW □ |
|                |                  | 1.6pF            | ±0.05pF               | CL21C1R6AECGNW □ |                  |               | 6.2pF       | ±0.05pF               | CL21C6R2AECGNW □ |
|                |                  | 1.6pF            | ±0.1pF                | CL21C1R6BECGNW □ |                  |               | 6.2pF       | ±0.1pF                | CL21C6R2BECGNW □ |
|                |                  | 1.6pF            | ±0.25pF               | CL21C1R6CECGNW □ |                  |               | 6.2pF       | ±0.25pF               | CL21C6R2CECGNW □ |
|                |                  | 1.8pF            | ±0.05pF               | CL21C1R8AECGNW □ |                  |               | 6.2pF       | ±0.5pF                | CL21C6R2DECGNW □ |
|                |                  | 1.8pF            | ±0.1pF                | CL21C1R8BECGNW □ |                  |               | 6.8pF       | ±0.05pF               | CL21C6R8AECGNW □ |
|                |                  | 1.8pF            | ±0.25pF               | CL21C1R8CECGNW □ |                  |               | 6.8pF       | ±0.1pF                | CL21C6R8BECGNW □ |
|                |                  | 2.0pF            | ±0.05pF               | CL21C020AECGNW □ |                  |               | 6.8pF       | ±0.25pF               | CL21C6R8CECGNW □ |
| 2.0pF          | ±0.1pF           | CL21C020BECGNW □ | 6.8pF                 | ±0.5pF           | CL21C6R8DECGNW □ |               |             |                       |                  |
| 2.0pF          | ±0.25pF          | CL21C020CECGNW □ | 7.0pF                 | ±0.05pF          | CL21C070AECGNW □ |               |             |                       |                  |
| 2.2pF          | ±0.05pF          | CL21C2R2AECGNW □ | 7.0pF                 | ±0.1pF           | CL21C070BECGNW □ |               |             |                       |                  |
| 2.2pF          | ±0.1pF           | CL21C2R2BECGNW □ | 7.0pF                 | ±0.25pF          | CL21C070CECGNW □ |               |             |                       |                  |
| 2.2pF          | ±0.25pF          | CL21C2R2CECGNW □ | 7.0pF                 | ±0.5pF           | CL21C070DECGNW □ |               |             |                       |                  |
| 2.4pF          | ±0.05pF          | CL21C2R4AECGNW □ | 7.5pF                 | ±0.05pF          | CL21C7R5AECGNW □ |               |             |                       |                  |
| 2.4pF          | ±0.1pF           | CL21C2R4BECGNW □ | 7.5pF                 | ±0.1pF           | CL21C7R5BECGNW □ |               |             |                       |                  |
| 2.4pF          | ±0.25pF          | CL21C2R4CECGNW □ | 7.5pF                 | ±0.25pF          | CL21C7R5CECGNW □ |               |             |                       |                  |
| 2.7pF          | ±0.05pF          | CL21C2R7AECGNW □ | 7.5pF                 | ±0.5pF           | CL21C7R5DECGNW □ |               |             |                       |                  |
| 2.7pF          | ±0.1pF           | CL21C2R7BECGNW □ | 8.0pF                 | ±0.05pF          | CL21C080AECGNW □ |               |             |                       |                  |
| 2.7pF          | ±0.25pF          | CL21C2R7CECGNW □ | 8.0pF                 | ±0.1pF           | CL21C080BECGNW □ |               |             |                       |                  |
| 3.0pF          | ±0.05pF          | CL21C030AECGNW □ | 8.0pF                 | ±0.25pF          | CL21C080CECGNW □ |               |             |                       |                  |
| 3.0pF          | ±0.1pF           | CL21C030BECGNW □ | 8.0pF                 | ±0.5pF           | CL21C080DECGNW □ |               |             |                       |                  |
| 3.0pF          | ±0.25pF          | CL21C030CECGNW □ | 8.2pF                 | ±0.05pF          | CL21C8R2AECGNW □ |               |             |                       |                  |

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## Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |                 |                 |
|----------------|---------------|-----------------|-----------------------|-----------------|----------------|---------------|-------------|-----------------------|-----------------|-----------------|-----------------|
| 0.95mm         | 250Vdc        | 8.2pF           | ±0.1pF                | CL21C8R2BECGNW□ | 0.95mm         | 250Vdc        | 68pF        | ±5%                   | CL21C680JECGNW□ |                 |                 |
|                |               | 8.2pF           | ±0.25pF               | CL21C8R2CECGNW□ |                |               | 82pF        | ±1%                   | CL21C820FECGNW□ |                 |                 |
|                |               | 8.2pF           | ±0.5pF                | CL21C8R2DECGNW□ |                |               | 82pF        | ±2%                   | CL21C820GECGNW□ |                 |                 |
|                |               | 9.0pF           | ±0.05pF               | CL21C090AECGNW□ |                |               | 82pF        | ±5%                   | CL21C820JECGNW□ |                 |                 |
|                |               | 9.0pF           | ±0.1pF                | CL21C090BECGNW□ |                |               | 100pF       | ±1%                   | CL21C101FECGNW□ |                 |                 |
|                |               | 9.0pF           | ±0.25pF               | CL21C090CECGNW□ |                |               | 100pF       | ±2%                   | CL21C101GECGNW□ |                 |                 |
|                |               | 9.0pF           | ±0.5pF                | CL21C090DECGNW□ |                |               | 100pF       | ±5%                   | CL21C101JECGNW□ |                 |                 |
|                |               | 9.1pF           | ±0.05pF               | CL21C9R1AECGNW□ |                |               | 100pF       | ±5%                   | CL21C101JECNNW□ |                 |                 |
|                |               | 9.1pF           | ±0.1pF                | CL21C9R1BECGNW□ |                |               | 1.35mm      | 25Vdc                 | 3.3nF           | ±1%             | CL21C332FAFNNW□ |
|                |               | 9.1pF           | ±0.25pF               | CL21C9R1CECGNW□ |                |               |             |                       | 50Vdc           | 1.2nF           | ±5%             |
|                |               | 9.1pF           | ±0.5pF                | CL21C9R1DECGNW□ |                |               |             | 1.2nF                 |                 | ±5%             | CL21C122JBFNNW□ |
|                |               | 10pF            | ±1%                   | CL21C100FECGNW□ |                |               |             | 1.5nF                 |                 | ±5%             | CL21C152JBFNNW□ |
|                |               | 10pF            | ±2%                   | CL21C100GECGNW□ |                |               |             | 2.2nF                 |                 | ±5%             | CL21C222JBFNNW□ |
|                |               | 10pF            | ±5%                   | CL21C100JECGNW□ |                |               |             | 2.7nF                 |                 | ±5%             | CL21C272JBFNNW□ |
|                |               | 10pF            | ±5%                   | CL21C100JECNNW□ | 2.7nF          | ±5%           |             | CL21C272JBFNNW□       |                 |                 |                 |
|                |               | 11pF            | ±1%                   | CL21C110FECGNW□ | 3.3nF          | ±5%           |             | CL21C332JBFNNW□       |                 |                 |                 |
|                |               | 11pF            | ±2%                   | CL21C110GECGNW□ | 3.3nF          | ±5%           |             | CL21C332JBFNNW□       |                 |                 |                 |
|                |               | 11pF            | ±5%                   | CL21C110JECGNW□ | 3.9nF          | ±5%           |             | CL21C392JBFNNW□       |                 |                 |                 |
|                |               | 12pF            | ±1%                   | CL21C120FECGNW□ | 4.7nF          | ±5%           |             | CL21C472JBFNNW□       |                 |                 |                 |
|                |               | 12pF            | ±2%                   | CL21C120GECGNW□ | 4.7nF          | ±5%           |             | CL21C472JBFNNW□       |                 |                 |                 |
|                |               | 12pF            | ±5%                   | CL21C120JECGNW□ | 100Vdc         | 1.0nF         |             | ±5%                   |                 | CL21C102JCFNNW□ |                 |
|                |               | 15pF            | ±1%                   | CL21C150FECGNW□ |                | 200Vdc        |             | 470pF                 |                 | ±5%             | CL21C471JDFNNW□ |
|                |               | 15pF            | ±2%                   | CL21C150GECGNW□ |                |               |             | 630Vdc                |                 | 39pF            | ±5%             |
|                |               | 15pF            | ±5%                   | CL21C150JECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 18pF            | ±1%                   | CL21C180FECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 18pF            | ±2%                   | CL21C180GECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 18pF            | ±5%                   | CL21C180JECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 20pF            | ±1%                   | CL21C200FECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 20pF            | ±2%                   | CL21C200GECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 20pF            | ±5%                   | CL21C200JECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 22pF            | ±1%                   | CL21C220FECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 22pF            | ±2%                   | CL21C220GECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 22pF            | ±5%                   | CL21C220JECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 24pF            | ±1%                   | CL21C240FECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 24pF            | ±2%                   | CL21C240GECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 24pF            | ±5%                   | CL21C240JECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 27pF            | ±1%                   | CL21C270FECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 27pF            | ±2%                   | CL21C270GECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 27pF            | ±5%                   | CL21C270JECGNW□ |                |               |             |                       |                 |                 |                 |
|                |               | 33pF            | ±1%                   | CL21C330FECGNW□ |                |               |             |                       |                 |                 |                 |
| 33pF           | ±2%           | CL21C330GECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 33pF           | ±5%           | CL21C330JECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 33pF           | ±5%           | CL21C330JECNNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 39pF           | ±1%           | CL21C390FECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 39pF           | ±2%           | CL21C390GECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 39pF           | ±5%           | CL21C390JECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 47pF           | ±1%           | CL21C470FECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 47pF           | ±2%           | CL21C470GECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 47pF           | ±5%           | CL21C470JECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 62pF           | ±1%           | CL21C620FECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 62pF           | ±2%           | CL21C620GECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 62pF           | ±5%           | CL21C620JECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 68pF           | ±1%           | CL21C680FECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |
| 68pF           | ±2%           | CL21C680GECGNW□ |                       |                 |                |               |             |                       |                 |                 |                 |

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Product Line Up (COG)

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 1.00mm         | 50Vdc         | 1.0nF       | ±5%                   | CL31C102JBCNNW□ |
|                |               | 1.5nF       | ±2%                   | CL31C152GBCNNW□ |
|                | 100Vdc        | 100pF       | ±5%                   | CL31C101JCCNNW□ |
|                |               | 220pF       | ±5%                   | CL31C221JCCNNW□ |
|                |               | 560pF       | ±5%                   | CL31C561JCCNNW□ |
|                |               | 680pF       | ±5%                   | CL31C681JCCNNW□ |
|                |               | 2.2nF       | ±5%                   | CL31C222JCCNNW□ |
| 1.40mm         | 25Vdc         | 10nF        | ±1%                   | CL31C103FAFNNW□ |
|                |               | 10nF        | ±2%                   | CL31C103GAFNNW□ |
|                | 50Vdc         | 3.3nF       | ±5%                   | CL31C332JBFNNW□ |
|                | 200Vdc        | 1.0nF       | ±5%                   | CL31C102JDFNNW□ |
|                | 500Vdc        | 10pF        | ±5%                   | CL31C100JGFNNW□ |
|                |               | 39pF        | ±5%                   | CL31C390JGFNNW□ |
|                |               | 220pF       | ±5%                   | CL31C221JGFNNW□ |
|                |               | 330pF       | ±5%                   | CL31C331JGFNNW□ |
|                |               | 470pF       | ±5%                   | CL31C471JGFNNW□ |
|                | 630Vdc        | 220pF       | ±5%                   | CL31C221JHFNNW□ |
| 1.80mm         | 25Vdc         | 47nF        | ±5%                   | CL31C473JAHNNW□ |
|                |               | 100nF       | ±5%                   | CL31C104JAHNNW□ |
|                | 50Vdc         | 5.6nF       | ±5%                   | CL31C562JBHNNW□ |
|                |               | 6.8nF       | ±5%                   | CL31C682JBHNNW□ |
|                |               | 12nF        | ±5%                   | CL31C123JBHNNW□ |
|                |               | 22nF        | ±5%                   | CL31C223JBHNNW□ |
|                |               | 27nF        | ±5%                   | CL31C273JBHNNW□ |
|                |               | 33nF        | ±5%                   | CL31C333JBHNNW□ |
|                | 2kVdc         | 22pF        | ±10%                  | CL31C220KJHNNW□ |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 1.45mm         | 1kVdc         | 100pF       | ±10%                  | CL32C101KIFNNW□ |
| 2.70mm         | 100Vdc        | 47nF        | ±5%                   | CL32C473JCJNNW□ |

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# Industrial Capacitors

NNW – COG / X5R / X6S / X7R / X7S

## Product Line Up (X5R)

### ■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |          |
|----------------|---------------|-------------|-----------------------|------------------|------------------|----------|
| 0.33mm         | 6.3Vdc        | 10nF        | ±10%                  | CL03A103KQ3NNW □ |                  |          |
|                |               | 100nF       | ±10%                  | CL03A104KQ3NNW □ | Derating         |          |
|                |               | 220nF       | ±10%                  | CL03A224KQ3NNW □ | Derating Ref     |          |
|                |               | 220nF       | ±20%                  | CL03A224MQ3NNW □ | Derating Ref     |          |
|                | 10Vdc         | 100nF       | ±10%                  | CL03A104KP3NNW □ | Derating         |          |
|                |               | 25Vdc       | 180pF                 | ±10%             | CL03A181KA3NNW □ | Derating |
|                |               |             | 330pF                 | ±10%             | CL03A331KA3NNW □ | Derating |
|                |               |             | 1.8nF                 | ±10%             | CL03A182KA3NNW □ | Derating |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark   |
|----------------|---------------|-------------|-----------------------|------------------|----------|
| 1.35mm         | 10Vdc         | 4.7uF       | ±10%                  | CL21A475KPFNNW □ |          |
|                | 25Vdc         | 2.2uF       | ±10%                  | CL21A225KAFNNW □ |          |
| 1.40mm         | 6.3Vdc        | 22uF        | ±20%                  | CL21A226MQNNW □  |          |
|                |               | 10uF        | ±10%                  | CL21A106KQNNW □  | Derating |
|                | 16Vdc         | 22uF        | ±10%                  | CL21A226KQNNW □  | Derating |
|                |               | 22uF        | ±20%                  | CL21A226MAQNNW □ | Derating |
| 1.45mm         | 6.3Vdc        | 47uF        | ±20%                  | CL21A476MQYNNW □ | Derating |

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark       |
|----------------|---------------|-------------|-----------------------|------------------|--------------|
| 0.55mm         | 6.3Vdc        | 220nF       | ±10%                  | CL05A224KQ5NNW □ |              |
|                |               | 330nF       | ±10%                  | CL05A334KQ5NNW □ |              |
|                |               | 470nF       | ±10%                  | CL05A474KQ5NNW □ |              |
|                |               | 1.0uF       | ±10%                  | CL05A105KQ5NNW □ | Derating     |
|                |               | 1.0uF       | ±20%                  | CL05A105MQ5NNW □ | Derating     |
|                |               | 2.2uF       | ±20%                  | CL05A225MQ5NNW □ | Derating Ref |
|                | 10Vdc         | 100nF       | ±10%                  | CL05A104KP5NNW □ |              |
|                |               | 220nF       | ±10%                  | CL05A224KP5NNW □ |              |
|                |               | 100nF       | ±10%                  | CL05A104KQ5NNW □ |              |
|                | 16Vdc         | 22nF        | ±10%                  | CL05A223KQ5NNW □ |              |
|                |               | 100nF       | ±10%                  | CL05A104KQ5NNW □ |              |
|                |               | 100nF       | ±10%                  | CL05A104KQ5NNW □ |              |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 1.25mm         | 10Vdc         | 10uF        | ±10%                  | CL31A106KPPLNW □ |                  |
| 1.80mm         | 6.3Vdc        | 10uF        | ±10%                  | CL31A106KQHNNW □ |                  |
|                |               | 10uF        | ±20%                  | CL31A106MQHNNW □ |                  |
|                |               | 22uF        | ±20%                  | CL31A226MQHNNW □ |                  |
|                |               | 47uF        | ±20%                  | CL31A476MQHNNW □ | Derating         |
|                |               | 100uF       | ±20%                  | CL31A107MQHNNW □ | Derating         |
|                |               | 10Vdc       | 4.7uF                 | ±10%             | CL31A475KPHNNW □ |
|                | 16Vdc         | 10uF        | ±10%                  | CL31A106KPHNNW □ |                  |
|                |               | 3.3uF       | ±10%                  | CL31A335KOHNNW □ |                  |
|                |               | 4.7uF       | ±20%                  | CL31A475MOHNNW □ |                  |
|                |               | 10uF        | ±10%                  | CL31A106KOHNNW □ |                  |
|                |               | 10uF        | ±20%                  | CL31A106MOHNNW □ |                  |
|                |               | 22uF        | ±20%                  | CL31A226MOHNNW □ | Derating         |
| 25Vdc          | 10uF          | ±10%        | CL31A106KAHNNW □      |                  |                  |
|                | 22uF          | ±10%        | CL31A226KAHNNW □      | Derating         |                  |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 0.90mm         | 6.3Vdc        | 470nF       | ±10%                  | CL10A474KQ8NNW □ |                  |  |
|                |               | 1.0uF       | ±10%                  | CL10A105KQ8NNW □ |                  |  |
|                |               | 2.2uF       | ±10%                  | CL10A225KQ8NNW □ |                  |  |
|                |               | 4.7uF       | ±10%                  | CL10A475KQ8NNW □ |                  |  |
|                |               | 10uF        | ±10%                  | CL10A106KQ8NNW □ | Ref              |  |
|                |               | 10uF        | ±20%                  | CL10A106MQ8NNW □ | Ref              |  |
|                |               | 10Vdc       | 220nF                 | ±10%             | CL10A224KP8NNW □ |  |
|                | 470nF         |             | ±10%                  | CL10A474KP8NNW □ |                  |  |
|                | 1.0uF         |             | ±10%                  | CL10A105KP8NNW □ |                  |  |
|                | 2.2uF         |             | ±10%                  | CL10A225KP8NNW □ |                  |  |
|                | 10uF          |             | ±10%                  | CL10A106KP8NNW □ | Derating Ref     |  |
|                | 16Vdc         |             | 1.0uF                 | ±10%             | CL10A105KQ8NNW □ |  |
|                |               |             | 2.2uF                 | ±10%             | CL10A225KQ8NNW □ |  |
|                |               | 4.7uF       | ±10%                  | CL10A475KQ8NNW □ | Derating         |  |

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number        | Remark           |
|----------------|---------------|-------------|-----------------------|--------------------|------------------|
| 0.95mm         | 16Vdc         | 10uF        | ±10%                  | CL32A106KOCNLNW □  |                  |
| 1.70mm         | 16Vdc         | 10uF        | ±10%                  | CL32A106KOTLNLNW □ |                  |
| 2.00mm         | 25Vdc         | 10uF        | ±10%                  | CL32A106KAULNLNW □ |                  |
| 2.20mm         | 10Vdc         | 10uF        | ±10%                  | CL32A106KPNNW □    |                  |
|                | 25Vdc         | 10uF        | ±20%                  | CL32A106MAILNLNW □ |                  |
| 2.70mm         | 6.3Vdc        | 22uF        | ±20%                  | CL32A226MQJNNW □   |                  |
|                |               | 47uF        | ±20%                  | CL32A476MQJNNW □   |                  |
|                |               | 22uF        | ±20%                  | CL32A226MPJNNW □   |                  |
|                |               | 47uF        | ±20%                  | CL32A476MPJNNW □   | Derating         |
|                | 10Vdc         | 10uF        | ±20%                  | CL32A106MOJNNW □   |                  |
|                |               | 22uF        | ±10%                  | CL32A226KQJNNW □   |                  |
|                |               | 22uF        | ±20%                  | CL32A226MOJNNW □   |                  |
|                |               | 47uF        | ±10%                  | CL32A476KQJNNW □   |                  |
|                |               | 47uF        | ±20%                  | CL32A476MOJNNW □   |                  |
|                |               | 25Vdc       | 22uF                  | ±10%               | CL32A226KAJNNW □ |
| 2.80mm         | 6.3Vdc        | 100uF       | ±20%                  | CL32A107MQVNNW □   | Derating         |
|                | 10Vdc         | 100uF       | ±20%                  | CL32A107MPVNNW □   | Derating         |

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       | Remark |
|----------------|---------------|-------------|-----------------------|-------------------|--------|
| 0.95mm         | 16Vdc         | 2.2uF       | ±10%                  | CL21A225KOCNLNW □ |        |
| 1.35mm         | 6.3Vdc        | 10uF        | ±10%                  | CL21A106KQFNNW □  |        |
|                |               | 10uF        | ±20%                  | CL21A106MQFNNW □  |        |
|                |               | 4.7uF       | ±10%                  | CL21A475KQFNNW □  |        |
|                |               | 4.7uF       | ±20%                  | CL21A475MQFNNW □  |        |
|                | 10Vdc         | 10uF        | ±10%                  | CL21A106KPFNNW □  |        |
|                |               | 2.2uF       | ±10%                  | CL21A225KPFNNW □  |        |

### ■ Size : 4.50 X 3.20mm (inch : 1812)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 3.50mm         | 6.3Vdc        | 100uF       | ±20%                  | CL43A107MQLNNW □ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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### Product Line Up (X6S)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.55mm         | 10Vdc         | 1.0uF       | ±10%                  | CL05X105KP5NNW□ |        |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.80mm         | 4.0Vdc        | 47uF        | ±20%                  | CL31X476MRHNNW□ |        |

■ Size : 1.60 X 0.80 (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.90mm         | 6.3Vdc        | 10uF        | ±20%                  | CL10X106MQ8NNW□ |        |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 2.80mm         | 6.3Vdc        | 100uF       | ±20%                  | CL32X107MQVNNW□ |        |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.40mm         | 4.0Vdc        | 22uF        | ±20%                  | CL21X226MRQNNW□ |        |
|                | 6.3Vdc        | 22uF        | ±20%                  | CL21X226MQQNNW□ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Industrial Capacitors

NNW – COG / X5R / X6S / X7R / X7S

## Product Line Up (X7R)

### ■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.33mm         | 10Vdc         | 10nF        | ±10%                  | CL03B103KP3NNW□ |        |
|                | 25Vdc         | 330pF       | ±10%                  | CL03B331KA3NNW□ |        |
|                |               | 470pF       | ±10%                  | CL03B471KA3NNW□ |        |
|                |               | 1.00nF      | ±10%                  | CL03B102KA3NNW□ |        |
|                |               | 2.20nF      | ±10%                  | CL03B222KA3NNW□ |        |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Remark          |  |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|--|
| 0.90mm         | 10Vdc         | 220nF           | ±10%                  | CL10B224KP8NNW□ |                 |  |
|                |               | 330nF           | ±10%                  | CL10B334KP8NNW□ |                 |  |
|                |               | 2.2uF           | ±10%                  | CL10B225KP8NNW□ | Ref.            |  |
|                |               | 18nF            | ±10%                  | CL10B183KO8NNW□ |                 |  |
|                | 16Vdc         | 22nF            | ±10%                  | CL10B223KO8NNW□ |                 |  |
|                |               | 27nF            | ±10%                  | CL10B273KO8NNW□ |                 |  |
|                |               | 33nF            | ±10%                  | CL10B333KO8NNW□ |                 |  |
|                |               | 47nF            | ±10%                  | CL10B473KO8NNW□ |                 |  |
|                |               | 100nF           | ±10%                  | CL10B104KO8NNW□ |                 |  |
|                |               | 100nF           | ±20%                  | CL10B104M08NNW□ |                 |  |
|                |               | 120nF           | ±10%                  | CL10B124KO8NNW□ |                 |  |
|                |               | 150nF           | ±10%                  | CL10B154KO8NNW□ |                 |  |
|                |               | 220nF           | ±10%                  | CL10B224KO8NNW□ |                 |  |
|                |               | 330nF           | ±10%                  | CL10B334KO8NNW□ |                 |  |
|                |               | 470nF           | ±10%                  | CL10B474KO8NNW□ |                 |  |
|                |               | 1.0uF           | ±20%                  | CL10B105M08NNW□ |                 |  |
|                |               | 25Vdc           | 18nF                  | ±10%            | CL10B183KA8NNW□ |  |
|                |               |                 | 22nF                  | ±10%            | CL10B223KA8NNW□ |  |
|                |               |                 | 27nF                  | ±10%            | CL10B273KA8NNW□ |  |
|                |               |                 | 47nF                  | ±10%            | CL10B473KA8NNW□ |  |
|                | 100nF         |                 | ±5%                   | CL10B104JA8NNW□ |                 |  |
|                | 100nF         |                 | ±10%                  | CL10B104KA8NNW□ |                 |  |
|                | 100nF         |                 | ±20%                  | CL10B104MA8NNW□ |                 |  |
|                | 470nF         |                 | ±10%                  | CL10B474KA8NNW□ |                 |  |
|                | 1.0uF         |                 | ±10%                  | CL10B105KA8NNW□ |                 |  |
|                | 50Vdc         |                 | 100pF                 | ±10%            | CL10B101KB8NNW□ |  |
|                | 50Vdc         | 150pF           | ±10%                  | CL10B151KB8NNW□ |                 |  |
|                |               | 220pF           | ±10%                  | CL10B221KB8NNW□ |                 |  |
|                |               | 270pF           | ±10%                  | CL10B271KB8NNW□ |                 |  |
|                |               | 330pF           | ±10%                  | CL10B331KB8NNW□ |                 |  |
|                |               | 470pF           | ±10%                  | CL10B471KB8NNW□ |                 |  |
|                |               | 560pF           | ±10%                  | CL10B561KB8NNW□ |                 |  |
|                |               | 680pF           | ±10%                  | CL10B681KB8NNW□ |                 |  |
|                |               | 1.0nF           | ±5%                   | CL10B102JB8NNW□ |                 |  |
|                |               | 1.0nF           | ±10%                  | CL10B102KB8NNW□ |                 |  |
|                |               | 1.2nF           | ±10%                  | CL10B122KB8NNW□ |                 |  |
|                |               | 1.5nF           | ±10%                  | CL10B152KB8NNW□ |                 |  |
|                |               | 1.8nF           | ±10%                  | CL10B182KB8NNW□ |                 |  |
|                |               | 2.2nF           | ±10%                  | CL10B222KB8NNW□ |                 |  |
|                |               | 2.2nF           | ±10%                  | CL10B222KB8NNW□ |                 |  |
|                |               | 2.7nF           | ±10%                  | CL10B272KB8NNW□ |                 |  |
|                |               | 3.3nF           | ±10%                  | CL10B332KB8NNW□ |                 |  |
|                |               | 3.3nF           | ±10%                  | CL10B332KB8NNW□ |                 |  |
|                |               | 4.7nF           | ±10%                  | CL10B472KB8NNW□ |                 |  |
|                |               | 5.6nF           | ±10%                  | CL10B562KB8NNW□ |                 |  |
|                |               | 5.6nF           | ±20%                  | CL10B562MB8NNW□ |                 |  |
|                | 6.8nF         | ±10%            | CL10B682KB8NNW□       |                 |                 |  |
|                | 10nF          | ±10%            | CL10B103KB8NNW□       |                 |                 |  |
|                | 12nF          | ±10%            | CL10B123KB8NNW□       |                 |                 |  |
|                | 15nF          | ±10%            | CL10B153KB8NNW□       |                 |                 |  |
| 22nF           | ±10%          | CL10B223KB8NNW□ |                       |                 |                 |  |
| 33nF           | ±10%          | CL10B333KB8NNW□ |                       |                 |                 |  |
| 47nF           | ±10%          | CL10B473KB8NNW□ |                       |                 |                 |  |
| 100nF          | ±10%          | CL10B104KB8NNW□ |                       |                 |                 |  |
| 100Vdc         | 100nF         | ±10%            | CL10B104KC8NNW□       |                 |                 |  |

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark          |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|
| 0.55mm         | 6.3Vdc        | 220nF       | ±10%                  | CL05B224KQ5NNW□ |                 |
|                |               | 470nF       | ±10%                  | CL05B474KQ5NNW□ | Ref.            |
|                | 10Vdc         | 33nF        | ±10%                  | CL05B333KP5NNW□ |                 |
|                |               | 100nF       | ±10%                  | CL05B104KP5NNW□ |                 |
|                | 16Vdc         | 1.0nF       | ±10%                  | CL05B102KO5NNW□ |                 |
|                |               | 5.6nF       | ±10%                  | CL05B562KO5NNW□ |                 |
|                |               | 6.8nF       | ±10%                  | CL05B682KO5NNW□ |                 |
|                |               | 10nF        | ±5%                   | CL05B103JO5NNW□ |                 |
|                |               | 10nF        | ±10%                  | CL05B103KO5NNW□ |                 |
|                |               | 10nF        | ±20%                  | CL05B103MO5NNW□ |                 |
|                |               | 15nF        | ±10%                  | CL05B153KO5NNW□ |                 |
|                |               | 22nF        | ±10%                  | CL05B223KO5NNW□ |                 |
|                |               | 33nF        | ±10%                  | CL05B333KO5NNW□ |                 |
|                |               | 33nF        | ±20%                  | CL05B333MO5NNW□ |                 |
|                |               | 47nF        | ±10%                  | CL05B473KO5NNW□ |                 |
|                |               | 47nF        | ±20%                  | CL05B473MO5NNW□ |                 |
|                |               | 100nF       | ±10%                  | CL05B104KO5NNW□ |                 |
|                |               | 25Vdc       | 560pF                 | ±10%            | CL05B561KA5NNW□ |
|                | 1.0nF         |             | ±10%                  | CL05B102KA5NNW□ |                 |
|                | 4.7nF         |             | ±10%                  | CL05B472KA5NNW□ |                 |
|                | 8.2nF         |             | ±10%                  | CL05B822KA5NNW□ |                 |
|                | 10nF          |             | ±10%                  | CL05B103KA5NNW□ |                 |
|                | 15nF          |             | ±10%                  | CL05B153KA5NNW□ |                 |
|                | 18nF          |             | ±10%                  | CL05B183KA5NNW□ |                 |
|                | 33nF          |             | ±10%                  | CL05B333KA5NNW□ |                 |
|                | 50Vdc         | 100pF       | ±10%                  | CL05B101KB5NNW□ |                 |
|                |               | 330pF       | ±10%                  | CL05B331KB5NNW□ |                 |
|                |               | 470pF       | ±10%                  | CL05B471KB5NNW□ |                 |
|                |               | 560pF       | ±10%                  | CL05B561KB5NNW□ |                 |
|                |               | 680pF       | ±10%                  | CL05B681KB5NNW□ |                 |
|                |               | 820pF       | ±10%                  | CL05B821KB5NNW□ |                 |
|                |               | 1.0nF       | ±10%                  | CL05B102KB5NNW□ |                 |
|                |               | 1.5nF       | ±10%                  | CL05B152KB5NNW□ |                 |
|                |               | 1.8nF       | ±10%                  | CL05B182KB5NNW□ |                 |
|                |               | 2.2nF       | ±5%                   | CL05B222JB5NNW□ |                 |
|                |               | 2.2nF       | ±10%                  | CL05B222KB5NNW□ |                 |
|                |               | 2.7nF       | ±10%                  | CL05B272KB5NNW□ |                 |
|                |               | 3.3nF       | ±10%                  | CL05B332KB5NNW□ |                 |
|                |               | 3.9nF       | ±10%                  | CL05B392KB5NNW□ |                 |
|                |               | 5.6nF       | ±10%                  | CL05B562KB5NNW□ |                 |
|                |               | 6.8nF       | ±10%                  | CL05B682KB5NNW□ |                 |
|                |               | 8.2nF       | ±10%                  | CL05B822KB5NNW□ |                 |
|                |               | 10nF        | ±10%                  | CL05B103KB5NNW□ |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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Product Line Up (X7R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 0.75mm         | 16Vdc         | 150nF       | ±10%                  | CL21B154KOANNW □ |                  |  |
|                |               | 25Vdc       | 10nF                  | ±10%             | CL21B103KAANNW □ |  |
|                | 50Vdc         | 390pF       | ±10%                  | CL21B391KBANNW □ |                  |  |
|                |               | 1.0nF       | ±10%                  | CL21B102KBANNW □ |                  |  |
|                |               | 2.2nF       | ±10%                  | CL21B222KBANNW □ |                  |  |
|                |               | 3.3nF       | ±5%                   | CL21B332JBANNW □ |                  |  |
|                |               | 3.3nF       | ±10%                  | CL21B332KBANNW □ |                  |  |
|                |               | 4.7nF       | ±10%                  | CL21B472KBANNW □ |                  |  |
|                |               | 6.8nF       | ±10%                  | CL21B682KBANNW □ |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KBANNW □ |                  |  |
|                |               | 10nF        | ±20%                  | CL21B103MBANNW □ |                  |  |
|                |               | 15nF        | ±10%                  | CL21B153KBANNW □ |                  |  |
|                |               | 22nF        | ±10%                  | CL21B223KBANNW □ |                  |  |
|                |               | 33nF        | ±10%                  | CL21B333KBANNW □ |                  |  |
|                | 100Vdc        | 330pF       | ±10%                  | CL21B331KANNW □  |                  |  |
|                |               | 1.0nF       | ±10%                  | CL21B102KANNW □  |                  |  |
|                |               | 2.2nF       | ±10%                  | CL21B222KANNW □  |                  |  |
|                | 0.95mm        | 16Vdc       | 100nF                 | ±5%              | CL21B104JOCNNW □ |  |
|                |               |             | 220nF                 | ±10%             | CL21B224KOCNNW □ |  |
|                |               |             | 330nF                 | ±10%             | CL21B334KOCNNW □ |  |
| 25Vdc          |               | 100nF       | ±10%                  | CL21B104KACNNW □ |                  |  |
|                |               | 50Vdc       | 47nF                  | ±10%             | CL21B473KBCNNW □ |  |
| 100Vdc         |               | 100nF       | ±10%                  | CL21B104KBCNNW □ |                  |  |
|                |               | 100nF       | ±20%                  | CL21B104MBCNNW □ |                  |  |
|                |               | 1.0nF       | ±10%                  | CL21B102KDCNNW □ |                  |  |
|                |               | 2.2nF       | ±10%                  | CL21B222KDCNNW □ |                  |  |
|                |               | 4.7nF       | ±10%                  | CL21B472KDCNNW □ |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KDCNNW □ |                  |  |
|                |               | 1.0uF       | ±10%                  | CL21B105KPFNNW □ |                  |  |
| 1.35mm         | 10Vdc         | 1.0uF       | ±10%                  | CL21B105KPFNNW □ |                  |  |
|                |               | 1.0uF       | ±20%                  | CL21B105MPFNNW □ |                  |  |
|                |               | 2.2uF       | ±10%                  | CL21B225KPFNNW □ |                  |  |
|                | 16Vdc         | 470nF       | ±10%                  | CL21B474KOFNNW □ |                  |  |
|                |               | 680nF       | ±10%                  | CL21B684KOFNNW □ |                  |  |
|                |               | 1.0uF       | ±10%                  | CL21B105KOFNNW □ |                  |  |
|                |               | 2.2uF       | ±10%                  | CL21B225KOFNNW □ |                  |  |
|                |               | 4.7uF       | ±10%                  | CL21B475KOFNNW □ | Ref.             |  |
|                | 25Vdc         | 150nF       | ±10%                  | CL21B154KAFNNW □ |                  |  |
|                |               | 220nF       | ±10%                  | CL21B224KAFNNW □ |                  |  |
|                |               | 470nF       | ±10%                  | CL21B474KAFNNW □ |                  |  |
|                |               | 1.0uF       | ±10%                  | CL21B105KAFNNW □ |                  |  |
| 2.2uF          |               | ±10%        | CL21B225KAFNNW □      |                  |                  |  |
| 50Vdc          |               | 220nF       | ±10%                  | CL21B224KBFNNW □ |                  |  |
| 100Vdc         | 330nF         | ±10%        | CL21B334KBFNNW □      |                  |                  |  |
|                | 470nF         | ±10%        | CL21B474KBFNNW □      |                  |                  |  |
|                | 680nF         | ±10%        | CL21B684KBFNNW □      |                  |                  |  |
|                | 18nF          | ±10%        | CL21B183KCFNNW □      |                  |                  |  |
|                | 22nF          | ±10%        | CL21B223KCFNNW □      |                  |                  |  |
|                | 47nF          | ±10%        | CL21B473KCFNNW □      |                  |                  |  |
| 1.40mm         | 6.3Vdc        | 10uF        | ±10%                  | CL21B106KQNNW □  |                  |  |
|                | 10Vdc         | 10uF        | ±10%                  | CL21B106KPQNNW □ |                  |  |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark            |                  |
|----------------|---------------|-------------|-----------------------|------------------|-------------------|------------------|
| 1.00mm         | 16Vdc         | 470nF       | ±10%                  | CL31B474KOCNNW □ |                   |                  |
|                |               | 47nF        | ±10%                  | CL31B473KOCNNW □ |                   |                  |
|                | 50Vdc         | 100nF       | ±5%                   | CL31B104JBCNNW □ |                   |                  |
|                |               | 100nF       | ±10%                  | CL31B104KBCNNW □ |                   |                  |
|                |               | 10nF        | ±10%                  | CL31B103KBCNNW □ |                   |                  |
|                |               | 120nF       | ±10%                  | CL31B124KBCNNW □ |                   |                  |
|                |               | 150nF       | ±10%                  | CL31B154KBCNNW □ |                   |                  |
|                |               | 1.0nF       | ±10%                  | CL31B102KBCNNW □ |                   |                  |
|                |               | 3.3nF       | ±5%                   | CL31B332JBCNNW □ |                   |                  |
|                |               | 47nF        | ±10%                  | CL31B473KBCNNW □ |                   |                  |
|                |               | 100Vdc      | 10nF                  | ±5%              | CL31B103JCCNNW □  |                  |
|                |               |             | 10nF                  | ±20%             | CL31B103MCCNNW □  |                  |
|                |               |             | 15nF                  | ±10%             | CL31B153KCCNNW □  |                  |
|                |               |             | 1.0nF                 | ±10%             | CL31B102KCCNNW □  |                  |
|                | 22nF          |             | ±10%                  | CL31B223KCCNNW □ |                   |                  |
|                | 33nF          |             | ±10%                  | CL31B333KCCNNW □ |                   |                  |
|                | 47nF          |             | ±10%                  | CL31B473KCCNNW □ |                   |                  |
|                | 47nF          |             | ±20%                  | CL31B473MCCNNW □ |                   |                  |
|                | 1.25mm        | 25Vdc       | 1.0uF                 | ±10%             | CL31B105KAPLNNW □ | Derating         |
|                | 1.40mm        | 10Vdc       | 2.2uF                 | ±10%             | CL31B225KPFNNW □  |                  |
| 16Vdc          |               |             | 1.0uF                 | ±10%             | CL31B105KOFNNW □  |                  |
| 50Vdc          |               | 1.0uF       | ±20%                  | CL31B105MOFNNW □ |                   |                  |
|                |               | 220nF       | ±10%                  | CL31B224KBFNNW □ |                   |                  |
|                |               | 220nF       | ±20%                  | CL31B224MBFNNW □ |                   |                  |
|                |               | 330nF       | ±10%                  | CL31B334KBFNNW □ |                   |                  |
| 100Vdc         |               | 100nF       | ±10%                  | CL31B104KCFNNW □ |                   |                  |
|                |               | 200Vdc      | 33nF                  | ±10%             | CL31B333KDFNNW □  |                  |
| 500Vdc         |               | 47nF        | ±10%                  | CL31B473KDFNNW □ |                   |                  |
|                |               | 6.8nF       | ±10%                  | CL31B682KGFNNW □ |                   |                  |
| 1.80mm         |               | 6.3Vdc      | 22uF                  | ±10%             | CL31B226KQHNNW □  |                  |
|                |               |             | 10Vdc                 | 10uF             | ±10%              | CL31B106KPHNNW □ |
|                | 22uF          |             | ±10%                  | CL31B226KPHNNW □ |                   |                  |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL31B475KPHNNW □ |                   |                  |
|                |               | 10uF        | ±10%                  | CL31B106KOHNNW □ |                   |                  |
|                |               | 2.2uF       | ±10%                  | CL31B225KOHNNW □ |                   |                  |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL31B475KOHNNW □ |                   |                  |
|                |               | 10uF        | ±10%                  | CL31B106KAHNNW □ |                   |                  |
|                |               | 1.0uF       | ±5%                   | CL31B105JAHNNW □ |                   |                  |
|                |               | 1.0uF       | ±10%                  | CL31B105KAHNNW □ |                   |                  |
|                |               | 1.0uF       | ±20%                  | CL31B105MAHNNW □ |                   |                  |
|                |               | 2.2uF       | ±10%                  | CL31B225KAHNNW □ |                   |                  |
| 50Vdc          | 4.7uF         | ±10%        | CL31B475KAHNNW □      |                  |                   |                  |
|                | 1.0uF         | ±10%        | CL31B105KBHNNW □      |                  |                   |                  |
|                | 2.2uF         | ±10%        | CL31B225KBHNNW □      |                  |                   |                  |
|                | 470nF         | ±10%        | CL31B474KBHNNW □      |                  |                   |                  |
|                | 100Vdc        | 1.0uF       | ±10%                  | CL31B105KCHNNW □ |                   |                  |
|                | 200Vdc        | 68nF        | ±10%                  | CL31B683KDHNNW □ |                   |                  |
| 250Vdc         | 47nF          | ±10%        | CL31B473KEHNNW □      |                  |                   |                  |
| 2kVdc          | 2.2nF         | ±10%        | CL31B222KJHNNW □      | Derating         |                   |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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## Product Line Up (X7R)

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark          |  |
|----------------|---------------|-------------|-----------------------|------------------|-----------------|--|
| 1.45mm         | 25Vdc         | 470nF       | ±10%                  | CL32B474KAFNNW□  |                 |  |
|                |               | 470nF       | ±20%                  | CL32B474MAFNNW□  |                 |  |
|                |               | 1.0uF       | ±10%                  | CL32B105KAFNNW□  |                 |  |
|                | 50Vdc         | 100nF       | ±20%                  | CL32B104MBFNNW□  |                 |  |
|                |               | 220nF       | ±10%                  | CL32B224KBFNNW□  |                 |  |
|                |               | 330nF       | ±10%                  | CL32B334KBFNNW□  |                 |  |
|                |               | 470nF       | ±10%                  | CL32B474KBFNNW□  |                 |  |
|                |               | 100Vdc      | 100nF                 | ±10%             | CL32B104KCFNNW□ |  |
|                | 500Vdc        | 150nF       | ±10%                  | CL32B154KCFNNW□  |                 |  |
|                |               | 22nF        | ±10%                  | CL32B223KGFNNW□  |                 |  |
|                | 2kVdc         | 1.0nF       | ±10%                  | CL32B102KJFNNW□  |                 |  |
|                | 1.80mm        | 100Vdc      | 220nF                 | ±10%             | CL32B224KCHNNW□ |  |
| 330nF          |               |             | ±10%                  | CL32B334KCHNNW□  |                 |  |
| 200Vdc         |               | 47nF        | ±10%                  | CL32B473KDHNNW□  |                 |  |
|                | 250Vdc        | 47nF        | ±10%                  | CL32B473KEHNNW□  |                 |  |
| 2.00mm         | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBUYNW□  |                 |  |
| 2.20mm         | 16Vdc         | 4.7uF       | ±10%                  | CL32B475KIOINNW□ |                 |  |
|                | 25Vdc         | 2.2uF       | ±10%                  | CL32B225KAINNW□  |                 |  |
|                | 630Vdc        | 47nF        | ±10%                  | CL32B473KHINNW□  |                 |  |
| 2.70mm         | 10Vdc         | 47uF        | ±10%                  | CL32B476KPJNNW□  | Ref             |  |
|                |               | 16Vdc       | 22uF                  | ±10%             | CL32B226KOJNNW□ |  |
|                |               |             | 22uF                  | ±20%             | CL32B226MOJNNW□ |  |
|                | 25Vdc         | 10uF        | ±10%                  | CL32B106KAJNNW□  |                 |  |
|                |               | 22uF        | ±10%                  | CL32B226KAJNNW□  |                 |  |
|                |               | 22uF        | ±20%                  | CL32B226MAJNNW□  |                 |  |
|                | 50Vdc         | 3.3uF       | ±10%                  | CL32B335KBJNNW□  |                 |  |
|                |               | 10uF        | ±10%                  | CL32B106KBJNNW□  |                 |  |
|                | 100Vdc        | 680nF       | ±10%                  | CL32B684KJNNW□   |                 |  |
|                |               | 1.0uF       | ±10%                  | CL32B105KJNNW□   |                 |  |
| 200Vdc         | 100nF         | ±10%        | CL32B104KDJNNW□       |                  |                 |  |

### ■ Size : 4.50 X 3.20mm (inch : 1812)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark   |
|----------------|---------------|-------------|-----------------------|-----------------|----------|
| 1.45mm         | 200Vdc        | 100nF       | ±10%                  | CL43B104KDFNNW□ |          |
|                | 1kVdc         | 10nF        | ±10%                  | CL43B103KIFNNW□ | Derating |
| 1.80mm         | 100Vdc        | 470nF       | ±10%                  | CL43B474KCHNNW□ |          |
| 2.70mm         | 250Vdc        | 220nF       | ±10%                  | CL43B224KEJNNW□ |          |
|                | 1kVdc         | 22nF        | ±10%                  | CL43B223KIJNNW□ | Derating |

### ■ Size : 5.70 X 5.00mm (inch : 2220)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.80mm         | 100Vdc        | 1.0uF       | ±10%                  | CL55B105KCHNNW□ |        |

## Product Line Up (X7S)

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 2.70mm         | 50Vdc         | 10uF        | ±10%                  | CL32Y106KBJNNW□ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Soft-Termination Industrial Capacitors

ZNW / SNW – X6S / X7R

## Feature

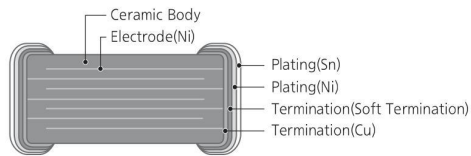
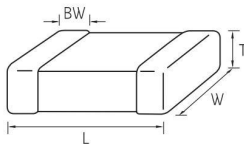


- Soft - Termination relaxes the applied thermal / mechanical stresses by ductile properties of metal - polymer composites.
- Can be applied to power (SMPS, DC - DC Converter) and industrial equipment
- ZNW, SNW series : Metal Epoxy
- Special outgoing inspection for industrial application (HALT, etc)

## Application

- Power(SMPS, DC - DC converter)
- Ideal for decoupling and filtering applications(Class II : X7R / X6S)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.65±0.10 | A              | 0.50+0.20/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.15±0.10 | M              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              |                 |
| 31        | 1206     | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | C              | 0.50±0.30       |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.25±0.15 | F              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | H              |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 1.25±0.20 | F              | 0.60±0.30       |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.60±0.20 | H              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.00±0.20 | I              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.50±0.20 | J              |                 |

# Soft-Termination Industrial Capacitors


ZNW / SNW – X6S / X7R

Industrial Capacitance Table (X6S / X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |     |    |    |    |     |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|-----|----|----|----|-----|
|                      |                           | nF          |     |     |     | uF  |     |     |    |    |    |     |
|                      |                           | 68          | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 |     |
| 0805(2012)           | 100                       |             |     |     |     |     |     |     |    |    |    |     |
| 1206(3216)           | 100                       |             |     |     |     |     |     |     |    |    |    |     |
| 1210<br>(3225)       | 16                        |             |     |     |     |     |     |     |    |    |    | X6S |
|                      | 100                       |             |     |     |     |     |     |     |    |    |    |     |

Product Line Up (X6S)

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark  |
|----------------|---------------|-------------|-----------------------|------------------|---|
| 2.80mm         | 10Vdc         | 47uF        | ±10%                  | CL32X476KOVZNW □ |  |

Product Line Up (X7R)


■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.35mm         | 100Vdc        | 100nF       | ±10%                  | CL21B104KCFSNW □ |        |
|                |               | 220nF       | ±10%                  | CL21B224KCFSNW □ |        |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.80mm         | 100Vdc        | 1.0uF       | ±10%                  | CL31B105KCHSNW □ |        |
|                |               | 2.2uF       | ±10%                  | CL31B225KCHSNW □ |        |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark  |
|----------------|---------------|-------------|-----------------------|------------------|---|
| 2.70mm         | 100Vdc        | 1.0uF       | ±10%                  | CL32B105KCJSNW □ |   |
|                |               | 2.2uF       | ±10%                  | CL32B225KCJSNW □ |   |
| 2.80mm         | 100Vdc        | 4.7uF       | ±10%                  | CL32B475KCVZNW □ |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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## Feature

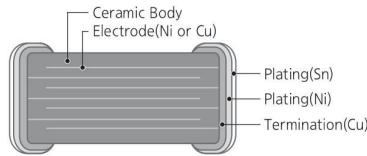
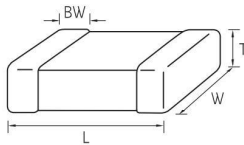


- Rated voltage 6.3V~100V,  
Temperature range -55°C to +125°C (COG / X7R), -55°C to +105°C (X6S), -55°C to +85°C (X5R),  
Case size 0201 to 1210.
- Special outgoing inspection for Power application  
(Bending Test : Sampling Test upto 2mm : X7R, 3mm : COG)

## Application

- Power supply (SMPS, DC – DC converter)
- Ideal for decoupling and filtering applications (Class II : X7R / X6S / X5R)
- Impedance matching, tuning, coupling in high frequency circuit (Class I : COG)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 03        | 0201     | 0.60±0.03     | 0.30±0.03 | 0.30±0.03 | 3              | 0.15±0.05       |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.65±0.10 | A              | 0.50+0.20/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.15±0.10 | M              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              |                 |
| 31        | 1206     | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | C              | 0.50±0.30       |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.25±0.15 | F              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | H              |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 1.25±0.20 | F              | 0.60±0.30       |
|           |          | 3.20±0.30     | 2.50±0.20 | 1.60±0.20 | H              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.00±0.20 | I              |                 |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.50±0.20 | J              |                 |



Industrial Capacitance Table (X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |     |     |     |     |    |    |     |     |     |  |
|----------------------|---------------------------|-------------|-----|-----|-----|-----|-----|-----|----|----|-----|-----|-----|--|
|                      |                           | nF          |     |     | uF  |     |     |     |    |    |     |     |     |  |
|                      |                           | 100         | 220 | 470 | 1.0 | 2.2 | 4.7 | 10  | 22 | 47 | 100 | 150 | 220 |  |
| 0201<br>(0603)       | 4.0                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 6.3                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
| 0402<br>(1005)       | 4.0                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 6.3                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
| 0603<br>(1608)       | 6.3                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 50                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
| 0805<br>(2012)       | 6.3                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
| 1206<br>(3216)       | 6.3                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     | 3.3 |    |    |     |     |     |  |
|                      | 50                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
| 1210<br>(3225)       | 6.3                       |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 10                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 16                        |             |     |     |     |     |     |     |    |    |     |     |     |  |
|                      | 25                        |             |     |     |     |     |     |     |    |    |     |     |     |  |

Industrial Capacitance Table (X6S)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(uF) |      |      |     |     |     |    |    |    |     |     |  |
|----------------------|---------------------------|-----------------|------|------|-----|-----|-----|----|----|----|-----|-----|--|
|                      |                           | 0.1             | 0.22 | 0.47 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 |  |
| 0402(1005)           | 6.3                       |                 |      |      |     |     |     |    |    |    |     |     |  |
| 0805<br>(2012)       | 4.0                       |                 |      |      |     |     |     |    |    |    |     |     |  |
|                      | 25                        |                 |      |      |     |     |     |    |    |    |     |     |  |
| 1206(3216)           | 6.3                       |                 |      |      |     |     |     |    |    |    |     |     |  |



Product Line Up (COG)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Thickness Max. | Rated Voltage    | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|----------------|------------------|------------------|-----------------------|------------------|
| 0.55mm         | 25Vdc         | 1.0nF            | ±5%                   | CL05C102JA5NFN □ | 0.90mm         | 50Vdc            | 180pF            | ±5%                   | CL10C181JB8NFN □ |
|                |               | 50Vdc            | 0.5pF                 | ±0.1pF           |                |                  | CL05C0R5BB5NFN □ | 200pF                 | ±5%              |
|                | 0.5pF         | ±0.25pF          | CL05C0R5CB5NFN □      | 220pF            |                |                  | ±5%              | CL10C221JB8NFN □      |                  |
|                | 1.0pF         | ±0.25pF          | CL05C010CB5NFN □      | 270pF            |                |                  | ±5%              | CL10C271JB8NFN □      |                  |
|                | 2.0pF         | ±0.25pF          | CL05C020CB5NFN □      | 330pF            |                |                  | ±5%              | CL10C331JB8NFN □      |                  |
|                | 10pF          | ±0.25pF          | CL05C100CB5NFN □      | 390pF            |                |                  | ±5%              | CL10C391JB8NFN □      |                  |
|                | 10pF          | ±5%              | CL05C100JB5NFN □      | 430pF            |                |                  | ±5%              | CL10C431JB8NFN □      |                  |
|                | 15pF          | ±5%              | CL05C150JB5NFN □      | 470pF            |                |                  | ±5%              | CL10C471JB8NFN □      |                  |
|                | 18pF          | ±5%              | CL05C180JB5NFN □      | 560pF            |                |                  | ±5%              | CL10C561JB8NFN □      |                  |
|                | 20pF          | ±5%              | CL05C200JB5NFN □      | 680pF            |                |                  | ±5%              | CL10C681JB8NFN □      |                  |
|                | 22pF          | ±5%              | CL05C220JB5NFN □      | 820pF            |                |                  | ±5%              | CL10C821JB8NFN □      |                  |
|                | 27pF          | ±5%              | CL05C270JB5NFN □      | 1.0nF            |                |                  | ±5%              | CL10C102JB8NFN □      |                  |
|                | 33pF          | ±5%              | CL05C330JB5NFN □      | 1.2nF            |                |                  | ±5%              | CL10C122JB8NFN □      |                  |
|                | 47pF          | ±5%              | CL05C470JB5NFN □      | 1.5nF            |                |                  | ±5%              | CL10C152JB8NFN □      |                  |
|                | 56pF          | ±5%              | CL05C560JB5NFN □      | 1.8nF            |                |                  | ±5%              | CL10C182JB8NFN □      |                  |
|                | 68pF          | ±5%              | CL05C680JB5NFN □      | 2.2nF            |                |                  | ±5%              | CL10C222JB8NFN □      |                  |
|                | 100pF         | ±5%              | CL05C101JB5NFN □      | 2.7nF            |                |                  | ±5%              | CL10C272JB8NFN □      |                  |
|                | 120pF         | ±5%              | CL05C121JB5NFN □      | 3.3nF            |                |                  | ±5%              | CL10C332JB8NFN □      |                  |
|                | 150pF         | ±5%              | CL05C151JB5NFN □      | 100Vdc           |                |                  | 47pF             | ±5%                   | CL10C470JC8NFN □ |
|                | 180pF         | ±5%              | CL05C181JB5NFN □      |                  |                |                  | 220pF            | ±5%                   | CL10C221JC8NFN □ |
| 220pF          | ±5%           | CL05C221JB5NFN □ | 470pF                 |                  | ±5%            | CL10C471JC8NFN □ |                  |                       |                  |
| 270pF          | ±5%           | CL05C271JB5NFN □ | 250Vdc                |                  | 470pF          | ±5%              | CL10C471JE8NFN □ |                       |                  |
| 330pF          | ±5%           | CL05C331JB5NFN □ |                       |                  |                |                  |                  |                       |                  |
| 680pF          | ±5%           | CL05C681JB5NFN □ |                       |                  |                |                  |                  |                       |                  |
|                |               |                  |                       |                  |                |                  |                  |                       |                  |

■ Size : 2.00 X 1.25mm (inch : 0805)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Thickness Max.   | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|------------------|---------------|------------------|-----------------------|------------------|
| 0.90mm         | 25Vdc         | 1.0nF            | ±5%                   | CL10C102JA8NFN □ | 0.75mm           | 50Vdc         | 0.5pF            | ±0.25pF               | CL21C0R5CBANFN □ |
|                |               | 50Vdc            | 0.5pF                 | ±0.25pF          |                  |               | CL10C0R5CB8NFN □ | 1.0pF                 | ±0.25pF          |
|                | 1.0pF         | ±0.25pF          | CL10C010CB8NFN □      | 1.8pF            |                  |               | ±0.25pF          | CL21C1R8CBANFN □      |                  |
|                | 3.9pF         | ±0.25pF          | CL10C3R9CB8NFN □      | 2.0pF            |                  |               | ±0.25pF          | CL21C020CBANFN □      |                  |
|                | 4.7pF         | ±0.25pF          | CL10C4R7CB8NFN □      | 3.0pF            |                  |               | ±0.25pF          | CL21C030CBANFN □      |                  |
|                | 5.0pF         | ±0.1pF           | CL10C050BB8NFN □      | 3.9pF            |                  |               | ±0.25pF          | CL21C3R9CBANFN □      |                  |
|                | 5.0pF         | ±0.25pF          | CL10C050CB8NFN □      | 4.0pF            |                  |               | ±0.25pF          | CL21C040CBANFN □      |                  |
|                | 10pF          | ±5%              | CL10C100JB8NFN □      | 4.7pF            |                  |               | ±0.25pF          | CL21C4R7CBANFN □      |                  |
|                | 12pF          | ±1%              | CL10C120FB8NFN □      | 6.0pF            |                  |               | ±0.5pF           | CL21C060DBANFN □      |                  |
|                | 12pF          | ±5%              | CL10C120JB8NFN □      | 7.0pF            |                  |               | ±0.5pF           | CL21C070DBANFN □      |                  |
|                | 15pF          | ±5%              | CL10C150JB8NFN □      | 7.5pF            |                  |               | ±0.5pF           | CL21C7R5DBANFN □      |                  |
|                | 18pF          | ±5%              | CL10C180JB8NFN □      | 8.0pF            |                  |               | ±0.5pF           | CL21C080DBANFN □      |                  |
|                | 20pF          | ±5%              | CL10C200JB8NFN □      | 8.2pF            |                  |               | ±0.5pF           | CL21C8R2DBANFN □      |                  |
|                | 22pF          | ±5%              | CL10C220JB8NFN □      | 10pF             |                  |               | ±5%              | CL21C100JBANFN □      |                  |
|                | 27pF          | ±5%              | CL10C270JB8NFN □      | 12pF             |                  |               | ±5%              | CL21C120JBANFN □      |                  |
|                | 33pF          | ±5%              | CL10C330JB8NFN □      | 15pF             |                  |               | ±5%              | CL21C150JBANFN □      |                  |
|                | 39pF          | ±5%              | CL10C390JB8NFN □      | 18pF             |                  |               | ±5%              | CL21C180JBANFN □      |                  |
|                | 47pF          | ±5%              | CL10C470JB8NFN □      | 20pF             |                  |               | ±5%              | CL21C200JBANFN □      |                  |
|                | 56pF          | ±5%              | CL10C560JB8NFN □      | 22pF             |                  |               | ±5%              | CL21C220JBANFN □      |                  |
|                | 62pF          | ±5%              | CL10C620JB8NFN □      | 25pF             |                  |               | ±5%              | CL21C250JBANFN □      |                  |
| 68pF           | ±5%           | CL10C680JB8NFN □ | 27pF                  | ±5%              | CL21C270JBANFN □ |               |                  |                       |                  |
| 82pF           | ±5%           | CL10C820JB8NFN □ | 30pF                  | ±5%              | CL21C300JBANFN □ |               |                  |                       |                  |
| 100pF          | ±5%           | CL10C101JB8NFN □ | 33pF                  | ±5%              | CL21C330JBANFN □ |               |                  |                       |                  |
| 120pF          | ±5%           | CL10C121JB8NFN □ | 39pF                  | ±5%              | CL21C390JBANFN □ |               |                  |                       |                  |
| 150pF          | ±5%           | CL10C151JB8NFN □ | 47pF                  | ±5%              | CL21C470JBANFN □ |               |                  |                       |                  |
|                |               |                  | 51pF                  | ±5%              | CL21C510JBANFN □ |               |                  |                       |                  |
|                |               |                  | 56pF                  | ±5%              | CL21C560JBANFN □ |               |                  |                       |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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## Product Line Up (COG)

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |                  |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------------------|
| 0.75mm         | 50Vdc         | 68pF        | ±5%                   | CL21C680JBANFN □ |                  |                  |
|                |               | 82pF        | ±5%                   | CL21C820JBANFN □ |                  |                  |
|                |               | 100pF       | ±5%                   | CL21C101JBANFN □ |                  |                  |
|                |               | 120pF       | ±5%                   | CL21C121JBANFN □ |                  |                  |
|                |               | 150pF       | ±5%                   | CL21C151JBANFN □ |                  |                  |
|                |               | 180pF       | ±5%                   | CL21C181JBANFN □ |                  |                  |
|                |               | 200pF       | ±5%                   | CL21C201JBANFN □ |                  |                  |
|                |               | 220pF       | ±5%                   | CL21C221JBANFN □ |                  |                  |
|                |               | 240pF       | ±5%                   | CL21C241JBANFN □ |                  |                  |
|                |               | 270pF       | ±5%                   | CL21C271JBANFN □ |                  |                  |
|                |               | 300pF       | ±5%                   | CL21C301JBANFN □ |                  |                  |
|                |               | 330pF       | ±5%                   | CL21C331JBANFN □ |                  |                  |
|                |               | 390pF       | ±5%                   | CL21C391JBANFN □ |                  |                  |
|                |               | 470pF       | ±5%                   | CL21C471JBANFN □ |                  |                  |
|                | 560pF         | ±5%         | CL21C561JBANFN □      |                  |                  |                  |
|                | 100Vdc        | 22pF        | ±5%                   | CL21C220JCANFN □ |                  |                  |
|                |               | 33pF        | ±5%                   | CL21C330JCANFN □ |                  |                  |
|                |               | 100pF       | ±5%                   | CL21C101JCANFN □ |                  |                  |
|                |               | 0.95mm      | 50Vdc                 | 680pF            | ±5%              | CL21C681JBCNFN □ |
|                |               |             |                       | 820pF            | ±5%              | CL21C821JBCNFN □ |
| 1.0nF          |               |             |                       | ±5%              | CL21C102JBCNFN □ |                  |
| 100Vdc         | 470pF         |             | ±5%                   | CL21C471JCCNFN □ |                  |                  |
|                | 200Vdc        | 47pF        | ±5%                   | CL21C470JDCNFN □ |                  |                  |
| 100pF          |               | ±5%         | CL21C101JDCNFN □      |                  |                  |                  |
| 220pF          |               | ±5%         | CL21C221JDCNFN □      |                  |                  |                  |
| 1.35mm         |               | 50Vdc       | 4.7nF                 | ±5%              | CL21C472JAFNFN □ |                  |
| 50Vdc          | 1.5nF         |             | ±5%                   | CL21C152JBFNFN □ |                  |                  |
|                | 1.8nF         | ±5%         | CL21C182JBFNFN □      |                  |                  |                  |
|                | 2.2nF         | ±5%         | CL21C222JBFNFN □      |                  |                  |                  |
|                | 3.9nF         | ±5%         | CL21C392JBFNFN □      |                  |                  |                  |
|                | 4.7nF         | ±5%         | CL21C472JBFNFN □      |                  |                  |                  |
|                | 10nF          | ±5%         | CL21C103JBFNFN □      |                  |                  |                  |
| 200Vdc         | 1.0nF         | ±5%         | CL21C102JDFNFN □      |                  |                  |                  |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 1.00mm         | 50Vdc         | 12pF        | ±5%                   | CL31C120JBCNFN □ |
|                |               | 15pF        | ±5%                   | CL31C150JBCNFN □ |
|                |               | 18pF        | ±5%                   | CL31C180JBCNFN □ |
|                |               | 22pF        | ±5%                   | CL31C220JBCNFN □ |
|                |               | 33pF        | ±5%                   | CL31C330JBCNFN □ |
|                |               | 47pF        | ±5%                   | CL31C470JBCNFN □ |
|                |               | 56pF        | ±5%                   | CL31C560JBCNFN □ |
|                |               | 100pF       | ±5%                   | CL31C101JBCNFN □ |
|                |               | 100pF       | ±10%                  | CL31C101KBCNFN □ |
|                |               | 120pF       | ±5%                   | CL31C121JBCNFN □ |
|                |               | 220pF       | ±5%                   | CL31C221JBCNFN □ |
|                |               | 270pF       | ±5%                   | CL31C271JBCNFN □ |
|                |               | 330pF       | ±5%                   | CL31C331JBCNFN □ |
|                |               | 470pF       | ±5%                   | CL31C471JBCNFN □ |
|                |               | 560pF       | ±5%                   | CL31C561JBCNFN □ |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 1.00mm         | 50Vdc         | 1.0nF       | ±5%                   | CL31C102JBCNFN □ |                  |
|                |               | 1.5nF       | ±5%                   | CL31C152JBCNFN □ |                  |
|                |               | 100Vdc      | 100pF                 | ±5%              | CL31C101JCCNFN □ |
|                |               |             | 330pF                 | ±5%              | CL31C331JCCNFN □ |
|                |               |             | 470pF                 | ±5%              | CL31C471JCCNFN □ |
|                |               |             | 200Vdc                | 100pF            | ±5%              |
|                | 220pF         | ±5%         | CL31C221JDCNFN □      |                  |                  |
|                | 1.40mm        | 50Vdc       | 4.7nF                 | ±5%              | CL31C472JBFNFN □ |
|                |               |             | 500Vdc                | 33pF             | ±5%              |
|                |               | 47pF        |                       | ±5%              | CL31C470JGFNFN □ |
|                |               | 100pF       |                       | ±5%              | CL31C101JGFNFN □ |
|                |               | 180pF       |                       | ±5%              | CL31C181JGFNFN □ |
| 220pF          |               | ±5%         |                       | CL31C221JGFNFN □ |                  |
| 330pF          |               | ±5%         |                       | CL31C331JGFNFN □ |                  |
| 390pF          |               | ±5%         | CL31C391JGFNFN □      |                  |                  |
| 470pF          |               | ±5%         | CL31C471JGFNFN □      |                  |                  |
| 560pF          |               | ±5%         | CL31C561JGFNFN □      |                  |                  |
| 630Vdc         |               | 10pF        | ±5%                   | CL31C100JHFNFN □ |                  |
|                |               | 15pF        | ±5%                   | CL31C150JHFNFN □ |                  |
|                |               | 33pF        | ±5%                   | CL31C330JHFNFN □ |                  |
|                |               | 47pF        | ±5%                   | CL31C470JHFNFN □ |                  |
|                |               | 100pF       | ±5%                   | CL31C101JHFNFN □ |                  |
|                |               | 150pF       | ±5%                   | CL31C151JHFNFN □ |                  |
|                |               | 220pF       | ±5%                   | CL31C221JHFNFN □ |                  |
|                |               | 220pF       | ±10%                  | CL31C221KHFNFN □ |                  |
|                | 330pF         | ±5%         | CL31C331JHFNFN □      |                  |                  |
|                | 470pF         | ±5%         | CL31C471JHFNFN □      |                  |                  |
| 1kVdc          | 10pF          | ±5%         | CL31C100JIFNFN □      |                  |                  |
|                | 18pF          | ±5%         | CL31C180JIFNFN □      |                  |                  |
|                | 22pF          | ±5%         | CL31C220JIFNFN □      |                  |                  |
|                | 33pF          | ±5%         | CL31C330JIFNFN □      |                  |                  |
|                | 47pF          | ±5%         | CL31C470JIFNFN □      |                  |                  |
|                | 56pF          | ±5%         | CL31C560JIFNFN □      |                  |                  |
|                | 68pF          | ±5%         | CL31C680JIFNFN □      |                  |                  |
|                | 100pF         | ±5%         | CL31C101JIFNFN □      |                  |                  |
|                | 1.80mm        | 500Vdc      | 680pF                 | ±5%              | CL31C681JGHNFN □ |
|                |               |             | 1.0nF                 | ±5%              | CL31C102JGHNFN □ |
| 2.2nF          |               |             | ±5%                   | CL31C222JGHNFN □ |                  |
| 630Vdc         |               | 680pF       | ±5%                   | CL31C681JHNNFN □ |                  |
|                |               | 1.0nF       | ±5%                   | CL31C102JHNNFN □ |                  |
|                |               | 1.2nF       | ±5%                   | CL31C122JHNNFN □ |                  |
|                |               | 1.5nF       | ±5%                   | CL31C152JHNNFN □ |                  |
|                |               | 2.2nF       | ±5%                   | CL31C222JHNNFN □ |                  |
|                |               | 3.3nF       | ±5%                   | CL31C332JHNNFN □ |                  |
| 1kVdc          |               | 220pF       | ±5%                   | CL31C221JHNNFN □ |                  |

### ■ Size : 4.50 X 3.20mm (inch : 1812)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 2.70mm         | 630Vdc        | 22nF        | ±5%                   | CL43C223JHJNFN □ |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X5R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark          |
|----------------|---------------|-------------|-----------------------|------------------|-----------------|
| 0.55mm         | 4.0Vdc        | 2.2uF       | ±20%                  | CL05A225MR5NFN □ | Operating       |
|                |               | 470nF       | ±10%                  | CL05A474KQ5NFN □ |                 |
|                | 6.3Vdc        | 1.0uF       | ±10%                  | CL05A105KQ5NFN □ | Operating       |
|                |               | 2.2uF       | ±10%                  | CL05A225KQ5NFN □ | Operating, Ref. |
|                |               | 100nF       | ±10%                  | CL05A104KP5NFN □ |                 |
|                | 10Vdc         | 220nF       | ±10%                  | CL05A224KP5NFN □ |                 |
|                |               | 470nF       | ±10%                  | CL05A474KP5NFN □ |                 |
|                |               | 1.0uF       | ±10%                  | CL05A105KQ5NFN □ | Operating       |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       | Remark    |
|----------------|---------------|-------------|-----------------------|-------------------|-----------|
| 0.95mm         | 16Vdc         | 22uF        | ±10%                  | CL31A226KOCFLFN □ | Operating |
|                |               | 22uF        | ±20%                  | CL31A226MOCFLFN □ | Operating |
| 1.80mm         | 6.3Vdc        | 10uF        | ±10%                  | CL31A106KQHNFN □  |           |
|                |               | 22uF        | ±10%                  | CL31A226KQHNFN □  |           |
|                |               | 22uF        | ±20%                  | CL31A226MQHNFN □  |           |
|                |               | 4.7uF       | ±10%                  | CL31A475KPHNFN □  |           |
|                | 10Vdc         | 10uF        | ±10%                  | CL31A106KPHNFN □  |           |
|                |               | 4.7uF       | ±10%                  | CL31A475KOHNFN □  |           |
|                |               | 4.7uF       | ±20%                  | CL31A475MOHNFN □  |           |
|                |               | 10uF        | ±10%                  | CL31A106KOHNFN □  |           |
|                | 16Vdc         | 22uF        | ±10%                  | CL31A226KOHNFN □  |           |
|                |               | 4.7uF       | ±10%                  | CL31A475KAHNFN □  |           |
|                |               | 10uF        | ±10%                  | CL31A106KAHNFN □  |           |
|                |               | 22uF        | ±10%                  | CL31A226KAHNFN □  | Operating |
|                |               | 4.7uF       | ±10%                  | CL31A475KAHNFN □  |           |
|                |               | 10uF        | ±10%                  | CL31A106KAHNFN □  |           |
| 25Vdc          | 3.3uF         | ±10%        | CL31A335KAHNFN □      |                   |           |
|                | 4.7uF         | ±10%        | CL31A475KAHNFN □      |                   |           |
|                | 10uF          | ±10%        | CL31A106KAHNFN □      |                   |           |
|                | 22uF          | ±10%        | CL31A226KAHNFN □      | Operating         |           |
| 50Vdc          | 10uF          | ±10%        | CL31A106KBHNFN □      |                   |           |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark          |
|----------------|---------------|-------------|-----------------------|------------------|-----------------|
| 0.90mm         | 6.3Vdc        | 1.0uF       | ±10%                  | CL10A105KQ8NFN □ |                 |
|                |               | 2.2uF       | ±10%                  | CL10A225KQ8NFN □ |                 |
|                | 10Vdc         | 1.0uF       | ±10%                  | CL10A105KP8NFN □ |                 |
|                |               | 2.2uF       | ±10%                  | CL10A225KP8NFN □ |                 |
|                |               | 4.7uF       | ±10%                  | CL10A475KP8NFN □ |                 |
|                |               | 10uF        | ±10%                  | CL10A106KP8NFN □ | Operating, Ref. |
|                | 16Vdc         | 10uF        | ±20%                  | CL10A106MP8NFN □ | Operating, Ref. |
|                |               | 1.0uF       | ±10%                  | CL10A105KQ8NFN □ |                 |
|                | 25Vdc         | 2.2uF       | ±10%                  | CL10A225KQ8NFN □ |                 |
|                |               | 4.7uF       | ±10%                  | CL10A475KQ8NFN □ | Operating       |
|                |               | 1.0uF       | ±10%                  | CL10A105KA8NFN □ |                 |
|                | 50Vdc         | 1.0uF       | ±10%                  | CL10A105KB8NFN □ |                 |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark    |
|----------------|---------------|-------------|-----------------------|------------------|-----------|
| 2.70mm         | 6.3Vdc        | 22uF        | ±10%                  | CL32A226KQJNFN □ |           |
|                |               | 22uF        | ±20%                  | CL32A226MQJNFN □ |           |
|                | 10Vdc         | 22uF        | ±10%                  | CL32A226KPNFN □  |           |
|                |               | 10uF        | ±10%                  | CL32A106KQJNFN □ |           |
|                | 16Vdc         | 22uF        | ±10%                  | CL32A226KQJNFN □ |           |
|                |               | 10uF        | ±10%                  | CL32A106KAJNFN □ |           |
| 25Vdc          | 10uF          | ±10%        | CL32A106KAJNFN □      |                  |           |
|                | 22uF          | ±10%        | CL32A226KAJNFN □      |                  |           |
| 2.80mm         | 6.3Vdc        | 100uF       | ±20%                  | CL32A107MQVNFN □ | Operating |
|                |               | 150uF       | ±20%                  | CL32A157MQVNFN □ | Operating |



■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark    |
|----------------|---------------|-------------|-----------------------|------------------|-----------|
| 1.35mm         | 6.3Vdc        | 4.7uF       | ±10%                  | CL21A475KQFNFN □ |           |
|                |               | 10uF        | ±10%                  | CL21A106KQFNFN □ |           |
|                | 10Vdc         | 2.2uF       | ±10%                  | CL21A225KPFNFN □ |           |
|                |               | 4.7uF       | ±10%                  | CL21A475KPFNFN □ |           |
|                |               | 10uF        | ±10%                  | CL21A106KPFNFN □ |           |
| 16Vdc          | 2.2uF         | ±10%        | CL21A225KOFNFN □      |                  |           |
| 1.40mm         | 6.3Vdc        | 22uF        | ±10%                  | CL21A226KQQNFN □ |           |
|                | 16Vdc         | 10uF        | ±10%                  | CL21A106KQQNFN □ | Operating |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL21A475KAQNFN □ |           |
| 22uF           |               | ±20%        | CL21A226MAQNFN □      | Operating        |           |
| 1.45mm         | 25Vdc         | 10uF        | ±10%                  | CL21A106KAYNFN □ | Operating |



※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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## Product Line Up (X6S)


### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark  |
|----------------|---------------|-------------|-----------------------|------------------|---|
| 0.55mm         | 6.3Vdc        | 1.0uF       | ±10%                  | CL05X105KQ5NFN □ |  |
| 0.57mm         | 2.5Vdc        | 2.2uF       | ±20%                  | CL05X225MS5NFN □ |  |

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark  |
|----------------|---------------|-------------|-----------------------|------------------|---|
| 1.40mm         | 4.0Vdc        | 22uF        | ±20%                  | CL21X226MRQNFN □ |  |
| 1.45mm         | 25Vdc         | 10uF        | ±10%                  | CL21X106KAYNFN □ |  |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark  |
|----------------|---------------|-------------|-----------------------|------------------|---|
| 1.80mm         | 6.3Vdc        | 47uF        | ±20%                  | CL31X476MQHNFN □ |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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Product Line Up (X7R)

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.33mm         | 10Vdc         | 4.7nF       | ±10%                  | CL03B472KP3NFN □ |        |
|                |               | 6.8nF       | ±10%                  | CL03B682KP3NFN □ |        |
|                |               | 10nF        | ±10%                  | CL03B103KP3NFN □ |        |

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|------------------|-----------------------|------------------|------------------|--|
| 0.55mm         | 10Vdc         | 100nF            | ±10%                  | CL05B104KP5NFN □ |                  |  |
|                |               | 16Vdc            | 330pF                 | ±10%             | CL05B331K05NFN □ |  |
|                |               |                  | 8.2nF                 | ±10%             | CL05B822K05NFN □ |  |
|                |               |                  | 10nF                  | ±10%             | CL05B103K05NFN □ |  |
|                |               |                  | 15nF                  | ±10%             | CL05B153K05NFN □ |  |
|                |               |                  | 22nF                  | ±10%             | CL05B223K05NFN □ |  |
|                |               |                  | 27nF                  | ±10%             | CL05B273K05NFN □ |  |
|                |               |                  | 33nF                  | ±10%             | CL05B333K05NFN □ |  |
|                |               |                  | 68nF                  | ±10%             | CL05B683K05NFN □ |  |
|                | 100nF         | ±10%             | CL05B104K05NFN □      |                  |                  |  |
|                | 25Vdc         | 4.7nF            | ±10%                  | CL05B472KA5NFN □ |                  |  |
|                |               | 5.6nF            | ±10%                  | CL05B562KA5NFN □ |                  |  |
|                |               | 10nF             | ±10%                  | CL05B103KA5NFN □ |                  |  |
|                |               | 22nF             | ±10%                  | CL05B223KA5NFN □ |                  |  |
|                |               | 50Vdc            | 270pF                 | ±10%             | CL05B271KB5NFN □ |  |
|                | 330pF         |                  | ±10%                  | CL05B331KB5NFN □ |                  |  |
|                | 390pF         |                  | ±10%                  | CL05B391KB5NFN □ |                  |  |
|                | 470pF         |                  | ±10%                  | CL05B471KB5NFN □ |                  |  |
|                | 560pF         |                  | ±10%                  | CL05B561KB5NFN □ |                  |  |
|                | 680pF         |                  | ±10%                  | CL05B681KB5NFN □ |                  |  |
|                | 820pF         |                  | ±10%                  | CL05B821KB5NFN □ |                  |  |
|                | 1.0nF         |                  | ±5%                   | CL05B102JB5NFN □ |                  |  |
|                | 1.0nF         |                  | ±10%                  | CL05B102KB5NFN □ |                  |  |
|                | 1.5nF         |                  | ±10%                  | CL05B152KB5NFN □ |                  |  |
| 2.2nF          | ±10%          | CL05B222KB5NFN □ |                       |                  |                  |  |
| 3.3nF          | ±10%          | CL05B332KB5NFN □ |                       |                  |                  |  |
| 4.7nF          | ±10%          | CL05B472KB5NFN □ |                       |                  |                  |  |
| 5.6nF          | ±10%          | CL05B562KB5NFN □ |                       |                  |                  |  |
| 10nF           | ±10%          | CL05B103KB5NFN □ |                       |                  |                  |  |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |     |
|----------------|---------------|-------------|-----------------------|------------------|------------------|-----|
| 0.90mm         | 6.3Vdc        | 1.0uF       | ±10%                  | CL10B105K08NFN □ |                  |     |
|                |               | 10Vdc       | 220nF                 | ±10%             | CL10B224KP8NFN □ |     |
|                |               |             | 330nF                 | ±10%             | CL10B334KP8NFN □ |     |
|                |               |             | 470nF                 | ±10%             | CL10B474KP8NFN □ |     |
|                |               |             | 1.0uF                 | ±10%             | CL10B105K08NFN □ |     |
|                |               |             | 2.2uF                 | ±10%             | CL10B225KP8NFN □ | Ref |
|                | 16Vdc         | 1.5nF       | ±10%                  | CL10B152K08NFN □ |                  |     |
|                |               | 3.3nF       | ±10%                  | CL10B332K08NFN □ |                  |     |
|                |               | 10nF        | ±10%                  | CL10B103K08NFN □ |                  |     |
|                |               | 15nF        | ±10%                  | CL10B153K08NFN □ |                  |     |
|                |               | 33nF        | ±10%                  | CL10B333K08NFN □ |                  |     |

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|------------------|-----------------------|------------------|------------------|--|
| 0.90mm         | 16Vdc         | 47nF             | ±10%                  | CL10B473K08NFN □ |                  |  |
|                |               | 68nF             | ±10%                  | CL10B683K08NFN □ |                  |  |
|                |               | 100nF            | ±10%                  | CL10B104K08NFN □ |                  |  |
|                |               | 150nF            | ±10%                  | CL10B154K08NFN □ |                  |  |
|                |               | 220nF            | ±10%                  | CL10B224K08NFN □ |                  |  |
|                |               | 330nF            | ±10%                  | CL10B334K08NFN □ |                  |  |
|                |               | 470nF            | ±10%                  | CL10B474K08NFN □ |                  |  |
|                |               | 680nF            | ±10%                  | CL10B684K08NFN □ |                  |  |
|                |               | 1.0uF            | ±10%                  | CL10B105K08NFN □ |                  |  |
|                |               | 25Vdc            | 1.0nF                 | ±10%             | CL10B102KA8NFN □ |  |
|                |               |                  | 10nF                  | ±10%             | CL10B103KA8NFN □ |  |
|                |               |                  | 12nF                  | ±10%             | CL10B123KA8NFN □ |  |
|                |               |                  | 15nF                  | ±10%             | CL10B153KA8NFN □ |  |
|                |               |                  | 18nF                  | ±10%             | CL10B183KA8NFN □ |  |
|                |               |                  | 22nF                  | ±10%             | CL10B223KA8NFN □ |  |
|                | 27nF          |                  | ±10%                  | CL10B273KA8NFN □ |                  |  |
|                | 33nF          |                  | ±10%                  | CL10B333KA8NFN □ |                  |  |
|                | 47nF          |                  | ±10%                  | CL10B473KA8NFN □ |                  |  |
|                | 68nF          |                  | ±10%                  | CL10B683KA8NFN □ |                  |  |
|                | 100nF         |                  | ±10%                  | CL10B104KA8NFN □ |                  |  |
|                | 150nF         |                  | ±10%                  | CL10B154KA8NFN □ |                  |  |
|                | 220nF         | ±10%             | CL10B224KA8NFN □      |                  |                  |  |
|                | 470nF         | ±10%             | CL10B474KA8NFN □      |                  |                  |  |
|                | 50Vdc         | 1.0uF            | ±10%                  | CL10B105KA8NFN □ |                  |  |
|                |               | 100pF            | ±10%                  | CL10B101KB8NFN □ |                  |  |
|                |               | 150pF            | ±10%                  | CL10B151KB8NFN □ |                  |  |
|                |               | 180pF            | ±10%                  | CL10B181KB8NFN □ |                  |  |
|                |               | 220pF            | ±10%                  | CL10B221KB8NFN □ |                  |  |
|                |               | 270pF            | ±10%                  | CL10B271KB8NFN □ |                  |  |
|                |               | 330pF            | ±10%                  | CL10B331KB8NFN □ |                  |  |
|                |               | 390pF            | ±10%                  | CL10B391KB8NFN □ |                  |  |
|                |               | 470pF            | ±10%                  | CL10B471KB8NFN □ |                  |  |
|                |               | 560pF            | ±10%                  | CL10B561KB8NFN □ |                  |  |
|                |               | 820pF            | ±10%                  | CL10B821KB8NFN □ |                  |  |
|                |               | 1.0nF            | ±5%                   | CL10B102JB8NFN □ |                  |  |
|                |               | 1.0nF            | ±10%                  | CL10B102KB8NFN □ |                  |  |
|                |               | 1.2nF            | ±10%                  | CL10B122KB8NFN □ |                  |  |
|                |               | 1.5nF            | ±10%                  | CL10B152KB8NFN □ |                  |  |
|                | 1.8nF         | ±10%             | CL10B182KB8NFN □      |                  |                  |  |
|                | 2.2nF         | ±10%             | CL10B222KB8NFN □      |                  |                  |  |
|                | 2.7nF         | ±10%             | CL10B272KB8NFN □      |                  |                  |  |
|                | 3.3nF         | ±10%             | CL10B332KB8NFN □      |                  |                  |  |
|                | 3.9nF         | ±10%             | CL10B392KB8NFN □      |                  |                  |  |
|                | 4.7nF         | ±10%             | CL10B472KB8NFN □      |                  |                  |  |
|                | 5.6nF         | ±10%             | CL10B562KB8NFN □      |                  |                  |  |
|                | 6.8nF         | ±10%             | CL10B682KB8NFN □      |                  |                  |  |
|                | 8.2nF         | ±10%             | CL10B822KB8NFN □      |                  |                  |  |
| 10nF           | ±5%           | CL10B103JB8NFN □ |                       |                  |                  |  |
| 10nF           | ±10%          | CL10B103KB8NFN □ |                       |                  |                  |  |
| 12nF           | ±10%          | CL10B123KB8NFN □ |                       |                  |                  |  |
| 15nF           | ±10%          | CL10B153KB8NFN □ |                       |                  |                  |  |
| 18nF           | ±10%          | CL10B183KB8NFN □ |                       |                  |                  |  |
| 22nF           | ±10%          | CL10B223KB8NFN □ |                       |                  |                  |  |
| 27nF           | ±10%          | CL10B273KB8NFN □ |                       |                  |                  |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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### Product Line Up (X7R)

#### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.90mm         | 50Vdc         | 33nF        | ±10%                  | CL10B333KB8NFN □ |        |
|                |               | 39nF        | ±10%                  | CL10B393KB8NFN □ |        |
|                |               | 47nF        | ±10%                  | CL10B473KB8NFN □ |        |
|                |               | 56nF        | ±10%                  | CL10B563KB8NFN □ |        |
|                |               | 68nF        | ±10%                  | CL10B683KB8NFN □ |        |
|                |               | 82nF        | ±10%                  | CL10B823KB8NFN □ |        |
|                |               | 100nF       | ±10%                  | CL10B104KB8NFN □ |        |
|                |               | 100nF       | ±20%                  | CL10B104MB8NFN □ |        |

#### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 0.75mm         | 25Vdc         | 1.0nF       | ±10%                  | CL21B102KAANFN □ |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KAANFN □ |                  |  |
|                | 50Vdc         | 100pF       | ±10%                  | CL21B101KBANFN □ |                  |  |
|                |               | 180pF       | ±10%                  | CL21B181KBANFN □ |                  |  |
|                |               | 220pF       | ±10%                  | CL21B221KBANFN □ |                  |  |
|                |               | 270pF       | ±10%                  | CL21B271KBANFN □ |                  |  |
|                |               | 330pF       | ±10%                  | CL21B331KBANFN □ |                  |  |
|                |               | 390pF       | ±10%                  | CL21B391KBANFN □ |                  |  |
|                |               | 470pF       | ±10%                  | CL21B471KBANFN □ |                  |  |
|                |               | 560pF       | ±10%                  | CL21B561KBANFN □ |                  |  |
|                |               | 680pF       | ±10%                  | CL21B681KBANFN □ |                  |  |
|                |               | 820pF       | ±10%                  | CL21B821KBANFN □ |                  |  |
|                |               | 1.0nF       | ±5%                   | CL21B102JBANFN □ |                  |  |
|                |               | 1.0nF       | ±10%                  | CL21B102KBANFN □ |                  |  |
|                |               | 1.2nF       | ±10%                  | CL21B122KBANFN □ |                  |  |
|                |               | 1.5nF       | ±10%                  | CL21B152KBANFN □ |                  |  |
|                |               | 1.8nF       | ±10%                  | CL21B182KBANFN □ |                  |  |
|                |               | 2.2nF       | ±10%                  | CL21B222KBANFN □ |                  |  |
|                |               | 3.3nF       | ±10%                  | CL21B332KBANFN □ |                  |  |
|                |               | 3.9nF       | ±10%                  | CL21B392KBANFN □ |                  |  |
|                |               | 4.7nF       | ±10%                  | CL21B472KBANFN □ |                  |  |
|                |               | 5.6nF       | ±10%                  | CL21B562KBANFN □ |                  |  |
|                |               | 6.8nF       | ±10%                  | CL21B682KBANFN □ |                  |  |
|                |               | 8.2nF       | ±10%                  | CL21B822KBANFN □ |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KBANFN □ |                  |  |
|                |               | 12nF        | ±10%                  | CL21B123KBANFN □ |                  |  |
|                |               | 15nF        | ±10%                  | CL21B153KBANFN □ |                  |  |
|                |               | 18nF        | ±10%                  | CL21B183KBANFN □ |                  |  |
|                |               | 22nF        | ±10%                  | CL21B223KBANFN □ |                  |  |
|                | 27nF          | ±10%        | CL21B273KBANFN □      |                  |                  |  |
|                | 33nF          | ±10%        | CL21B333KBANFN □      |                  |                  |  |
|                | 100Vdc        | 1.0nF       | ±10%                  | CL21B102KCANFN □ |                  |  |
|                |               | 2.2nF       | ±10%                  | CL21B222KCANFN □ |                  |  |
|                |               | 4.7nF       | ±10%                  | CL21B472KCANFN □ |                  |  |
|                |               | 6.8nF       | ±10%                  | CL21B682KCANFN □ |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KCANFN □ |                  |  |
|                | 0.95mm        | 16Vdc       | 220nF                 | ±10%             | CL21B224KOCNFN □ |  |
|                |               |             | 330nF                 | ±10%             | CL21B334KOCNFN □ |  |
|                |               | 25Vdc       | 100nF                 | ±10%             | CL21B104KACNFN □ |  |
|                |               |             | 150pF                 | ±10%             | CL21B151KBCNFN □ |  |
|                |               |             | 180pF                 | ±10%             | CL21B181KBCNFN □ |  |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |      |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------|
| 0.95mm         | 50Vdc         | 220pF       | ±10%                  | CL21B221KBCNFN □ |                  |      |
|                |               | 270pF       | ±10%                  | CL21B271KBCNFN □ |                  |      |
|                |               | 330pF       | ±10%                  | CL21B331KBCNFN □ |                  |      |
|                |               | 390pF       | ±10%                  | CL21B391KBCNFN □ |                  |      |
|                |               | 470pF       | ±10%                  | CL21B471KBCNFN □ |                  |      |
|                |               | 560pF       | ±10%                  | CL21B561KBCNFN □ |                  |      |
|                |               | 820pF       | ±10%                  | CL21B821KBCNFN □ |                  |      |
|                |               | 1.0nF       | ±10%                  | CL21B102KBCNFN □ |                  |      |
|                |               | 1.5nF       | ±10%                  | CL21B152KBCNFN □ |                  |      |
|                |               | 2.2nF       | ±10%                  | CL21B222KBCNFN □ |                  |      |
|                |               | 2.7nF       | ±10%                  | CL21B272KBCNFN □ |                  |      |
|                |               | 3.3nF       | ±10%                  | CL21B332KBCNFN □ |                  |      |
|                |               | 4.7nF       | ±10%                  | CL21B472KBCNFN □ |                  |      |
|                |               | 6.8nF       | ±10%                  | CL21B682KBCNFN □ |                  |      |
|                |               | 8.2nF       | ±10%                  | CL21B822KBCNFN □ |                  |      |
|                |               | 10nF        | ±10%                  | CL21B103KBCNFN □ |                  |      |
|                |               | 12nF        | ±10%                  | CL21B123KBCNFN □ |                  |      |
|                |               | 15nF        | ±10%                  | CL21B153KBCNFN □ |                  |      |
|                |               | 18nF        | ±10%                  | CL21B183KBCNFN □ |                  |      |
|                |               | 20nF        | ±10%                  | CL21B203KBCNFN □ |                  |      |
|                |               | 22nF        | ±10%                  | CL21B223KBCNFN □ |                  |      |
|                |               | 27nF        | ±10%                  | CL21B273KBCNFN □ |                  |      |
|                |               | 33nF        | ±10%                  | CL21B333KBCNFN □ |                  |      |
|                |               | 47nF        | ±5%                   | CL21B473JBCNFN □ |                  |      |
|                |               | 47nF        | ±10%                  | CL21B473KBCNFN □ |                  |      |
|                |               | 56nF        | ±10%                  | CL21B563KBCNFN □ |                  |      |
|                |               | 68nF        | ±10%                  | CL21B683KBCNFN □ |                  |      |
|                | 82nF          | ±10%        | CL21B823KBCNFN □      |                  |                  |      |
|                | 100nF         | ±10%        | CL21B104KBCNFN □      |                  |                  |      |
|                | 200Vdc        | 220pF       | ±10%                  | CL21B221KDCNFN □ |                  |      |
|                |               | 470pF       | ±10%                  | CL21B471KDCNFN □ |                  |      |
|                |               | 1.0nF       | ±10%                  | CL21B102KDCNFN □ |                  |      |
|                |               | 2.2nF       | ±10%                  | CL21B222KDCNFN □ |                  |      |
|                |               | 4.7nF       | ±10%                  | CL21B472KDCNFN □ |                  |      |
|                | 1.35mm        | 10Vdc       | 2.2uF                 | ±10%             | CL21B225KPFNFN □ |      |
|                |               |             | 4.7uF                 | ±10%             | CL21B475KPFNFN □ | Ref. |
|                |               | 16Vdc       | 470nF                 | ±10%             | CL21B474KOFNFN □ |      |
|                |               |             | 680nF                 | ±10%             | CL21B684KOFNFN □ |      |
|                |               |             | 1.0uF                 | ±10%             | CL21B105KOFNFN □ |      |
|                |               |             | 2.2uF                 | ±10%             | CL21B225KOFNFN □ |      |
|                |               |             | 4.7uF                 | ±10%             | CL21B475KOFNFN □ | Ref. |
|                |               | 25Vdc       | 150nF                 | ±10%             | CL21B154KAFNFN □ |      |
|                |               |             | 220nF                 | ±10%             | CL21B224KAFNFN □ |      |
|                |               |             | 470nF                 | ±10%             | CL21B474KAFNFN □ |      |
|                |               |             | 1.0uF                 | ±10%             | CL21B105KAFNFN □ |      |
|                |               |             | 1.5uF                 | ±10%             | CL21B155KAFNFN □ |      |
|                |               | 50Vdc       | 2.2uF                 | ±10%             | CL21B225KAFNFN □ |      |
|                | 4.7uF         |             | ±10%                  | CL21B475KAFNFN □ | Ref.             |      |
|                | 120nF         |             | ±10%                  | CL21B124KBFNFN □ |                  |      |
|                | 150nF         |             | ±10%                  | CL21B154KBFNFN □ |                  |      |
|                | 220nF         |             | ±10%                  | CL21B224KBFNFN □ |                  |      |
|                |               | 330nF       | ±10%                  | CL21B334KBFNFN □ |                  |      |
|                |               | 470nF       | ±10%                  | CL21B474KBFNFN □ |                  |      |
|                |               | 1.0uF       | ±10%                  | CL21B105KBFNFN □ |                  |      |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X7R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       | Remark           |
|----------------|---------------|-------------|-----------------------|-------------------|------------------|
| 1.35mm         | 100Vdc        | 220nF       | ±10%                  | CL21B224KCFNFN □  |                  |
| 1.40mm         | 6.3Vdc        | 4.7uF       | ±10%                  | CL21B475KQCNFN □  | Ref.             |
|                |               | 10uF        | ±10%                  | CL21B106KQCNFN □  |                  |
|                | 10Vdc         | 10uF        | ±10%                  | CL21B106KPQCNFN □ |                  |
|                |               | 16Vdc       | 10uF                  | ±10%              | CL21B106KQCNFN □ |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------------------|
| 1.00mm         | 10Vdc         | 1.2uF       | ±10%                  | CL31B125KPCNFN □ |                  |                  |
|                |               | 16Vdc       | 330nF                 | ±10%             | CL31B334KOCNFN □ |                  |
|                | 25Vdc         | 220nF       | ±10%                  | CL31B224KACNFN □ |                  |                  |
|                |               | 50Vdc       | 220pF                 | ±10%             | CL31B221KBCNFN □ |                  |
|                | 330pF         |             | ±10%                  | CL31B331KBCNFN □ |                  |                  |
|                | 470pF         |             | ±10%                  | CL31B471KBCNFN □ |                  |                  |
|                | 560pF         |             | ±10%                  | CL31B561KBCNFN □ |                  |                  |
|                | 680pF         |             | ±10%                  | CL31B681KBCNFN □ |                  |                  |
|                | 1.5nF         |             | ±10%                  | CL31B152KBCNFN □ |                  |                  |
|                | 2.2nF         |             | ±10%                  | CL31B222KBCNFN □ |                  |                  |
|                | 2.7nF         |             | ±10%                  | CL31B272KBCNFN □ |                  |                  |
|                | 3.3nF         |             | ±10%                  | CL31B332KBCNFN □ |                  |                  |
|                | 4.7nF         |             | ±10%                  | CL31B472KBCNFN □ |                  |                  |
|                | 8.2nF         |             | ±10%                  | CL31B822KBCNFN □ |                  |                  |
|                | 10nF          |             | ±10%                  | CL31B103KBCNFN □ |                  |                  |
|                | 15nF          |             | ±10%                  | CL31B153KBCNFN □ |                  |                  |
|                | 33nF          |             | ±10%                  | CL31B333KBCNFN □ |                  |                  |
|                | 47nF          |             | ±10%                  | CL31B473KBCNFN □ |                  |                  |
|                | 68nF          | ±10%        | CL31B683KBCNFN □      |                  |                  |                  |
|                | 100nF         | ±10%        | CL31B104KBCNFN □      |                  |                  |                  |
|                | 100Vdc        | 1.0nF       | ±10%                  | CL31B102KCCNFN □ |                  |                  |
|                |               | 2.2nF       | ±10%                  | CL31B222KCCNFN □ |                  |                  |
|                |               | 3.3nF       | ±10%                  | CL31B332KCCNFN □ |                  |                  |
|                |               | 10nF        | ±10%                  | CL31B103KCCNFN □ |                  |                  |
|                |               | 22nF        | ±10%                  | CL31B223KCCNFN □ |                  |                  |
|                | 200Vdc        | 470pF       | ±10%                  | CL31B471KDCNFN □ |                  |                  |
|                |               | 1.0nF       | ±10%                  | CL31B102KDCNFN □ |                  |                  |
|                | 1.40mm        | 16Vdc       | 1.0uF                 | ±10%             | CL31B105KOFNFN □ |                  |
|                |               |             | 50Vdc                 | 220nF            | ±10%             | CL31B224KBFNFN □ |
|                |               | 330nF       |                       | ±10%             | CL31B334KBFNFN □ |                  |
|                |               | 100Vdc      | 100nF                 | ±10%             | CL31B104KCFNFN □ |                  |
|                |               |             | 500Vdc                | 220pF            | ±10%             | CL31B221KGFNFN □ |
|                |               | 470pF       |                       | ±10%             | CL31B471KGFNFN □ |                  |
|                |               | 1.0nF       |                       | ±10%             | CL31B102KGFNFN □ |                  |
|                |               | 2.2nF       |                       | ±10%             | CL31B222KGFNFN □ |                  |
|                |               | 3.3nF       |                       | ±10%             | CL31B332KGFNFN □ |                  |
|                |               | 4.7nF       |                       | ±10%             | CL31B472KGFNFN □ |                  |
| 6.8nF          |               | ±10%        |                       | CL31B682KGFNFN □ |                  |                  |
| 10nF           |               | ±10%        |                       | CL31B103KGFNFN □ |                  |                  |
| 630Vdc         |               | 330pF       |                       | ±10%             | CL31B331KHFNFN □ |                  |
|                |               | 470pF       |                       | ±10%             | CL31B471KHFNFN □ |                  |
|                |               | 680pF       |                       | ±10%             | CL31B681KHFNFN □ |                  |
|                |               | 1.0nF       | ±10%                  | CL31B102KHFNFN □ |                  |                  |
|                |               | 1.5nF       | ±10%                  | CL31B152KHFNFN □ |                  |                  |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |                  |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------------------|--|
| 1.40mm         | 630Vdc        | 2.2nF       | ±10%                  | CL31B222KHFNFN □ |                  |                  |  |
|                |               | 3.3nF       | ±10%                  | CL31B332KHFNFN □ |                  |                  |  |
|                |               | 4.7nF       | ±10%                  | CL31B472KHFNFN □ |                  |                  |  |
|                |               | 6.8nF       | ±10%                  | CL31B682KHFNFN □ |                  |                  |  |
|                |               | 10nF        | ±10%                  | CL31B103KHFNFN □ |                  |                  |  |
|                | 1kVdc         | 220pF       | ±10%                  | CL31B221KIFNFN □ | Derating         |                  |  |
|                |               | 1.0nF       | ±10%                  | CL31B102KIFNFN □ | Derating         |                  |  |
|                |               | 1.5nF       | ±10%                  | CL31B152KIFNFN □ | Derating         |                  |  |
|                |               | 1.80mm      | 6.3Vdc                | 6.8uF            | ±10%             | CL31B685KQHNFN □ |  |
|                |               |             |                       | 10uF             | ±10%             | CL31B106KQHNFN □ |  |
|                |               |             | 10Vdc                 | 4.7uF            | ±10%             | CL31B475KPHNFN □ |  |
| 22uF           | ±10%          |             |                       | CL31B226KPHNFN □ |                  |                  |  |
| 16Vdc          | 2.2uF         |             |                       | ±10%             | CL31B225KOHNFN □ |                  |  |
|                | 3.3uF         | ±10%        | CL31B335KOHNFN □      |                  |                  |                  |  |
|                | 4.7uF         | ±10%        | CL31B475KOHNFN □      |                  |                  |                  |  |
|                | 10uF          | ±10%        | CL31B106KOHNFN □      |                  |                  |                  |  |
|                | 25Vdc         | 680nF       | ±10%                  | CL31B684KAHNFN □ |                  |                  |  |
|                |               | 1.0uF       | ±10%                  | CL31B105KAHNFN □ |                  |                  |  |
|                |               | 2.2uF       | ±10%                  | CL31B225KAHNFN □ |                  |                  |  |
| 4.7uF          |               | ±10%        | CL31B475KAHNFN □      |                  |                  |                  |  |
| 35Vdc          | 10uF          | ±10%        | CL31B106KLHNFN □      | Ref.             |                  |                  |  |
|                |               | 50Vdc       | 470nF                 | ±10%             | CL31B474KBHNFN □ |                  |  |
|                |               |             | 680nF                 | ±10%             | CL31B684KBHNFN □ |                  |  |
|                | 1.0uF         |             | ±10%                  | CL31B105KBHNFN □ |                  |                  |  |
|                | 2.2uF         |             | ±10%                  | CL31B225KBHNFN □ |                  |                  |  |
|                | 100Vdc        | 4.7uF       | ±10%                  | CL31B475KBHNFN □ |                  |                  |  |
|                |               | 220nF       | ±10%                  | CL31B224KCHNFN □ |                  |                  |  |
|                |               | 1.0uF       | ±10%                  | CL31B105KCHNFN □ |                  |                  |  |
|                |               | 100nF       | ±10%                  | CL31B104KDHNFN □ |                  |                  |  |
|                | 200Vdc        | 100nF       | ±10%                  | CL31B104KEHNFN □ |                  |                  |  |
|                |               | 500Vdc      | 33nF                  | ±10%             | CL31B333KGHNFN □ |                  |  |
| 630Vdc         | 22nF          | ±10%        | CL31B223KHHNFN □      |                  |                  |                  |  |
|                | 33nF          | ±10%        | CL31B333KHHNFN □      |                  |                  |                  |  |
|                | 2kVdc         | 2.2nF       | ±10%                  | CL31B222KJHNFN □ | Ref.             |                  |  |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 2.20mm         | 10Vdc         | 10uF        | ±10%                  | CL32B106KPINFN □ |                  |  |
| 2.70mm         | 6.3Vdc        | 22uF        | ±20%                  | CL32B226MQJNFN □ |                  |  |
|                |               | 10Vdc       | 470nF                 | ±10%             | CL32B474KPJNFN □ |  |
|                |               |             | 22uF                  | ±10%             | CL32B226KPJNFN □ |  |
|                | 16Vdc         | 22uF        | ±20%                  | CL32B226MPJNFN □ |                  |  |
|                |               | 10uF        | ±10%                  | CL32B106KOJNFN □ |                  |  |
|                |               | 22uF        | ±10%                  | CL32B226KOJNFN □ |                  |  |
|                | 25Vdc         | 10uF        | ±10%                  | CL32B106KAJNFN □ |                  |  |
|                |               | 22uF        | ±10%                  | CL32B226KAJNFN □ |                  |  |
|                | 50Vdc         | 2.2uF       | ±10%                  | CL32B225KBJNFN □ |                  |  |
|                |               | 4.7uF       | ±10%                  | CL32B475KBJNFN □ |                  |  |
|                |               | 10uF        | ±10%                  | CL32B106KBJNFN □ |                  |  |
|                | 100Vdc        | 1.0uF       | ±10%                  | CL32B105KJNFN □  |                  |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Soft – Termination Capacitors for Power Application

ZFN / SFN / YFN – X7R

## Feature

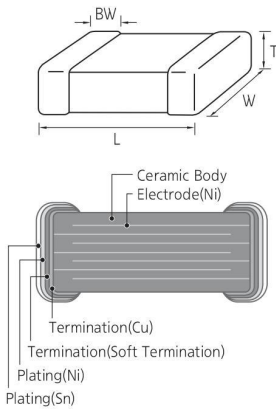


- Soft – Termination relaxes the applied thermal / mechanical stresses by ductile properties of metal-polymer composites.
- Special outgoing inspection for Power application (Bending Test : Sampling Test upto 2mm : X7R)
- Can be applied to power(SMPS, DC – DC Converter) and industrial equipment
- ZFN, SFN, YFN series : Metal Epoxy

## Application

- Power(SMPS, DC – DC converter)
- Ideal for decoupling and filtering applications (Class II : X7R)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.65±0.10 | A              | 0.50+0.20/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.15±0.10 | M              |                 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              |                 |
| 31        | 1206     | 3.20±0.15     | 1.60±0.15 | 0.85±0.15 | C              | 0.50±0.30       |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.25±0.15 | F              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | H              |                 |

## Industrial Capacitance Table (X7R)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|----------------|---------------------|-------------|-----|-----|-----|-----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|----|----|
|                |                     | nF          |     |     |     |     |    |    |    |    |    |     |     | uF  |     |     |     |    |    |
|                |                     | 1.0         | 1.5 | 2.2 | 3.3 | 4.7 | 10 | 22 | 33 | 47 | 68 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 |
| 0402(1005)     | 50                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
| 0603 (1608)    | 10                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|                | 16                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|                | 25                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|                | 50                  | 0.47        |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
| 0805 (2012)    | 10                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|                | 16                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|                | 25                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
| 1206 (3216)    | 16                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |
|                | 50                  |             |     |     |     |     |    |    |    |    |    |     |     |     |     |     |     |    |    |

Product Line Up (ZFN - X7R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.90mm         | 10Vdc         | 2.2uF       | ± 10%                 | CL10B225KP8ZFN □ | Ref.   |
|                | 16Vdc         | 1.0uF       | ± 10%                 | CL10B105K08ZFN □ |        |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       | Remark           |
|----------------|---------------|-------------|-----------------------|-------------------|------------------|
| 1.35mm         | 16Vdc         | 4.7uF       | ± 10%                 | CL21B475K0FZFN □  | Ref.             |
|                |               | 25Vdc       | 4.7uF                 | ± 10%             | CL21B475KAFZFN □ |
|                | 50Vdc         | 1.0uF       | ± 10%                 | CL21B105KBZFZFN □ |                  |
|                |               | 10Vdc       | 10uF                  | ± 10%             | CL21B106KPQZFN □ |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.80mm         | 16Vdc         | 10uF        | ± 10%                 | CL31B106KOHZFN □ |        |
|                | 50Vdc         | 4.7uF       | ± 10%                 | CL31B475KBHZFN □ |        |

Product Line Up (SFN - X7R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 0.55mm         | 50Vdc         | 22nF        | ± 10%                 | CL05B223KB55FN □ |        |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 0.90mm         | 16Vdc         | 68nF        | ± 10%                 | CL10B683K085FN □ |                  |  |
|                |               | 100nF       | ± 10%                 | CL10B104K085FN □ |                  |  |
|                |               | 220nF       | ± 10%                 | CL10B224K085FN □ |                  |  |
|                |               | 1.0uF       | ± 10%                 | CL10B105K085FN □ |                  |  |
|                |               | 1.0uF       | ± 10%                 | CL10B105K085FN □ |                  |  |
|                | 25Vdc         | 10nF        | ± 10%                 | CL10B103KA85FN □ |                  |  |
|                |               | 150nF       | ± 10%                 | CL10B154KA85FN □ |                  |  |
|                |               | 220nF       | ± 10%                 | CL10B224KA85FN □ |                  |  |
|                |               | 1.0uF       | ± 10%                 | CL10B105KA85FN □ |                  |  |
|                |               | 1.0uF       | ± 10%                 | CL10B105KA85FN □ |                  |  |
|                |               | 50Vdc       | 470pF                 | ± 10%            | CL10B471KB85FN □ |  |
|                |               |             | 1.0nF                 | ± 10%            | CL10B102KB85FN □ |  |
|                | 1.5nF         |             | ± 10%                 | CL10B152KB85FN □ |                  |  |
|                | 2.2nF         |             | ± 10%                 | CL10B222KB85FN □ |                  |  |
|                | 2.7nF         |             | ± 10%                 | CL10B272KB85FN □ |                  |  |
|                | 3.3nF         |             | ± 10%                 | CL10B332KB85FN □ |                  |  |
|                | 3.9nF         |             | ± 10%                 | CL10B392KB85FN □ |                  |  |
|                | 4.7nF         |             | ± 10%                 | CL10B472KB85FN □ |                  |  |
|                | 5.6nF         |             | ± 10%                 | CL10B562KB85FN □ |                  |  |
|                | 6.8nF         |             | ± 10%                 | CL10B682KB85FN □ |                  |  |
|                | 8.2nF         |             | ± 10%                 | CL10B822KB85FN □ |                  |  |
|                | 10nF          | ± 10%       | CL10B103KB85FN □      |                  |                  |  |
|                | 12nF          | ± 10%       | CL10B123KB85FN □      |                  |                  |  |
|                | 15nF          | ± 10%       | CL10B153KB85FN □      |                  |                  |  |
|                | 22nF          | ± 10%       | CL10B223KB85FN □      |                  |                  |  |
|                | 27nF          | ± 10%       | CL10B273KB85FN □      |                  |                  |  |
|                | 33nF          | ± 10%       | CL10B333KB85FN □      |                  |                  |  |
|                | 39nF          | ± 10%       | CL10B393KB85FN □      |                  |                  |  |
|                | 47nF          | ± 10%       | CL10B473KB85FN □      |                  |                  |  |
|                | 56nF          | ± 10%       | CL10B563KB85FN □      |                  |                  |  |
|                | 100nF         | ± 10%       | CL10B104KB85FN □      |                  |                  |  |
|                | 220nF         | ± 10%       | CL10B224KB85FN □      |                  |                  |  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Soft – Termination Capacitors for Power Application

ZFN / SFN / YFN – X7R

## Product Line Up (SFN – X7R)

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Remark           |                 |
|----------------|---------------|------------------|-----------------------|------------------|------------------|-----------------|
| 0.70mm         | 50Vdc         | 330pF            | ±10%                  | CL21B331KB6SFN□  |                  |                 |
|                |               | 470pF            | ±5%                   | CL21B471JB6SFN□  |                  |                 |
|                |               | 560pF            | ±10%                  | CL21B561KB6SFN□  |                  |                 |
|                |               | 680pF            | ±10%                  | CL21B681KB6SFN□  |                  |                 |
|                |               | 2.2nF            | ±10%                  | CL21B222KB6SFN□  |                  |                 |
|                |               | 3.3nF            | ±10%                  | CL21B332KB6SFN□  |                  |                 |
|                |               | 4.7nF            | ±10%                  | CL21B472KB6SFN□  |                  |                 |
|                |               | 6.8nF            | ±10%                  | CL21B682KB6SFN□  |                  |                 |
|                |               | 8.2nF            | ±10%                  | CL21B822KB6SFN□  |                  |                 |
|                |               | 10nF             | ±10%                  | CL21B103KB6SFN□  |                  |                 |
|                |               | 15nF             | ±10%                  | CL21B153KB6SFN□  |                  |                 |
|                |               | 22nF             | ±10%                  | CL21B223KB6SFN□  |                  |                 |
|                |               | 47nF             | ±10%                  | CL21B472KB6SFN□  |                  |                 |
|                |               | 0.95mm           | 50Vdc                 | 4.7nF            | ±10%             | CL21B103KB6SFN□ |
| 10nF           | ±10%          |                  |                       | CL21B103KB6SFN□  |                  |                 |
| 22nF           | ±10%          |                  |                       | CL21B223KB6SFN□  |                  |                 |
| 39nF           | ±10%          |                  |                       | CL21B393KB6SFN□  |                  |                 |
| 47nF           | ±10%          |                  |                       | CL21B473KB6SFN□  |                  |                 |
| 100nF          | ±10%          |                  |                       | CL21B104KB6SFN□  |                  |                 |
| 250Vdc         | 1.0nF         | ±10%             | CL21B102KECSFN□       |                  |                  |                 |
|                | 2.2nF         | ±10%             | CL21B222KECSFN□       |                  |                  |                 |
| 1.35mm         | 16Vdc         | 1.0uF            | ±10%                  | CL21B105KOFCSFN□ |                  |                 |
|                |               | 25Vdc            | 220nF                 | ±10%             | CL21B224KAFCSFN□ |                 |
|                |               |                  | 470nF                 | ±10%             | CL21B474KAFCSFN□ |                 |
|                |               |                  | 1.0uF                 | ±10%             | CL21B105KAFCSFN□ |                 |
|                | 50Vdc         | 2.2uF            | ±10%                  | CL21B225KAFCSFN□ |                  |                 |
|                |               | 220nF            | ±10%                  | CL21B224KBFSFN□  |                  |                 |
|                |               | 470nF            | ±10%                  | CL21B474KBFSFN□  |                  |                 |
| 100Vdc         | 1.0uF         | ±10%             | CL21B105KBFSFN□       |                  |                  |                 |
|                | 100nF         | ±10%             | CL21B104KCFCSFN□      |                  |                  |                 |
| 220nF          | ±10%          | CL21B224KCFCSFN□ |                       |                  |                  |                 |
|                | 4.7uF         | ±10%             | CL21B475KQCSFN□       |                  |                  |                 |

### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 1.00mm         | 50Vdc         | 100nF       | ±10%                  | CL31B104KB6SFN□  |                  |
| 1.25mm         | 16Vdc         | 470nF       | ±10%                  | CL31B474KOPFSFN□ |                  |
|                | 50Vdc         | 1.0uF       | ±10%                  | CL31B105KB6SFN□  |                  |
| 1.40mm         | 630Vdc        | 220pF       | ±10%                  | CL31B221KHFSFN□  |                  |
|                |               | 1.0nF       | ±10%                  | CL31B102KHFSFN□  |                  |
|                |               | 1.5nF       | ±10%                  | CL31B152KHFSFN□  |                  |
|                |               | 2.2nF       | ±10%                  | CL31B222KHFSFN□  |                  |
|                |               | 2.7nF       | ±10%                  | CL31B272KHFSFN□  |                  |
|                |               | 3.3nF       | ±10%                  | CL31B332KHFSFN□  |                  |
|                |               | 4.7nF       | ±10%                  | CL31B472KHFSFN□  |                  |
|                |               | 6.8nF       | ±10%                  | CL31B682KHFSFN□  |                  |
|                |               | 10nF        | ±10%                  | CL31B103KHFSFN□  |                  |
|                |               | 15nF        | ±10%                  | CL31B153KHFSFN□  |                  |
|                |               | 1kVdc       | 1.0nF                 | ±10%             | CL31B102KIFCSFN□ |
| 1.80mm         | 25Vdc         | 10uF        | ±10%                  | CL31B106KAHSFN□  |                  |
|                | 35Vdc         | 10uF        | ±10%                  | CL31B106KLHSFN□  | Ref.             |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 1.80mm         | 100Vdc        | 220nF       | ±10%                  | CL31B224KCHFSFN□ |        |
|                |               | 470nF       | ±10%                  | CL31B474KCHFSFN□ |        |
|                |               | 1.0uF       | ±10%                  | CL31B105KCHFSFN□ |        |
|                |               | 2.2uF       | ±10%                  | CL31B225KCHFSFN□ |        |
|                |               | 47nF        | ±10%                  | CL31B473KEHFSFN□ |        |
|                | 250Vdc        | 100nF       | ±10%                  | CL31B104KEHFSFN□ |        |
|                |               | 22nF        | ±10%                  | CL31B223KHHSFN□  |        |
|                |               | 33nF        | ±10%                  | CL31B333KHHSFN□  |        |
|                | 630Vdc        | 22nF        | ±10%                  | CL31B223KHHSFN□  |        |
|                |               | 33nF        | ±10%                  | CL31B333KHHSFN□  |        |

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 2.70mm         | 50Vdc         | 2.2uF       | ±10%                  | CL32B225KBJSFN□ |        |
|                | 100Vdc        | 1.0uF       | ±10%                  | CL32B105KCJSFN□ |        |
|                |               | 2.2uF       | ±10%                  | CL32B225KCJSFN□ |        |

## Product Line Up (YFN – X7R)

### ■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 2.00mm         | 25Vdc         | 4.7uF       | ±10%                  | CL32B475KAUYFN□ |        |
|                | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBUYFN□ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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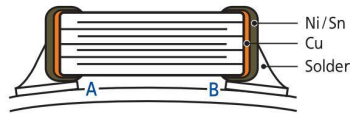
# Soft - Termination(3mm) Industrial Capacitors

ZW6 / SW6 - X7R / X7S

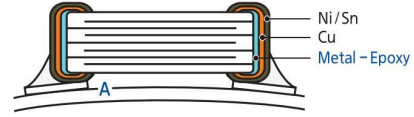
## Feature



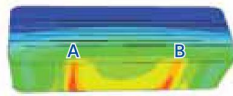
- Excellent bending strength( $\geq 3\text{mm}$ ) &  $40^\circ\text{C}$  95%RH 500hr with rated voltage
- Soft - Termination is applicable to all class II MLCC series
- W6 = Industrial(3mm bending) code for Network, Power, etc
- Special outgoing inspection for industrial application (HALT, etc)
- Bending strength simulation



Cross-section of MLCC with Cu - Termination

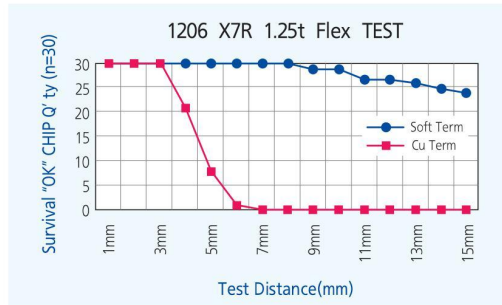


Cross-section of MLCC with Soft - Termination



Soft - Termination relaxes the applied thermal - mechanical stresses by ductile properties of metal - polymer composites.

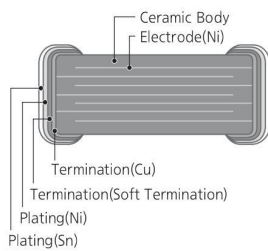
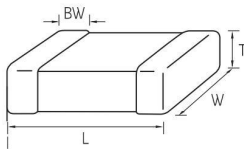
- Comparison of bending strength



## Application

- Network, Power application and etc.
- Ideal for decoupling and filtering applications (Class II : X7R)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              | 0.50+0.20/-0.30 |
|           |          | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              |                 |
|           |          | 2.00±0.15     | 1.25±0.15 | 1.25±0.15 | Q              |                 |
| 31        | 1206     | 3.20±0.20     | 1.60±0.20 | 1.15±0.10 | P              | 0.50±0.30       |
|           |          | 3.20±0.15     | 1.60±0.15 | 1.25±0.15 | F              |                 |
|           |          | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | H              |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 2.50±0.20 | J              | 0.60±0.30       |
|           |          | 3.20±0.40     | 2.50±0.30 | 2.50±0.30 | V              |                 |

# Soft – Termination(3mm) Industrial Capacitors

ZW6 / SW6 – X7R /X7S

Industrial Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |     |     |    |    |    |     |     |     |     |     |     |     |     |    |     |
|----------------------|---------------------------|-------------|-----|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|
|                      |                           | nF          |     |     |    |    |    |     | uF  |     |     |     |     |     |     |    |     |
|                      |                           | 1.5         | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10  | 22  | 47 | 100 |
| 0402<br>(1005)       | 16                        |             |     |     | 10 | 22 | 47 | 100 |     |     |     |     |     |     |     |    |     |
|                      | 25                        |             |     |     | 10 | 22 | 47 | 100 |     |     |     |     |     |     |     |    |     |
|                      | 50                        |             |     |     | 10 | 22 | 47 | 100 |     |     |     |     |     |     |     |    |     |
| 0603<br>(1608)       | 16                        |             |     |     | 10 | 22 | 47 | 100 | 220 | 470 |     |     |     |     |     |    |     |
|                      | 25                        |             |     |     | 10 | 22 | 47 | 100 | 220 | 470 |     |     |     |     |     |    |     |
|                      | 50                        | 1.5         | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 | 470 |     |     |     |     |     |    |     |
|                      | 100                       |             |     |     | 10 | 22 | 47 | 100 |     |     |     |     |     |     |     |    |     |
| 0805<br>(2012)       | 10                        |             |     |     |    |    |    |     |     |     | 1.0 | 2.2 | 4.7 | 10  |     |    |     |
|                      | 16                        |             |     |     |    |    |    |     |     |     | 1.0 | 2.2 | 4.7 | 10  |     |    |     |
|                      | 25                        |             |     |     | 10 | 22 | 47 | 100 | 220 | 470 |     |     |     |     |     |    |     |
|                      | 50                        | 1.5         | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 | 470 |     |     |     |     |     |    |     |
|                      | 100                       |             |     |     | 10 | 22 | 47 | 100 |     |     |     |     |     |     |     |    |     |
| 1206<br>(3216)       | 10                        |             |     |     |    |    |    |     |     |     |     |     |     | 10  | 22  |    |     |
|                      | 16                        |             |     |     |    |    |    |     |     |     |     |     |     | 10  | 22  |    |     |
|                      | 25                        |             |     |     |    |    |    |     |     |     |     |     |     | 10  | 22  |    |     |
|                      | 50                        |             |     |     |    |    |    | 100 | 220 | 470 |     |     |     |     |     |    |     |
|                      | 100                       |             |     |     |    |    |    | 100 | 220 | 470 |     |     |     |     |     |    |     |
| 1210<br>(3225)       | 10                        |             |     |     |    |    |    |     |     |     |     |     |     |     | 10  | 22 |     |
|                      | 16                        |             |     |     |    |    |    |     |     |     |     |     |     |     | 10  | 22 |     |
|                      | 50                        |             |     |     |    |    |    |     |     |     |     |     |     | 10  | 22  |    |     |
|                      | 100                       |             |     |     |    |    |    |     |     |     |     |     | 1.0 | 2.2 | 4.7 | 10 |     |



Product Line Up (X7R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.90mm         | 16Vdc         | 1.0uF       | ±10%                  | CL10B105K08ZW6□ |        |
|                | 25Vdc         | 1.0uF       | ±10%                  | CL10B105KA8ZW6□ |        |
|                | 50Vdc         | 100nF       | ±10%                  | CL10B104KB8ZW6□ |        |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.95mm         | 100Vdc        | 47nF        | ±10%                  | CL21B473KCCZW6□ |        |
|                |               | 100nF       | ±10%                  | CL21B104KCCZW6□ |        |
| 1.35mm         | 25Vdc         | 1.0uF       | ±10%                  | CL21B105KAFZW6□ |        |
|                |               | 2.2uF       | ±10%                  | CL21B225KAFZW6□ |        |
|                |               | 4.7uF       | ±10%                  | CL21B475KAFZW6□ | Ref.   |
|                | 50Vdc         | 1.0uF       | ±10%                  | CL21B105KBFZW6□ |        |
| 1.40mm         | 16Vdc         | 4.7uF       | ±10%                  | CL21B475KQZW6□  | Ref.   |

■ Size: 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 1.25mm         | 100Vdc        | 100nF       | ±10%                  | CL31B104KCPZW6□ |        |
| 1.40mm         | 100Vdc        | 100nF       | ±10%                  | CL31B104KCFZW6□ |        |
| 1.80mm         | 16Vdc         | 10uF        | ±10%                  | CL31B106KOHZW6□ |        |
|                |               | 4.7uF       | ±10%                  | CL31B475KAHZW6□ |        |
|                | 25Vdc         | 10uF        | ±10%                  | CL31B106KAHZW6□ |        |
|                |               | 4.7uF       | ±10%                  | CL31B475KBHZW6□ |        |

■ Size: 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark    |
|----------------|---------------|-------------|-----------------------|-----------------|-----------|
| 2.70mm         | 50Vdc         | 10uF        | ±10%                  | CL32B106KBJZW6□ |           |
|                | 100Vdc        | 2.2uF       | ±10%                  | CL32B225KCJZW6□ |           |
| 2.80mm         | 100Vdc        | 4.7uF       | ±10%                  | CL32B475KCVZW6□ | Operating |

Product Line Up (X7S)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     | Remark |
|----------------|---------------|-------------|-----------------------|-----------------|--------|
| 0.90mm         | 50Vdc         | 100uF       | ±10%                  | CL10Y104KB8ZW6□ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Reinforced Soft – Termination(3mm) Industrial Capacitors

Z46 – X7R

## Feature

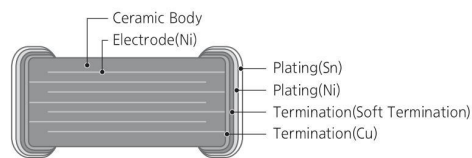
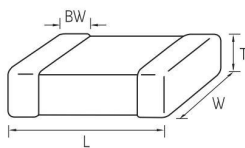


- Excellent bending strength( $\geq 3\text{mm}$ ) &  $85^\circ\text{C}$  85%RH 1000hr with rated voltage
- Soft-Termination is applicable to all class II MLCC series
- Durability against thermal shock /cycles

## Application

- Network, Power application and etc.
- Ideal for decoupling and filtering applications (Class II : X7R)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm)   |                 |                 |                |                        |
|-----------|----------|-----------------|-----------------|-----------------|----------------|------------------------|
|           |          | L               | W               | T               | Thickness Code | BW                     |
| 05        | 0402     | $1.00 \pm 0.05$ | $0.50 \pm 0.05$ | $0.50 \pm 0.05$ | 5              | $0.25 \pm 0.10$        |
| 10        | 0603     | $1.60 \pm 0.10$ | $0.80 \pm 0.10$ | $0.80 \pm 0.10$ | 8              | $0.30 \pm 0.20$        |
| 21        | 0805     | $2.00 \pm 0.10$ | $1.25 \pm 0.10$ | $0.60 \pm 0.10$ | 6              | $0.50 + 0.20 / - 0.30$ |
|           |          | $2.00 \pm 0.10$ | $1.25 \pm 0.10$ | $0.85 \pm 0.10$ | C              |                        |
|           |          | $2.00 \pm 0.10$ | $1.25 \pm 0.10$ | $1.25 \pm 0.10$ | F              |                        |
|           |          | $2.00 \pm 0.15$ | $1.25 \pm 0.15$ | $1.25 \pm 0.15$ | Q              |                        |
| 31        | 1206     | $3.20 \pm 0.20$ | $1.60 \pm 0.20$ | $1.15 \pm 0.10$ | P              | $0.50 \pm 0.30$        |
|           |          | $3.20 \pm 0.20$ | $1.60 \pm 0.20$ | $1.60 \pm 0.20$ | H              |                        |
| 32        | 1210     | $3.20 \pm 0.30$ | $2.50 \pm 0.20$ | $2.50 \pm 0.20$ | J              | $0.60 \pm 0.30$        |

Industrial Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |    |    |     |     |     |     |     |     |    |    |    |     |  |
|----------------------|---------------------------|-------------|----|----|-----|-----|-----|-----|-----|-----|----|----|----|-----|--|
|                      |                           | nF          |    |    |     |     |     | uF  |     |     |    |    |    |     |  |
|                      |                           | 10          | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 |  |
| 0402<br>(1005)       | 16                        | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
|                      | 25                        | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
|                      | 50                        | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
| 0603<br>(1608)       | 16                        |             |    | █  |     |     |     |     |     |     |    |    |    |     |  |
|                      | 25                        | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
|                      | 50                        | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
|                      | 100                       | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
| 0805<br>(2012)       | 10                        |             |    |    |     |     |     | █   |     |     |    |    |    |     |  |
|                      | 16                        |             |    |    |     |     |     | █   |     |     |    |    |    |     |  |
|                      | 25                        |             |    | █  |     |     |     |     |     |     |    |    |    |     |  |
|                      | 50                        | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
|                      | 100                       | █           |    |    |     |     |     |     |     |     |    |    |    |     |  |
| 1206<br>(3216)       | 10                        |             |    |    |     |     |     |     |     |     | █  |    |    |     |  |
|                      | 16                        |             |    |    |     |     |     | █   |     |     |    |    |    |     |  |
|                      | 25                        |             |    |    |     |     |     | █   |     |     |    |    |    |     |  |
|                      | 50                        |             |    | █  |     |     |     |     |     |     |    |    |    |     |  |
|                      | 100                       |             |    | █  |     |     |     |     |     |     |    |    |    |     |  |
| 1210<br>(3225)       | 10                        |             |    |    |     |     |     |     |     |     |    | █  |    |     |  |
|                      | 16                        |             |    |    |     |     |     |     |     |     |    | █  |    |     |  |
|                      | 50                        |             |    |    |     |     |     |     |     | █   |    |    |    |     |  |

# Reinforced Soft – Termination(3mm) Industrial Capacitors

Z46 – X7R

## Product Line Up (X7R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 0.55mm         | 16Vdc         | 15nF        | ±10%                  | CL05B153K05Z46□ |
|                |               | 22nF        | ±10%                  | CL05B223K05Z46□ |
|                |               | 33nF        | ±10%                  | CL05B333K05Z46□ |
|                |               | 47nF        | ±10%                  | CL05B473K05Z46□ |
|                |               | 100nF       | ±10%                  | CL05B104K05Z46□ |
|                | 25Vdc         | 1.0nF       | ±10%                  | CL05B102KA5Z46□ |
|                |               | 4.7nF       | ±10%                  | CL05B472KA5Z46□ |
|                |               | 10nF        | ±10%                  | CL05B103KA5Z46□ |
|                |               | 22nF        | ±10%                  | CL05B223KA5Z46□ |
|                | 50Vdc         | 330pF       | ±10%                  | CL05B331KB5Z46□ |
|                |               | 470pF       | ±10%                  | CL05B471KB5Z46□ |
|                |               | 1.0nF       | ±10%                  | CL05B102KB5Z46□ |
|                |               | 1.5nF       | ±10%                  | CL05B152KB5Z46□ |
|                |               | 2.2nF       | ±10%                  | CL05B222KB5Z46□ |
|                |               | 4.7nF       | ±10%                  | CL05B472KB5Z46□ |
|                |               | 10nF        | ±10%                  | CL05B103KB5Z46□ |
|                |               | 15nF        | ±10%                  | CL05B153KB5Z46□ |
|                |               | 22nF        | ±10%                  | CL05B223KB5Z46□ |

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |                 |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|
| 0.90mm         | 10Vdc         | 1.0uF       | ±10%                  | CL10B105KP8Z46□ |                 |
|                |               | 16Vdc       | 47nF                  | ±10%            | CL10B473K08Z46□ |
|                |               |             | 68nF                  | ±10%            | CL10B683K08Z46□ |
|                | 100nF         |             | ±10%                  | CL10B104K08Z46□ |                 |
|                | 25Vdc         | 220nF       | ±10%                  | CL10B224K08Z46□ |                 |
|                |               | 470nF       | ±10%                  | CL10B474K08Z46□ |                 |
|                |               | 680nF       | ±10%                  | CL10B684K08Z46□ |                 |
|                |               | 1.0uF       | ±10%                  | CL10B105K08Z46□ |                 |
|                |               | 25Vdc       | 10nF                  | ±10%            | CL10B103KA8Z46□ |
|                |               |             | 68nF                  | ±10%            | CL10B683KA8Z46□ |
|                |               |             | 100nF                 | ±10%            | CL10B104KA8Z46□ |
|                |               | 50Vdc       | 150nF                 | ±10%            | CL10B154KA8Z46□ |
|                |               |             | 220nF                 | ±10%            | CL10B224KA8Z46□ |
|                | 470nF         |             | ±10%                  | CL10B474KA8Z46□ |                 |
|                | 1.0uF         |             | ±10%                  | CL10B105KA8Z46□ |                 |
|                | 50Vdc         |             | 220pF                 | ±10%            | CL10B221KB8Z46□ |
|                |               |             | 470pF                 | ±10%            | CL10B471KB8Z46□ |
|                |               |             | 1.0nF                 | ±10%            | CL10B102KB8Z46□ |
|                | 1.2nF         |             | ±10%                  | CL10B122KB8Z46□ |                 |
|                | 1.5nF         |             | ±10%                  | CL10B152KB8Z46□ |                 |
|                | 2.2nF         |             | ±10%                  | CL10B222KB8Z46□ |                 |
|                | 3.3nF         |             | ±10%                  | CL10B332KB8Z46□ |                 |
|                | 4.7nF         |             | ±10%                  | CL10B472KB8Z46□ |                 |
|                | 6.8nF         |             | ±10%                  | CL10B682KB8Z46□ |                 |
|                | 10nF          |             | ±10%                  | CL10B103KB8Z46□ |                 |
|                | 15nF          |             | ±10%                  | CL10B153KB8Z46□ |                 |
|                | 22nF          |             | ±10%                  | CL10B223KB8Z46□ |                 |
|                | 33nF          |             | ±10%                  | CL10B333KB8Z46□ |                 |
|                | 47nF          |             | ±10%                  | CL10B473KB8Z46□ |                 |
|                | 68nF          | ±10%        | CL10B683KB8Z46□       |                 |                 |
|                | 100nF         | ±10%        | CL10B104KB8Z46□       |                 |                 |
|                | 150nF         | ±10%        | CL10B154KB8Z46□       |                 |                 |
|                | 220nF         | ±10%        | CL10B224KB8Z46□       |                 |                 |
|                | 100Vdc        | 270pF       | ±10%                  | CL10B271KC8Z46□ |                 |
|                |               | 470pF       | ±10%                  | CL10B471KC8Z46□ |                 |
|                |               | 1.0nF       | ±10%                  | CL10B102KC8Z46□ |                 |
|                |               | 2.2nF       | ±10%                  | CL10B222KC8Z46□ |                 |
|                |               | 2.7nF       | ±10%                  | CL10B272KC8Z46□ |                 |
|                |               | 4.7nF       | ±10%                  | CL10B472KC8Z46□ |                 |
|                |               | 10nF        | ±10%                  | CL10B103KC8Z46□ |                 |
|                |               | 68nF        | ±10%                  | CL10B683KC8Z46□ |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (X7R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |                  |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|------------------|--|
| 0.70mm         | 50Vdc         | 1.0nF       | ±10%                  | CL21B102KB6Z46 □ |                  |                  |  |
|                |               | 1.5nF       | ±10%                  | CL21B152KB6Z46 □ |                  |                  |  |
|                |               | 2.2nF       | ±10%                  | CL21B222KB6Z46 □ |                  |                  |  |
|                |               | 4.7nF       | ±10%                  | CL21B472KB6Z46 □ |                  |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KB6Z46 □ |                  |                  |  |
|                |               | 22nF        | ±10%                  | CL21B223KB6Z46 □ |                  |                  |  |
|                | 100Vdc        | 1.0nF       | ±10%                  | CL21B102KC6Z46 □ |                  |                  |  |
|                |               | 3.3nF       | ±10%                  | CL21B332KC6Z46 □ |                  |                  |  |
|                |               | 4.7nF       | ±10%                  | CL21B472KC6Z46 □ |                  |                  |  |
|                |               | 10nF        | ±10%                  | CL21B103KC6Z46 □ |                  |                  |  |
|                |               | 15nF        | ±10%                  | CL21B153KC6Z46 □ |                  |                  |  |
|                |               | 22nF        | ±10%                  | CL21B223KC6Z46 □ |                  |                  |  |
|                |               | 0.95mm      | 25Vdc                 | 100nF            | ±10%             | CL21B104KACZ46 □ |  |
|                |               |             | 50Vdc                 | 47nF             | ±10%             | CL21B473KBCZ46 □ |  |
| 68nF           | ±10%          |             |                       | CL21B683KBCZ46 □ |                  |                  |  |
| 100nF          | ±10%          |             |                       | CL21B104KBCZ46 □ |                  |                  |  |
| 100Vdc         | 47nF          | ±10%        | CL21B473KCCZ46 □      |                  |                  |                  |  |
|                | 68nF          | ±10%        | CL21B683KCCZ46 □      |                  |                  |                  |  |
|                | 100nF         | ±10%        | CL21B104KCCZ46 □      |                  |                  |                  |  |
| 1.35mm         | 16Vdc         | 470nF       | ±10%                  | CL21B474KOFZ46 □ |                  |                  |  |
|                |               | 1.0uF       | ±10%                  | CL21B105KOFZ46 □ |                  |                  |  |
|                |               | 2.2uF       | ±10%                  | CL21B225KOFZ46 □ |                  |                  |  |
|                | 25Vdc         | 220nF       | ±10%                  | CL21B224KAFZ46 □ |                  |                  |  |
|                |               | 1.0uF       | ±10%                  | CL21B105KAFZ46 □ |                  |                  |  |
|                |               | 2.2uF       | ±10%                  | CL21B225KAFZ46 □ |                  |                  |  |
|                | 35Vdc         | 1.0uF       | ±10%                  | CL21B105KLFZ46 □ |                  |                  |  |
|                |               | 50Vdc       | 100nF                 | ±10%             | CL21B104KBFZ46 □ |                  |  |
|                |               |             | 180nF                 | ±10%             | CL21B184KBFZ46 □ |                  |  |
|                |               |             | 220nF                 | ±10%             | CL21B224KBFZ46 □ |                  |  |
|                |               |             | 330nF                 | ±10%             | CL21B334KBFZ46 □ |                  |  |
|                |               |             | 470nF                 | ±10%             | CL21B474KBFZ46 □ |                  |  |
|                |               |             | 1.0uF                 | ±10%             | CL21B105KBFZ46 □ |                  |  |
|                |               |             | 100Vdc                | 100nF            | ±10%             | CL21B104KCFZ46 □ |  |
| 1.40mm         | 10Vdc         | 4.7uF       | ±10%                  | CL21B475KPQZ46 □ | Ref.             |                  |  |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL21B475KQQZ46 □ | Ref.             |                  |  |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark           |  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|--|
| 1.25mm         | 25Vdc         | 1.0uF       | ±10%                  | CL31B105KAPZ46 □ |                  |  |
|                |               | 50Vdc       | 100nF                 | ±10%             | CL31B104KBPZ46 □ |  |
|                |               | 100Vdc      | 100nF                 | ±10%             | CL31B104KCPZ46 □ |  |
|                | 1.80mm        | 16Vdc       | 2.2nF                 | ±10%             | CL31B225KOHZ46 □ |  |
|                |               |             | 10uF                  | ±10%             | CL31B106KOHZ46 □ |  |
|                |               | 25Vdc       | 1.5uF                 | ±10%             | CL31B155KAHZ46 □ |  |
| 2.2uF          | ±10%          |             | CL31B225KAHZ46 □      |                  |                  |  |
| 3.3uF          | ±10%          |             | CL31B335KAHZ46 □      |                  |                  |  |
| 4.7uF          | ±10%          |             | CL31B475KAHZ46 □      |                  |                  |  |
| 10uF           | ±10%          |             | CL31B106KAHZ46 □      |                  |                  |  |
| 50Vdc          | 470nF         |             | ±10%                  | CL31B474KBHZ46 □ |                  |  |
|                | 680nF         |             | ±10%                  | CL31B684KBHZ46 □ |                  |  |
|                | 1.0uF         |             | ±10%                  | CL31B105KBHZ46 □ |                  |  |
|                | 1.5uF         | ±10%        | CL31B155KBHZ46 □      |                  |                  |  |
|                | 2.2uF         | ±10%        | CL31B225KBHZ46 □      |                  |                  |  |
|                | 4.7uF         | ±10%        | CL31B475KBHZ46 □      |                  |                  |  |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      | Remark |
|----------------|---------------|-------------|-----------------------|------------------|--------|
| 2.70mm         | 16Vdc         | 22uF        | ±10%                  | CL32B226KOJZ46 □ |        |
|                |               | 22uF        | ±20%                  | CL32B226MOJZ46 □ |        |
|                | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBJZ46 □ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Reinforced Soft – Termination(5mm) Industrial Capacitors

Z4J – X7R

## Feature

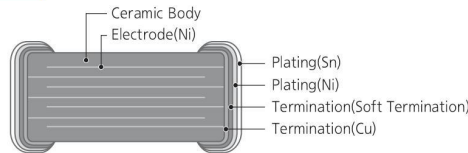
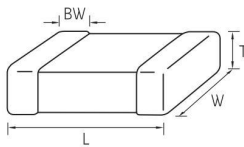


- Excellent bending strength( $\geq 5\text{mm}$ ) &  $85^\circ\text{C}$  85%RH 1000hr with rated voltage
- Soft – Termination is applicable to all class II MLCC series
- Durability against thermal shock / cycles

## Application

- Network, Power application and etc.
- Ideal for decoupling and filtering applications (Class II : X7R)  
(Directly connected to battery)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm)   |                 |                 |                |                        |
|-----------|----------|-----------------|-----------------|-----------------|----------------|------------------------|
|           |          | L               | W               | T               | Thickness Code | BW                     |
| 10        | 0603     | $1.60 \pm 0.10$ | $0.80 \pm 0.10$ | $0.80 \pm 0.10$ | 8              | $0.30 \pm 0.20$        |
| 21        | 0805     | $2.00 \pm 0.10$ | $1.25 \pm 0.10$ | $1.25 \pm 0.10$ | F              | $0.50 + 0.20 / - 0.30$ |

## Industrial Capacitance Table (X7R)

| Size inch (mm) | Rated Voltage (Vdc) | Capacitance |     |    |    |    |     |     |     |     |     |     |  |  |
|----------------|---------------------|-------------|-----|----|----|----|-----|-----|-----|-----|-----|-----|--|--|
|                |                     | nF          |     |    |    |    |     |     |     |     | uF  |     |  |  |
|                |                     | 1.5         | 4.7 | 10 | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 |  |  |
| 0603 (1608)    | 25                  |             |     |    |    |    |     |     |     |     |     |     |  |  |
|                | 50                  |             |     |    |    |    |     |     |     |     |     |     |  |  |
| 0805 (2012)    | 25                  |             |     |    |    |    |     |     |     |     |     |     |  |  |
|                | 50                  |             |     |    |    |    |     |     |     |     |     |     |  |  |

## Product Line Up (X7R)

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 0.90mm         | 25Vdc         | 220nF       | $\pm 10\%$            | CL10B224KA8Z4J□ |
|                |               | 1.0uF       | $\pm 10\%$            | CL10B105KA8Z4J□ |
|                | 50Vdc         | 1.5nF       | $\pm 10\%$            | CL10B152KB8Z4J□ |
|                |               | 4.7nF       | $\pm 10\%$            | CL10B472KB8Z4J□ |
|                |               | 22nF        | $\pm 10\%$            | CL10B223KB8Z4J□ |
|                |               | 47nF        | $\pm 10\%$            | CL10B473KB8Z4J□ |
|                |               | 100nF       | $\pm 10\%$            | CL10B104KB8Z4J□ |
|                |               | 220nF       | $\pm 10\%$            | CL10B224KB8Z4J□ |
|                |               | 470nF       | $\pm 10\%$            | CL10B474KB8Z4J□ |

### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-------------|-----------------------|-----------------|
| 1.35mm         | 25Vdc         | 2.2uF       | $\pm 10\%$            | CL21B225KAFZ4J□ |
|                | 50Vdc         | 1.0uF       | $\pm 10\%$            | CL21B105KBFZ4J□ |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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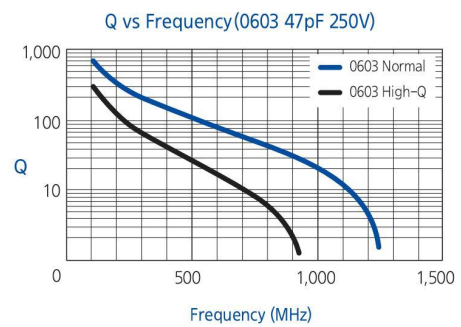
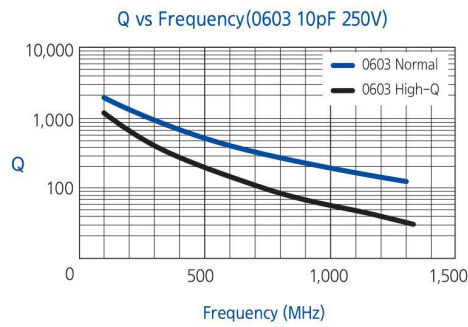
# High Q Industrial Capacitors

GNW / GQW – COG

## Feature



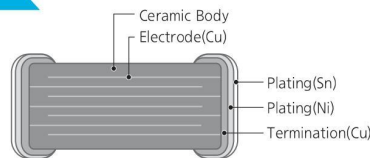
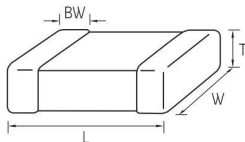
- High Q and low ESR in high frequency range
- Tight tolerance available
- Expanding High-Q (Cu inner-electrode) line – up of 0402, 0603, 0805 case size (0201, 01005 products are already under mass production)
- High efficiency and low power consumption in RF circuit
- Special outgoing inspection for industrial application (HALT, etc)
- Comparison of Q value in high frequency (Normal vs High-Q)



## Application

- Power amplifier module for base-station and GHz range communications
- Smart Factory & Smart Home (IoT)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 03        | 0201     | 0.60±0.03     | 0.30±0.03 | 0.30±0.03 | 3              | 0.15±0.05       |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.15     | 0.80±0.15 | 0.65±0.15 | A              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.85±0.10 | C              | 0.50+0.20/-0.30 |

Industrial Capacitance Table (COG)

| Size<br>inch<br>(mm) | T max.<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance(pF) |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |     |  |  |
|----------------------|----------------|---------------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|-----|-----|-----|-----|-----|--|--|
|                      |                |                           | 0.1             | 0.5 | 1.0 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47  | 6.8 | 100 | 150 | 220 |  |  |
| 01005<br>(0402)      | 0.22           | 16                        |                 |     |     |     |     |     |     |     |    |    |    |    |     | 27  |     |     |     |  |  |
|                      |                | 25                        |                 |     |     |     |     |     |     |     |    |    |    |    |     | 27  |     |     |     |  |  |
| 0201<br>(0603)       | 0.33           | 25                        |                 |     |     |     |     |     |     |     |    |    | 33 |    |     |     |     |     |     |  |  |
|                      |                | 50                        |                 |     |     |     |     |     |     |     |    |    | 15 |    |     |     |     |     |     |  |  |
| 0402(1005)           | 0.55           | 50                        |                 |     |     |     |     |     |     |     |    |    | 47 |    |     |     |     |     |     |  |  |
| 0603<br>(1608)       | 0.90           | 50                        |                 |     |     |     |     |     |     |     |    |    |    |    | 100 |     |     |     |     |  |  |
|                      |                | 100                       |                 |     |     |     |     |     |     |     |    |    |    |    | 150 |     | 220 |     |     |  |  |
|                      | 0.80           | 250                       |                 |     |     |     |     |     |     |     |    |    |    |    | 47  |     |     |     |     |  |  |
| 0805(2012)           | 1.00           | 250                       |                 |     |     |     |     |     |     |     |    |    |    |    | 100 |     |     |     |     |  |  |



Product Line Up (COG)

■ Size : 0.60 X 0.30mm (inch : 0201)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.33mm         | 25Vdc         | 4.7pF       | ±0.25pF               | CL03C4R7CA3GNW □ |
|                |               | 10pF        | ±0.5pF                | CL03C100DA3GNW □ |

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.55mm         | 50Vdc         | 0.1pF            | ±0.05pF               | CL05C0R1AB5GNW □ |
|                |               | 0.1pF            | ±0.1pF                | CL05C0R1BB5GNW □ |
|                |               | 0.2pF            | ±0.05pF               | CL05C0R2AB5GNW □ |
|                |               | 0.2pF            | ±0.1pF                | CL05C0R2BB5GNW □ |
|                |               | 0.3pF            | ±0.05pF               | CL05C0R3AB5GNW □ |
|                |               | 0.3pF            | ±0.1pF                | CL05C0R3BB5GNW □ |
|                |               | 0.4pF            | ±0.05pF               | CL05C0R4AB5GNW □ |
|                |               | 0.4pF            | ±0.1pF                | CL05C0R4BB5GNW □ |
|                |               | 0.5pF            | ±0.05pF               | CL05C0R5AB5GNW □ |
|                |               | 0.5pF            | ±0.1pF                | CL05C0R5BB5GNW □ |
|                |               | 0.6pF            | ±0.05pF               | CL05C0R6AB5GNW □ |
|                |               | 0.6pF            | ±0.1pF                | CL05C0R6BB5GNW □ |
|                |               | 0.7pF            | ±0.05pF               | CL05C0R7AB5GNW □ |
|                |               | 0.7pF            | ±0.1pF                | CL05C0R7BB5GNW □ |
|                |               | 0.8pF            | ±0.05pF               | CL05C0R8AB5GNW □ |
|                |               | 0.8pF            | ±0.1pF                | CL05C0R8BB5GNW □ |
|                |               | 0.9pF            | ±0.05pF               | CL05C0R9AB5GNW □ |
|                |               | 0.9pF            | ±0.1pF                | CL05C0R9BB5GNW □ |
|                |               | 1.0pF            | ±0.05pF               | CL05C010AB5GNW □ |
|                |               | 1.0pF            | ±0.1pF                | CL05C010BB5GNW □ |
|                |               | 1.0pF            | ±0.25pF               | CL05C010CB5GNW □ |
|                |               | 1.1pF            | ±0.05pF               | CL05C1R1AB5GNW □ |
|                |               | 1.1pF            | ±0.1pF                | CL05C1R1BB5GNW □ |
|                |               | 1.1pF            | ±0.25pF               | CL05C1R1CB5GNW □ |
|                |               | 1.2pF            | ±0.05pF               | CL05C1R2AB5GNW □ |
|                |               | 1.2pF            | ±0.1pF                | CL05C1R2BB5GNW □ |
|                |               | 1.2pF            | ±0.25pF               | CL05C1R2CB5GNW □ |
|                |               | 1.3pF            | ±0.05pF               | CL05C1R3AB5GNW □ |
|                |               | 1.3pF            | ±0.1pF                | CL05C1R3BB5GNW □ |
|                |               | 1.3pF            | ±0.25pF               | CL05C1R3CB5GNW □ |
|                |               | 1.5pF            | ±0.05pF               | CL05C1R5AB5GNW □ |
| 1.5pF          | ±0.1pF        | CL05C1R5BB5GNW □ |                       |                  |
| 1.5pF          | ±0.25pF       | CL05C1R5CB5GNW □ |                       |                  |
| 1.6pF          | ±0.05pF       | CL05C1R6AB5GNW □ |                       |                  |
| 1.6pF          | ±0.1pF        | CL05C1R6BB5GNW □ |                       |                  |
| 1.6pF          | ±0.25pF       | CL05C1R6CB5GNW □ |                       |                  |
| 1.8pF          | ±0.05pF       | CL05C1R8AB5GNW □ |                       |                  |
| 1.8pF          | ±0.1pF        | CL05C1R8BB5GNW □ |                       |                  |
| 1.8pF          | ±0.25pF       | CL05C1R8CB5GNW □ |                       |                  |
| 2.0pF          | ±0.05pF       | CL05C020AB5GNW □ |                       |                  |
| 2.0pF          | ±0.1pF        | CL05C020BB5GNW □ |                       |                  |
| 2.0pF          | ±0.25pF       | CL05C020CB5GNW □ |                       |                  |
| 2.2pF          | ±0.05pF       | CL05C2R2AB5GNW □ |                       |                  |
| 2.2pF          | ±0.1pF        | CL05C2R2BB5GNW □ |                       |                  |
| 2.2pF          | ±0.25pF       | CL05C2R2CB5GNW □ |                       |                  |
| 2.4pF          | ±0.05pF       | CL05C2R4AB5GNW □ |                       |                  |
| 2.4pF          | ±0.1pF        | CL05C2R4BB5GNW □ |                       |                  |

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.55mm         | 50Vdc         | 2.4pF            | ±0.25pF               | CL05C2R4CB5GNW □ |
|                |               | 2.7pF            | ±0.05pF               | CL05C2R7AB5GNW □ |
|                |               | 2.7pF            | ±0.1pF                | CL05C2R7BB5GNW □ |
|                |               | 2.7pF            | ±0.25pF               | CL05C2R7CB5GNW □ |
|                |               | 3.0pF            | ±0.05pF               | CL05C030AB5GNW □ |
|                |               | 3.0pF            | ±0.1pF                | CL05C030BB5GNW □ |
|                |               | 3.0pF            | ±0.25pF               | CL05C030CB5GNW □ |
|                |               | 3.3pF            | ±0.05pF               | CL05C3R3AB5GNW □ |
|                |               | 3.3pF            | ±0.1pF                | CL05C3R3BB5GNW □ |
|                |               | 3.3pF            | ±0.25pF               | CL05C3R3CB5GNW □ |
|                |               | 3.6pF            | ±0.05pF               | CL05C3R6AB5GNW □ |
|                |               | 3.6pF            | ±0.1pF                | CL05C3R6BB5GNW □ |
|                |               | 3.6pF            | ±0.25pF               | CL05C3R6CB5GNW □ |
|                |               | 3.9pF            | ±0.05pF               | CL05C3R9AB5GNW □ |
|                |               | 3.9pF            | ±0.1pF                | CL05C3R9BB5GNW □ |
|                |               | 3.9pF            | ±0.25pF               | CL05C3R9CB5GNW □ |
|                |               | 4.0pF            | ±0.05pF               | CL05C040AB5GNW □ |
|                |               | 4.0pF            | ±0.1pF                | CL05C040BB5GNW □ |
|                |               | 4.0pF            | ±0.25pF               | CL05C040CB5GNW □ |
|                |               | 4.3pF            | ±0.05pF               | CL05C4R3AB5GNW □ |
|                |               | 4.3pF            | ±0.1pF                | CL05C4R3BB5GNW □ |
|                |               | 4.3pF            | ±0.25pF               | CL05C4R3CB5GNW □ |
|                |               | 4.7pF            | ±0.05pF               | CL05C4R7AB5GNW □ |
|                |               | 4.7pF            | ±0.1pF                | CL05C4R7BB5GNW □ |
|                |               | 4.7pF            | ±0.25pF               | CL05C4R7CB5GNW □ |
|                |               | 5.0pF            | ±0.05pF               | CL05C050AB5GNW □ |
|                |               | 5.0pF            | ±0.1pF                | CL05C050BB5GNW □ |
|                |               | 5.0pF            | ±0.25pF               | CL05C050CB5GNW □ |
|                |               | 5.1pF            | ±0.05pF               | CL05C5R1AB5GNW □ |
|                |               | 5.1pF            | ±0.1pF                | CL05C5R1BB5GNW □ |
|                |               | 5.1pF            | ±0.25pF               | CL05C5R1CB5GNW □ |
| 5.1pF          | ±0.5pF        | CL05C5R1DB5GNW □ |                       |                  |
| 5.6pF          | ±0.05pF       | CL05C5R6AB5GNW □ |                       |                  |
| 5.6pF          | ±0.1pF        | CL05C5R6BB5GNW □ |                       |                  |
| 5.6pF          | ±0.25pF       | CL05C5R6CB5GNW □ |                       |                  |
| 5.6pF          | ±0.5pF        | CL05C5R6DB5GNW □ |                       |                  |
| 6.0pF          | ±0.05pF       | CL05C060AB5GNW □ |                       |                  |
| 6.0pF          | ±0.1pF        | CL05C060BB5GNW □ |                       |                  |
| 6.0pF          | ±0.25pF       | CL05C060CB5GNW □ |                       |                  |
| 6.0pF          | ±0.5pF        | CL05C060DB5GNW □ |                       |                  |
| 6.2pF          | ±0.05pF       | CL05C6R2AB5GNW □ |                       |                  |
| 6.2pF          | ±0.1pF        | CL05C6R2BB5GNW □ |                       |                  |
| 6.2pF          | ±0.25pF       | CL05C6R2CB5GNW □ |                       |                  |
| 6.2pF          | ±0.5pF        | CL05C6R2DB5GNW □ |                       |                  |
| 6.8pF          | ±0.05pF       | CL05C6R8AB5GNW □ |                       |                  |
| 6.8pF          | ±0.1pF        | CL05C6R8BB5GNW □ |                       |                  |
| 6.8pF          | ±0.25pF       | CL05C6R8CB5GNW □ |                       |                  |
| 6.8pF          | ±0.5pF        | CL05C6R8DB5GNW □ |                       |                  |
| 7.0pF          | ±0.05pF       | CL05C070AB5GNW □ |                       |                  |
| 7.0pF          | ±0.1pF        | CL05C070BB5GNW □ |                       |                  |
| 7.0pF          | ±0.25pF       | CL05C070CB5GNW □ |                       |                  |
| 7.0pF          | ±0.5pF        | CL05C070DB5GNW □ |                       |                  |
| 7.5pF          | ±0.05pF       | CL05C7R5AB5GNW □ |                       |                  |
| 7.5pF          | ±0.1pF        | CL05C7R5BB5GNW □ |                       |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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## Product Line Up (COG)

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.55mm         | 50Vdc         | 7.5pF           | ±0.25pF               | CL05C7R5CB5GNW□ |
|                |               | 7.5pF           | ±0.5pF                | CL05C7R5DB5GNW□ |
|                |               | 8.0pF           | ±0.05pF               | CL05C080AB5GNW□ |
|                |               | 8.0pF           | ±0.1pF                | CL05C080BB5GNW□ |
|                |               | 8.0pF           | ±0.25pF               | CL05C080CB5GNW□ |
|                |               | 8.0pF           | ±0.5pF                | CL05C080DB5GNW□ |
|                |               | 8.2pF           | ±0.05pF               | CL05C8R2AB5GNW□ |
|                |               | 8.2pF           | ±0.1pF                | CL05C8R2BB5GNW□ |
|                |               | 8.2pF           | ±0.25pF               | CL05C8R2CB5GNW□ |
|                |               | 8.2pF           | ±0.5pF                | CL05C8R2DB5GNW□ |
|                |               | 9.0pF           | ±0.05pF               | CL05C090AB5GNW□ |
|                |               | 9.0pF           | ±0.1pF                | CL05C090BB5GNW□ |
|                |               | 9.0pF           | ±0.25pF               | CL05C090CB5GNW□ |
|                |               | 9.0pF           | ±0.5pF                | CL05C090DB5GNW□ |
|                |               | 9.1pF           | ±0.05pF               | CL05C9R1AB5GNW□ |
|                |               | 9.1pF           | ±0.1pF                | CL05C9R1BB5GNW□ |
|                |               | 9.1pF           | ±0.25pF               | CL05C9R1CB5GNW□ |
|                |               | 9.1pF           | ±0.5pF                | CL05C9R1DB5GNW□ |
|                |               | 10pF            | ±1%                   | CL05C100FB5GNW□ |
|                |               | 10pF            | ±2%                   | CL05C100GB5GNW□ |
|                |               | 10pF            | ±5%                   | CL05C100JB5GNW□ |
|                |               | 11pF            | ±1%                   | CL05C110FB5GNW□ |
|                |               | 11pF            | ±2%                   | CL05C110GB5GNW□ |
|                |               | 11pF            | ±5%                   | CL05C110JB5GNW□ |
|                |               | 12pF            | ±1%                   | CL05C120FB5GNW□ |
|                |               | 12pF            | ±2%                   | CL05C120GB5GNW□ |
|                |               | 12pF            | ±5%                   | CL05C120JB5GNW□ |
|                |               | 15pF            | ±1%                   | CL05C150FB5GNW□ |
|                |               | 15pF            | ±2%                   | CL05C150GB5GNW□ |
|                |               | 15pF            | ±5%                   | CL05C150JB5GNW□ |
|                |               | 18pF            | ±1%                   | CL05C180FB5GNW□ |
|                |               | 18pF            | ±2%                   | CL05C180GB5GNW□ |
|                |               | 18pF            | ±5%                   | CL05C180JB5GNW□ |
|                |               | 20pF            | ±1%                   | CL05C200FB5GNW□ |
|                |               | 20pF            | ±2%                   | CL05C200GB5GNW□ |
|                |               | 20pF            | ±5%                   | CL05C200JB5GNW□ |
|                |               | 22pF            | ±1%                   | CL05C220FB5GNW□ |
|                |               | 22pF            | ±2%                   | CL05C220GB5GNW□ |
|                |               | 22pF            | ±5%                   | CL05C220JB5GNW□ |
|                |               | 24pF            | ±1%                   | CL05C240FB5GNW□ |
|                |               | 24pF            | ±2%                   | CL05C240GB5GNW□ |
|                |               | 24pF            | ±5%                   | CL05C240JB5GNW□ |
|                |               | 27pF            | ±1%                   | CL05C270FB5GNW□ |
|                |               | 27pF            | ±2%                   | CL05C270GB5GNW□ |
|                |               | 27pF            | ±5%                   | CL05C270JB5GNW□ |
|                |               | 33pF            | ±1%                   | CL05C330FB5GNW□ |
|                |               | 33pF            | ±2%                   | CL05C330GB5GNW□ |
| 33pF           | ±5%           | CL05C330JB5GNW□ |                       |                 |
| 39pF           | ±1%           | CL05C390FB5GNW□ |                       |                 |
| 39pF           | ±2%           | CL05C390GB5GNW□ |                       |                 |
| 39pF           | ±5%           | CL05C390JB5GNW□ |                       |                 |
| 47pF           | ±1%           | CL05C470FB5GNW□ |                       |                 |
| 47pF           | ±2%           | CL05C470GB5GNW□ |                       |                 |
| 47pF           | ±5%           | CL05C470JB5GNW□ |                       |                 |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|
| 0.80mm         | 100Vdc        | 0.5pF           | ±0.1pF                | CL10C0R5BCAGQW□ |
|                | 250Vdc        | 0.1pF           | ±0.05pF               | CL10C0R1AEAGQW□ |
|                |               | 0.1pF           | ±0.1pF                | CL10C0R1BEAGQW□ |
|                |               | 0.2pF           | ±0.05pF               | CL10C0R2AEAGQW□ |
|                |               | 0.2pF           | ±0.1pF                | CL10C0R2BEAGQW□ |
|                |               | 0.3pF           | ±0.05pF               | CL10C0R3AEAGQW□ |
|                |               | 0.3pF           | ±0.1pF                | CL10C0R3BEAGQW□ |
|                |               | 0.3pF           | ±0.25pF               | CL10C0R3CEAGQW□ |
|                |               | 0.4pF           | ±0.05pF               | CL10C0R4AEAGQW□ |
|                |               | 0.4pF           | ±0.1pF                | CL10C0R4BEAGQW□ |
|                |               | 0.4pF           | ±0.25pF               | CL10C0R4CEAGQW□ |
|                |               | 0.5pF           | ±0.05pF               | CL10C0R5AEAGQW□ |
|                |               | 0.5pF           | ±0.1pF                | CL10C0R5BEAGQW□ |
|                |               | 0.5pF           | ±0.25pF               | CL10C0R5CEAGQW□ |
|                |               | 0.6pF           | ±0.05pF               | CL10C0R6AEAGQW□ |
|                |               | 0.6pF           | ±0.1pF                | CL10C0R6BEAGQW□ |
|                |               | 0.6pF           | ±0.25pF               | CL10C0R6CEAGQW□ |
|                |               | 0.7pF           | ±0.05pF               | CL10C0R7AEAGQW□ |
|                |               | 0.7pF           | ±0.1pF                | CL10C0R7BEAGQW□ |
|                |               | 0.7pF           | ±0.25pF               | CL10C0R7CEAGQW□ |
|                |               | 0.8pF           | ±0.05pF               | CL10C0R8AEAGQW□ |
|                |               | 0.8pF           | ±0.1pF                | CL10C0R8BEAGQW□ |
|                |               | 0.8pF           | ±0.25pF               | CL10C0R8CEAGQW□ |
|                |               | 0.9pF           | ±0.05pF               | CL10C0R9AEAGQW□ |
|                |               | 0.9pF           | ±0.1pF                | CL10C0R9BEAGQW□ |
|                |               | 0.9pF           | ±0.25pF               | CL10C0R9CEAGQW□ |
|                |               | 1.0pF           | ±0.05pF               | CL10C010AEAGQW□ |
|                |               | 1.0pF           | ±0.1pF                | CL10C010BEAGQW□ |
|                |               | 1.0pF           | ±0.25pF               | CL10C010CEAGQW□ |
|                |               | 1.1pF           | ±0.05pF               | CL10C1R1AEAGQW□ |
|                |               | 1.1pF           | ±0.1pF                | CL10C1R1BEAGQW□ |
|                |               | 1.1pF           | ±0.25pF               | CL10C1R1CEAGQW□ |
|                |               | 1.2pF           | ±0.05pF               | CL10C1R2AEAGQW□ |
|                |               | 1.2pF           | ±0.1pF                | CL10C1R2BEAGQW□ |
|                |               | 1.2pF           | ±0.25pF               | CL10C1R2CEAGQW□ |
|                |               | 1.3pF           | ±0.05pF               | CL10C1R3AEAGQW□ |
|                |               | 1.3pF           | ±0.1pF                | CL10C1R3BEAGQW□ |
|                |               | 1.3pF           | ±0.25pF               | CL10C1R3CEAGQW□ |
|                |               | 1.5pF           | ±0.05pF               | CL10C1R5AEAGQW□ |
|                |               | 1.5pF           | ±0.1pF                | CL10C1R5BEAGQW□ |
|                |               | 1.5pF           | ±0.25pF               | CL10C1R5CEAGQW□ |
|                |               | 1.6pF           | ±0.05pF               | CL10C1R6AEAGQW□ |
|                |               | 1.6pF           | ±0.1pF                | CL10C1R6BEAGQW□ |
|                |               | 1.6pF           | ±0.25pF               | CL10C1R6CEAGQW□ |
|                |               | 1.8pF           | ±0.05pF               | CL10C1R8AEAGQW□ |
|                |               | 1.8pF           | ±0.1pF                | CL10C1R8BEAGQW□ |
|                |               | 1.8pF           | ±0.25pF               | CL10C1R8CEAGQW□ |
| 2.0pF          | ±0.05pF       | CL10C020AEAGQW□ |                       |                 |
| 2.0pF          | ±0.1pF        | CL10C020BEAGQW□ |                       |                 |
| 2.0pF          | ±0.25pF       | CL10C020CEAGQW□ |                       |                 |
| 2.2pF          | ±0.05pF       | CL10C2R2AEAGQW□ |                       |                 |
| 2.2pF          | ±0.1pF        | CL10C2R2BEAGQW□ |                       |                 |
| 2.2pF          | ±0.25pF       | CL10C2R2CEAGQW□ |                       |                 |
| 2.4pF          | ±0.05pF       | CL10C2R4AEAGQW□ |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up ( COG )

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      | Thickness Max.   | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|------------------|---------------|-------------|-----------------------|------------------|
| 0.80mm         | 250Vdc        | 2.4pF            | ±0.1pF                | CL10C2R4BEAGQW □ | 0.80mm           | 250Vdc        | 7.5pF       | ±0.1pF                | CL10C7R5BEAGQW □ |
|                |               | 2.4pF            | ±0.25pF               | CL10C2R4CEAGQW □ |                  |               | 7.5pF       | ±0.25pF               | CL10C7R5CEAGQW □ |
|                |               | 2.7pF            | ±0.05pF               | CL10C2R7AEAGQW □ |                  |               | 7.5pF       | ±0.5pF                | CL10C7R5DEAGQW □ |
|                |               | 2.7pF            | ±0.1pF                | CL10C2R7BEAGQW □ |                  |               | 8.0pF       | ±0.05pF               | CL10C080AEAGQW □ |
|                |               | 2.7pF            | ±0.25pF               | CL10C2R7CEAGQW □ |                  |               | 8.0pF       | ±0.1pF                | CL10C080BEAGQW □ |
|                |               | 3.0pF            | ±0.05pF               | CL10C030AEAGQW □ |                  |               | 8.0pF       | ±0.25pF               | CL10C080CEAGQW □ |
|                |               | 3.0pF            | ±0.1pF                | CL10C030BEAGQW □ |                  |               | 8.0pF       | ±0.5pF                | CL10C080DEAGQW □ |
|                |               | 3.0pF            | ±0.25pF               | CL10C030CEAGQW □ |                  |               | 8.2pF       | ±0.05pF               | CL10C8R2AEAGQW □ |
|                |               | 3.3pF            | ±0.05pF               | CL10C3R3AEAGQW □ |                  |               | 8.2pF       | ±0.1pF                | CL10C8R2BEAGQW □ |
|                |               | 3.3pF            | ±0.1pF                | CL10C3R3BEAGQW □ |                  |               | 8.2pF       | ±0.25pF               | CL10C8R2CEAGQW □ |
|                |               | 3.3pF            | ±0.25pF               | CL10C3R3CEAGQW □ |                  |               | 8.2pF       | ±0.5pF                | CL10C8R2DEAGQW □ |
|                |               | 3.6pF            | ±0.05pF               | CL10C3R6AEAGQW □ |                  |               | 9.0pF       | ±0.05pF               | CL10C090AEAGQW □ |
|                |               | 3.6pF            | ±0.1pF                | CL10C3R6BEAGQW □ |                  |               | 9.0pF       | ±0.1pF                | CL10C090BEAGQW □ |
|                |               | 3.6pF            | ±0.25pF               | CL10C3R6CEAGQW □ |                  |               | 9.0pF       | ±0.25pF               | CL10C090CEAGQW □ |
|                |               | 3.9pF            | ±0.05pF               | CL10C3R9AEAGQW □ |                  |               | 9.0pF       | ±0.5pF                | CL10C090DEAGQW □ |
|                |               | 3.9pF            | ±0.1pF                | CL10C3R9BEAGQW □ |                  |               | 9.1pF       | ±0.05pF               | CL10C9R1AEAGQW □ |
|                |               | 3.9pF            | ±0.25pF               | CL10C3R9CEAGQW □ |                  |               | 9.1pF       | ±0.1pF                | CL10C9R1BEAGQW □ |
|                |               | 4.0pF            | ±0.05pF               | CL10C040AEAGQW □ |                  |               | 9.1pF       | ±0.25pF               | CL10C9R1CEAGQW □ |
|                |               | 4.0pF            | ±0.1pF                | CL10C040BEAGQW □ |                  |               | 9.1pF       | ±0.5pF                | CL10C9R1DEAGQW □ |
|                |               | 4.0pF            | ±0.25pF               | CL10C040CEAGQW □ |                  |               | 10pF        | ±1%                   | CL10C100FEAGQW □ |
|                |               | 4.3pF            | ±0.05pF               | CL10C4R3AEAGQW □ |                  |               | 10pF        | ±2%                   | CL10C100GEAGQW □ |
|                |               | 4.3pF            | ±0.1pF                | CL10C4R3BEAGQW □ |                  |               | 10pF        | ±5%                   | CL10C100JEAGQW □ |
|                |               | 4.3pF            | ±0.25pF               | CL10C4R3CEAGQW □ |                  |               | 11pF        | ±1%                   | CL10C110FEAGQW □ |
|                |               | 4.7pF            | ±0.05pF               | CL10C4R7AEAGQW □ |                  |               | 11pF        | ±2%                   | CL10C110GEAGQW □ |
|                |               | 4.7pF            | ±0.1pF                | CL10C4R7BEAGQW □ |                  |               | 11pF        | ±5%                   | CL10C110JEAGQW □ |
|                |               | 4.7pF            | ±0.25pF               | CL10C4R7CEAGQW □ |                  |               | 12pF        | ±1%                   | CL10C120FEAGQW □ |
|                |               | 5.0pF            | ±0.05pF               | CL10C050AEAGQW □ |                  |               | 12pF        | ±2%                   | CL10C120GEAGQW □ |
|                |               | 5.0pF            | ±0.1pF                | CL10C050BEAGQW □ |                  |               | 12pF        | ±5%                   | CL10C120JEAGQW □ |
|                |               | 5.0pF            | ±0.25pF               | CL10C050CEAGQW □ |                  |               | 15pF        | ±1%                   | CL10C150FEAGQW □ |
|                |               | 5.1pF            | ±0.05pF               | CL10C5R1AEAGQW □ |                  |               | 15pF        | ±2%                   | CL10C150GEAGQW □ |
|                |               | 5.1pF            | ±0.1pF                | CL10C5R1BEAGQW □ |                  |               | 15pF        | ±5%                   | CL10C150JEAGQW □ |
|                |               | 5.1pF            | ±0.25pF               | CL10C5R1CEAGQW □ |                  |               | 18pF        | ±1%                   | CL10C180FEAGQW □ |
|                |               | 5.1pF            | ±0.5pF                | CL10C5R1DEAGQW □ |                  |               | 18pF        | ±2%                   | CL10C180GEAGQW □ |
|                |               | 5.6pF            | ±0.05pF               | CL10C5R6AEAGQW □ |                  |               | 18pF        | ±5%                   | CL10C180JEAGQW □ |
|                |               | 5.6pF            | ±0.1pF                | CL10C5R6BEAGQW □ |                  |               | 20pF        | ±1%                   | CL10C200FEAGQW □ |
|                |               | 5.6pF            | ±0.25pF               | CL10C5R6CEAGQW □ |                  |               | 20pF        | ±2%                   | CL10C200GEAGQW □ |
|                |               | 5.6pF            | ±0.5pF                | CL10C5R6DEAGQW □ |                  |               | 20pF        | ±5%                   | CL10C200JEAGQW □ |
|                |               | 6.0pF            | ±0.05pF               | CL10C060AEAGQW □ |                  |               | 22pF        | ±1%                   | CL10C220FEAGQW □ |
|                |               | 6.0pF            | ±0.1pF                | CL10C060BEAGQW □ |                  |               | 22pF        | ±2%                   | CL10C220GEAGQW □ |
|                |               | 6.0pF            | ±0.25pF               | CL10C060CEAGQW □ |                  |               | 22pF        | ±5%                   | CL10C220JEAGQW □ |
|                |               | 6.0pF            | ±0.5pF                | CL10C060DEAGQW □ |                  |               | 24pF        | ±2%                   | CL10C240GEAGQW □ |
|                |               | 6.2pF            | ±0.05pF               | CL10C6R2AEAGQW □ |                  |               | 24pF        | ±5%                   | CL10C240JEAGQW □ |
|                |               | 6.2pF            | ±0.1pF                | CL10C6R2BEAGQW □ |                  |               | 27pF        | ±1%                   | CL10C270FEAGQW □ |
|                |               | 6.2pF            | ±0.25pF               | CL10C6R2CEAGQW □ |                  |               | 27pF        | ±2%                   | CL10C270GEAGQW □ |
|                |               | 6.2pF            | ±0.5pF                | CL10C6R2DEAGQW □ |                  |               | 27pF        | ±5%                   | CL10C270JEAGQW □ |
|                |               | 6.8pF            | ±0.05pF               | CL10C6R8AEAGQW □ |                  |               | 33pF        | ±1%                   | CL10C330FEAGQW □ |
|                |               | 6.8pF            | ±0.1pF                | CL10C6R8BEAGQW □ |                  |               | 33pF        | ±2%                   | CL10C330GEAGQW □ |
| 6.8pF          | ±0.25pF       | CL10C6R8CEAGQW □ | 33pF                  | ±5%              | CL10C330JEAGQW □ |               |             |                       |                  |
| 6.8pF          | ±0.5pF        | CL10C6R8DEAGQW □ | 39pF                  | ±1%              | CL10C390FEAGQW □ |               |             |                       |                  |
| 7.0pF          | ±0.05pF       | CL10C070AEAGQW □ | 39pF                  | ±2%              | CL10C390GEAGQW □ |               |             |                       |                  |
| 7.0pF          | ±0.1pF        | CL10C070BEAGQW □ | 39pF                  | ±5%              | CL10C390JEAGQW □ |               |             |                       |                  |
| 7.0pF          | ±0.25pF       | CL10C070CEAGQW □ | 47pF                  | ±1%              | CL10C470FEAGQW □ |               |             |                       |                  |
| 7.0pF          | ±0.5pF        | CL10C070DEAGQW □ | 47pF                  | ±2%              | CL10C470GEAGQW □ |               |             |                       |                  |
| 7.5pF          | ±0.05pF       | CL10C7R5AEAGQW □ | 47pF                  | ±5%              | CL10C470JEAGQW □ |               |             |                       |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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## Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|-------------|-----------------------|-----------------|
| 0.95mm         | 250Vdc        | 0.5pF           | ±0.05pF               | CL21C0R5AECGNW□ | 0.95mm          | 250Vdc        | 3.6pF       | ±0.05pF               | CL21C3R6AECGNW□ |
|                |               | 0.5pF           | ±0.1pF                | CL21C0R5BECGNW□ |                 |               | 3.6pF       | ±0.1pF                | CL21C3R6BECGNW□ |
|                |               | 0.5pF           | ±0.25pF               | CL21C0R5CECGNW□ |                 |               | 3.6pF       | ±0.25pF               | CL21C3R6CECGNW□ |
|                |               | 0.6pF           | ±0.05pF               | CL21C0R6AECGNW□ |                 |               | 3.9pF       | ±0.05pF               | CL21C3R9AECGNW□ |
|                |               | 0.6pF           | ±0.1pF                | CL21C0R6BECGNW□ |                 |               | 3.9pF       | ±0.1pF                | CL21C3R9BECGNW□ |
|                |               | 0.6pF           | ±0.25pF               | CL21C0R6CECGNW□ |                 |               | 3.9pF       | ±0.25pF               | CL21C3R9CECGNW□ |
|                |               | 0.7pF           | ±0.05pF               | CL21C0R7AECGNW□ |                 |               | 4.0pF       | ±0.05pF               | CL21C040AECGNW□ |
|                |               | 0.7pF           | ±0.1pF                | CL21C0R7BECGNW□ |                 |               | 4.0pF       | ±0.1pF                | CL21C040BECGNW□ |
|                |               | 0.7pF           | ±0.25pF               | CL21C0R7CECGNW□ |                 |               | 4.0pF       | ±0.25pF               | CL21C040CECGNW□ |
|                |               | 0.8pF           | ±0.05pF               | CL21C0R8AECGNW□ |                 |               | 4.3pF       | ±0.05pF               | CL21C4R3AECGNW□ |
|                |               | 0.8pF           | ±0.1pF                | CL21C0R8BECGNW□ |                 |               | 4.3pF       | ±0.1pF                | CL21C4R3BECGNW□ |
|                |               | 0.8pF           | ±0.25pF               | CL21C0R8CECGNW□ |                 |               | 4.3pF       | ±0.25pF               | CL21C4R3CECGNW□ |
|                |               | 0.9pF           | ±0.05pF               | CL21C0R9AECGNW□ |                 |               | 4.7pF       | ±0.05pF               | CL21C4R7AECGNW□ |
|                |               | 0.9pF           | ±0.1pF                | CL21C0R9BECGNW□ |                 |               | 4.7pF       | ±0.1pF                | CL21C4R7BECGNW□ |
|                |               | 0.9pF           | ±0.25pF               | CL21C0R9CECGNW□ |                 |               | 4.7pF       | ±0.25pF               | CL21C4R7CECGNW□ |
|                |               | 1.0pF           | ±0.05pF               | CL21C010AECGNW□ |                 |               | 5.0pF       | ±0.05pF               | CL21C050AECGNW□ |
|                |               | 1.0pF           | ±0.1pF                | CL21C010BECGNW□ |                 |               | 5.0pF       | ±0.1pF                | CL21C050BECGNW□ |
|                |               | 1.0pF           | ±0.25pF               | CL21C010CECGNW□ |                 |               | 5.0pF       | ±0.25pF               | CL21C050CECGNW□ |
|                |               | 1.1pF           | ±0.05pF               | CL21C1R1AECGNW□ |                 |               | 5.1pF       | ±0.05pF               | CL21C5R1AECGNW□ |
|                |               | 1.1pF           | ±0.1pF                | CL21C1R1BECGNW□ |                 |               | 5.1pF       | ±0.1pF                | CL21C5R1BECGNW□ |
|                |               | 1.1pF           | ±0.25pF               | CL21C1R1CECGNW□ |                 |               | 5.1pF       | ±0.25pF               | CL21C5R1CECGNW□ |
|                |               | 1.2pF           | ±0.05pF               | CL21C1R2AECGNW□ |                 |               | 5.1pF       | ±0.5pF                | CL21C5R1DECENW□ |
|                |               | 1.2pF           | ±0.1pF                | CL21C1R2BECGNW□ |                 |               | 5.6pF       | ±0.05pF               | CL21C5R6AECGNW□ |
|                |               | 1.2pF           | ±0.25pF               | CL21C1R2CECGNW□ |                 |               | 5.6pF       | ±0.1pF                | CL21C5R6BECGNW□ |
|                |               | 1.3pF           | ±0.05pF               | CL21C1R3AECGNW□ |                 |               | 5.6pF       | ±0.25pF               | CL21C5R6CECGNW□ |
|                |               | 1.3pF           | ±0.1pF                | CL21C1R3BECGNW□ |                 |               | 5.6pF       | ±0.5pF                | CL21C5R6DECENW□ |
|                |               | 1.3pF           | ±0.25pF               | CL21C1R3CECGNW□ |                 |               | 6.0pF       | ±0.05pF               | CL21C060AECGNW□ |
|                |               | 1.5pF           | ±0.05pF               | CL21C1R5AECGNW□ |                 |               | 6.0pF       | ±0.1pF                | CL21C060BECGNW□ |
|                |               | 1.5pF           | ±0.1pF                | CL21C1R5BECGNW□ |                 |               | 6.0pF       | ±0.25pF               | CL21C060CECGNW□ |
|                |               | 1.5pF           | ±0.25pF               | CL21C1R5CECGNW□ |                 |               | 6.0pF       | ±0.5pF                | CL21C060DECENW□ |
|                |               | 1.6pF           | ±0.05pF               | CL21C1R6AECGNW□ |                 |               | 6.2pF       | ±0.05pF               | CL21C6R2AECGNW□ |
|                |               | 1.6pF           | ±0.1pF                | CL21C1R6BECGNW□ |                 |               | 6.2pF       | ±0.1pF                | CL21C6R2BECGNW□ |
|                |               | 1.6pF           | ±0.25pF               | CL21C1R6CECGNW□ |                 |               | 6.2pF       | ±0.25pF               | CL21C6R2CECGNW□ |
|                |               | 1.8pF           | ±0.05pF               | CL21C1R8AECGNW□ |                 |               | 6.2pF       | ±0.5pF                | CL21C6R2DECENW□ |
|                |               | 1.8pF           | ±0.1pF                | CL21C1R8BECGNW□ |                 |               | 6.8pF       | ±0.05pF               | CL21C6R8AECGNW□ |
|                |               | 1.8pF           | ±0.25pF               | CL21C1R8CECGNW□ |                 |               | 6.8pF       | ±0.1pF                | CL21C6R8BECGNW□ |
|                |               | 2.0pF           | ±0.05pF               | CL21C020AECGNW□ |                 |               | 6.8pF       | ±0.25pF               | CL21C6R8CECGNW□ |
|                |               | 2.0pF           | ±0.1pF                | CL21C020BECGNW□ |                 |               | 6.8pF       | ±0.5pF                | CL21C6R8DECENW□ |
|                |               | 2.0pF           | ±0.25pF               | CL21C020CECGNW□ |                 |               | 7.0pF       | ±0.05pF               | CL21C070AECGNW□ |
|                |               | 2.2pF           | ±0.05pF               | CL21C2R2AECGNW□ |                 |               | 7.0pF       | ±0.1pF                | CL21C070BECGNW□ |
| 2.2pF          | ±0.1pF        | CL21C2R2BECGNW□ | 7.0pF                 | ±0.25pF         | CL21C070CECGNW□ |               |             |                       |                 |
| 2.2pF          | ±0.25pF       | CL21C2R2CECGNW□ | 7.0pF                 | ±0.5pF          | CL21C070DECENW□ |               |             |                       |                 |
| 2.4pF          | ±0.05pF       | CL21C2R4AECGNW□ | 7.5pF                 | ±0.05pF         | CL21C7R5AECGNW□ |               |             |                       |                 |
| 2.4pF          | ±0.1pF        | CL21C2R4BECGNW□ | 7.5pF                 | ±0.1pF          | CL21C7R5BECGNW□ |               |             |                       |                 |
| 2.4pF          | ±0.25pF       | CL21C2R4CECGNW□ | 7.5pF                 | ±0.25pF         | CL21C7R5CECGNW□ |               |             |                       |                 |
| 2.7pF          | ±0.05pF       | CL21C2R7AECGNW□ | 7.5pF                 | ±0.5pF          | CL21C7R5DECENW□ |               |             |                       |                 |
| 2.7pF          | ±0.1pF        | CL21C2R7BECGNW□ | 8.0pF                 | ±0.05pF         | CL21C080AECGNW□ |               |             |                       |                 |
| 2.7pF          | ±0.25pF       | CL21C2R7CECGNW□ | 8.0pF                 | ±0.1pF          | CL21C080BECGNW□ |               |             |                       |                 |
| 3.0pF          | ±0.05pF       | CL21C030AECGNW□ | 8.0pF                 | ±0.25pF         | CL21C080CECGNW□ |               |             |                       |                 |
| 3.0pF          | ±0.1pF        | CL21C030BECGNW□ | 8.0pF                 | ±0.5pF          | CL21C080DECENW□ |               |             |                       |                 |
| 3.0pF          | ±0.25pF       | CL21C030CECGNW□ | 8.2pF                 | ±0.05pF         | CL21C8R2AECGNW□ |               |             |                       |                 |
| 3.3pF          | ±0.05pF       | CL21C3R3AECGNW□ | 8.2pF                 | ±0.1pF          | CL21C8R2BECGNW□ |               |             |                       |                 |
| 3.3pF          | ±0.1pF        | CL21C3R3BECGNW□ | 8.2pF                 | ±0.25pF         | CL21C8R2CECGNW□ |               |             |                       |                 |
| 3.3pF          | ±0.25pF       | CL21C3R3CECGNW□ | 8.2pF                 | ±0.5pF          | CL21C8R2DECENW□ |               |             |                       |                 |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

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Product Line Up (COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |
|----------------|---------------|------------------|-----------------------|------------------|
| 0.95mm         | 250Vdc        | 9.0pF            | ±0.05pF               | CL21C090AECGNW □ |
|                |               | 9.0pF            | ±0.1pF                | CL21C090BECGNW □ |
|                |               | 9.0pF            | ±0.25pF               | CL21C090CECGNW □ |
|                |               | 9.0pF            | ±0.5pF                | CL21C090DECGNW □ |
|                |               | 9.1pF            | ±0.05pF               | CL21C9R1AECGNW □ |
|                |               | 9.1pF            | ±0.1pF                | CL21C9R1BECGNW □ |
|                |               | 9.1pF            | ±0.25pF               | CL21C9R1CECGNW □ |
|                |               | 9.1pF            | ±0.5pF                | CL21C9R1DECGNW □ |
|                |               | 10pF             | ±1%                   | CL21C100FECGNW □ |
|                |               | 10pF             | ±2%                   | CL21C100GECGNW □ |
|                |               | 10pF             | ±5%                   | CL21C100JECGNW □ |
|                |               | 11pF             | ±1%                   | CL21C110FECGNW □ |
|                |               | 11pF             | ±2%                   | CL21C110GECGNW □ |
|                |               | 11pF             | ±5%                   | CL21C110JECGNW □ |
|                |               | 12pF             | ±1%                   | CL21C120FECGNW □ |
|                |               | 12pF             | ±2%                   | CL21C120GECGNW □ |
|                |               | 12pF             | ±5%                   | CL21C120JECGNW □ |
|                |               | 15pF             | ±1%                   | CL21C150FECGNW □ |
|                |               | 15pF             | ±2%                   | CL21C150GECGNW □ |
|                |               | 15pF             | ±5%                   | CL21C150JECGNW □ |
|                |               | 18pF             | ±1%                   | CL21C180FECGNW □ |
|                |               | 18pF             | ±2%                   | CL21C180GECGNW □ |
|                |               | 18pF             | ±5%                   | CL21C180JECGNW □ |
|                |               | 20pF             | ±1%                   | CL21C200FECGNW □ |
|                |               | 20pF             | ±2%                   | CL21C200GECGNW □ |
|                |               | 20pF             | ±5%                   | CL21C200JECGNW □ |
|                |               | 22pF             | ±1%                   | CL21C220FECGNW □ |
|                |               | 22pF             | ±2%                   | CL21C220GECGNW □ |
|                |               | 22pF             | ±5%                   | CL21C220JECGNW □ |
|                |               | 24pF             | ±1%                   | CL21C240FECGNW □ |
|                |               | 24pF             | ±2%                   | CL21C240GECGNW □ |
|                |               | 24pF             | ±5%                   | CL21C240JECGNW □ |
|                |               | 27pF             | ±1%                   | CL21C270FECGNW □ |
|                |               | 27pF             | ±2%                   | CL21C270GECGNW □ |
|                |               | 27pF             | ±5%                   | CL21C270JECGNW □ |
|                |               | 33pF             | ±1%                   | CL21C330FECGNW □ |
|                |               | 33pF             | ±2%                   | CL21C330GECGNW □ |
|                |               | 33pF             | ±5%                   | CL21C330JECGNW □ |
|                |               | 39pF             | ±1%                   | CL21C390FECGNW □ |
|                |               | 39pF             | ±2%                   | CL21C390GECGNW □ |
| 39pF           | ±5%           | CL21C390JECGNW □ |                       |                  |
| 47pF           | ±1%           | CL21C470FECGNW □ |                       |                  |
| 47pF           | ±2%           | CL21C470GECGNW □ |                       |                  |
| 47pF           | ±5%           | CL21C470JECGNW □ |                       |                  |
| 62pF           | ±1%           | CL21C620FECGNW □ |                       |                  |
| 62pF           | ±2%           | CL21C620GECGNW □ |                       |                  |
| 62pF           | ±5%           | CL21C620JECGNW □ |                       |                  |
| 68pF           | ±1%           | CL21C680FECGNW □ |                       |                  |
| 68pF           | ±2%           | CL21C680GECGNW □ |                       |                  |
| 68pF           | ±5%           | CL21C680JECGNW □ |                       |                  |
| 82pF           | ±1%           | CL21C820FECGNW □ |                       |                  |
| 82pF           | ±2%           | CL21C820GECGNW □ |                       |                  |
| 82pF           | ±5%           | CL21C820JECGNW □ |                       |                  |
| 100pF          | ±1%           | CL21C101FECGNW □ |                       |                  |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.95mm         | 250Vdc        | 100pF       | ±2%                   | CL21C101GECGNW □ |
|                |               | 100pF       | ±5%                   | CL21C101JECGNW □ |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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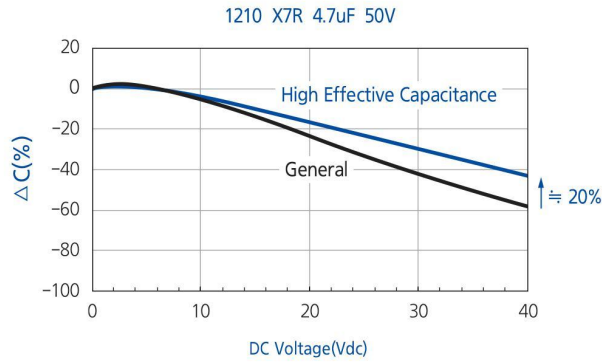
# High Effective Capacitance Industrial Capacitors

N3W – X5R / X7R

## Feature



- Excellent DC – bias characteristics with fine powder
- Enhance high temperature reliability
- Speical outgoing inspection for industrial application (HALT, etc)
- Advantage of fine powder technology

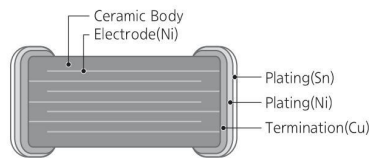
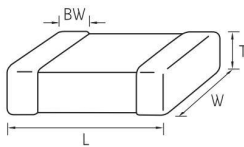


By using finer powder : Reduced capacitance degradation by bias and aging

## Application

- 24 / 48V input line filter for power supply
- Network, Power application and etc.
- Ideal for decoupling and filtering applications (Class II : X7R)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 1.25±0.10 | F              | 0.50+0.20/-0.30 |
| 32        | 1210     | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | H              | 0.50±0.30       |
|           |          | 3.20±0.30     | 2.50±0.20 | 2.50±0.20 | J              |                 |
|           |          | 3.20±0.40     | 2.50±0.30 | 2.50±0.30 | V              |                 |

### Industrial Capacitance Table (X5R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |    |    |     |     |     |     |     |     |     |    |  |  |
|----------------------|---------------------------|-------------|----|----|-----|-----|-----|-----|-----|-----|-----|----|--|--|
|                      |                           | nF          |    |    |     |     |     | uF  |     |     |     |    |  |  |
|                      |                           | 10          | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 6.8 | 10 |  |  |
| 0805(2012)           | 6.3                       |             |    |    |     |     |     |     |     |     |     |    |  |  |

### Industrial Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |    |    |     |     |     |     |     |     |     |    |  |  |
|----------------------|---------------------------|-------------|----|----|-----|-----|-----|-----|-----|-----|-----|----|--|--|
|                      |                           | nF          |    |    |     |     |     | uF  |     |     |     |    |  |  |
|                      |                           | 10          | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 6.8 | 10 |  |  |
| 0402(1005)           | 16                        |             |    |    |     |     |     |     |     |     |     |    |  |  |
| 1206<br>(3216)       | 50                        |             |    |    |     |     |     |     |     |     |     |    |  |  |
|                      | 100                       |             |    |    |     |     |     |     |     |     |     |    |  |  |
| 1210<br>(3225)       | 50                        |             |    |    |     |     |     |     |     |     |     |    |  |  |
|                      | 100                       |             |    |    |     |     |     |     |     |     |     |    |  |  |

### Product Line Up (X5R)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     | Remark |
|-------------------|------------------|-------------|--------------------------|-----------------|--------|
| 1.35mm            | 6.3Vdc           | 10uF        | ±10%                     | CL21A106KQFN3W□ |        |

### Product Line Up (X7R)

■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     | Remark |
|-------------------|------------------|-------------|--------------------------|-----------------|--------|
| 0.55mm            | 16Vdc            | 100nF       | ±10%                     | CL05B104K05N3W□ |        |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     | Remark |
|-------------------|------------------|-------------|--------------------------|-----------------|--------|
| 1.80mm            | 50Vdc            | 4.7uF       | ±10%                     | CL31B475KBHN3W□ |        |

■ Size : 3.20 X 2.50mm (inch : 1210)

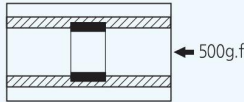
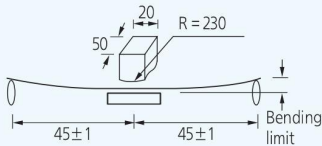
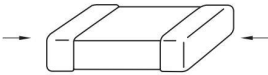
| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     | Remark |
|-------------------|------------------|-------------|--------------------------|-----------------|--------|
| 2.70mm            | 50Vdc            | 10uF        | ±10%                     | CL32B106KBJN3W□ |        |
|                   |                  | 4.7uF       | ±10%                     | CL32B475KBJN3W□ |        |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Reliability Test Condition

| No.   | Item   | Performance   | Test condition   |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|---|--|---|--|-----------------|----------------------------|-------------------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|--------|-------------------------|---|------|
| 1   | Appearance   | No abnormal exterior appearance   | Visual Inspection through Microscope (X10)   |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 2   | Insulation resistance  | 10,000MΩ min. or 500MΩ · μF min. (or *100MΩ · μF) product whichever is smaller.<br>(Rated voltage ≤ 16V: 10,000MΩ min. or 100MΩ · μF min. product whichever is smaller) | Apply the rated voltage for 60 ~ 120sec.<br>Rated voltage > 500V : Insulation resistance shall be measured with 500±50Vdc  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 3   | Withstanding voltage   | No dielectric breakdown or mechanical breakdown   | Apply the specified voltage* for 1 ~ 5 sec.<br>Charge / Discharge current limit : 50mA max<br>*CLASS I (Rated Voltage < 100V) : 300% of the rated Voltage<br>CLASS II (Rated Voltage < 100V) : 250% of the rated Voltage<br>In the case of rated Voltage ≥ 100V products, following condition should be applied.<br>100V ≤ Rated Voltage < 500V : 200% of the rated Voltage<br>500V ≤ Rated Voltage < 1000V : 150% of the rated Voltage<br>Rated Voltage ≥ 1000V : 120% of the rated Voltage |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 4   | Capacitance  | Class I   | Within the specified tolerance   |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|   |  | Class II  | Within the specified tolerance   |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|   | Q  | Class I   | Capacitance ≥ 30pF : Q ≥ 1,000<br>< 30pF : Q ≥ 400+20×C<br>(C : Capacitance)   |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 5   | Tanδ   | Class II  | 1.Characteristic : A(X5R)  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|   |  |   | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Spec</th> </tr> </thead> <tbody> <tr> <td>50V / 35V</td> <td>0.025 max / 0.05 max*</td> </tr> <tr> <td>25V</td> <td>0.025 max / 0.05 max* / 0.10 max*</td> </tr> <tr> <td>16V</td> <td>0.035 max / 0.05 max* / 0.10 max*</td> </tr> <tr> <td>≤ 10V</td> <td>0.05 max / 0.10 max*</td> </tr> </tbody> </table>   | Rated Voltage   | Spec                       | 50V / 35V         | 0.025 max / 0.05 max*             | 25V    | 0.025 max / 0.05 max* / 0.10 max* | 16V    | 0.035 max / 0.05 max* / 0.10 max* | ≤ 10V  | 0.05 max / 0.10 max*    |   |      |
|   |  |   | Rated Voltage  | Spec            |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 50V / 35V   | 0.025 max / 0.05 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 25V   | 0.025 max / 0.05 max* / 0.10 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 16V   | 0.035 max / 0.05 max* / 0.10 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| ≤ 10V   | 0.05 max / 0.10 max*   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 2.Characteristic : B(X7R), X(X6S), Y(X7S)   |  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|   |  |   | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Spec</th> </tr> </thead> <tbody> <tr> <td>50V ≥ / 35V / 25V</td> <td>0.025 max / 0.05 max* / 0.10 max*</td> </tr> <tr> <td>16V</td> <td>0.035 max / 0.10 max*</td> </tr> <tr> <td>≤ 10V</td> <td>0.05 max / 0.10 max*</td> </tr> </tbody> </table>  | Rated Voltage   | Spec                       | 50V ≥ / 35V / 25V | 0.025 max / 0.05 max* / 0.10 max* | 16V    | 0.035 max / 0.10 max*             | ≤ 10V  | 0.05 max / 0.10 max*              |        |                         |   |      |
| Rated Voltage   | Spec   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 50V ≥ / 35V / 25V   | 0.025 max / 0.05 max* / 0.10 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 16V   | 0.035 max / 0.10 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| ≤ 10V   | 0.05 max / 0.10 max*   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|   |  |   | 3.Characteristic : F(Y5V)  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
|   |  |   | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Spec</th> </tr> </thead> <tbody> <tr> <td>50V / 35V / 25V</td> <td>0.05 max / 0.07 max* / 0.09 max*</td> </tr> <tr> <td>16V</td> <td>0.07 max / 0.09 max* / 0.125 max*</td> </tr> <tr> <td>10V</td> <td>0.125 max / 0.16 max*</td> </tr> <tr> <td>≤ 6.3V</td> <td>0.16 max</td> </tr> </tbody> </table>   | Rated Voltage   | Spec                       | 50V / 35V / 25V   | 0.05 max / 0.07 max* / 0.09 max*  | 16V    | 0.07 max / 0.09 max* / 0.125 max* | 10V    | 0.125 max / 0.16 max*             | ≤ 6.3V | 0.16 max                |   |      |
| Rated Voltage   | Spec   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 50V / 35V / 25V   | 0.05 max / 0.07 max* / 0.09 max*   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 16V   | 0.07 max / 0.09 max* / 0.125 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 10V   | 0.125 max / 0.16 max*  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| ≤ 6.3V  | 0.16 max   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| <p>Capacitance shall be measured after the heat treatment of 150+0/-10°C for 1hr and leaving for 24±2hr at room temperature. (Class II)</p> <p>* The conditions of measurement may be altered upon request. You can check the specification at the web site or contact sales people for each product with mark*</p>   |  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 6   | Temperature characteristics of capacitance   | Class I   | <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Temp. coefficient (PPM/°C)</th> </tr> </thead> <tbody> <tr> <td>C(C0G)</td> <td>0±30</td> </tr> </tbody> </table>  | Characteristic  | Temp. coefficient (PPM/°C) | C(C0G)            | 0±30                              |        |                                   |        |                                   |        |                         |   |      |
|   |  | Characteristic  | Temp. coefficient (PPM/°C)   |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| C(C0G)  | 0±30   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| Class II  | <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change(%) with No bias</th> </tr> </thead> <tbody> <tr> <td>A(X5R) / B(X7R)</td> <td>±15%</td> </tr> <tr> <td>X(X6S) / Y(X7S)</td> <td>±22%</td> </tr> <tr> <td>Z(X7T)</td> <td>+22% ~ -33%</td> </tr> <tr> <td>F(Y5V)</td> <td>+22% ~ -82%</td> </tr> </tbody> </table> | Characteristic  | Capacitance change(%) with No bias   | A(X5R) / B(X7R) | ±15%                       | X(X6S) / Y(X7S)   | ±22%                              | Z(X7T) | +22% ~ -33%                       | F(Y5V) | +22% ~ -82%                       |        |                         |   |      |
| Characteristic  | Capacitance change(%) with No bias   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| A(X5R) / B(X7R)   | ±15%   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| X(X6S) / Y(X7S)   | ±22%   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| Z(X7T)  | +22% ~ -33%  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| F(Y5V)  | +22% ~ -82%  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| <p>Capacitance shall be measured by the steps shown in the following table.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25±2</td> </tr> <tr> <td>2</td> <td>Min. operating temp. ±2</td> </tr> <tr> <td>3</td> <td>25±2</td> </tr> <tr> <td>4</td> <td>Max. operating temp. ±2</td> </tr> <tr> <td>5</td> <td>25±2</td> </tr> </tbody> </table> <p>■ Class I<br/>Temperature Coefficient shall be calculated from the formula as below<br/>Temp. Coefficient = <math>\frac{C2 - C1}{C1 \times \Delta T} \times 10^6</math> [ppm/°C]<br/>C1 : Capacitance at step 3<br/>C2 : Capacitance at 125°C<br/>ΔT : 125°C - 25°C = 100°C</p> <p>■ Class II<br/>Capacitance change shall be calculated from the formula as below<br/>ΔC = <math>\frac{C2 - C1}{C1} \times 100</math> (%)<br/>C1 : Capacitance at step 3<br/>C2 : Capacitance at step 2 or step 4</p> |  |   |  | Step            | Temperature(°C)            | 1                 | 25±2                              | 2      | Min. operating temp. ±2           | 3      | 25±2                              | 4      | Max. operating temp. ±2 | 5 | 25±2 |
| Step  | Temperature(°C)  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 1   | 25±2   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 2   | Min. operating temp. ±2  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 3   | 25±2   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 4   | Max. operating temp. ±2  |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |
| 5   | 25±2   |   |  |                 |                            |                   |                                   |        |                                   |        |                                   |        |                         |   |      |



| No.            | Item                                    | Performance  | Test condition   |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
|----------------|---|--|--|--------------------|--------------|---|----------|--------------|----------|------------|---|-------------|--|------------|---|----------|----|---|-----------|----|
| 7              | Adhesive strength of termination        | No indication of peeling shall occur on the terminal electrode.  | Apply 500g.f pressure for 10±1 sec.<br>※ 200g.f for size 0201 / 100g.f for size 01005<br>   |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| 8              | Bending strength                        | No mechanical damage shall occur.<br><br><table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td>Within±5% or ±0.5pF whichever is larger</td> </tr> <tr> <td>Class II</td> <td>Within±12.5%</td> </tr> <tr> <td>Class II</td> <td>Within±30%</td> </tr> </tbody> </table>   | Characteristic   | Capacitance change | Class I      | Within±5% or ±0.5pF whichever is larger | Class II | Within±12.5% | Class II | Within±30% | • Bending Limit : 1mm • Test Speed : 1.0mm /sec.<br>Keep the test board at the limit point in 5sec. then Measure Capacitance.<br>※ Industrial Capacitor<br>- SW6 / ZW6 / Z46 Code, Bending Limit : 3mm<br>- Z4J Code, Bending Limit : 5mm<br>                               |             |  |            |   |          |    |   |           |    |
| Characteristic | Capacitance change                      |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class I        | Within±5% or ±0.5pF whichever is larger |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±12.5%                            |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±30%                              |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| 9              | Solderability                           | More than 75% of the terminal surface is to be soldered newly, so metal part does not come out or dissolve<br>※ Industrial Capacitor : Z46 / Z4J Code, More than 95%<br>  | <table border="1"> <thead> <tr> <th>Solder</th> <th>Sn_Ag3_0.5Cu</th> </tr> </thead> <tbody> <tr> <td>Solder temp.</td> <td>245±5℃</td> </tr> <tr> <td>Flux</td> <td>RMA Type</td> </tr> <tr> <td>Dip time</td> <td>3±0.3sec.</td> </tr> <tr> <td>Pre-heating</td> <td>at 80 ~ 120℃ for 10 ~ 30sec.</td> </tr> </tbody> </table> | Solder             | Sn_Ag3_0.5Cu | Solder temp.                            | 245±5℃   | Flux         | RMA Type | Dip time   | 3±0.3sec.   | Pre-heating | at 80 ~ 120℃ for 10 ~ 30sec.   |            |   |          |    |   |           |    |
| Solder         | Sn_Ag3_0.5Cu                            |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Solder temp.   | 245±5℃                                  |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Flux           | RMA Type                                |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Dip time       | 3±0.3sec.                               |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Pre-heating    | at 80 ~ 120℃ for 10 ~ 30sec.            |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| 10             | Resistance to soldering heat            | No mechanical damage shall occur.<br><br><table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td>±2.5% or ±0.25pF whichever is larger</td> </tr> <tr> <td>Class II</td> <td>Within±7.5%</td> </tr> <tr> <td>Class II</td> <td>Within±20%</td> </tr> </tbody> </table>   | Characteristic   | Capacitance change | Class I      | ±2.5% or ±0.25pF whichever is larger    | Class II | Within±7.5%  | Class II | Within±20% | Solder temperature: 270±5℃ DIP TIME : 10±1 sec.<br>Each termination shall be fully immersed and preheated as below :<br><table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(℃)</th> <th>Time(sec.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>80 ~ 100</td> <td>60</td> </tr> <tr> <td>2</td> <td>150 ~ 180</td> <td>60</td> </tr> </tbody> </table> | Step        | Temp.(℃)   | Time(sec.) | 1 | 80 ~ 100 | 60 | 2 | 150 ~ 180 | 60 |
| Characteristic | Capacitance change                      |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class I        | ±2.5% or ±0.25pF whichever is larger    |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±7.5%                             |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±20%                              |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Step           | Temp.(℃)                                | Time(sec.)   |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| 1              | 80 ~ 100                                | 60   |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| 2              | 150 ~ 180                               | 60   |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| 11             | Vibration test                          | No mechanical damage shall occur.<br><br><table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td>±2.5% or ±0.25pF whichever is larger</td> </tr> <tr> <td>Class II</td> <td>Within±5%</td> </tr> <tr> <td>Class II</td> <td>Within±5%</td> </tr> <tr> <td>Class II</td> <td>Within±10%</td> </tr> </tbody> </table> | Characteristic   | Capacitance change | Class I      | ±2.5% or ±0.25pF whichever is larger    | Class II | Within±5%    | Class II | Within±5%  | Class II  | Within±10%  | The capacitor shall be subjected to a harmonic motion having a total amplitude of 1.5mm changing frequency from 10Hz to 55Hz and back to 10Hz in about 1 min.<br>Repeat this for 2hours each in 3mutually perpendicular directions<br>※ Industrial Capacitor : Z46 / Z4J Code<br>With frequency from 10 ~ 2000Hz during 20min.<br>3 directions X 12 times (total 36 times, 12hr)<br><br>Perform the initial measurement according to Note1.<br>Please refer to p.131<br><br>Final measurement<br>Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement. |            |   |          |    |   |           |    |
| Characteristic | Capacitance change                      |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class I        | ±2.5% or ±0.25pF whichever is larger    |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±5%                               |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±5%                               |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
| Class II       | Within±10%                              |  |  |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
|                |   | Q (Class I)<br>Tanδ (Class II)<br>Insulation resistance<br>Withstanding voltage  | Within the specified initial value<br>Within the specified initial value<br>Within the specified initial value<br>No breakdown of dielectric   |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |
|                |   | Q (Class I)<br>Tanδ (Class II)<br>Insulation resistance  | Within the specified initial value<br>Within the specified initial value<br>Within the specified initial value   |                    |              |   |          |              |          |            |   |             |  |            |   |          |    |   |           |    |

# Reliability Test Condition

| No.   | Item  | Performance   | Test condition   |                    |         |  |          |                     |   |
|---|---|---|--|--------------------|---------|--|----------|---------------------|---|
| 12  | Appearance  | No mechanical damage shall occur.   | Applied voltage : Rated Voltage                        |                    |         |  |          |                     |   |
|   | Capacitance   | <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td><math>\pm 7.5\%</math> or <math>\pm 0.75\text{pF}</math> whichever is larger</td> </tr> <tr> <td>Class II</td> <td>Within <math>\pm 12.5\%</math></td> </tr> </tbody> </table>         | Characteristic   | Capacitance change | Class I | $\pm 7.5\%$ or $\pm 0.75\text{pF}$ whichever is larger | Class II | Within $\pm 12.5\%$ | Temperature : $40\pm 2^\circ\text{C}$<br>Humidity : 90~95%RH<br>Duration time : 500+12/-0hr.<br>Charge / Discharge current : 50mA max.<br><br>※ Industrial Capacitor : Z46 / Z4J Code<br>85 $\pm 2^\circ\text{C}$ , 80~85%RH, 1000+48/-0hr. |
|   |   | Characteristic  | Capacitance change                                     |                    |         |  |          |                     |   |
|   |   | Class I   | $\pm 7.5\%$ or $\pm 0.75\text{pF}$ whichever is larger |                    |         |  |          |                     |   |
|   | Class II  | Within $\pm 12.5\%$   |  |                    |         |  |          |                     |   |
| <table border="1"> <tbody> <tr> <td>A(X5R), B(X7R), X(X6S), Y(X7S), Z(X7T)</td> <td>Within <math>\pm 12.5\%</math></td> </tr> <tr> <td>F(Y5V)</td> <td><math>\pm 30\%</math></td> </tr> </tbody> </table> | A(X5R), B(X7R), X(X6S), Y(X7S), Z(X7T)  | Within $\pm 12.5\%$   | F(Y5V)   | $\pm 30\%$         |         |  |          |                     |   |
| A(X5R), B(X7R), X(X6S), Y(X7S), Z(X7T)  | Within $\pm 12.5\%$   |   |  |                    |         |  |          |                     |   |
| F(Y5V)  | $\pm 30\%$  |   |  |                    |         |  |          |                     |   |
| Q (Class I)   | Capacitance $\geq 30\text{pF}$ : Q $\geq 200$<br>$< 30\text{pF}$ : Q $\geq 100 + 10 / 3 \times C$ (C : Capacitance)   |   |  |                    |         |  |          |                     |   |
| Tan $\delta$ (Class II)   | 1. Capacitance : A(X5R)<br>0.05 max / 0.075 max* (35V / 50V)<br>0.05 max / 0.075 max* / 0.125 max* (16V / 25V)<br>0.075 max / 0.125 max* ( $\leq 10\text{V}$ )<br>2. Capacitance : B(X7R), X(X6S)<br>0.05 max / 0.125 max* (16V / 25V / 35V / 50V $\geq$ )<br>0.075 max / 0.125 max* ( $\leq 10\text{V}$ )<br>3. Capacitance : F(Y5V)<br>0.09 max (50V)<br>0.09 max / 0.125 max* (25V / 35V)<br>0.09 max / 0.125 max* / 0.16 max* (16V)<br>0.16 max / 0.195 max* (10V)<br>0.195 max (4V / 6.3V)<br>4. Industrial Capacitor : Z46 / Z4J Code<br>0.035 max* ( $\geq 25\text{V}$ )<br>0.050 max* (16V)<br>0.075 max* (10V) | Perform the initial measurement according to Note1.<br>Perform the final measurement according to Note2.<br>Please refer to p.131<br><br><br>This test is only applied to Rated Voltage $\leq 500\text{V}$ products.<br>You can check the specification at the web site or contact sales people for each product with mark* |  |                    |         |  |          |                     |   |
| Insulation resistance   | 500M $\Omega$ min. or 25M $\Omega$ $\cdot \mu\text{F}$ min.<br>product whichever is smaller / 12.5M $\Omega$ $\cdot \mu\text{F}$ or over*   |   |  |                    |         |  |          |                     |   |
| 13  | Appearance  | No mechanical damage shall occur.   | Temperature : Max. operating temperature               |                    |         |  |          |                     |   |
|   | Capacitance   | <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td><math>\pm 3\%</math> or <math>\pm 0.30\text{pF}</math> whichever is larger</td> </tr> <tr> <td>Class II</td> <td>Within <math>\pm 12.5\%</math></td> </tr> </tbody> </table>           | Characteristic   | Capacitance change | Class I | $\pm 3\%$ or $\pm 0.30\text{pF}$ whichever is larger   | Class II | Within $\pm 12.5\%$ | Duration Time: 1000+48 / -0hr.<br>Charge / Discharge Current : 50mAmax.<br>Apply Voltage : 100% of Rated Voltage*<br>It depends on each item (120% / 150% / 200% Rated Voltage)   |
|   |   | Characteristic  | Capacitance change                                     |                    |         |  |          |                     |   |
|   |   | Class I   | $\pm 3\%$ or $\pm 0.30\text{pF}$ whichever is larger   |                    |         |  |          |                     |   |
|   | Class II  | Within $\pm 12.5\%$   |  |                    |         |  |          |                     |   |
| <table border="1"> <tbody> <tr> <td>A(X5R), B(X7R), X(X6S), Y(X7S), Z(X7T)</td> <td>Within <math>\pm 12.5\%</math></td> </tr> <tr> <td>F(Y5V)</td> <td>30%</td> </tr> </tbody> </table>                   | A(X5R), B(X7R), X(X6S), Y(X7S), Z(X7T)  | Within $\pm 12.5\%$   | F(Y5V)   | 30%                |         |  |          |                     |   |
| A(X5R), B(X7R), X(X6S), Y(X7S), Z(X7T)  | Within $\pm 12.5\%$   |   |  |                    |         |  |          |                     |   |
| F(Y5V)  | 30%   |   |  |                    |         |  |          |                     |   |
| Q (Class I)   | Capacitance $\geq 30\text{pF}$ : Q $\geq 350$<br>$10\text{pF} \leq \text{Capacitance} < 30\text{pF}$ : Q $\geq 275 + 2.5 \times C$<br>Capacitance $< 10\text{pF}$ : Q $\geq 200 + 10 \times C$ (C : Capacitance)  |   |  |                    |         |  |          |                     |   |
| Tan $\delta$ (Class II)   | 1. Capacitance : A(X5R)<br>0.05 max / 0.075 max* (35V / 50V)<br>0.05 max / 0.075 max* / 0.125 max* (16V / 25V)<br>0.075 max / 0.125 max* ( $\leq 10\text{V}$ )<br>2. Capacitance : B(X7R), X(X6S)<br>0.05 max / 0.125 max* (16V / 25V / 35V / 50V $\geq$ )<br>0.075 max / 0.125 max* ( $\leq 10\text{V}$ )<br>3. Capacitance : F(Y5V)<br>0.09 max (50V)<br>0.09 max / 0.125 max* (25V / 35V)<br>0.09 max / 0.125 max* / 0.16 max* (16V)<br>0.16 max / 0.195 max* (10V)<br>0.195 max (4V / 6.3V)<br>4. Industrial Capacitor : Z46 / Z4J Code<br>0.035 max* ( $\geq 25\text{V}$ )<br>0.050 max* (16V)<br>0.075 max* (10V) | Perform the initial measurement according to Note1.<br>Perform the final measurement according to Note2.<br>Please refer to p.131<br><br><br>You can check the specification at the web site or contact sales people for each product with mark*  |  |                    |         |  |          |                     |   |
| Insulation resistance   | 1,000M $\Omega$ min. or 50M $\Omega$ $\cdot \mu\text{F}$ min.<br>product whichever is smaller / 25M $\Omega$ $\cdot \mu\text{F}$ or over*   |   |  |                    |         |  |          |                     |   |

| No.                      | Item   | Performance | Test condition   |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|--------------------------|--|-------------|--|--|--|----------|--|---|------------|--|--------|--------------------|--------------------------|-------------------|-----------|-------------------|---|------|-----------|------------|---|----------------------------------|----|---|----|-------|---|----------------------------------|----|---|----|-------|
| 14                       | Temperature cycle  | Appearance  | No mechanical damage shall occur.  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  | Capacitance | <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td><math>\pm 2.5\%</math> or <math>\pm 0.25\text{pF}</math> whichever is larger</td> </tr> <tr> <td rowspan="4">Class II</td> <td>A(X5R)</td> <td>Within <math>\pm 7.5\%</math> / <math>\pm 10\%</math> / <math>\pm 15\%</math>*</td> </tr> <tr> <td>B(X7R)</td> <td>Within <math>\pm 7.5\%</math></td> </tr> <tr> <td>X(X6S), Y(X7S)<br/>Z(X7T)</td> <td>Within <math>\pm 15\%</math></td> </tr> <tr> <td>F(Y5V)</td> <td>Within <math>\pm 20\%</math></td> </tr> </tbody> </table> | Characteristic   | Capacitance change                             | Class I  | $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger | Class II  | A(X5R)     | Within $\pm 7.5\%$ / $\pm 10\%$ / $\pm 15\%$ * | B(X7R) | Within $\pm 7.5\%$ | X(X6S), Y(X7S)<br>Z(X7T) | Within $\pm 15\%$ | F(Y5V)    | Within $\pm 20\%$ | Capacitor shall be subjected to 5 cycles.<br>※ Industrial Capacitor : Z46 / Z4J Code, 1000 cycles.<br>Condition for 1 cycle : <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min. operating temperature +0/-3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25</td> <td>2 ~ 3</td> </tr> <tr> <td>3</td> <td>Max. operating temperature +3/-0</td> <td>30</td> </tr> <tr> <td>4</td> <td>25</td> <td>2 ~ 3</td> </tr> </tbody> </table> | Step | Temp.(°C) | Time(min.) | 1 | Min. operating temperature +0/-3 | 30 | 2 | 25 | 2 ~ 3 | 3 | Max. operating temperature +3/-0 | 30 | 4 | 25 | 2 ~ 3 |
|                          |  |             | Characteristic   | Capacitance change                                     |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  |             | Class I  | $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  |             | Class II   | A(X5R)   | Within $\pm 7.5\%$ / $\pm 10\%$ / $\pm 15\%$ * |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  |             |  | B(X7R)   | Within $\pm 7.5\%$                             |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| X(X6S), Y(X7S)<br>Z(X7T) | Within $\pm 15\%$  |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| F(Y5V)                   | Within $\pm 20\%$  |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| Step                     | Temp.(°C)  | Time(min.)  |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| 1                        | Min. operating temperature +0/-3   | 30          |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| 2                        | 25   | 2 ~ 3       |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| 3                        | Max. operating temperature +3/-0   | 30          |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| 4                        | 25   | 2 ~ 3       |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| Q (Class I)              | Within the specified initial value   |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| Tanδ (Class II)          | Within the specified initial value   |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| Insulation resistance    | Within the specified initial value   |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| 15                       | Mechanical Shock<br>(Only for Z46 / Z4J Code)  | Appearance  | No abnormal exterior appearance.   |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  | Capacitance | <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>Class II</td> <td>Within <math>\pm 10\%</math></td> </tr> </tbody> </table>  | Characteristic   | Capacitance change                             | Class II | Within $\pm 10\%$                                      | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks) <table border="1"> <thead> <tr> <th>Peak value</th> <th>Duration</th> <th>Wave</th> <th>Velocity</th> </tr> </thead> <tbody> <tr> <td>1,500G</td> <td>0.5ms</td> <td>Half sine</td> <td>4.7m / sec</td> </tr> </tbody> </table> | Peak value | Duration                                       | Wave   | Velocity           | 1,500G                   | 0.5ms             | Half sine | 4.7m / sec        |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  |             | Characteristic   | Capacitance change                                     |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
|                          |  | Class II    | Within $\pm 10\%$  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| Peak value               | Duration   | Wave        | Velocity   |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| 1,500G                   | 0.5ms  | Half sine   | 4.7m / sec   |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| Tanδ (Class II)          | 1. Capacitance : B(X7R)<br>0.025 max* (25V)<br>0.035 max* (16V)<br>0.050 max* (6.3V/10V) |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |
| IR                       | 1,000MΩ min. or 50MΩ · μF min.<br>product whichever is smaller / 12.5MΩ · μF or over*    |             |  |  |  |          |  |   |            |  |        |                    |                          |                   |           |                   |   |      |           |            |   |                                  |    |   |    |       |   |                                  |    |   |    |       |

| Recommended Soldering Method |                            |             |           |        |
|------------------------------|----------------------------|-------------|-----------|--------|
| Size inch(mm)                | Temperature Characteristic | Capacitance | Condition |        |
|                              |                            |             | Flow      | Reflow |
| 01005(0402)                  | -                          | -           | -         | ○      |
| 0201(0603)                   |                            |             |           |        |
| 0402(1005)                   |                            |             |           |        |
| 0603(1608)                   | Class I                    | -           | ○         | ○      |
|                              | Class II                   | C < 1uF     | ○         | ○      |
|                              |                            | C ≥ 1uF     | -         | ○      |
| 0805(2012)                   | Class I                    | -           | ○         | ○      |
|                              | Class II                   | C < 4.7uF   | ○         | ○      |
|                              |                            | C ≥ 4.7uF   | -         | ○      |
| 1206(3216)                   | Array                      | -           | -         | ○      |
|                              | Class I                    | -           | ○         | ○      |
|                              |                            | Class II    | C < 10uF  | ○      |
| Class II                     | C ≥ 10uF                   |             | -         | ○      |
|                              | Array                      | -           | -         | ○      |
| 1210(3225)                   | -                          | -           | -         | ○      |
| 1808(4520)                   |                            |             |           |        |
| 1812(4532)                   |                            |             |           |        |
| 2220(5750)                   |                            |             |           |        |
|                              |                            |             |           |        |

**Note 1. Initial Measurement For Class II**

Perform the heat treatment at 150°C +0/-10°C for 1 hour and leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

**Note 2. Latter Measurement**

1. CLASS I

Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

2. CLASS II

Perform the heat treatment at 150°C +0/-10°C for 1 hour and leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

**Note 3. All Size in Reliability Test Condition Section is "inch"**

# Premium Capacitors for Automotive Applications

|           |           |          |            |          |          |          |          |          |           |           |
|-----------|-----------|----------|------------|----------|----------|----------|----------|----------|-----------|-----------|
| <b>CL</b> | <b>10</b> | <b>B</b> | <b>104</b> | <b>K</b> | <b>B</b> | <b>8</b> | <b>W</b> | <b>P</b> | <b>N</b>  | <b>C</b>  |
| <b>1</b>  | <b>2</b>  | <b>3</b> | <b>4</b>   | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> |

## 1 SERIES CODE

CL = Multilayer Ceramic Capacitors

## 2 SIZE CODE

| Code | inch(mm)   | Code | inch(mm)   | Code | inch(mm)   |
|------|------------|------|------------|------|------------|
| 05   | 0402(1005) | 21   | 0805(2012) | 32   | 1210(3225) |
| 10   | 0603(1608) | 31   | 1206(3216) |      |            |

## 3 DIELECTRIC CODE

Class I

| Symbol | EIA Code | Operation Temperature Range(°C) | Temperature Coefficient(ppm / °C) |
|--------|----------|---------------------------------|-----------------------------------|
| C      | COG      | -55 ~ +125                      | 0±30                              |

Class II

| Symbol | EIA Code | Operation Temperature Range(°C) | Capacitance Change(%) |
|--------|----------|---------------------------------|-----------------------|
| B      | X7R      | -55 ~ +125                      | ±15                   |
| Y      | X7S      | -55 ~ +125                      | ±22                   |

## 4 CAPACITANCE CODE

Capacitance expressed in pF. 2 significant digits plus number of zeros.

example) 106=10 × 10<sup>6</sup>=10,000,000pF

For Values <10pF, Letter R denotes decimal point

example) 1R5 =1.5pF

## 5 TOLERANCE CODE

Capacitance Tolerance

| Code | Capacitance Tolerance | TC      | Capacitance series | Remark          |
|------|-----------------------|---------|--------------------|-----------------|
| C    | ±0.25pF               | COG     | E-12 series*       | under 5pF       |
| D    | ±0.5pF                | COG     | E-12 series*       | 5pF < Cp < 10pF |
| J    | ±5%                   | COG     | E-12 series        | ≥ 10pF          |
| K    | ±10%                  | X7R/X7S | E-6 series         |                 |
| M    | ±20%                  | X7R/X7S | E-6 series         |                 |

\* E-24 series is also available

※This code has only typical specifications. Please refer to individual specifications.

| Series | Capacitance Step |     |     |     |     |     |     |     |     |     |     |     |
|--------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|        | 1.0              |     |     | 2.2 |     |     |     | 4.7 |     |     |     |     |
| E-3    | 1.0              |     |     | 2.2 |     |     |     | 4.7 |     |     |     |     |
| E-6    | 1.0              | 1.5 |     | 2.2 | 3.3 |     | 4.7 | 6.8 |     |     |     |     |
| E-12   | 1.0              | 1.2 | 1.5 | 1.8 | 2.2 | 2.7 | 3.3 | 3.9 | 4.7 | 5.6 | 6.8 | 8.2 |
| E-24   | 1.0              | 1.1 | 1.2 | 1.3 | 2.2 | 2.4 | 2.7 | 3.0 | 4.7 | 5.1 | 5.6 | 6.2 |
|        | 1.5              | 1.6 | 1.8 | 2.0 | 3.3 | 3.6 | 3.9 | 4.3 | 6.8 | 7.5 | 8.2 | 9.1 |

## 6 RATED VOLTAGE CODE

Q = 6.3V P = 10V O = 16V A = 25V B = 50V C = 100V

## 7 THICKNESS CODE

(Unit:mm)

| Size<br>mm(inch) | Code | Thickness* | Tolerance |
|------------------|------|------------|-----------|
| 1005(0402)       | 5    | 0.50       | ±0.05     |
| 1608(0603)       | 8    | 0.80       | ±0.10     |
| 2012(0805)       | 6    | 0.60       | ±0.10     |
|                  | C    | 0.85       | ±0.10     |
|                  | F    | 1.25       | ±0.10     |
|                  | Q    | 1.25       | ±0.15     |
| 3216(1206)       | C    | 0.85       | ±0.15     |
|                  | P    | 1.15       | ±0.10     |
|                  | H    | 1.60       | ±0.20     |
| 3225(1210)       | I    | 2.00       | ±0.20     |
|                  | J    | 2.50       | ±0.20     |

\* In case of Higher Bending Strength, ESD protection capacitors, Please refer to individual specifications.  
 ※ This code has only typical specifications. Please refer to individual specifications.

## 8 DESIGN CODE

| Code | Inner electrode | Termination    | Plating material | Design     |
|------|-----------------|----------------|------------------|------------|
| 1    | Ni              | Cu             | Ni_Sn 100%       | Standard   |
| V    | Ni              | Cu/Metal Epoxy | Ni_Sn 100%       | Standard   |
| W    | Ni              | Cu/Metal Epoxy | Ni_Sn 100%       | Open Mode  |
| X    | Ni              | Cu/Metal Epoxy | Ni_Sn 100%       | Float Mode |

※ This code has only typical specifications. Please refer to individual specifications.

## 9 PRODUCT CODE OR SIZE CONTROL CODE

P = Automotive product meet AEC-Q200.

## 10 CONTROL CODE

N = Standard J = Higher Bending Strength E = ESD Protection

## 11 PACKAGING CODE

| Code | Type                                      | Code | Type                    |
|------|---|------|-------------------------|
| C    | Cardbord Tape, 7" reel                    | E    | Embossed Tape, 7" reel  |
| D/L  | Cardbord Tape, 13" reel (Quantity option) | F    | Embossed Tape, 13" reel |

※ If you want to learn to the code or quantity in detail, please see page 148.  
 In order to move to the page directly, please click the here. ↑

# General Automotive Capacitors

## Feature

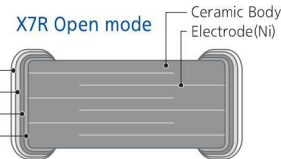
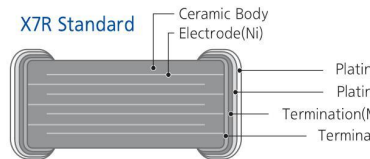
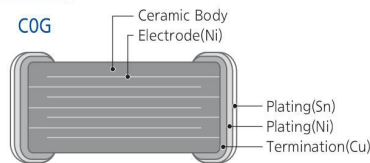
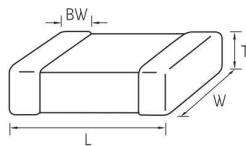


- Automotive products are manufactured in state of the art facilities recommend for registration to ISO / TS 16949 : 2002.
- Automotive products meet AEC – Q200 requirements.
- Automotive products are RoHS compliant.
- Automotive products meet JEDEC – 020 – D requirements.
- X7R dielectric components have BME and metal – epoxy terminations with a Ni / Sn plated overcoat.
- COG dielectric components contain BME and copper terminations with a Ni / Sn plated overcoat.
- Size 0603 / 0805 / 1206 is suitable for flow and reflow soldering.
- Size 0402 and smaller ( $\leq 0402$ ) and 1210 and bigger ( $\geq 1210$ ) is suitable for reflow soldering.

## Application

- Automotive Electronic Equipment (Powertrain, Safety, Body & Chassis, Convenience, Infotainment)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 05        | 0402     | 1.00±0.05     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.10     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.10     | 1.25±0.10 | 0.60±0.10 | 6              | 0.50±0.20/-0.30 |
|           |          |               |           | 0.85±0.10 |                |                 |
|           |          |               |           | 1.25±0.10 |                |                 |
| 31        | 1206     | 3.20±0.15     | 1.60±0.15 | 1.25±0.15 | Q              | 0.50±0.30       |
|           |          |               |           | 0.85±0.15 |                |                 |
|           |          |               |           | 1.15±0.10 |                |                 |
| 32        | 1210     | 3.20±0.20     | 1.60±0.20 | 1.60±0.20 | I              | 0.50±0.30       |
|           |          |               |           | 2.00±0.20 |                |                 |
| 32        | 1210     | 3.20±0.30     | 2.50±0.20 | 2.00±0.20 | J              | 0.60±0.30       |
|           |          |               |           | 2.50±0.20 |                |                 |

## Automotive Capacitance Table (COG)

| Size inch (mm) | Thickness (mm) | Rated Voltage (Vdc) | Capacitance |    |    |     |     |     |     |     |     |    |    |
|----------------|----------------|---------------------|-------------|----|----|-----|-----|-----|-----|-----|-----|----|----|
|                |                |                     | pF          |    |    |     |     | nF  |     |     |     |    |    |
|                |                |                     | 10          | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 |
| 0402 (1005)    | 0.50           | 50                  |             |    |    |     |     |     |     |     |     |    |    |
|                |                | 100                 |             |    |    |     |     |     |     |     |     |    |    |
| 0603 (1608)    | 0.80           | 50                  |             |    |    |     |     |     |     |     |     |    |    |
|                |                | 100                 |             |    |    |     | 270 |     |     |     |     |    |    |
| 0805 (2012)    | 0.60           | 50                  |             |    |    |     |     |     |     |     |     |    |    |
|                |                | 100                 |             |    |    |     |     |     |     |     |     |    |    |
|                | 0.85           | 50                  |             |    |    |     |     |     |     |     |     |    |    |
|                | 1.25           | 100                 |             |    |    |     |     |     |     |     |     |    |    |

Automotive Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Thickness<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |    |    |     |     |     |     |     |     |    |    |
|----------------------|-------------------|---------------------------|-------------|----|----|-----|-----|-----|-----|-----|-----|----|----|
|                      |                   |                           | nF          |    |    |     |     | uF  |     |     |     |    |    |
|                      |                   |                           | 10          | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 |
| 0402<br>(1005)       | 0.50              | 10                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 16                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 25                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 50                        | ■           |    |    |     |     |     |     |     |     |    |    |
| 0603<br>(1608)       | 0.80              | 10                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 16                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 25                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 50                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 100                       | ■           |    |    |     |     |     |     |     |     |    |    |
| 0805<br>(2012)       | 1.25              | 10                        | ■           |    |    |     |     | ■   |     |     |     |    |    |
|                      |                   | 16                        | ■           |    |    |     | ■   |     |     |     |     |    |    |
|                      | 0.85              | 16                        | ■           |    |    |     | ■   |     |     |     |     |    |    |
|                      |                   | 25                        | ■           |    |    | ■   |     |     |     |     |     |    |    |
|                      | 1.25              | 25                        | ■           |    |    | ■   |     |     |     |     |     |    |    |
|                      |                   | 50                        | ■           |    |    | ■   |     |     |     |     |     |    |    |
|                      | 0.60              | 50                        | ■           |    |    | ■   |     |     |     |     |     |    |    |
|                      |                   | 100                       | ■           |    |    | ■   |     |     |     |     |     |    |    |
|                      | 1.25              | 100                       | ■           |    |    | ■   |     |     |     |     |     |    |    |
|                      |                   | 1206<br>(3216)            | 1.60        | 10 | ■  |     |     |     |     | ■   |     |    |    |
|                      | 1.15              | 16                        | ■           |    |    |     |     | ■   |     |     |     |    |    |
|                      |                   | 25                        | ■           |    |    |     | ■   |     |     |     |     |    |    |
| 0.85                 | 25                | ■                         |             |    | ■  |     |     |     |     |     |     |    |    |
|                      | 50                | ■                         |             |    | ■  |     |     |     |     |     |     |    |    |
| 1.60                 | 50                | ■                         |             |    | ■  |     |     |     |     |     |     |    |    |
|                      | 100               | ■                         |             |    | ■  |     |     |     |     |     |     |    |    |
| 1210<br>(3225)       | 2.50              | 10                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 16                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      | 2.50              | 25                        | ■           |    |    |     |     |     |     |     |     |    |    |
|                      |                   | 50                        | ■           |    |    |     |     |     |     |     |     |    |    |

# General Automotive Capacitors

## Product Line Up (Automotive Capacitors – COG)

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |         |                 |
|----------------|---------------|-----------------|-----------------------|-----------------|---------|-----------------|
| 0.55mm         | 50Vdc         | 4.7pF           | ±0.25pF               | CL05C4R7CB51PN□ |         |                 |
|                |               | 6.8pF           | ±0.5pF                | CL05C6R8DB51PN□ |         |                 |
|                |               | 10pF            | ±5%                   | CL05C100JB51PN□ |         |                 |
|                |               | 12pF            | ±5%                   | CL05C120JB51PN□ |         |                 |
|                |               | 15pF            | ±5%                   | CL05C150JB51PN□ |         |                 |
|                |               | 18pF            | ±5%                   | CL05C180JB51PN□ |         |                 |
|                |               | 22pF            | ±5%                   | CL05C220JB51PN□ |         |                 |
|                |               | 33pF            | ±5%                   | CL05C330JB51PN□ |         |                 |
|                |               | 39pF            | ±5%                   | CL05C390JB51PN□ |         |                 |
|                |               | 47pF            | ±5%                   | CL05C470JB51PN□ |         |                 |
|                |               | 56pF            | ±5%                   | CL05C560JB51PN□ |         |                 |
|                |               | 68pF            | ±5%                   | CL05C680JB51PN□ |         |                 |
|                |               | 82pF            | ±5%                   | CL05C820JB51PN□ |         |                 |
|                |               | 100pF           | ±5%                   | CL05C101JB51PN□ |         |                 |
|                |               | 120pF           | ±5%                   | CL05C121JB51PN□ |         |                 |
|                |               | 150pF           | ±5%                   | CL05C151JB51PN□ |         |                 |
|                |               | 180pF           | ±5%                   | CL05C181JB51PN□ |         |                 |
|                |               | 220pF           | ±5%                   | CL05C221JB51PN□ |         |                 |
|                |               | 100Vdc          | 100Vdc                | 4.7pF           | ±0.25pF | CL05C4R7CC51PN□ |
|                |               |                 |                       | 6.8pF           | ±0.5pF  | CL05C6R8DC51PN□ |
|                |               |                 |                       | 10pF            | ±5%     | CL05C100JC51PN□ |
|                |               |                 |                       | 12pF            | ±5%     | CL05C120JC51PN□ |
| 15pF           | ±5%           |                 |                       | CL05C150JC51PN□ |         |                 |
| 18pF           | ±5%           |                 |                       | CL05C180JC51PN□ |         |                 |
| 22pF           | ±5%           |                 |                       | CL05C220JC51PN□ |         |                 |
| 27pF           | ±5%           |                 |                       | CL05C270JC51PN□ |         |                 |
| 33pF           | ±5%           |                 |                       | CL05C330JC51PN□ |         |                 |
| 39pF           | ±5%           |                 |                       | CL05C390JC51PN□ |         |                 |
| 47pF           | ±5%           |                 |                       | CL05C470JC51PN□ |         |                 |
| 56pF           | ±5%           |                 |                       | CL05C560JC51PN□ |         |                 |
| 68pF           | ±5%           |                 |                       | CL05C680JC51PN□ |         |                 |
| 82pF           | ±5%           |                 |                       | CL05C820JC51PN□ |         |                 |
| 100pF          | ±5%           | CL05C101JC51PN□ |                       |                 |         |                 |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number     |                 |                 |                 |
|----------------|---------------|-------------|-----------------------|-----------------|-----------------|-----------------|-----------------|
| 0.90mm         | 50Vdc         | 4.7pF       | ±0.25pF               | CL10C4R7CB81PN□ |                 |                 |                 |
|                |               | 6.8pF       | ±0.5pF                | CL10C6R8DB81PN□ |                 |                 |                 |
|                |               | 10pF        | ±5%                   | CL10C100JB81PN□ |                 |                 |                 |
|                |               | 12pF        | ±5%                   | CL10C120JB81PN□ |                 |                 |                 |
|                |               | 15pF        | ±5%                   | CL10C150JB81PN□ |                 |                 |                 |
|                |               | 18pF        | ±5%                   | CL10C180JB81PN□ |                 |                 |                 |
|                |               | 22pF        | ±5%                   | CL10C220JB81PN□ |                 |                 |                 |
|                |               | 27pF        | ±5%                   | CL10C270JB81PN□ |                 |                 |                 |
|                |               | 33pF        | ±5%                   | CL10C330JB81PN□ |                 |                 |                 |
|                |               | 39pF        | ±5%                   | CL10C390JB81PN□ |                 |                 |                 |
|                |               | 47pF        | ±5%                   | CL10C470JB81PN□ |                 |                 |                 |
|                |               | 56pF        | ±5%                   | CL10C560JB81PN□ |                 |                 |                 |
|                |               | 68pF        | ±5%                   | CL10C680JB81PN□ |                 |                 |                 |
|                |               | 82pF        | ±5%                   | CL10C820JB81PN□ |                 |                 |                 |
|                |               | 100pF       | ±5%                   | CL10C101JB81PN□ |                 |                 |                 |
|                |               | 120pF       | ±5%                   | CL10C121JB81PN□ |                 |                 |                 |
|                |               | 150pF       | ±5%                   | CL10C151JB81PN□ |                 |                 |                 |
|                |               | 180pF       | ±5%                   | CL10C181JB81PN□ |                 |                 |                 |
|                |               | 220pF       | ±5%                   | CL10C221JB81PN□ |                 |                 |                 |
|                |               | 100Vdc      | 100Vdc                | 270pF           | ±5%             | CL10C271JB81PN□ |                 |
|                |               |             |                       | 330pF           | ±5%             | CL10C331JB81PN□ |                 |
|                |               |             |                       | 390pF           | ±5%             | CL10C391JB81PN□ |                 |
|                | 470pF         |             |                       | ±5%             | CL10C471JB81PN□ |                 |                 |
|                | 560pF         |             |                       | ±5%             | CL10C561JB81PN□ |                 |                 |
|                | 680pF         |             |                       | ±5%             | CL10C681JB81PN□ |                 |                 |
|                | 820pF         |             |                       | ±5%             | CL10C821JB81PN□ |                 |                 |
|                | 1.0nF         |             |                       | ±5%             | CL10C102JB81PN□ |                 |                 |
|                | 100Vdc        |             |                       | 100Vdc          | 4.7pF           | ±0.25pF         | CL10C4R7CC81PN□ |
|                |               |             |                       |                 | 6.8pF           | ±0.5pF          | CL10C6R8DC81PN□ |
|                |               |             |                       |                 | 10pF            | ±5%             | CL10C100JC81PN□ |
|                |               |             |                       |                 | 12pF            | ±5%             | CL10C120JC81PN□ |
|                |               |             |                       |                 | 15pF            | ±5%             | CL10C150JC81PN□ |
|                |               |             |                       |                 | 18pF            | ±5%             | CL10C180JC81PN□ |
|                |               |             |                       |                 | 22pF            | ±5%             | CL10C220JC81PN□ |
|                |               |             |                       |                 | 27pF            | ±5%             | CL10C270JC81PN□ |
|                |               |             |                       |                 | 33pF            | ±5%             | CL10C330JC81PN□ |
|                |               |             |                       |                 | 39pF            | ±5%             | CL10C390JC81PN□ |
|                |               |             |                       |                 | 47pF            | ±5%             | CL10C470JC81PN□ |
|                |               |             |                       |                 | 56pF            | ±5%             | CL10C560JC81PN□ |
|                |               | 68pF        | ±5%                   |                 | CL10C680JC81PN□ |                 |                 |
|                |               | 82pF        | ±5%                   |                 | CL10C820JC81PN□ |                 |                 |
|                |               | 100pF       | ±5%                   |                 | CL10C101JC81PN□ |                 |                 |
| 120pF          |               | ±5%         | CL10C121JC81PN□       |                 |                 |                 |                 |
| 150pF          |               | ±5%         | CL10C151JC81PN□       |                 |                 |                 |                 |
| 180pF          |               | ±5%         | CL10C181JC81PN□       |                 |                 |                 |                 |
| 220pF          |               | ±5%         | CL10C221JC81PN□       |                 |                 |                 |                 |

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Product Line Up (Automotive Capacitors – COG)

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     | Thickness Max.  | Rated Voltage | Capacitance     | Capacitance Tolerance | Part Number     |
|----------------|---------------|-----------------|-----------------------|-----------------|-----------------|---------------|-----------------|-----------------------|-----------------|
| 0.70mm         | 50Vdc         | 10pF            | ±5%                   | CL21C100JB61PN□ | 0.95mm          | 100Vdc        | 470pF           | ±5%                   | CL21C471JCC1PN□ |
|                |               | 12pF            | ±5%                   | CL21C120JB61PN□ |                 |               | 560pF           | ±5%                   | CL21C561JCC1PN□ |
|                |               | 15pF            | ±5%                   | CL21C150JB61PN□ |                 |               | 680pF           | ±5%                   | CL21C681JCC1PN□ |
|                |               | 18pF            | ±5%                   | CL21C180JB61PN□ |                 |               | 820pF           | ±5%                   | CL21C821JCC1PN□ |
|                |               | 22pF            | ±5%                   | CL21C220JB61PN□ |                 |               | 1.0nF           | ±5%                   | CL21C102JCC1PN□ |
|                |               | 27pF            | ±5%                   | CL21C270JB61PN□ | 1.35mm          | 50Vdc         | 1.0nF           | ±5%                   | CL21C102JBF1PN□ |
|                |               | 33pF            | ±5%                   | CL21C330JB61PN□ |                 |               | 1.2nF           | ±5%                   | CL21C122JBF1PN□ |
|                |               | 39pF            | ±5%                   | CL21C390JB61PN□ |                 |               | 1.5nF           | ±5%                   | CL21C152JBF1PN□ |
|                |               | 47pF            | ±5%                   | CL21C470JB61PN□ |                 |               | 1.8nF           | ±5%                   | CL21C182JBF1PN□ |
|                |               | 56pF            | ±5%                   | CL21C560JB61PN□ |                 |               | 2.2nF           | ±5%                   | CL21C222JBF1PN□ |
|                |               | 68pF            | ±5%                   | CL21C680JB61PN□ |                 |               | 2.7nF           | ±5%                   | CL21C272JBF1PN□ |
|                |               | 82pF            | ±5%                   | CL21C820JB61PN□ |                 |               | 3.3nF           | ±5%                   | CL21C332JBF1PN□ |
|                |               | 100pF           | ±5%                   | CL21C101JB61PN□ |                 |               | 3.9nF           | ±5%                   | CL21C392JBF1PN□ |
|                |               | 120pF           | ±5%                   | CL21C121JB61PN□ |                 |               | 4.7nF           | ±5%                   | CL21C472JBF1PN□ |
|                |               | 150pF           | ±5%                   | CL21C151JB61PN□ |                 |               | 5.6nF           | ±5%                   | CL21C562JBF1PN□ |
|                |               | 180pF           | ±5%                   | CL21C181JB61PN□ |                 |               | 6.8nF           | ±5%                   | CL21C682JBF1PN□ |
|                |               | 220pF           | ±5%                   | CL21C221JB61PN□ |                 |               | 8.2nF           | ±5%                   | CL21C822JBF1PN□ |
|                |               | 270pF           | ±5%                   | CL21C271JB61PN□ |                 |               | 10nF            | ±5%                   | CL21C103JBF1PN□ |
|                |               | 330pF           | ±5%                   | CL21C331JB61PN□ |                 |               | 100Vdc          | 1.0nF                 | ±5%             |
|                |               | 390pF           | ±5%                   | CL21C391JB61PN□ |                 |               |                 |                       |                 |
|                |               | 10pF            | ±5%                   | CL21C100JC61PN□ |                 |               |                 |                       |                 |
|                | 12pF          | ±5%             | CL21C120JC61PN□       | 100Vdc          | 12pF            | ±5%           | CL21C120JC61PN□ |                       |                 |
|                | 15pF          | ±5%             | CL21C150JC61PN□       |                 | 15pF            | ±5%           | CL21C150JC61PN□ |                       |                 |
|                | 18pF          | ±5%             | CL21C180JC61PN□       |                 | 18pF            | ±5%           | CL21C180JC61PN□ |                       |                 |
|                | 22pF          | ±5%             | CL21C220JC61PN□       |                 | 22pF            | ±5%           | CL21C220JC61PN□ |                       |                 |
|                | 27pF          | ±5%             | CL21C270JC61PN□       |                 | 27pF            | ±5%           | CL21C270JC61PN□ |                       |                 |
|                | 33pF          | ±5%             | CL21C330JC61PN□       |                 | 33pF            | ±5%           | CL21C330JC61PN□ |                       |                 |
|                | 39pF          | ±5%             | CL21C390JC61PN□       |                 | 39pF            | ±5%           | CL21C390JC61PN□ |                       |                 |
|                | 47pF          | ±5%             | CL21C470JC61PN□       |                 | 47pF            | ±5%           | CL21C470JC61PN□ |                       |                 |
|                | 56pF          | ±5%             | CL21C560JC61PN□       |                 | 56pF            | ±5%           | CL21C560JC61PN□ |                       |                 |
|                | 68pF          | ±5%             | CL21C680JC61PN□       |                 | 68pF            | ±5%           | CL21C680JC61PN□ |                       |                 |
|                | 82pF          | ±5%             | CL21C820JC61PN□       |                 | 82pF            | ±5%           | CL21C820JC61PN□ |                       |                 |
|                | 100pF         | ±5%             | CL21C101JC61PN□       |                 | 100pF           | ±5%           | CL21C101JC61PN□ |                       |                 |
|                | 120pF         | ±5%             | CL21C121JC61PN□       |                 | 120pF           | ±5%           | CL21C121JC61PN□ |                       |                 |
|                | 150pF         | ±5%             | CL21C151JC61PN□       |                 | 150pF           | ±5%           | CL21C151JC61PN□ |                       |                 |
|                | 180pF         | ±5%             | CL21C181JC61PN□       |                 | 180pF           | ±5%           | CL21C181JC61PN□ |                       |                 |
|                | 220pF         | ±5%             | CL21C221JC61PN□       |                 | 220pF           | ±5%           | CL21C221JC61PN□ |                       |                 |
|                | 270pF         | ±5%             | CL21C271JC61PN□       |                 | 270pF           | ±5%           | CL21C271JC61PN□ |                       |                 |
|                | 330pF         | ±5%             | CL21C331JC61PN□       |                 | 330pF           | ±5%           | CL21C331JC61PN□ |                       |                 |
| 390pF          | ±5%           | CL21C391JC61PN□ | 390pF                 | ±5%             | CL21C391JC61PN□ |               |                 |                       |                 |
| 0.95mm         | 50Vdc         | 470pF           | ±5%                   | CL21C471JBC1PN□ | 470pF           | ±5%           | CL21C471JBC1PN□ |                       |                 |
|                |               | 560pF           | ±5%                   | CL21C561JBC1PN□ | 560pF           | ±5%           | CL21C561JBC1PN□ |                       |                 |
|                |               | 680pF           | ±5%                   | CL21C681JBC1PN□ | 680pF           | ±5%           | CL21C681JBC1PN□ |                       |                 |
|                |               | 820pF           | ±5%                   | CL21C821JBC1PN□ | 820pF           | ±5%           | CL21C821JBC1PN□ |                       |                 |
|                |               | 1.0nF           | ±5%                   | CL21C102JBC1PN□ | 1.0nF           | ±5%           | CL21C102JBC1PN□ |                       |                 |
|                |               | 1.2nF           | ±5%                   | CL21C122JBC1PN□ | 1.2nF           | ±5%           | CL21C122JBC1PN□ |                       |                 |
|                |               | 1.5nF           | ±5%                   | CL21C152JBC1PN□ | 1.5nF           | ±5%           | CL21C152JBC1PN□ |                       |                 |
|                |               | 1.8nF           | ±5%                   | CL21C182JBC1PN□ | 1.8nF           | ±5%           | CL21C182JBC1PN□ |                       |                 |
|                |               | 2.2nF           | ±5%                   | CL21C222JBC1PN□ | 2.2nF           | ±5%           | CL21C222JBC1PN□ |                       |                 |
|                |               | 2.7nF           | ±5%                   | CL21C272JBC1PN□ | 2.7nF           | ±5%           | CL21C272JBC1PN□ |                       |                 |
|                |               | 3.3nF           | ±5%                   | CL21C332JBC1PN□ | 3.3nF           | ±5%           | CL21C332JBC1PN□ |                       |                 |
| 3.9nF          | ±5%           | CL21C392JBC1PN□ | 3.9nF                 | ±5%             | CL21C392JBC1PN□ |               |                 |                       |                 |
| 4.7nF          | ±5%           | CL21C472JBC1PN□ | 4.7nF                 | ±5%             | CL21C472JBC1PN□ |               |                 |                       |                 |
| 5.6nF          | ±5%           | CL21C562JBC1PN□ | 5.6nF                 | ±5%             | CL21C562JBC1PN□ |               |                 |                       |                 |

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# General Automotive Capacitors

## Product Line Up (Automotive Capacitors – X7R)

### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |                  |
|----------------|---------------|-------------|-----------------------|------------------|------------------|
| 0.55mm         | 10Vdc         | 100nF       | ±10%                  | CL05B104KP5VPN □ |                  |
|                |               | 16Vdc       | 1.0nF                 | ±10%             | CL05B102K05VPN □ |
|                |               |             | 1.5nF                 | ±10%             | CL05B152K05VPN □ |
|                |               |             | 2.2nF                 | ±10%             | CL05B222K05VPN □ |
|                |               |             | 3.3nF                 | ±10%             | CL05B332K05VPN □ |
|                |               |             | 4.7nF                 | ±10%             | CL05B472K05VPN □ |
|                |               |             | 6.8nF                 | ±10%             | CL05B682K05VPN □ |
|                |               |             | 10nF                  | ±10%             | CL05B103K05VPN □ |
|                |               |             | 15nF                  | ±10%             | CL05B153K05VPN □ |
|                |               |             | 22nF                  | ±10%             | CL05B223K05VPN □ |
|                |               |             | 33nF                  | ±10%             | CL05B333K05VPN □ |
|                |               | 47nF        | ±10%                  | CL05B473K05VPN □ |                  |
|                |               | 68nF        | ±10%                  | CL05B683K05VPN □ |                  |
|                |               | 100nF       | ±10%                  | CL05B104K05VPN □ |                  |
|                | 25Vdc         | 1.0nF       | ±10%                  | CL05B102KA5VPN □ |                  |
|                |               | 1.5nF       | ±10%                  | CL05B152KA5VPN □ |                  |
|                |               | 2.2nF       | ±10%                  | CL05B222KA5VPN □ |                  |
|                |               | 3.3nF       | ±10%                  | CL05B332KA5VPN □ |                  |
|                |               | 4.7nF       | ±10%                  | CL05B472KA5VPN □ |                  |
|                |               | 6.8nF       | ±10%                  | CL05B682KA5VPN □ |                  |
|                |               | 10nF        | ±10%                  | CL05B103KA5VPN □ |                  |
|                |               | 15nF        | ±10%                  | CL05B153KA5VPN □ |                  |
|                |               | 22nF        | ±10%                  | CL05B223KA5VPN □ |                  |
|                |               | 33nF        | ±10%                  | CL05B333KA5VPN □ |                  |
|                |               | 47nF        | ±10%                  | CL05B473KA5VPN □ |                  |
|                |               | 50Vdc       | 330pF                 | ±10%             | CL05B331KB5VPN □ |
|                |               |             | 470pF                 | ±10%             | CL05B471KB5VPN □ |
|                |               |             | 560pF                 | ±10%             | CL05B561KB5VPN □ |
|                | 680pF         |             | ±10%                  | CL05B681KB5VPN □ |                  |
|                | 1.0nF         |             | ±10%                  | CL05B102KB5VPN □ |                  |
|                | 1.5nF         |             | ±10%                  | CL05B152KB5VPN □ |                  |
|                | 2.2nF         |             | ±10%                  | CL05B222KB5VPN □ |                  |
|                | 3.3nF         |             | ±10%                  | CL05B332KB5VPN □ |                  |
|                | 4.7nF         |             | ±10%                  | CL05B472KB5VPN □ |                  |
|                | 6.8nF         |             | ±10%                  | CL05B682KB5VPN □ |                  |
|                | 10nF          |             | ±10%                  | CL05B103KB5VPN □ |                  |
|                | 15nF          |             | ±10%                  | CL05B153KB5VPN □ |                  |
|                | 22nF          |             | ±10%                  | CL05B223KB5VPN □ |                  |
|                | 33nF          |             | ±10%                  | CL05B333KB5VPN □ |                  |
|                | 47nF          | ±10%        | CL05B473KB5VPN □      |                  |                  |

### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance      | Capacitance Tolerance | Part Number      |                  |
|----------------|---------------|------------------|-----------------------|------------------|------------------|
| 0.90mm         | 10Vdc         | 1.0uF            | ±10%                  | CL10B105KP8VPN □ |                  |
|                |               | 16Vdc            | 47nF                  | ±10%             | CL10B473K08WPN □ |
|                |               |                  | 68nF                  | ±10%             | CL10B683K08WPN □ |
|                |               |                  | 100nF                 | ±10%             | CL10B104K08WPN □ |
|                |               |                  | 150nF                 | ±10%             | CL10B154K08WPN □ |
|                |               |                  | 220nF                 | ±10%             | CL10B224K08WPN □ |
|                |               |                  | 330nF                 | ±10%             | CL10B334K08WPN □ |
|                |               |                  | 470nF                 | ±10%             | CL10B474K08WPN □ |
|                |               |                  | 680nF                 | ±10%             | CL10B684K08WPN □ |
|                |               |                  | 1.0uF                 | ±10%             | CL10B105K08WPN □ |
|                |               |                  | 25Vdc                 | 1.0nF            | ±10%             |
|                |               | 1.5nF            |                       | ±10%             | CL10B152KA8WPN □ |
|                |               | 2.2nF            |                       | ±10%             | CL10B222KA8WPN □ |
|                |               | 3.3nF            |                       | ±10%             | CL10B332KA8WPN □ |
|                | 4.7nF         | ±10%             |                       | CL10B472KA8WPN □ |                  |
|                | 6.8nF         | ±10%             |                       | CL10B682KA8WPN □ |                  |
|                | 10nF          | ±10%             |                       | CL10B103KA8WPN □ |                  |
|                | 15nF          | ±10%             |                       | CL10B153KA8WPN □ |                  |
|                | 22nF          | ±10%             |                       | CL10B223KA8WPN □ |                  |
|                | 33nF          | ±10%             |                       | CL10B333KA8WPN □ |                  |
|                | 47nF          | ±10%             |                       | CL10B473KA8WPN □ |                  |
|                | 68nF          | ±10%             |                       | CL10B683KA8WPN □ |                  |
|                | 100nF         | ±10%             |                       | CL10B104KA8WPN □ |                  |
|                | 150nF         | ±10%             |                       | CL10B154KA8WPN □ |                  |
|                | 220nF         | ±10%             | CL10B224KA8WPN □      |                  |                  |
|                | 50Vdc         | 330nF            | ±10%                  | CL10B334KA8WPN □ |                  |
|                |               | 470nF            | ±10%                  | CL10B474KA8WPN □ |                  |
|                |               | 470pF            | ±10%                  | CL10B471KB8WPN □ |                  |
|                |               | 1.0nF            | ±10%                  | CL10B102KB8WPN □ |                  |
|                |               | 1.5nF            | ±10%                  | CL10B152KB8WPN □ |                  |
|                |               | 2.2nF            | ±10%                  | CL10B222KB8WPN □ |                  |
|                |               | 3.3nF            | ±10%                  | CL10B332KB8WPN □ |                  |
|                |               | 4.7nF            | ±10%                  | CL10B472KB8WPN □ |                  |
|                |               | 6.8nF            | ±10%                  | CL10B682KB8WPN □ |                  |
|                |               | 10nF             | ±10%                  | CL10B103KB8WPN □ |                  |
|                |               | 15nF             | ±10%                  | CL10B153KB8WPN □ |                  |
|                |               | 22nF             | ±10%                  | CL10B223KB8WPN □ |                  |
|                |               | 33nF             | ±10%                  | CL10B333KB8WPN □ |                  |
|                |               | 47nF             | ±10%                  | CL10B473KB8WPN □ |                  |
|                | 68nF          | ±10%             | CL10B683KB8WPN □      |                  |                  |
|                | 100nF         | ±10%             | CL10B104KB8WPN □      |                  |                  |
|                | 150nF         | ±10%             | CL10B154KB8WPN □      |                  |                  |
| 220nF          | ±10%          | CL10B224KB8WPN □ |                       |                  |                  |
| 100Vdc         | 220pF         | ±10%             | CL10B221KC8WPN □      |                  |                  |
|                | 330pF         | ±10%             | CL10B331KC8WPN □      |                  |                  |
|                | 470pF         | ±10%             | CL10B471KC8WPN □      |                  |                  |
|                | 680pF         | ±10%             | CL10B681KC8WPN □      |                  |                  |
|                | 1.0nF         | ±10%             | CL10B102KC8WPN □      |                  |                  |
|                | 1.5nF         | ±10%             | CL10B152KC8WPN □      |                  |                  |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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Product Line Up (Automotive Capacitors – X7R)

■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.90mm         | 100Vdc        | 2.2nF       | ±10%                  | CL10B222KC8WPN □ |
|                |               | 3.3nF       | ±10%                  | CL10B332KC8WPN □ |
|                |               | 4.7nF       | ±10%                  | CL10B472KC8WPN □ |
|                |               | 6.8nF       | ±10%                  | CL10B682KC8WPN □ |
|                |               | 10nF        | ±10%                  | CL10B103KC8WPN □ |
|                |               | 15nF        | ±10%                  | CL10B153KC8WPN □ |
|                |               | 22nF        | ±10%                  | CL10B223KC8WPN □ |
|                |               | 33nF        | ±10%                  | CL10B333KC8WPN □ |
|                |               | 47nF        | ±10%                  | CL10B473KC8WPN □ |

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.90mm         | 50Vdc         | 100nF       | ±10%                  | CL21B104KBFVPN □ |
|                |               | 150nF       | ±10%                  | CL21B154KBFVPN □ |
|                |               | 220nF       | ±10%                  | CL21B224KBFVPN □ |
|                |               | 330nF       | ±10%                  | CL21B334KBFVPN □ |
|                |               | 470nF       | ±10%                  | CL21B474KBFVPN □ |
|                |               | 680nF       | ±10%                  | CL21B684KBFVPN □ |
|                |               | 1.0uF       | ±10%                  | CL21B105KBFVPN □ |
|                |               | 100Vdc      | 100nF                 | ±10%             |
| 1.40mm         | 10Vdc         | 4.7uF       | ±10%                  | CL21B475KQVVPN □ |
|                | 16Vdc         | 4.7uF       | ±10%                  | CL21B475KQVVPN □ |

■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 0.70mm         | 50Vdc         | 1.0nF       | ±10%                  | CL21B102KB6WPN □ |
|                |               | 2.2nF       | ±10%                  | CL21B222KB6WPN □ |
|                |               | 4.7nF       | ±10%                  | CL21B472KB6WPN □ |
|                |               | 10nF        | ±10%                  | CL21B103KB6WPN □ |
|                |               | 15nF        | ±10%                  | CL21B153KB6WPN □ |
|                | 100Vdc        | 22nF        | ±10%                  | CL21B223KB6WPN □ |
|                |               | 1.0nF       | ±10%                  | CL21B102KC6WPN □ |
|                |               | 2.2nF       | ±10%                  | CL21B222KC6WPN □ |
|                |               | 4.7nF       | ±10%                  | CL21B472KC6WPN □ |
|                |               | 10nF        | ±10%                  | CL21B103KC6WPN □ |
| 0.95mm         | 16Vdc         | 100nF       | ±10%                  | CL21B104KOCWPN □ |
|                |               | 47nF        | ±10%                  | CL21B473KACWPN □ |
|                |               | 68nF        | ±10%                  | CL21B683KACWPN □ |
|                |               | 100nF       | ±10%                  | CL21B104KACWPN □ |
|                | 25Vdc         | 33nF        | ±10%                  | CL21B333KBCWPN □ |
|                |               | 47nF        | ±10%                  | CL21B473KBCWPN □ |
|                |               | 68nF        | ±10%                  | CL21B683KBCWPN □ |
|                |               | 100nF       | ±10%                  | CL21B104KBCWPN □ |
|                | 50Vdc         | 33nF        | ±10%                  | CL21B333KCCWPN □ |
|                |               | 47nF        | ±10%                  | CL21B473KCCWPN □ |
| 68nF           |               | ±10%        | CL21B683KCCWPN □      |                  |
| 100nF          |               | ±10%        | CL21B104KCCWPN □      |                  |
| 1.35mm         | 10Vdc         | 1.0uF       | ±10%                  | CL21B105KPFVPN □ |
|                |               | 2.2uF       | ±10%                  | CL21B225KPFVPN □ |
|                | 16Vdc         | 150nF       | ±10%                  | CL21B154KOFVPN □ |
|                |               | 220nF       | ±10%                  | CL21B224KOFVPN □ |
|                |               | 330nF       | ±10%                  | CL21B334KOFVPN □ |
|                |               | 470nF       | ±10%                  | CL21B474KOFVPN □ |
|                |               | 680nF       | ±10%                  | CL21B684KOFVPN □ |
|                |               | 1.0uF       | ±10%                  | CL21B105KOFVPN □ |
|                | 25Vdc         | 2.2uF       | ±10%                  | CL21B225KOFVPN □ |
|                |               | 150nF       | ±10%                  | CL21B154KAFVPN □ |
| 220nF          |               | ±10%        | CL21B224KAFVPN □      |                  |
| 330nF          |               | ±10%        | CL21B334KAFVPN □      |                  |
| 470nF          |               | ±10%        | CL21B474KAFVPN □      |                  |
| 680nF          |               | ±10%        | CL21B684KAFVPN □      |                  |
| 1.0uF          |               | ±10%        | CL21B105KAFVPN □      |                  |
| 2.2uF          |               | ±10%        | CL21B225KAFVPN □      |                  |

■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       |                   |
|----------------|---------------|-------------|-----------------------|-------------------|-------------------|
| 1.00mm         | 25Vdc         | 220nF       | ±10%                  | CL31B224KACWPN □  |                   |
|                |               | 330nF       | ±10%                  | CL31B334KACWPN □  |                   |
|                |               | 470nF       | ±10%                  | CL31B474KACWPN □  |                   |
|                | 50Vdc         | 100nF       | ±10%                  | CL31B104KBCWPN □  |                   |
|                |               | 100Vdc      | 100nF                 | ±10%              | CL31B104KCCWPN □  |
|                |               | 1.25mm      | 16Vdc                 | 1.0uF             | ±10%              |
| 25Vdc          | 680nF         |             |                       | ±10%              | CL31B684KAPWPN □  |
| 50Vdc          | 1.0uF         |             | ±10%                  | CL31B105KAPWPN □  |                   |
|                | 100nF         |             | ±10%                  | CL31B104KBPWPN □  |                   |
|                | 150nF         |             | ±10%                  | CL31B154KBPWPN □  |                   |
|                | 220nF         |             | ±10%                  | CL31B224KBPWPN □  |                   |
| 100Vdc         | 100nF         | ±10%        | CL31B104KCPWPN □      |                   |                   |
|                | 150nF         | ±10%        | CL31B154KCPWPN □      |                   |                   |
|                | 220nF         | ±10%        | CL31B224KCPWPN □      |                   |                   |
|                | 1.80mm        | 10Vdc       | 4.7uF                 | ±10%              | CL31B475KPHVPN □  |
| 10uF           |               |             | ±10%                  | CL31B106KPHVPN □  |                   |
| 16Vdc          |               | 2.2uF       | ±10%                  | CL31B225KOHVPN □  |                   |
|                |               | 4.7uF       | ±10%                  | CL31B475KOHVPN □  |                   |
|                |               | 10uF        | ±10%                  | CL31B106KOHVPN □  |                   |
| 25Vdc          |               | 2.2uF       | ±10%                  | CL31B225KAHVPN □  |                   |
|                |               | 4.7uF       | ±10%                  | CL31B475KAHVPN □  |                   |
|                |               | 10uF        | ±10%                  | CL31B106KAHVPN □  |                   |
|                |               | 50Vdc       | 330nF                 | ±10%              | CL31B334KBHWPVN □ |
|                |               | 470nF       | ±10%                  | CL31B474KBHWPVN □ |                   |
| 2.70mm         | 10Vdc         | 680nF       | ±10%                  | CL31B684KBHWPVN □ |                   |
|                |               | 1.0uF       | ±10%                  | CL31B105KBHWPVN □ |                   |
|                | 16Vdc         | 2.2uF       | ±10%                  | CL31B225KBHWPVN □ |                   |
|                |               | 4.7uF       | ±10%                  | CL31B475KBHWPVN □ |                   |
|                |               | 10uF        | ±10%                  | CL31B106KBHWPVN □ |                   |
|                |               | 4.7uF       | ±10%                  | CL31B475KBHWPVN □ |                   |

■ Size : 3.20 X 2.50mm (inch : 1210)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number       |
|----------------|---------------|-------------|-----------------------|-------------------|
| 2.70mm         | 10Vdc         | 22uF        | ±10%                  | CL32B226KJVPVN □  |
|                | 16Vdc         | 22uF        | ±10%                  | CL32B226KJVPVN □  |
|                | 25Vdc         | 4.7uF       | ±10%                  | CL32B475KAJVPVN □ |
|                | 50Vdc         | 4.7uF       | ±10%                  | CL32B475KBJVPVN □ |

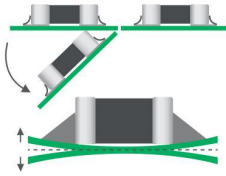
※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148  
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# Special Automotive Capacitors

Higher Bending Strength

## Feature

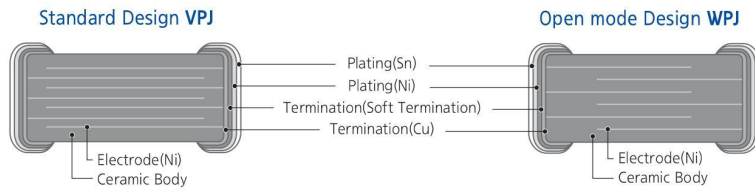
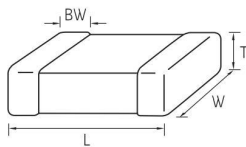
- AEC – Q200 qualified, 5mm bending strength guarantee.
- Strong thermal – mechanical properties.



## Application

- Critical circuits and Battery line circuits.  
(Prevent a module / sub – system failure in the event of a cracked /shorted capacitor)

## Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |                |                 |
|-----------|----------|---------------|-----------|-----------|----------------|-----------------|
|           |          | L             | W         | T         | Thickness Code | BW              |
| 05        | 0402     | 1.00±0.10     | 0.50±0.05 | 0.50±0.05 | 5              | 0.25±0.10       |
| 10        | 0603     | 1.60±0.20     | 0.80±0.10 | 0.80±0.10 | 8              | 0.30±0.20       |
| 21        | 0805     | 2.00±0.30     | 1.25±0.20 | 0.85±0.10 | C              | 0.50+0.20/-0.30 |
|           |          |               |           | 1.25±0.20 | F              |                 |
| 31        | 1206     | 3.20±0.30     | 1.60±0.30 | 1.60±0.30 | H              | 0.50±0.30       |
| 32        | 1210     | 3.20±0.40     | 2.50±0.30 | 2.50±0.30 | J              | 0.60±0.30       |

### Higher Bending Strength Capacitance Table (X7R)

| Size<br>inch<br>(mm) | Thickness<br>(mm) | Rated<br>Voltage<br>(Vdc) | Capacitance |    |    |     |     |     |     |     |     |    |    |  |
|----------------------|-------------------|---------------------------|-------------|----|----|-----|-----|-----|-----|-----|-----|----|----|--|
|                      |                   |                           | nF          |    |    |     |     | uF  |     |     |     |    |    |  |
|                      |                   |                           | 10          | 22 | 47 | 100 | 220 | 470 | 1.0 | 2.2 | 4.7 | 10 | 22 |  |
| 0402<br>(1005)       | 0.50              | 16                        |             |    |    |     |     |     |     |     |     |    |    |  |
|                      |                   | 50                        |             |    |    |     |     |     |     |     |     |    |    |  |
| 0603(1608)           | 0.80              | 25                        |             |    |    |     |     |     |     |     |     |    |    |  |
| 0805(2012)           | 1.25              | 25                        |             |    |    |     |     |     |     |     |     |    |    |  |
| 1206(3216)           | 1.60              | 16                        |             |    |    |     |     |     |     |     |     |    |    |  |

### Product Line Up (Higher Bending Strength Capacitors – X7R)

#### ■ Size : 1.00 X 0.50mm (inch : 0402)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     |
|-------------------|------------------|-------------|--------------------------|-----------------|
| 0.55mm            | 16Vdc            | 10nF        | ±10%                     | CL05B103K05VPJ□ |
|                   |                  | 22nF        | ±10%                     | CL05B223K05VPJ□ |
|                   |                  | 47nF        | ±10%                     | CL05B473K05VPJ□ |
|                   |                  | 100nF       | ±10%                     | CL05B104K05VPJ□ |
|                   | 25Vdc            | 10nF        | ±10%                     | CL05B103KA5VPJ□ |
|                   |                  | 22nF        | ±10%                     | CL05B223KA5VPJ□ |
|                   | 50Vdc            | 10nF        | ±10%                     | CL05B103KB5VPJ□ |
|                   |                  | 22nF        | ±10%                     | CL05B223KB5VPJ□ |

#### ■ Size : 1.60 X 0.80mm (inch : 0603)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     |
|-------------------|------------------|-------------|--------------------------|-----------------|
| 0.90mm            | 10Vdc            | 1.0uF       | ±10%                     | CL10B105KP8VPJ□ |
|                   | 16Vdc            | 1.0uF       | ±10%                     | CL10B105K08VPJ□ |
|                   | 25Vdc            | 1.0uF       | ±10%                     | CL10B105KA8VPJ□ |

#### ■ Size : 2.00 X 1.25mm (inch : 0805)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     |
|-------------------|------------------|-------------|--------------------------|-----------------|
| 1.45mm            | 10Vdc            | 1.0uF       | ±10%                     | CL21B105KPFVPJ□ |
|                   | 16Vdc            | 1.0uF       | ±10%                     | CL21B105KOFVPJ□ |
|                   | 25Vdc            | 1.0uF       | ±10%                     | CL21B105KAFVPJ□ |

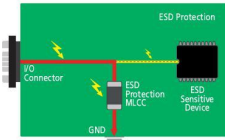
#### ■ Size : 3.20 X 1.60mm (inch : 1206)

| Thickness<br>Max. | Rated<br>Voltage | Capacitance | Capacitance<br>Tolerance | Part Number     |
|-------------------|------------------|-------------|--------------------------|-----------------|
| 1.90mm            | 10Vdc            | 4.7uF       | ±10%                     | CL31B475KPHVPJ□ |
|                   | 16Vdc            | 4.7uF       | ±10%                     | CL31B475KOHVPJ□ |

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### Feature

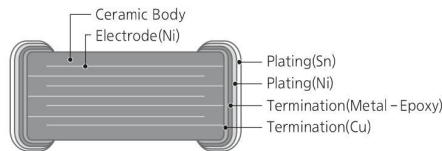
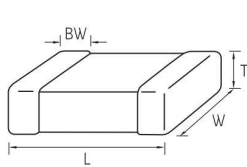
- Compliance with the IEC 61000 – 4 – 2 standard for ESD immunity.
- Enhanced DC – Bias & Breakdown voltage.



### Application

- Input and output sections in a wide range of automotive electronics.

### Structure and Dimensions



| Size Code | EIA Code | Dimension(mm) |           |           |           |
|-----------|----------|---------------|-----------|-----------|-----------|
|           |          | L             | W         | T         | BW        |
| 10        | 0603     | 1.70±0.10     | 0.90±0.10 | 0.90±0.10 | 0.30±0.20 |

### ESD Protection Capacitance Table (X7R)

| Size inch (mm) | Thickness (mm) | Rated Voltage (Vdc) | Capacitance(nF) |     |     |     |     |     |    |    |    |    |    |  |  |  |  |
|----------------|----------------|---------------------|-----------------|-----|-----|-----|-----|-----|----|----|----|----|----|--|--|--|--|
|                |                |                     | 1.0             | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 |  |  |  |  |
| 0603(1608)     | 0.80           | 100                 |                 |     |     |     |     |     |    |    |    |    |    |  |  |  |  |

### Product Lineup (ESD Protection Capacitors – X7R)

■ Size : 1.70 X 0.90mm (inch : 0603)

| Thickness Max. | Rated Voltage | Capacitance | Capacitance Tolerance | Part Number      |
|----------------|---------------|-------------|-----------------------|------------------|
| 1.00mm         | 100Vdc        | 1.0nF       | ±10%                  | CL10B102KC84PE □ |
|                |               | 1.5nF       | ±10%                  | CL10B152KC84PE □ |
|                |               | 2.2nF       | ±10%                  | CL10B222KC84PE □ |
|                |               | 3.3nF       | ±10%                  | CL10B332KC84PE □ |
|                |               | 4.7nF       | ±10%                  | CL10B472KC84PE □ |
|                |               | 6.8nF       | ±10%                  | CL10B682KC84PE □ |
|                |               | 10nF        | ±10%                  | CL10B103KC84PE □ |

※ □ mark means packaging code. If you want to learn the code or quantity in detail, please see p.148

In order to move to the page directly, please click the here. ↑

# Reliability Test Conditions

| No. | Item                                | Performance   | Test condition                  |  |
|-----|-------------------------------------|---|---------------------------------|--|
| 1   | Pre-and Post-Stress Electrical Test | -   |                                 |  |
| 2   | High Temperature Exposure           | Appearance  | No abnormal exterior appearance |  |
|     |                                     | Capacitance Change  | Class I                         | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)  |
|     |                                     |   | Class II                        | Within $\pm 10\%$  |
|     |                                     | Q   | Class I                         | Capacitance $\geq 30\text{pF}$ : $Q \geq 1,000$<br>$< 30\text{pF}$ : $Q \geq 400 + 20 \times C$<br>(C : Capacitance)   |
|     |                                     | Tan $\delta$  | Class II                        | Rated Voltage $\geq 25\text{V}$ : 0.030 max<br>$\geq 16\text{V}$ : 0.050 max<br>$\geq 10\text{V}$ : 0.075 max *1)  |
| IR  |                                     | More than 10,000M $\Omega$ or 500M $\Omega$ X $\mu\text{F}$<br>(Whichever is smaller) *1) |                                 |  |
| 3   | Temperature Cycling                 | Appearance  | No abnormal exterior appearance |  |
|     |                                     | Capacitance Change  | Class I                         | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)  |
|     |                                     |   | Class II                        | Within $\pm 10\%$  |
|     |                                     | Q   | Class I                         | Capacitance $\geq 30\text{pF}$ : $Q \geq 1,000$<br>$< 30\text{pF}$ : $Q \geq 400 + 20 \times C$<br>(C : Capacitance)   |
|     |                                     | Tan $\delta$  | Class II                        | Rated Voltage $\geq 25\text{V}$ : 0.030 max<br>$\geq 16\text{V}$ : 0.050 max<br>$\geq 10\text{V}$ : 0.075 max *1)  |
| IR  |                                     | More than 10,000M $\Omega$ or 500M $\Omega$ X $\mu\text{F}$<br>(Whichever is smaller) *1) |                                 |  |
| 4   | Destructive Physical Analysis       | Appearance  | No abnormal exterior appearance |  |
|     |                                     | Capacitance Change  | Class I                         | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)  |
|     |                                     | Class II  | Within $\pm 10\%$               |  |
|     |                                     | IR  |                                 | More than 10,000M $\Omega$ or 500M $\Omega$ X $\mu\text{F}$<br>(Whichever is smaller) *1)  |
| 4   | Destructive Physical Analysis       | No defects or abnormalities   | Per EIA 469                     |  |
| 5   | Biased Humidity                     | Appearance  | No abnormal exterior appearance |  |
|     |                                     | Capacitance Change  | Class I                         | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)  |
|     |                                     |   | Class II                        | Within $\pm 12.5\%$  |
|     |                                     | Q   | Class I                         | Capacitance $\geq 30\text{pF}$ : $Q \geq 200$<br>$< 30\text{pF}$ : $Q \geq 100 + (10/3) \times C$<br>(C : Capacitance)   |
|     |                                     | Tan $\delta$  | Class II                        | Rated Voltage $\geq 25\text{V}$ : 0.035 max<br>$\geq 16\text{V}$ : 0.050 max<br>$\geq 10\text{V}$ : 0.075 max *1)  |
| IR  |                                     | More than 500M $\Omega$ or 25M $\Omega$ X $\mu\text{F}$<br>(Whichever is smaller) *1)     |                                 |  |
| 6   | High Temperature Operating Life     | Appearance  | No abnormal exterior appearance |  |
|     |                                     | Capacitance Change  | Class I                         | Within $\pm 3.0\%$ or $\pm 0.3\text{pF}$ , (Whichever is larger)   |
|     |                                     |   | Class II                        | Within $\pm 12.5\%$  |
|     |                                     | Q   | Class I                         | Capacitance $\geq 30\text{pF}$ : $Q \geq 350$<br>$\geq 10\text{pF}$ : $Q \geq 275 + (5/2) \times C$<br>$< 10\text{pF}$ : $Q \geq 200 + 10 \times C$<br>(C : Capacitance) |
|     |                                     | Tan $\delta$  | Class II                        | Rated Voltage $\geq 25\text{V}$ : 0.035 max<br>$\geq 16\text{V}$ : 0.050 max<br>$\geq 10\text{V}$ : 0.075 max *1)  |
| IR  |                                     | More than 1,000M $\Omega$ or 50M $\Omega$ X $\mu\text{F}$<br>(Whichever is smaller) *1)   |                                 |  |

Unpowered, 1000hrs@T = 125°C

Initial Measurement  
 Perform the heat treatment at 150°C +0/-10°C for 1 hour and leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

Final Measurement  
 Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

1000Cycles

Initial Measurement  
 Perform the heat treatment at 150°C +0/-10°C for 1 hour and leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

Final Measurement  
 Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.

| Step | Temperature(°C)           | Time(min.) |
|------|---------------------------|------------|
| 1    | Min. operating Temp.+0/-3 | 30±3       |
| 2    | 25±2                      | 1          |
| 3    | Max. operating Temp.+3/-0 | 30±3       |
| 4    | 25±2                      | 1          |

※ \*1) : Indicates typical specification. Please refer to individual specifications.  
 \*2) : Some of the parts are applicable in rated voltage X 150% or X 120%, Please refer to individual specifications.

# Reliability Test Conditions

| No.        | Item                      | Performance  | Test condition   |   |          |      |          |        |       |           |            |
|------------|---------------------------|--|--|---|----------|------|----------|--------|-------|-----------|------------|
| 7          | External Visual           | No abnormal exterior appearance  | Microscope (x10)   |   |          |      |          |        |       |           |            |
| 8          | Physical Dimensions       | Within the specified dimensions  | Using the calipers   |   |          |      |          |        |       |           |            |
| 9          | Mechanical Shock          | Appearance   | No abnormal exterior appearance  |   |          |      |          |        |       |           |            |
|            |                           | Capacitance Change   | Class I  | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)   |          |      |          |        |       |           |            |
|            |                           |  | Class II   | Within $\pm 10\%$   |          |      |          |        |       |           |            |
|            |                           | Q  | Class I  | Capacitance $\geq 30\text{pF}$ : $Q \geq 1,000$<br>$< 30\text{pF}$ : $Q \geq 400 + 20 \times C$<br>(C : Capacitance)    |          |      |          |        |       |           |            |
|            |                           | Tan $\delta$   | Class II   | Rated Voltage $\geq 25\text{V}$ : $0.025$ max<br>$\geq 16\text{V}$ : $0.035$ max<br>$\geq 10\text{V}$ : $0.050$ max *1) |          |      |          |        |       |           |            |
| IR         |                           | More than $10,000\text{M}\Omega$ or $500\text{M}\Omega \times \mu\text{F}$<br>(Whichever is smaller) *1) |  |   |          |      |          |        |       |           |            |
|            |                           |  | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks) <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Peak value</th> <th>Duration</th> <th>Wave</th> <th>Velocity</th> </tr> </thead> <tbody> <tr> <td>1,500G</td> <td>0.5ms</td> <td>Half sine</td> <td>4.7m / sec</td> </tr> </tbody> </table> Initial Measurement<br>Perform the heat treatment at $150^\circ\text{C} +0/-10^\circ\text{C}$ for 1 hour and leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.<br><br>Final Measurement<br>Leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement. | Peak value  | Duration | Wave | Velocity | 1,500G | 0.5ms | Half sine | 4.7m / sec |
| Peak value | Duration                  | Wave   | Velocity   |   |          |      |          |        |       |           |            |
| 1,500G     | 0.5ms                     | Half sine  | 4.7m / sec   |   |          |      |          |        |       |           |            |
| 10         | Vibration                 | Appearance   | No abnormal exterior appearance  |   |          |      |          |        |       |           |            |
|            |                           | Capacitance Change   | Class I  | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)   |          |      |          |        |       |           |            |
|            |                           |  | Class II   | Within $\pm 10\%$   |          |      |          |        |       |           |            |
|            |                           | Q  | Class I  | Capacitance $\geq 30\text{pF}$ : $Q \geq 1,000$<br>$< 30\text{pF}$ : $Q \geq 400 + 20 \times C$<br>(C : Capacitance)    |          |      |          |        |       |           |            |
|            |                           | Tan $\delta$   | Class II   | Rated Voltage $\geq 25\text{V}$ : $0.025$ max<br>$\geq 16\text{V}$ : $0.035$ max<br>$\geq 10\text{V}$ : $0.050$ max *1) |          |      |          |        |       |           |            |
| IR         |                           | More than $10,000\text{M}\Omega$ or $500\text{M}\Omega \times \mu\text{F}$<br>(Whichever is smaller) *1) |  |   |          |      |          |        |       |           |            |
|            |                           |  | 5g's for 20min., 12cycles each of 3 orientations,<br>Use $8" \times 5"$ PCB 0.031" Thick 7 secure points on one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10~2000Hz.<br><br>Initial Measurement<br>Perform the heat treatment at $150^\circ\text{C} +0/-10^\circ\text{C}$ for 1 hour and leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.<br><br>Final Measurement<br>Leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.  |   |          |      |          |        |       |           |            |
| 11         | Resistance to Solder Heat | Appearance   | No abnormal exterior appearance  |   |          |      |          |        |       |           |            |
|            |                           | Capacitance Change   | Class I  | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)   |          |      |          |        |       |           |            |
|            |                           |  | Class II   | Within $\pm 10\%$   |          |      |          |        |       |           |            |
|            |                           | Q  | Class I  | Capacitance $\geq 30\text{pF}$ : $Q \geq 1,000$<br>$< 30\text{pF}$ : $Q \geq 400 + 20 \times C$<br>(C : Capacitance)    |          |      |          |        |       |           |            |
|            |                           | Tan $\delta$   | Class II   | Rated Voltage $\geq 25\text{V}$ : $0.025$ max<br>$\geq 16\text{V}$ : $0.035$ max<br>$\geq 10\text{V}$ : $0.050$ max *1) |          |      |          |        |       |           |            |
| IR         |                           | More than $10,000\text{M}\Omega$ or $500\text{M}\Omega \times \mu\text{F}$<br>(Whichever is smaller) *1) |  |   |          |      |          |        |       |           |            |
|            |                           |  | Solder pot : $260 \pm 5^\circ\text{C}$ , $10 \pm 1\text{sec}$ .<br><br>Initial Measurement<br>Perform the heat treatment at $150^\circ\text{C} +0/-10^\circ\text{C}$ for 1 hour and leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.<br><br>Final Measurement<br>Leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.  |   |          |      |          |        |       |           |            |
| 12         | ESD                       | Appearance   | No abnormal exterior appearance  |   |          |      |          |        |       |           |            |
|            |                           | Capacitance Change   | Class I  | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , (Whichever is larger)   |          |      |          |        |       |           |            |
|            |                           |  | Class II   | Within $\pm 10\%$   |          |      |          |        |       |           |            |
|            |                           | Q  | Class I  | Capacitance $\geq 30\text{pF}$ : $Q \geq 1,000$<br>$< 30\text{pF}$ : $Q \geq 400 + 20 \times C$<br>(C : Capacitance)    |          |      |          |        |       |           |            |
|            |                           | Tan $\delta$   | Class II   | Rated Voltage $\geq 25\text{V}$ : $0.025$ max<br>$\geq 16\text{V}$ : $0.035$ max<br>$\geq 10\text{V}$ : $0.050$ max *1) |          |      |          |        |       |           |            |
| IR         |                           | More than $10,000\text{M}\Omega$ or $500\text{M}\Omega \times \mu\text{F}$<br>(Whichever is smaller) *1) |  |   |          |      |          |        |       |           |            |
|            |                           |  | AEC - Q200 - 002<br><br>Initial Measurement<br>Perform the heat treatment at $150^\circ\text{C} +0/-10^\circ\text{C}$ for 1 hour and leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.<br><br>Final Measurement<br>Perform the heat treatment at $150^\circ\text{C} +0/-10^\circ\text{C}$ for 1 hour and leave the capacitor in ambient condition for $24 \pm 2$ hours before measurement. Then perform the measurement.   |   |          |      |          |        |       |           |            |
| 13         | Solderability             | 95% of the terminations is to be soldered evenly and continuously  | a) Preheat at $155^\circ\text{C}$ for 4 hrs, Immerse in solder for 5s at $235 \pm 5^\circ\text{C}$<br>b) Steam aging for 8 hrs, Immerse in solder for 5s at $235 \pm 5^\circ\text{C}$<br>c) Steam aging for 8 hrs, Immerse in solder for 120s at $260 \pm 5^\circ\text{C}$<br>solder : a solution ethanol and rosin  |   |          |      |          |        |       |           |            |

※ \*1) : Indicates typical specification. Please refer to individual specifications.



| No.                 | Item                                    |   | Performance   | Test condition  |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|---------------------|---|---|---|---|---|---------------|-----------------|---------|------|----------|-------------------------|---------------|----------|------------|-------------------------|--------|------------|-------------|--------|-------------|-------------|
| 14                  | Electrical Characterization             | Capacitance   | Within specified tolerance  | The Capacitance / D.F. should be measured at 25°C,<br>* Capacitance shall be measured after the heat treatment of 150+0/-10°C for 1hr and leaving for 24±2hr at room temperature. (Class II)<br><table border="1"> <thead> <tr> <th>Class</th> <th>Capacitance</th> <th>Frequency</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="2">I</td> <td>1000pF ↓</td> <td>1MHz ± 10%</td> <td rowspan="2">0.5 - 5.0Vrms</td> </tr> <tr> <td>1000pF ↑</td> <td>1kHz ± 10%</td> </tr> <tr> <td rowspan="2">II</td> <td>10μF ↓</td> <td>1kHz ± 10%</td> <td>1.0±0.2Vrms</td> </tr> <tr> <td>10μF ↑</td> <td>120Hz ± 20%</td> <td>0.5±0.1Vrms</td> </tr> </tbody> </table> | Class   | Capacitance   | Frequency       | Voltage | I    | 1000pF ↓ | 1MHz ± 10%              | 0.5 - 5.0Vrms | 1000pF ↑ | 1kHz ± 10% | II                      | 10μF ↓ | 1kHz ± 10% | 1.0±0.2Vrms | 10μF ↑ | 120Hz ± 20% | 0.5±0.1Vrms |
|                     |   | Class   | Capacitance   |   | Frequency   | Voltage       |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   | I   | 1000pF ↓  |   | 1MHz ± 10%  | 0.5 - 5.0Vrms |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   |   | 1000pF ↑  |   | 1kHz ± 10%  |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   | II  | 10μF ↓  |   | 1kHz ± 10%  | 1.0±0.2Vrms   |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   |   | 10μF ↑  |   | 120Hz ± 20%   | 0.5±0.1Vrms   |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   | Q   | Class I   |   | Capacitance ≥ 30pF : Q ≥ 1,000<br>< 30pF : Q ≥ 400 + 20 X C<br>(C : Capacitance)  |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| Tanδ                | Class II                                | Rated Voltage ≥ 25V : 0.025 max<br>≥ 16V : 0.035 max<br>≥ 10V : 0.050 max *1) |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| IR@25°C             | Class I                                 | More than 100,000MΩ or 1,000MΩ X μF<br>(Whichever is smaller)                 |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     | Class II                                | More than 10,000MΩ or 500MΩ X μF<br>(Whichever is smaller)                    |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| IR@125°C            | Class I                                 | More than 10,000MΩ or 100MΩ X μF<br>(Whichever is smaller)                    |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     | Class II                                | More than 1,000MΩ or 10MΩ X μF<br>(Whichever is smaller)                      |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| Dielectric Strength |   | No dielectric breakdown or mechanical breakdown                               | I.R. should be measured with a DC voltage not exceeding Rated Voltage @25°C, @125°C for 60 ~ 120 sec.<br><br>Dielectric Strength : 250% of the rated voltage for 1 ~ 5 seconds<br>The charge / discharge current is less than 50mA. |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 15                  | Board Flex                              | Appearance  | No abnormal exterior appearance   | Bending to the limit for 60 seconds.<br>Limit : Class I - 3mm<br>Class II - 2mm *1)<br><br>Initial Measurement<br>Perform the heat treatment at 150°C +0/-10°C for 1 hour and leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.<br><br>Final Measurement<br>Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   | Capacitance Change  | Class I   |   | Within ±5.0% or ±0.5pF,<br>(Whichever is larger)  |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   |   | Class II  |   | Within ±10%   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 16                  | Terminal Strength (SMD)                 | Appearance  | No abnormal exterior appearance   | 18N, for 60±1 sec.<br>* 0603(1608) -10N, 0402(1005) -2N<br><br>Initial Measurement<br>Perform the heat treatment at 150°C +0/-10°C for 1 hour and leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.<br><br>Final Measurement<br>Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   | Capacitance Change  | Class I   |   | Within ±2.5% or ±0.25pF,<br>(Whichever is larger)   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
|                     |   |   | Class II  |   | Within ±10%   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 17                  | Beam Load                               |   | Destruction value should be exceed<br>Chip Length ≤ 2.5mm<br>a) Chip Thickness > 0.5mm : 20N<br>b) Chip Thickness ≤ 0.5mm : 8N<br>Chip Length ≥ 3.2mm<br>a) Chip Thickness ≥ 1.25mm : 54.5N<br>b) Chip Thickness < 1.25mm : 15N     | Beam speed<br>Chip Length ≤ 2.5mm, 0.50±0.05mm / sec.<br>Chip Length ≥ 3.5mm, 2.50±0.25mm / sec.  |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 18                  | Capacitance Temperature Characteristics | Capacitance Change  | Class I   | 0 ± 30ppm / °C  | Capacitance shall be measured by the steps shown in the following table.<br><table border="1"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25±2</td> </tr> <tr> <td>2</td> <td>Min. operating temp. ±2</td> </tr> <tr> <td>3</td> <td>25±2</td> </tr> <tr> <td>4</td> <td>Max. operating temp. ±2</td> </tr> <tr> <td>5</td> <td>25±2</td> </tr> </tbody> </table> ■ Class I<br>Temperature Coefficient shall be calculated from the formula as below<br>Temp. Coefficient = $\frac{C2 - C1}{C1 \times \Delta T} \times 10^6$ [ppm / °C]<br>C1 : Capacitance at step 3    C2 : Capacitance at 125°C<br>ΔT : 125°C - 25°C = 100°C<br><br>■ Class II<br>Capacitance change shall be calculated from the formula as below<br>ΔC = $\frac{C2 - C1}{C1} \times 100$ (%)<br>C1 : Capacitance at step 3    C2 : Capacitance at step 2 or step 4 | Step          | Temperature(°C) | 1       | 25±2 | 2        | Min. operating temp. ±2 | 3             | 25±2     | 4          | Max. operating temp. ±2 | 5      | 25±2       |             |        |             |             |
|                     |   |   | Step  | Temperature(°C)   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 1                   | 25±2                                    |   |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 2                   | Min. operating temp. ±2                 |   |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 3                   | 25±2                                    |   |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 4                   | Max. operating temp. ±2                 |   |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| 5                   | 25±2                                    |   |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |
| Class II            | Within ±15%                             |   |   |   |   |               |                 |         |      |          |                         |               |          |            |                         |        |            |             |        |             |             |

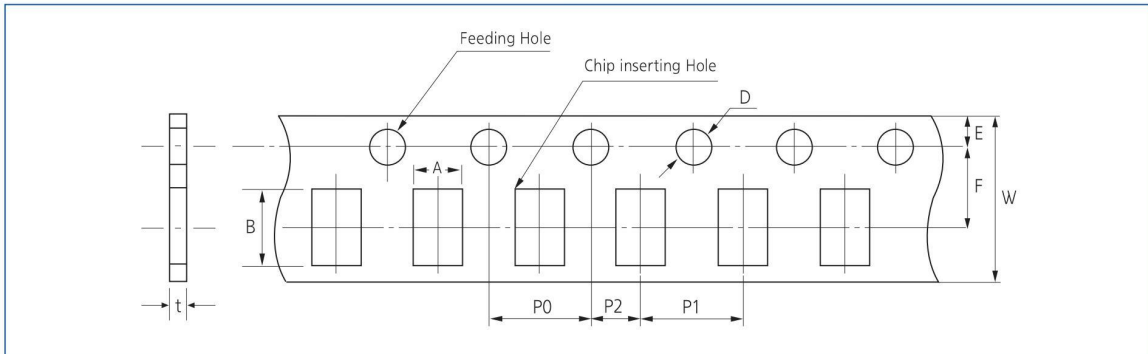
※ \*1) : Indicates typical specification. Please refer to individual specifications.

If you want more detailed information, Please Visit Samsung Electro - mechanics website ( www.semcr.com )

# Packaging Specifications

- Taping Packaging design : Packaging design follows IEC 60286 – 3 standard (IEC 60286 – 3 Packaging of components for automatic handling – parts 3)

## Cardboard(Paper) tape : 4mm pitch

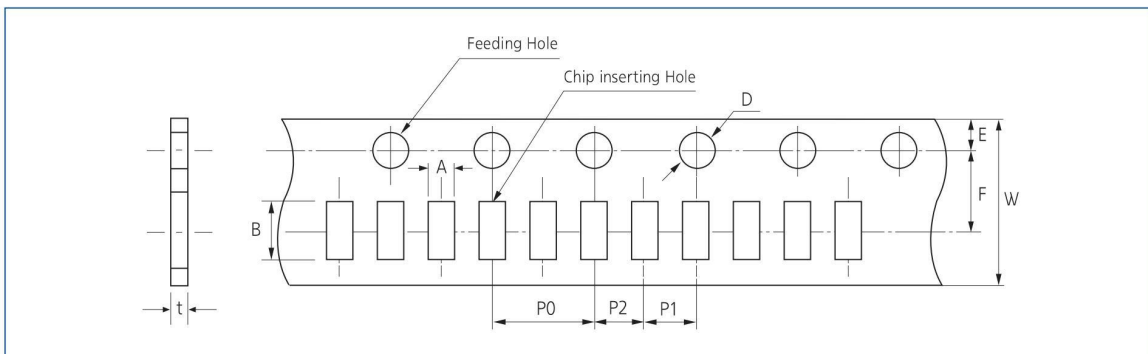


Unit : mm

| Symbol           | A                          | B             | W             | F             | E             | P1            | P2            | P0            | D             | t                 |               |
|------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|---------------|
| Size<br>inch(mm) | 0504<br>(1410)             | 1.30<br>±0.20 | 1.70<br>±0.20 | 8.00<br>±0.30 | 3.50<br>±0.05 | 1.75<br>±0.10 | 4.00<br>±0.10 | 2.00<br>±0.05 | 4.00<br>±0.10 | Ø1.50<br>+0.10/-0 | 1.10<br>Below |
|                  | 0603 0306<br>(1608) (0816) | 1.10<br>±0.20 | 1.90<br>±0.20 |               |               |               |               |               |               |                   |               |
|                  | 0805 0508<br>(2012) (1220) | 1.60<br>±0.20 | 2.40<br>±0.20 |               |               |               |               |               |               |                   |               |
|                  | 1206 0612<br>(3216) (1632) | 2.00<br>±0.20 | 3.60<br>±0.20 |               |               |               |               |               |               |                   |               |

※ According to normal size, we fill out A, B in the table above. The data may be changed as special size tolerance.

## Cardboard(Paper) tape : 2mm pitch

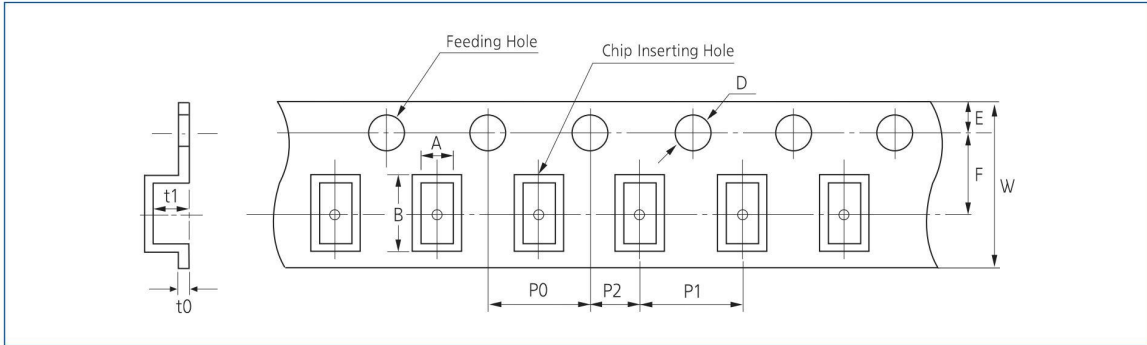


Unit : mm

| Symbol           | A               | B                   | W                   | F             | E             | P1            | P2            | P0            | D             | t                        |               |
|------------------|-----------------|---------------------|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------------------|---------------|
| Size<br>inch(mm) | 01005<br>(0402) | 0.25<br>±0.02       | 0.45<br>±0.02       | 8.00<br>±0.30 | 3.50<br>±0.05 | 1.75<br>±0.10 | 2.00<br>±0.10 | 2.00<br>±0.05 | 4.00<br>±0.10 | Ø1.50<br>+0.10<br>/-0.03 | 0.25<br>±0.02 |
|                  | 0201<br>(0603)  | 0.38<br>±0.03       | 0.68<br>±0.03       |               |               |               |               |               |               |                          | 0.37<br>±0.03 |
|                  | 0402<br>(1005)  | 0.62<br>±0.05       | 1.12<br>±0.05       |               |               |               |               |               |               |                          | 0.37<br>±0.05 |
|                  |                 |                     |                     |               |               |               |               |               |               |                          | 0.60<br>±0.05 |
|                  | 0204<br>(0510)  | 0.62+0.05<br>/-0.10 | 1.12+0.05<br>/-0.10 |               |               |               |               |               |               |                          | 0.37<br>±0.03 |

※ According to normal size, we fill out A, B in the table above. The data may be changed as special size tolerance.

### Embossed(Plastic) tape



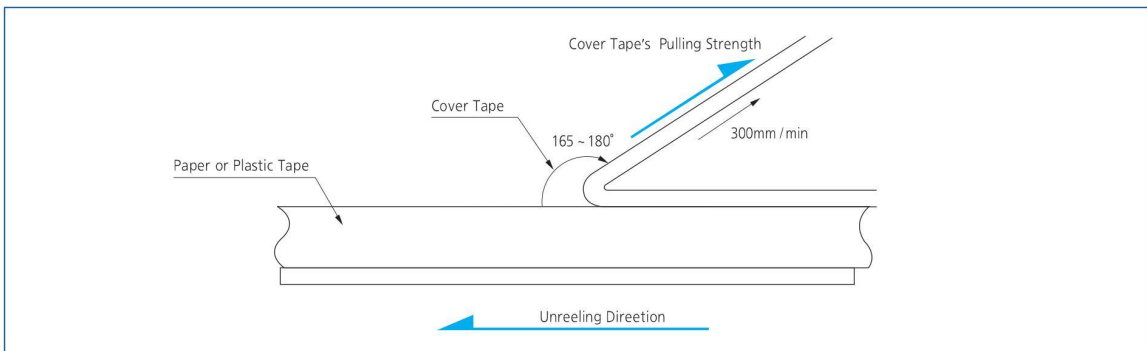
Unit : mm

| Symbol          | A                          | B                          | W                   | F                  | E                  | P1                 | P2                 | P0                 | D  | t1                 | t0            |
|-----------------|----------------------------|----------------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--|--------------------|---------------|
| Type            |                            |                            |                     |                    |                    |                    |                    |                    |  |                    |               |
| 01005<br>(0402) | 0.25<br>$\pm 0.02$         | 0.45<br>$\pm 0.02$         | 4.00<br>$\pm 0.05$  | 1.80<br>$\pm 0.02$ | 0.90<br>$\pm 0.05$ | 1.00<br>$\pm 0.02$ | 1.00<br>$\pm 0.02$ | 2.00<br>$\pm 0.04$ | $\varnothing 0.80$<br>$\pm 0.04$         | 0.25<br>$\pm 0.02$ | 0.50<br>Max   |
| 0603<br>(1608)  | 1.05<br>$\pm 0.15$         | 1.90<br>$\pm 0.15$         | 8.00<br>$\pm 0.30$  | 3.50<br>$\pm 0.05$ | 1.75<br>$\pm 0.10$ | 4.00<br>$\pm 0.10$ | 2.00<br>$\pm 0.05$ | 4.00<br>$\pm 0.10$ | $\varnothing 1.50$<br>$+0.10$<br>$-0.03$ | 2.90<br>Max        | 0.60<br>Below |
| 0805<br>(2012)  | 1.45<br>$\pm 0.20$         | 2.30<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 1206<br>(3216)  | 1.90<br>$\pm 0.20$         | 3.50<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 1210<br>(3225)  | 2.80<br>$\pm 0.20$         | 3.60<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 1808<br>(4520)  | 2.30<br>$\pm 0.20$         | 4.90<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 1812<br>(4532)  | 3.60<br>$\pm 0.20$         | 4.90<br>$\pm 0.20$         | 12.00<br>$\pm 0.30$ | 5.60<br>$\pm 0.05$ | 8.00<br>$\pm 0.10$ | 3.80<br>Max        |                    |                    |  |                    |               |
| 2220<br>(5750)  | 5.50<br>$\pm 0.20$         | 6.20<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 0204<br>(5010)  | 0.62<br>$+0.05$<br>$-0.10$ | 1.12<br>$+0.05$<br>$-0.10$ | 0.80<br>$\pm 0.30$  | 3.50<br>$\pm 0.05$ | 4.00<br>$\pm 0.10$ | 2.50<br>Max        |                    |                    |  |                    |               |
| 0306<br>(0816)  | 1.10<br>$\pm 0.20$         | 1.90<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 0508<br>(1220)  | 1.45<br>$\pm 0.20$         | 2.30<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |
| 0612<br>(1632)  | 2.00<br>$\pm 0.20$         | 3.60<br>$\pm 0.20$         |                     |                    |                    |                    |                    |                    |  |                    |               |

※ According to normal size, we fill out A, B in the table above. The data may be changed as special size tolerance.

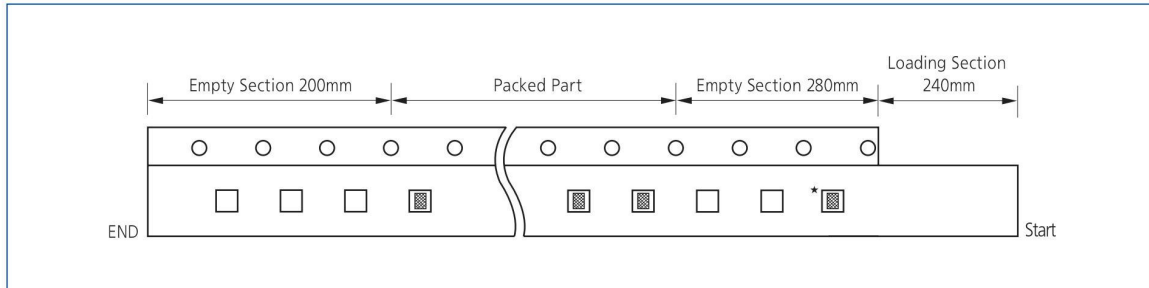
### Peeling off of Tape

- $10g.f \leq \text{Peel off force} \leq 70g.f$



# Packaging Specifications

## Taping figure



★The chip is only use for identifying the label and packaged products. Please don't use the chip.

## Packaging Code & Quantity

Unit : kpcs

| Size inch(mm) | Thickness code | Cardboard(Paper) Type |   |    |    |    |          |          |    |     |    |    |
|---------------|----------------|-----------------------|---|----|----|----|----------|----------|----|-----|----|----|
|               |                | 7" Reel               |   |    |    |    | 10" Reel | 13" Reel |    |     |    |    |
|               |                | C                     | 8 | H  | Z* | Y* | O        | D        | L  | 2*  | 7* | 3  |
| 01005(0402)   | 2              | 20                    | - | -  | -  | -  | -        | 100      | -  | -   | -  | -  |
| 0201(0603)    | 3              | 10                    | - | 15 | 10 | 10 | 30       | 50       | -  | 150 | 50 | -  |
| 0402(1005)    | 3              | 10                    | - | 15 | -  | -  | 30       | 50       | -  | -   | -  | -  |
|               | 5              | 10                    | 8 | -  | 10 | 10 | 30       | 50       | 40 | 100 | 50 | -  |
|               | 7,8(THMC)      | -                     | 8 | -  | -  | -  | -        | -        | -  | -   | -  | 30 |
| 0504(1410)    | 8              | 4                     | - | -  | -  | -  | 10       | 10       | 15 | -   | -  | -  |
| 0603(1608)    | 5              | 4                     | - | -  | -  | -  | 30       | 50       | -  | -   | -  | -  |
|               | 8              | 4                     | - | -  | 4  | 4  | 10       | 10       | 15 | -   | -  | -  |
|               | 9,N            | 4                     | - | -  | -  | -  | -        | -        | -  | -   | -  | -  |
| 0805(2012)    | A,C            | 4                     | - | -  | -  | -  | 10       | 10       | 15 | -   | -  | -  |
| 1206(3216)    | C              | 4                     | - | -  | -  | -  | 10       | 10       | 15 | -   | -  | -  |

\* 2 = 1mm Pitch / Z = Chip aligned for horizontal / Y, 7 = Chip aligned for vertical

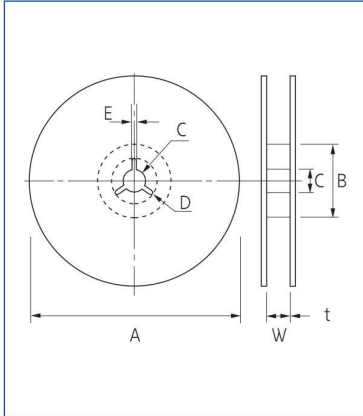
Unit : kpcs

| Size inch(mm) | Thickness code | Embossed(Plastic) Type |   |    |    |          |          | Bulk case Type | Bulk Type |
|---------------|----------------|------------------------|---|----|----|----------|----------|----------------|-----------|
|               |                | 7" Reel                |   |    |    | 10" Reel | 13" Reel |                |           |
|               |                | E                      | G | W* | R* | S        | F        | P              | B         |
| 01005(0402)   | 2              | 50                     | - | -  | -  | -        | -        | -              |           |
| 0201(0603)    | 1              | 10                     | - | -  | -  | -        | -        | -              |           |
| 0402(1005)    | 1,2,L          | 15                     | - | -  | -  | -        | -        | -              |           |
|               | 3,5            | -                      | - | -  | -  | -        | -        | 50             |           |
| 0603(1608)    | 8              | 3                      | - | -  | 3  | -        | 10       | 15             |           |
|               | E,M            | 3                      | - | -  | -  | -        | -        | -              |           |
| 0604(1610)    | D              | 3                      | - | 3  | -  | 6        | 10       | -              |           |
| 0805(2012)    | A,C            | -                      | - | -  | -  | -        | -        | 10             |           |
|               | E              | 2                      | 3 | 2  | -  | 6        | 10       | 5              |           |
|               | F              | 2                      | 3 | 2  | -  | 6        | 10       | 5              |           |
|               | Q              | 2                      | 3 | 2  | -  | 6        | 10       | 5              |           |
| 1206(3216)    | E,P,F          | 2                      | 3 | -  | -  | 6        | 10       | -              |           |
|               | H              | 2                      | - | 2  | -  | 4        | 8        | -              |           |
| 1210(3225)    | 9,D,C,O        | 2                      | - | -  | -  | -        | 10       | -              |           |
|               | E,F,M          | 2                      | - | -  | -  | -        | 10       | -              |           |
|               | H,T            | 2                      | - | -  | -  | -        | 8        | -              |           |
|               | I,U            | 2                      | - | -  | -  | 4        | 8        | -              |           |
|               | J,V            | 1                      | - | 1  | -  | -        | 4        | -              |           |
|               | S              | 2                      | - | -  | -  | -        | 8        | -              |           |
| 1808(4520)    | F              | 2                      | - | -  | -  | -        | -        | -              |           |
| 1812(4532)    | F              | 1                      | - | -  | -  | -        | 4        | -              |           |
|               | H,I            | 1                      | - | -  | -  | -        | 4        | -              |           |
|               | J,L            | -                      | - | -  | -  | -        | 2        | -              |           |
| 2220(5750)    | H,I,J          | -                      | - | -  | -  | -        | 2        | -              |           |

\* R = Chip aligned for horizontal / W = Chip aligned for vertical

### Reel Dimensions

Unit : mm



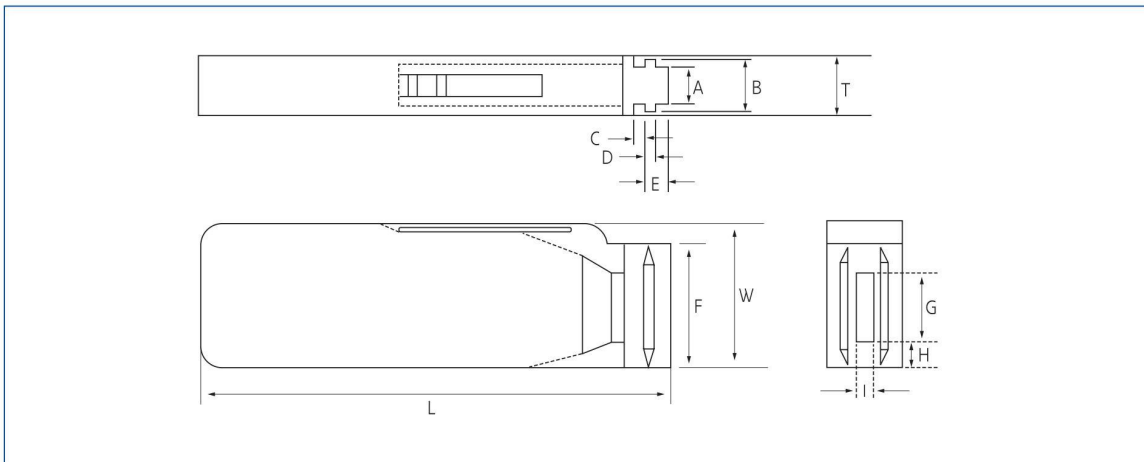
| Symbol   | Tape Width | A                         | B                    | C                        | D            |
|----------|------------|---------------------------|----------------------|--------------------------|--------------|
| 7" Reel  | 4mm        | $\varnothing 178 \pm 2.0$ | MIN $\varnothing 50$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |
|          | 8mm        | $\varnothing 178 \pm 2.0$ | MIN $\varnothing 50$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |
|          | 12mm       | $\varnothing 178 \pm 2.0$ | MIN $\varnothing 50$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |
| 10" Reel | 8mm        | $\varnothing 258 \pm 2.0$ | MIN $\varnothing 70$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |
|          | 12mm       | $\varnothing 330 \pm 2.0$ | MIN $\varnothing 70$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |
| 13" Reel | 8mm        | $\varnothing 330 \pm 2.0$ | MIN $\varnothing 70$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |
|          | 12mm       | $\varnothing 330 \pm 2.0$ | MIN $\varnothing 70$ | $\varnothing 13 \pm 0.5$ | $21 \pm 0.8$ |

| Symbol   | Tape Width | E             | W             | t             |
|----------|------------|---------------|---------------|---------------|
| 7" Reel  | 4mm        | $2.0 \pm 0.5$ | $5.0 \pm 0.5$ | $1.2 \pm 0.2$ |
|          | 8mm        | $2.0 \pm 0.5$ | $10 \pm 1.5$  | $0.9 \pm 0.2$ |
|          | 12mm       | $2.0 \pm 0.5$ | $13 \pm 0.5$  | $1.2 \pm 0.2$ |
| 10" Reel | 8mm        | $2.0 \pm 0.5$ | $10 \pm 1.5$  | $1.8 \pm 0.2$ |
| 13" Reel | 8mm        | $2.0 \pm 0.5$ | $10 \pm 1.5$  | $1.8 \pm 0.2$ |
|          | 12mm       | $2.0 \pm 0.5$ | $13 \pm 0.5$  | $2.2 \pm 0.2$ |

### Bulk Case Packaging

- Bulk case packaging can reduce the stock space and transportation costs.
- The bulk feeding system can increase the productivity.
- It can eliminate the components loss.



Unit : mm

| Symbol    | A               | B               | T             | C                    | D                 | E                 |
|-----------|-----------------|-----------------|---------------|----------------------|-------------------|-------------------|
| Dimension | $6.80 \pm 0.10$ | $8.80 \pm 0.10$ | $12 \pm 0.10$ | $1.50 \pm 0.10 / -0$ | $2.00 +0 / -0.10$ | $3.00 +0.20 / -0$ |

| Symbol    | F                 | W               | G             | H               | L              | I               |
|-----------|-------------------|-----------------|---------------|-----------------|----------------|-----------------|
| Dimension | $31.5 +0.20 / -0$ | $36 +0 / -0.20$ | $19 \pm 0.35$ | $7.00 \pm 0.35$ | $110 \pm 0.70$ | $5.00 \pm 0.35$ |

### ■ QUANTITY

Unit : pcs

| Size<br>Inch(mm) | 0402(1005) | 0603(1608)       | 0805(2012) |           |
|------------------|------------|------------------|------------|-----------|
|                  |            |                  | T ≤ 0.85mm | T ≥ 1.0mm |
| Quantity         | 50,000     | 10,000 or 15,000 | 10,000     | 5,000     |

# Application Manual for Surface Mounting

## 1. Storage of products

### 1-1. Storage Environment

Tape packing materials are designed to withstand long-term storage, but they will degrade more rapidly in the presence of high temperature or high humidity. Therefore, the products must be stored in an ambient 0 ~ 40°C with a relative humidity of 0 ~ 70%. Allowable storage period is within 6 months from the outgoing date of delivery.

### 1-2. Corrosive Gases

Since sulfur and chlorine may degrade the solderability of the end termination, it is important to store the capacitors in an environment free of these gases.

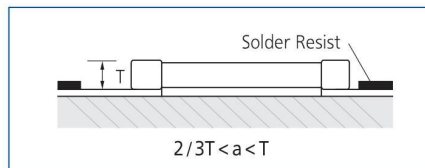
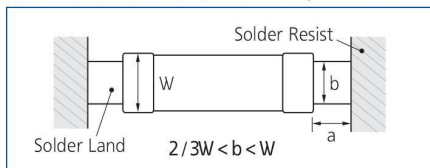
### 1-3. Temperature Fluctuations

Since dew condensation may occur by the differences in temperature when the products are taken out of storage, it is important to maintain a temperature-controlled environment.

## 2. Design of Solder Land Pattern

When designing printed circuit boards, the shape and size of the solder lands must allow for the proper amount of solder on the capacitor. The amount of solder at the end terminations has a direct effect on the probability that the chip will crack. The greater amount of solder, the larger amount of stress on the chip, and the more likely that it will break. Use the following illustrations as guidelines for proper Solder land design.

Recommendation of solder Land Shape and Size



## 3. Adhesives

MLCCs generally require the use of an adhesive to position the chips to the circuit board prior to soldering.

### 3-1. Requirements for Adhesives

They must have enough adhesion so that the chips will not fall off or move during the handling of the circuit board.

They must maintain their adhesive strength when exposed to soldering temperatures.

They should not spread or run when applied to the circuit board.

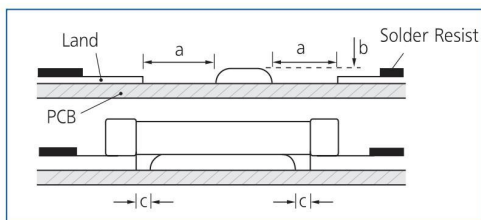
They should have a long pot life.

They should harden quickly.

They should not corrode the circuit board or chip material.

They should be a good insulator.

They should be non-toxic, and not produce harmful gases, nor be harmful when touched.



| Type | 21          | 31          |
|------|-------------|-------------|
| a    | Min. 0.2    | Min. 0.2    |
| b    | 70 ~ 100 μm | 70 ~ 100 μm |
| c    | > 0         | > 0         |

### 3-2. Application Method

It is important to use the proper amount of adhesive. Too little will cause poor adhesion to the circuit board, and too much may strain the conductor pattern, thereby causing defective soldering. The following illustrations show the proper quantity of adhesive.

### 3-3. Adhesive hardening Characteristics

To prevent oxidation of the terminations, the adhesive must harden at 160°C or less, within 2 minutes or less.

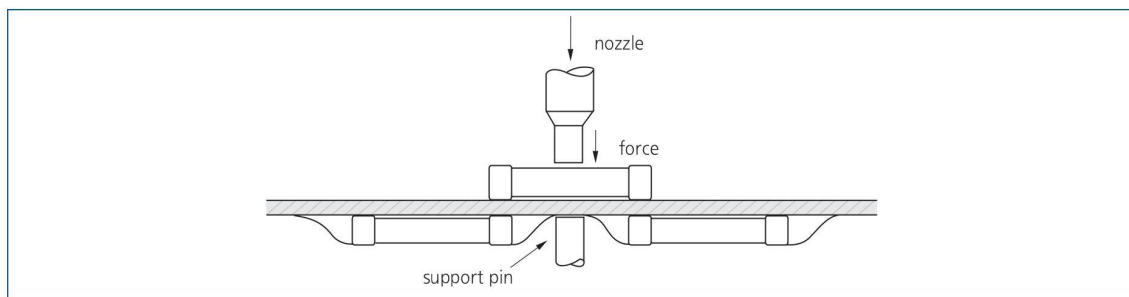
## 4. Mounting

### 4-1. Mounting Head Pressure

Excessive pressure will cause chip capacitors to crack.  
The pressure between nozzle and chip capacitor will be 300g maximum during mounting.

### 4-2. Bending Stress

Bending of printed circuit board by mounting head when double-sided circuit boards are used, chip capacitors first are mounted and soldered onto one side of the board.  
When the capacitors are mounted onto the other side, it is important to support the board as shown in the illustration. If the circuit board is not supported, it may bend, causing the already -installed capacitors to crack.



## 5. Flux

Although highly -activated flux gives better solderability, substances which increase activity may also degrade the insulation of the chip capacitors, To avoid such degradation, it is recommended that a mildly activated rosin flux ( less than 0.2% chlo.rine ) be used

## 6. Soldering

Since a multilayer ceramic chip capacitor comes into direct contact with melted solder during soldering, it is exposed to potentially mechanical stress caused by the sudden temperature change. The capacitor may also be subject to silver migration, and to contamination by the flux. Because of these factors, soldering technique is critical.

### 6-1. Soldering Methods

| Method           | Classification                 |   |
|------------------|--------------------------------|---|
| Reflow soldering | - Overall heating              | - Infrared rays<br>- Hot plate<br>- VPS (Vapor phase) |
|                  | - Local heating                | - Air heater<br>- Laser<br>- Light beam               |
| Flow soldering   | - Single wave<br>- Double wave |   |

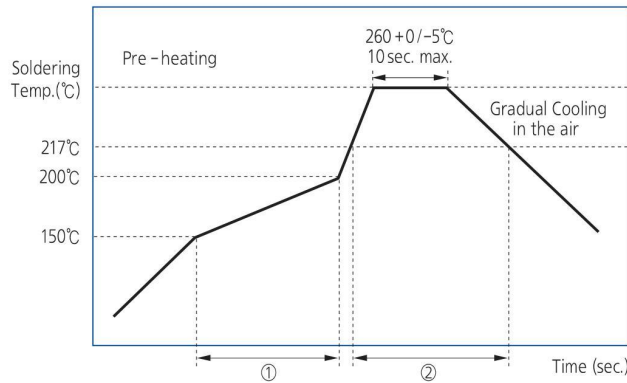
### 6-2. Soldering Profile

To avoid the crack problem by sudden temperature change, follow the temperature profile in the adjacent graph.

# Application Manual for Surface Mounting

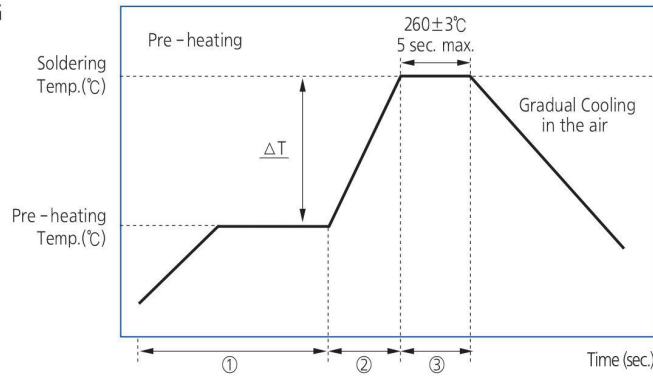
## 6-3. Pb-Free (Sn 100%) Plating

### • REFLOW SOLDERING



| Soldering Temp.(°C) | Pre-heating Time (①, sec.) | Soldering Time(②, sec.) |
|---------------------|----------------------------|-------------------------|
| 260+0 / -5          | 60 ~ 120                   | 60 ~ 150                |

### • FLOW SOLDERING



| $\Delta T$ (°C)                     | Soldering Temp. (°C) | Pre-heating Time (① + ②, sec.) | Soldering Time (③, sec.) |
|-------------------------------------|----------------------|--------------------------------|--------------------------|
| $\leq 150$<br>(1206 and below size) | 260±3                | $\geq 120$                     | $\leq 5$                 |

### • SOLDER IRON(Hand Soldering)

| Variation of Temp.(°C) | Soldering Temp.(°C) | Pre-heating Time(sec.) | Soldering Time(sec.) | Cooling Time(sec.) | Condition of Iron Facilities |              |                |
|------------------------|---------------------|------------------------|----------------------|--------------------|------------------------------|--------------|----------------|
|                        |                     |                        |                      |                    | Wattage                      | Tip Diameter | Soldering Time |
| $\Delta T \leq 130$    | 300±10°C max.       | $\geq 60$ sec.         | $\leq 4$ sec.        | -                  | 20W max.                     | 3mm max.     | 4 sec max.     |

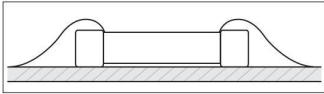
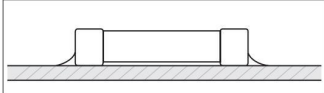
\* Caution - Iron tip should not contact with ceramic body directly



#### 6-4. Manual Soldering

Manual soldering can pose a great risk of creating thermal cracks in chip capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's carelessness may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore the soldering iron must be handled carefully, and close attention must be paid to the selection of the soldering iron tip and to temperature control of the tip.

#### 6-5. Amount of Solder

|                   |   |  |
|-------------------|---|--|
| Too much Solder   |  | Cracks tend to occur due to large stress.                                  |
| Not enough solder |  | Weak holding force may cause bad connections or detaching of the capacitor |

#### 6-6. Cooling

Natural cooling using air is recommended. If the chips are dipped into solvent for cleaning, the temperature difference( $\Delta T$ ) must be less than 100°C

#### 6-7. Cleaning

If rosin flux is used, cleaning usually is unnecessary. When strongly activated flux is used, chlorine in the flux may dissolve into some types of cleaning fluids, thereby affecting the chip capacitors. This means that the cleaning fluid must be carefully selected, and should always be new.

### 7. Notes for Separating Multiple, Shared PC Boards

A multi-PC board is separated into many individual circuit boards after soldering has been completed. If the board is bent or distorted at the time of separation, cracks may occur in the chip capacitors. Carefully choose a separation method that minimizes the bending of the circuit board.

# Certifications



## Quality System Certification status for each factory site

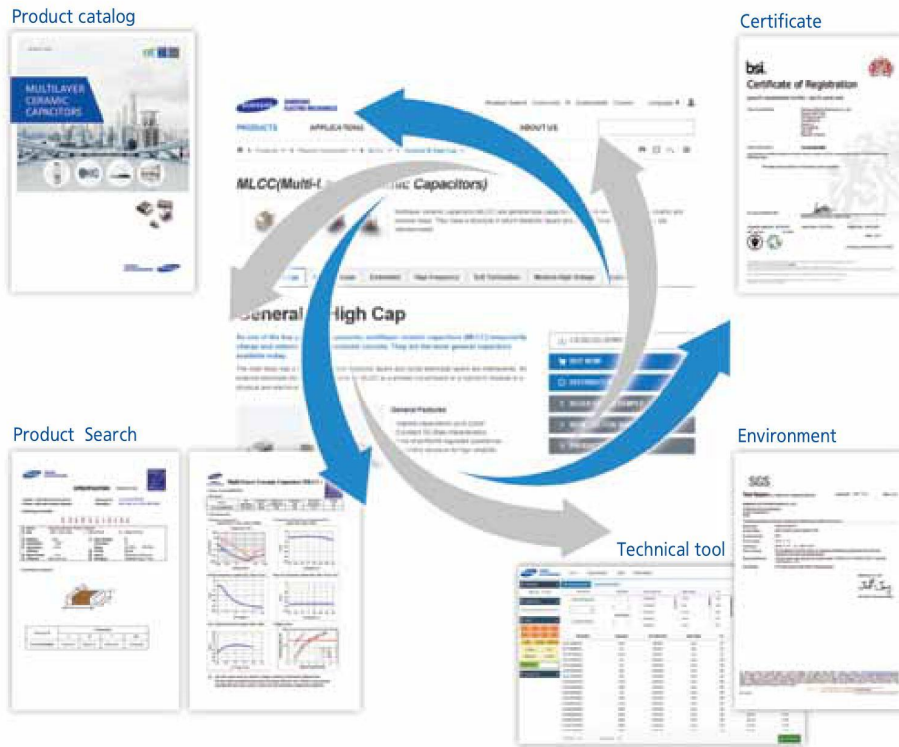
| Certification                       | Suwon (Korea)              | Busan (Korea)              | Calamba (Philippines)      | Tianjin (China)            | Binhai (China)             |
|-------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| ISO / TS 16949                      | BSI<br>TS 91430-000        | BSI<br>TS 91430-001        | BSI<br>TS 91430-005        | BSI<br>TS 91430-007        | BSI<br>TS 91430-007        |
| Date Validity                       | 2013-10-25<br>~ 2016-10-24 | 2016-07-31<br>~ 2018-09-14 | 2015-07-20<br>~ 2018-07-19 | 2014-11-18<br>~ 2017-11-17 | 2014-11-18<br>~ 2017-11-17 |
| ISO 14001                           | 20BK00223-UK               | 20BK00223-UK               | EMS_77354                  | CNBJ320761-UK              | CNBJ320761-UK              |
| Date Validity                       | 2016-06-25<br>~ 2018-09-14 | 2016-06-25<br>~ 2018-09-14 | 2015-07-13<br>~ 2018-07-12 | 2015-04-15<br>~ 2018-04-14 | 2015-04-15<br>~ 2018-04-14 |
| OHSAS 18001                         | BK50217                    | BK50217                    | OHS_568723                 | CN100043A                  | CN100043A                  |
| Date Validity                       | 2013-06-25<br>~ 2019-06-24 | 2013-06-25<br>~ 2019-06-24 | 2010-12-21<br>~ 2016-10-13 | 2015-04-15<br>~ 2018-04-14 | 2015-04-15<br>~ 2018-04-14 |
| QC 080000                           | KR-HSPM-1011               | KR-HSPM-1012               | PI-HSPM-1001               | PRC-HSPM-1767              | PRC-HSPM-1767-2            |
| Date Validity                       | 2016-07-02<br>~ 2019-07-01 | 2016-07-14<br>~ 2019-07-19 | 2016-07-11<br>~ 2019-07-04 | 2016-07-11<br>~ 2019-07-26 | 2016-07-11<br>~ 2019-07-26 |
| Sony Green Partner<br>Date Validity | 2016-02-22<br>~ 2018-05-31 | 2016-02-22<br>~ 2018-05-31 | 2016-02-22<br>~ 2018-05-31 | 2016-02-22<br>~ 2018-05-31 | 2016-02-22<br>~ 2018-05-31 |

# Homepage

<http://www.Samsungsem.com>

## SEMCO LCR web-site

SEMCO web -site supports all technical data & information for our partner.



Certifications

## LCR Web Library

The software of "LCR Web Library" provides the characteristics of SEMCO's products on the website. (<http://weblib.samsungsem.com/>)

- S-parameter and Spice Model of MLCC, Inductor and Bead.
- The acoustic noise data of MLCC
- Capacitance of MLCC according to Temperature and DC bias

| Part Number    | Capacitance | Size (Thickness) | Rated Voltage | TCC | Thickness Max | Tolerance |
|----------------|-------------|------------------|---------------|-----|---------------|-----------|
| CL31104R05LN   | 100nF       | 03050402         | 4Vdc          | ±75 | 0.25 mm       | ±20%      |
| CL31105R05LN   | 1µF         | 03050815         | 4Vdc          | ±75 | 0.55 mm       | ±20%      |
| CL31147R05LN   | 470nF       | 03050815         | 4Vdc          | ±75 | 0.55 mm       | ±20%      |
| CL324102K2N1N  | 10nF        | 010550402        | 10Vdc         | ±5R | 0.22 mm       | ±10%      |
| CL324102K2N1N  | 10nF        | 010550402        | 5.3Vdc        | ±5R | 0.22 mm       | ±10%      |
| CL324102K2N1N  | 10nF        | 010550402        | 10Vdc         | ±5R | 0.22 mm       | ±10%      |
| CL324102K2N1N  | 10nF        | 010550402        | 5.3Vdc        | ±5R | 0.22 mm       | ±10%      |
| CL324104K2N1N  | 100nF       | 010550402        | 5.3Vdc        | ±5R | 0.22 mm       | ±10%      |
| CL324104R2N1N  | 100nF       | 010550402        | 4Vdc          | ±5R | 0.22 mm       | ±20%      |
| CL324105R4K100 | 1µF         | 010550403        | 5.3Vdc        | ±5R | 0.55 mm       | ±20%      |
| CL324182K2N1N  | 1.8nF       | 010550402        | 10Vdc         | ±5R | 0.22 mm       | ±10%      |
| CL324222K2N1N  | 2.2nF       | 010550402        | 10Vdc         | ±5R | 0.22 mm       | ±10%      |
| CL324254K2N1N  | 220nF       | 010550402        | 5.3Vdc        | ±5R | 0.22 mm       | ±20%      |
| CL32482K2N1N   | 6.8nF       | 010550402        | 5.3Vdc        | ±5R | 0.22 mm       | ±10%      |
| CL325224K2N1N  | 220nF       | 010550402        | 10Vdc         | ±7R | 0.22 mm       | ±10%      |
| CL325334K2N1N  | 330nF       | 010550402        | 10Vdc         | ±7R | 0.22 mm       | ±10%      |

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