

# MULTILAYER CERAMIC CHIP CAPACITORS

Commercial grade, low ESL reverse geometry

## C series

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**C0510 [EIA CC0204]**

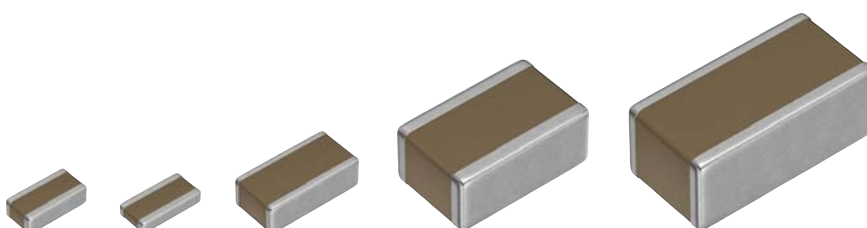
**CGBD [EIA CC0204]**

**C0816 [EIA CC0306]**

**C1220 [EIA CC0508]**

**C1632 [EIA CC0612]**

\* Dimensions code: JIS[EIA]



# REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

## SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using this products.

 **REMINDERS**

1. The products listed on this catalog are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.

If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in the each catalog, please contact us.

- |  |  |
|--|--|
| (1) Aerospace/aviation equipment   | (8) Public information-processing equipment                                  |
| (2) Transportation equipment (cars, electric trains, ships, etc.)                    | (9) Military equipment   |
| (3) Medical equipment (excepting Pharmaceutical Affairs Law classification Class1,2) | (10) Electric heating apparatus, burning equipment                           |
| (4) Power-generation control equipment   | (11) Disaster prevention/crime prevention equipment                          |
| (5) Atomic energy-related equipment  | (12) Safety equipment  |
| (6) Seabed equipment   | (13) Other applications that are not considered general-purpose applications |
| (7) Transportation control equipment   |  |

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.

- We may modify products or discontinue production of a product listed in this catalog without prior notification.
- We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
- If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
- Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
- We are not responsible for problems that occur related to the intellectual property rights or other rights of our company or a third party when you use a product listed in this catalog. We do not grant license of these rights.
- This catalog only applies to products purchased through our company or one of our company's official agencies. This catalog does not apply to products that are purchased through other third parties.

Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part number orders.

Please be aware the last five digits of the catalog number will differ from the item description (internal control number) on the product label.

Contact your local TDK Sales representative for more information.

(Example)

Catalog issued date	Catalog number	Item description (on delivery label)
Prior to January 2013	C1608C0G1E103J(080AA)	C1608C0G1E103JT000N
January 2013 and later	C1608C0G1E103J080AA	C1608C0G1E103JT000N

# C series

## Low ESL reverse geometry



Type: C0510 [0204 inch], CGBD [0204 inch], C0816 [0306 inch], C1220 [0508 inch], C1632 [0612 inch]

### SERIES OVERVIEW

TDK multilayer ceramic chip capacitor low ESL flip type commercial grade C series is a product which rotated the electrode direction 90 degrees vertically and horizontally compared to standard termination type. ESR, ESL and impedance are reduced by wider and shorter current route.

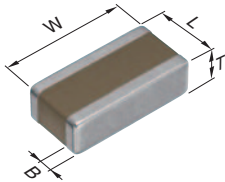
### FEATURES

- Small and high-performance EMC components. Good attenuation characteristic in wide bandwidth.
- Very effective for the decoupling use. The number of decoupling MLCCs can be decreased because the impedance is lower than standard termination type.

### APPLICATIONS

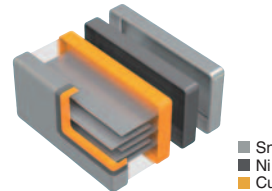
- EMC countermeasure and decoupling use in power lines for general electronic equipment.

### SHAPE & DIMENSIONS



L	Body length
W	Body width
T	Body height
B	Terminal width

### PRODUCT STRUCTURE



The current route becomes wider and shorter by the structure which rotated the electrode direction 90 degrees vertically and horizontally compared to standard termination type.

Dimensions in mm

Type	L	W	T	B
C0510	0.52±0.05	1.00±0.05	0.30±0.05	0.10 min.
CGBD	0.52±0.05	1.00±0.05	0.22 max.	0.10 min.
C0816	0.80±0.15	1.60±0.20	0.50±0.10	0.10 min.
C1220	1.25±0.20	2.00±0.20	0.85±0.15	0.20 min.
C1632	1.60±0.20	3.20±0.20	1.30±0.15	0.20 min.

\*Dimensional tolerances are typical values.

**CATALOG NUMBER CONSTRUCTION**

<b>C</b>	<b>0510</b>	<b>X7R</b>	<b>1H</b>	<b>473</b>	<b>M</b>	<b>030</b>	<b>B</b>	<b>C</b>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

## (1) Series

## (2) Dimensions L x W (mm)

Dimensions code	EIA	Length	Width	Terminal width
0510	CC0204	0.52	1.00	0.10
CGBD	CC0204	0.52	1.00	0.10
0816	CC0306	0.80	1.60	0.10
1220	CC0508	1.25	2.00	0.20
1632	CC0612	1.60	3.20	0.20

## (3) Temperature characteristics

Temperature characteristics	Capacitance change	Temperature range
X5R	±15%	-55 to +85°C
X6S	±22%	-55 to +105°C
X7R	±15%	-55 to +125°C
X7S	±22%	-55 to +125°C
X7T	+22,-33%	-55 to +125°C

## (4) Rated voltage (DC)

Code	Voltage (DC)
0E	2.5V
0G	4V
0J	6.3V
1A	10V
1C	16V
1E	25V
1H	50V

## (5) Nominal capacitance (pF)

The capacitance is expressed in three digit codes and in units of pico Farads (pF). The first and second digits identify the first and second significant figures of the capacitance. The third digit identifies the multiplier. R designates a decimal point.

(Example)0R5 = 0.5pF

101 = 100pF

225 = 2,200,000pF = 2.2μF

## (6) Capacitance tolerance

Code	Tolerance
M	±20%

## (7) Thickness

Code	Thickness
022	0.22mm
030	0.30mm
050	0.50mm
070	0.70mm
085	0.85mm
115	1.15mm
130	1.30mm

## (8) Packaging style

Code	Style
A	178mm reel, 4mm pitch
B	178mm reel, 2mm pitch

## (9) Special reserved code

Code	Description
A, C	TDK internal code

## Capacitance range chart

C0510 [0204 inch]

Capacitance		X5R			X6S		X7R		X7S	
(pF)	Code	1C (16V)	1A (10V)	0J (6.3V)	0J (6.3V)	0G (4V)	1H (50V)	1E (25V)	0G (4V)	0E (2.5V)
47,000	473									
100,000	104									
220,000	224									
470,000	474									
1,000,000	105									

Standard thickness 0.30 mm

■ Please refer to the capacitance range table at P-7 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CGBD/0510 [0204 inch]

Capacitance		X5R	X6S	X7T
(pF)	Code	0G (4V)	0G (4V)	0E (2.5V)
1,000,000	105			

Standard thickness 0.22 mm max.

■ Please refer to the capacitance range table at P-7 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

C0816 [0306 inch]

Capacitance		X5R			X6S	X7R		X7S
(pF)	Code	1C (16V)	1A (10V)	0J (6.3V)	0G (4V)	1C (16V)	0J (6.3V)	0G (4V)
10,000	103							
22,000	223							
47,000	473							
100,000	104							
220,000	224							
470,000	474							
1,000,000	105							
2,200,000	225							
4,700,000	475							

Standard thickness 0.50 mm

Background red: The product which is planning to stop production

■ Please refer to the capacitance range table at P-7 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

C1220 [0508 inch]

Capacitance		X5R				X7R			
(pF)	Code	1H (50V)	1E (25V)	1C (16V)	1A (10V)	1H (50V)	1E (25V)	1C (16V)	0J (6.3V)
10,000	103								
22,000	223								
47,000	473								
100,000	104								
220,000	224								
470,000	474								
1,000,000	105								

Standard thickness 0.85 mm

Background red: The product which is planning to stop production

■ Please refer to the capacitance range table at P-7 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

C1632 [0612 inch]

Capacitance		X5R					X7R					X7S
(pF)	Code	1H (50V)	1E (25V)	1C (16V)	1A (10V)	0J (6.3V)	1H (50V)	1E (25V)	1C (16V)	1A (10V)	0J (6.3V)	0G (4V)
10,000	103											
22,000	223											
47,000	473											
100,000	104											
220,000	224											
470,000	474											
1,000,000	105											
2,200,000	225											
4,700,000	475											
10,000,000	106											

Standard thickness 0.70 mm 1.15 mm 1.30 mm

Background red: The product which is planning to stop production

■ Please refer to the capacitance range table at P-7 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range table

## Temperature characteristics: X5R (–55 to 85°C, ±15%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number			
				Rated voltage Edc: 50V	Rated voltage Edc: 25V	Rated voltage Edc: 16V	Rated voltage Edc: 10V
10nF	0816	0.50±0.10	±20%			C0816X5R1C103M050AC	
	1220	0.85±0.15	±20%	C1220X5R1H103M085AC			
	1632	0.70±0.10	±20%	C1632X5R1H103M070AC			
22nF	0816	0.50±0.10	±20%			C0816X5R1C223M050AC	
	1220	0.85±0.15	±20%	C1220X5R1H223M085AC			
	1632	0.70±0.10	±20%	C1632X5R1H223M070AC			
47nF	0816	0.50±0.10	±20%			C0816X5R1C473M050AC	
	1220	0.85±0.15	±20%	C1220X5R1H473M085AC			
	1632	0.70±0.10	±20%	C1632X5R1H473M070AC			
100nF	0510	0.30±0.05	±20%			C0510X5R1C104M030BC	
	0816	0.50±0.10	±20%			C0816X5R1C104M050AC	
	1220	0.85±0.15	±20%		C1220X5R1E104M085AC		
	1632	0.70±0.10	±20%	C1632X5R1H104M070AC			
220nF	0816	0.50±0.10	±20%				C0816X5R1A224M050AC
	1220	0.85±0.15	±20%			C1220X5R1C224M085AC	
	1632	0.70±0.10	±20%		C1632X5R1E224M070AC		
		1.15±0.15	±20%	C1632X5R1H224M115AC			
470nF	0510	0.30±0.05	±20%			C0510X5R1C474M030BC	C0510X5R1A474M030BC
	0816	0.50±0.10	±20%				C0816X5R1A474M050AC
	1220	0.85±0.15	±20%				C1220X5R1A474M085AC
	1632	0.70±0.10	±20%			C1632X5R1C474M070AC	
		1.15±0.15	±20%		C1632X5R1E474M115AC		
1µF	0816	0.50±0.10	±20%			C0816X5R1C105M050AC	
	1220	0.85±0.15	±20%				C1220X5R1A105M085AC
	1632	0.70±0.10	±20%				C1632X5R1A105M070AC
		1.15±0.15	±20%			C1632X5R1C105M115AC	
2.2µF	1632	1.15±0.15	±20%				C1632X5R1A225M115AC

■ The red items are products which the production will be stopped.

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	
				Rated voltage Edc: 6.3V	Rated voltage Edc: 4.0V
470 nF	0816	0.50±0.10	±20%	C0816X5R0J474M050AC	
1 µF	0510	0.30±0.05	±20%	C0510X5R0J105M030BC	
		0.22max.	±20%		CGBDT1X5R0G105M022BC
2.2 µF	0816	0.50±0.10	±20%	C0816X5R0J105M050AC	
4.7 µF	0816	0.50±0.10	±20%	C0816X5R0J475M050AC	
	1632	1.30±0.15	±20%	C1632X5R0J475M130AC	
10 µF	1632	1.30±0.15	±20%	C1632X5R0J106M130AC	

■ The red items are products which the production will be stopped.

## Capacitance range table

## Temperature characteristics: X6S (–55 to 105°C, ±22%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	
				Rated voltage Edc: 6.3V	Rated voltage Edc: 4.0V
100 nF	0510	0.30±0.05	±20%		C0510X6S0G104M030BC
220 nF	0510	0.30±0.05	±20%		C0510X6S0G224M030BC
470 nF	0510	0.30±0.05	±20%	C0510X6S0J474M030BC	C0510X6S0G474M030BC
1 µF	0510	0.30±0.05	±20%		C0510X6S0G105M030BC
		0.22max.	±20%		CGBDT1X6S0G105M022BC
4.7 µF	0816	0.50±0.10	±20%		C0816X6S0G475M050AC

⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.  
Please note that the contents may change without any prior notice due to reasons such as upgrading.

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

## Temperature characteristics: X7R (–55 to 125°C, ±15%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number			
				Rated voltage Edc: 50V	Rated voltage Edc: 25V	Rated voltage Edc: 16V	Rated voltage Edc: 10V
10nF	0816	0.50±0.10	±20%			C0816X7R1C103M050AC	
	1220	0.85±0.15	±20%	C1220X7R1H103M085AC			
	1632	0.70±0.10	±20%	C1632X7R1H103M070AC			
22nF	0816	0.50±0.10	±20%			C0816X7R1C223M050AC	
	1220	0.85±0.15	±20%	C1220X7R1H223M085AC			
	1632	0.70±0.10	±20%	C1632X7R1H223M070AC			
47nF	0510	0.30±0.05	±20%	C0510X7R1H473M030BC	C0510X7R1E473M030BA		
	0816	0.50±0.10	±20%			C0816X7R1C473M050AC	
	1220	0.85±0.15	±20%	C1220X7R1H473M085AC			
	1632	0.70±0.10	±20%	C1632X7R1H473M070AC			
100nF	0816	0.50±0.10	±20%			C0816X7R1C104M050AC	
	1220	0.85±0.15	±20%		C1220X7R1E104M085AC		
	1632	0.70±0.10	±20%	C1632X7R1H104M070AC			
220nF	1220	0.85±0.15	±20%			C1220X7R1C224M085AC	
	1632	0.70±0.10	±20%		C1632X7R1E224M070AC		
		1.15±0.15	±20%	C1632X7R1H224M115AC			
470nF	1632	0.70±0.10	±20%			C1632X7R1C474M070AC	
		1.15±0.15	±20%		C1632X7R1E474M115AC		
		0.70±0.10	±20%				C1632X7R1A105M070AC
1μF	1632	0.70±0.10	±20%				C1632X7R1C105M115AC
		1.15±0.15	±20%				
2.2μF	1632	1.15±0.15	±20%				C1632X7R1A225M115AC

■ The red items are products which the production will be stopped.

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number
				Rated voltage Edc: 6.3V
220nF	0816	0.50±0.10	±20%	C0816X7R0J224M050AC
470nF	1220	0.85±0.15	±20%	C1220X7R0J474M085AC
1μF	1220	0.85±0.15	±20%	C1220X7R0J105M085AC
	1632	0.70±0.10	±20%	C1632X7R0J105M070AC
2.2μF	1632	1.15±0.15	±20%	C1632X7R0J225M115AC

■ The red items are products which the production will be stopped.

## Capacitance range table

## Temperature characteristics: X7S (–55 to 125°C, ±22%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	
				Rated voltage Edc: 4.0V	Rated voltage Edc: 2.5V
470nF	0510	0.30±0.05	±20%	C0510X7S0G474M030BC	
	0816	0.50±0.10	±20%	C0816X7S0G474M050AC	
1μF	0510	0.30±0.05	±20%		C0510X7S0E105M030BC
	0816	0.50±0.10	±20%	C0816X7S0G105M050AC	
2.2μF	0816	0.50±0.10	±20%	C0816X7S0G225M050AC	
4.7μF	1632	1.30±0.15	±20%	C1632X7S0G475M130AC	
10μF	1632	1.30±0.15	±20%	C1632X7S0G106M130AC	

■ The red items are products which the production will be stopped.

## Capacitance range table

## Temperature characteristics: X7T (–55 to 125°C, +22, –33%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number
				Rated voltage Edc: 2.5V
1μF	0510	0.22 max.	±20%	CGBDT1X7T0E105M022BC

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