


Surface Mount Type CS,CT,CX Series

 CS, CT and CX series part numbers rated 10 V.DC or above are Not Recommended For New Design.



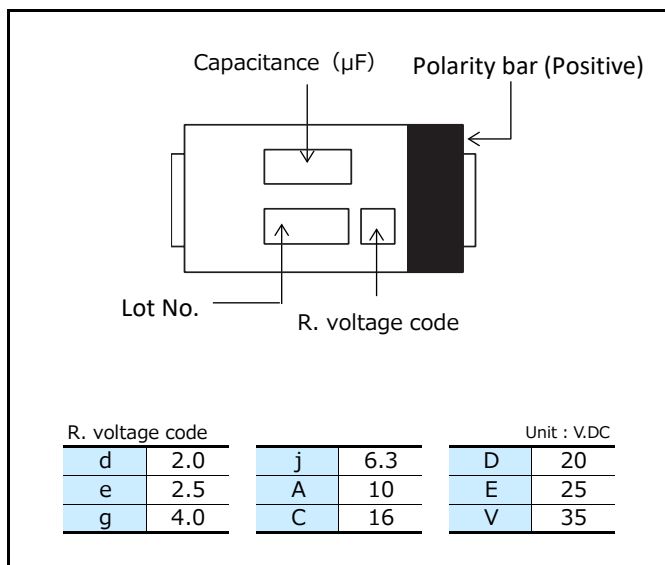
Features

- High voltage (35 V.DC max.)
- Low profile (Height 1.0 mm max.)
- High ripple current (5600 mA r.m.s. max.)
- RoHS compliance, Halogen free

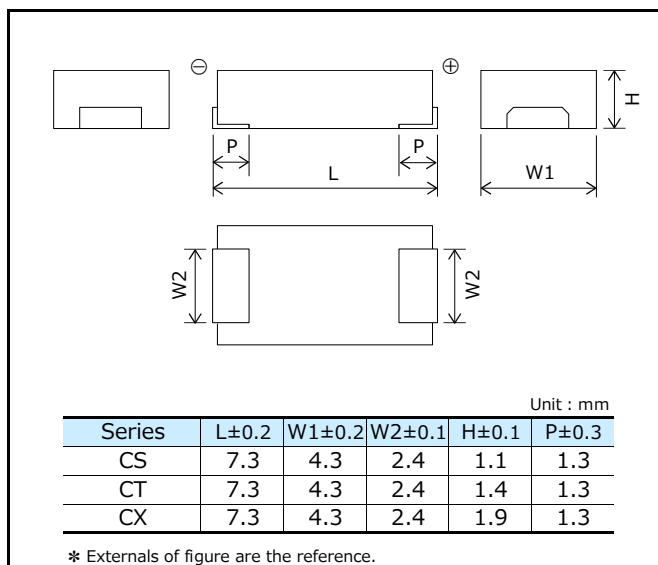
Specifications

| Series | CS | CT | CX | |
|----------------------------|---|--|--|--------------------------|
| Category temp. range | -55 °C to +105 °C | | | |
| Rated voltage range | 4.0 V.DC to 35 V.DC | | 2.0 V.DC to 35 V.DC | |
| Nominal cap. range | 10 μF to 120 μF | 15 μF to 180 μF | 15 μF to 560 μF | |
| Capacitance tolerance | ±20 % (120 Hz / +20 °C) | | | |
| DC leakage current | I ≤ 0.1 CV(μA) [2.0 V.DC to 6.3 V.DC, 2 min], I ≤ 0.3 CV(μA) [10 V.DC to 35 V.DC, 2 min] | | | |
| Dissipation factor (tan δ) | ≤ 0.06 (120 Hz / + 20 °C) | | | |
| Surge voltage (V.DC) | Rated voltage × 1.25 [2.0 V.DC to 16 V.DC], × 1.15 [20 V.DC to 35 V.DC] (15 °C to 35 °C) +105 °C ± 2 °C, 2000 h, rated voltage applied | | | |
| Endurance | Capacitance change | Within ±20 % of the initial value | | |
| | Dissipation factor (tan δ) | ≤ 2 times of the initial limit | | |
| | DC leakage current | ≤ 3 times of the initial limit : 2.0 V.DC to 6.3 V.DC Within the initial limit : 10 V.DC to 35 V.DC | | |
| Damp heat (Steady state) | +60 °C, 90 %, 500 h, No-applied voltage | | | |
| | Capacitance change of initial measured value | 2.0 V.DC to 2.5 V.DC +70 %, -20 % | 4.0 V.DC, 10 V.DC to 35 V.DC +60 %, -20 % | 6.3 V.DC +50 %, -20 % |
| | Dissipation factor (tan δ) | ≤ 2 times of the initial limit | | |
| | DC leakage current | Within the initial limit : 2.0 V.DC to 6.3 V.DC ≤ 3 times of the initial limit : 10 V.DC to 35 V.DC | | |

Marking



Dimensions (not to scale)



Characteristics list

■ 2.0 V.DC to 6.3 V.DC

| Series | Rated voltage (V.DC) | Capacitance (μF) | Case size (mm) | | | Specification | | Part number | Min. Packaging Q'ty* ³ (pcs) |
|--------|----------------------|------------------|----------------|-----|-----|--|-----------------------------|--------------|---|
| | | | L | W | H | Ripple current* ¹ (mA r.m.s.) | ESR* ² (mΩ max.) | | |
| CS | 4.0 | 120 | 7.3 | 4.3 | 1.1 | 5100 | 15 | EEFCS0G121R | 3500 |
| | 6.3 | 68 | 7.3 | 4.3 | 1.1 | 5100 | 15 | EEFCS0J680R | 3500 |
| CT | 4.0 | 180 | 7.3 | 4.3 | 1.4 | 5100 | 15 | EEFCT0G181R | 3500 |
| | 6.3 | 100 | 7.3 | 4.3 | 1.4 | 5100 | 15 | EEFCT0J101R | 3500 |
| CX | 2.0 | 220 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0D221R | 3500 |
| | | 270 | 7.3 | 4.3 | 1.9 | 5600 | 12 | EEFCX0D271XR | 3500 |
| | | 330 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0D331R | 3500 |
| | | | 7.3 | 4.3 | 1.9 | 5600 | 12 | EEFCX0D331XR | 3500 |
| | | 390 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0D391R | 3500 |
| | | 470 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0D471R | 3500 |
| | | 560 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0D561R | 3500 |
| | 2.5 | 220 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0E221R | 3500 |
| | | 330 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0E331R | 3500 |
| | | 390 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0E391R | 3500 |
| | | 470 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0E471R | 3500 |
| | 4.0 | 150 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0G151R | 3500 |
| | | | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0G181R | 3500 |
| | | 180 | 7.3 | 4.3 | 1.9 | 5600 | 12 | EEFCX0G181XR | 3500 |
| | | | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0G221R | 3500 |
| | | 220 | 7.3 | 4.3 | 1.9 | 5600 | 12 | EEFCX0G221XR | 3500 |
| | | | 270 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0G271R |
| | | 330 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0G331R | 3500 |
| | 6.3 | 100 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0J101R | 3500 |
| | | 120 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0J121R | 3500 |
| | | 150 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0J151R | 3500 |
| | | | 7.3 | 4.3 | 1.9 | 5600 | 12 | EEFCX0J151XR | 3500 |
| | | 180 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0J181R | 3500 |
| | | 220 | 7.3 | 4.3 | 1.9 | 5100 | 15 | EEFCX0J221R | 3500 |

*1: Ripple current (100 kHz / +45 °C)

*2: ESR (100 kHz / +20 °C)

*3: Please contact us when 500 pcs packing is necessary.

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Temperature coefficient of ripple current

| Temperature | T ≤ 45 °C | 45 °C < T ≤ 85 °C | 85 °C < T ≤ 105 °C |
|----------------------------------|-----------|-------------------|--------------------|
| 2.0 V.DC to 6.3 V.DC Coefficient | 1.0 | 0.7 | 0.25 |

◆ Ripple current should be controlled so that surface temperature of capacitor does not exceed the category temperature.

Characteristics list

■ 10 V.DC to 35 V.DC

Not Recommended for New Design

| Series | Rated voltage (V.DC) | Capacitance (μF) | Case size (mm) | | | Specification | | Part number | Min. Packaging Q'ty*3 (pcs) |
|--------|----------------------|------------------|----------------|-----|-----|------------------------------|-----------------|-------------|-----------------------------|
| | | | L | W | H | Ripple current*1 (mA r.m.s.) | ESR*2 (mΩ max.) | | |
| CS | 10 | 47 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1A470R | 3500 |
| | 16 | 15 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1C150R | 3500 |
| | | 22 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1C220R | 3500 |
| | | 33 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1C330R | 3500 |
| | | 47 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1C470R | 3500 |
| | 20 | 10 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1D100R | 3500 |
| | | 15 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1D150R | 3500 |
| | | 22 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1D220R | 3500 |
| | 25 | 10 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1E100R | 3500 |
| | | 15 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1E150R | 3500 |
| | 35 | 10 | 7.3 | 4.3 | 1.1 | 3200 | 40 | EEFCS1V100R | 3500 |
| CT | 10 | 68 | 7.3 | 4.3 | 1.4 | 3200 | 40 | EEFCT1A680R | 3500 |
| | 16 | 47 | 7.3 | 4.3 | 1.4 | 3200 | 40 | EEFCT1C470R | 3500 |
| | 20 | 33 | 7.3 | 4.3 | 1.4 | 3200 | 40 | EEFCT1D330R | 3500 |
| | | 47 | 7.3 | 4.3 | 1.4 | 3200 | 40 | EEFCT1D470R | 3500 |
| | 25 | 22 | 7.3 | 4.3 | 1.4 | 3200 | 40 | EEFCT1E220R | 3500 |
| | 35 | 15 | 7.3 | 4.3 | 1.4 | 3200 | 40 | EEFCT1V150R | 3500 |
| CX | 10 | 47 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1A470R | 3500 |
| | | 68 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1A680R | 3500 |
| | | 100 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1A101R | 3500 |
| | 16 | 15 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1C150R | 3500 |
| | | 22 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1C220R | 3500 |
| | | 33 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1C330R | 3500 |
| | | 47 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1C470R | 3500 |
| | | 68 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1C680R | 3500 |
| | 20 | 22 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1D220R | 3500 |
| | | 33 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1D330R | 3500 |
| | | 47 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1D470R | 3500 |
| | | 56 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1D560R | 3500 |
| | 25 | 15 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1E150R | 3500 |
| | | 22 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1E220R | 3500 |
| | | 33 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1E330R | 3500 |
| | 35 | 15 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1V150R | 3500 |
| | | 22 | 7.3 | 4.3 | 1.9 | 3200 | 40 | EEFCX1V220R | 3500 |

*1: Ripple current (100 kHz / +45 °C)

*2: ESR (100 kHz / +20 °C)

*3: Please contact us when 500 pcs packing is necessary.

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Temperature coefficient of ripple current

| Temperature | | T ≤ 45 °C | 45 °C < T ≤ 85 °C | 85 °C < T ≤ 105 °C |
|--------------------|-------------|-----------|-------------------|--------------------|
| 10 V.DC to 35 V.DC | Coefficient | 1.0 | 0.8 | 0.5 |

◆ Ripple current should be controlled so that surface temperature of capacitor does not exceed the category temperature.

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