

# CC series

## General purpose capacitor series

### ◆ Features

- » A wide selection of sizes is available (0201 to 2225)
- » High capacitance in given case size
- » Capacitor with lead-free termination (pure Tin)
- » RoHS & HALOGEN compliant

### ◆ Applications

- » For general digital circuit
- » For power supply bypass capacitors
- » For consumer electronics
- » For telecommunication
- » DC to DC converter

### ◆ Part Number

| CC     | 0402   | N               | 100  | J                                 | 500  |
|--------|--------|-----------------|--|-----------------------------------|--|
| Series | Size   | Dielectric      | Capacitance  | Tolerance                         | Rated voltage  |
| 0201   | Inch:  | N: NPO<br>(COG) | Two significant Digits followed<br>by no. of zeros and P is in place<br>of decimal point | B=±0.1pF<br>C=±0.25pF<br>D=±0.5pF | Two significant Digits followed<br>by no. of zeros and V is in place<br>of decimal point |
| 0402   |        |                 |  | F=±1%                             |  |
| 0603   | X: X7R |                 | Eg.:   | G=±2%                             | 6V3 = 6.3 VDC  |
| 0805   |        |                 | 0P47 = 0.47pF  | J=±5%                             | 100 = 10 VDC   |
| 1206   | B: X5R |                 | 0P5 = 0.5pF  | K=±10%                            | 160 = 16 VDC   |
| 1210   |        |                 | 1P0 = 1.0pF  | M=±20%                            | 250 = 25 VDC   |
| 1808   | Y: Y5V |                 | 100 = 10x10 <sup>0</sup>   | Z= -20/+80%                       | 500 = 50 VDC   |
| 1812   |        |                 | = 10pF   |                                   |  |
| 1825   |        |                 |  |                                   |  |
| 2220   |        |                 |  |                                   |  |

### ◆ General Electrical Data

| Dielectric                              | NPO (COG)   | X7R   | Y5V                                   | X5R                             |
|---|---|---|---------------------------------------|---------------------------------|
| Size                                    | 0201, 0402, 0603, 0805, 1206, 1210,<br>1812, 1825, 2220, 2225   | 0201, 0402, 0603, 0805, 1206,<br>1210, 1808, 1812, 1825, 2220, 2225 | 0402, 0603, 0805,<br>1206, 1210, 1812 | 0201, 0402, 0603                |
| Rate Voltage (WVDC)                     | 10, 16V, 25V, 50V   |   |                                       |                                 |
| Capacitance range*                      | 0.1pF to 150nF  | 100pF to 820nF  | 10nF to 1.0μF                         | 100pF to 820nF                  |
| Capacitance tolerance                   | Cap≤5pF: B (±0.1pF), C (±0.25pF)<br>5pF<Cap<10pF: C (±0.25pF), D (±0.5pF)<br>Cap≥10pF: F (±1%), G (±2%),<br>J (±5%), K (±10%) | J (±5%)<br>K (±10%)<br>M (±20%)                                     | M (±20%),<br>Z (-20/+80%)             | J (±5%)<br>K (±10%)<br>M (±20%) |
| Tan δ*                                  | Cap<30pF: Q≥400+20C<br>Cap≥30pF: Q≥1000   | Note 1  |                                       |                                 |
| Insulation resistance at U <sub>R</sub> | ≥10GΩ   | ≥10GΩ or R x C≥100Ω x F whichever is less                           |                                       |                                 |
| Operating temperature                   | -55°C ~ 125°C   |   | -25°C ~ 85°C                          | -55°C ~ 85°C                    |
| Temperature coefficient                 | ±30ppm  | ±15%  | +30/-80%                              | ±15%                            |
| Termination                             | Cu (or Ag)/Ni/Sn (lead-free termination)  |   |                                       |                                 |

\*Measured at the condition of 30~70% related humidity.

NPO (COG) : Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000PF and 1.0±0.2Vrms, 1.0KHz±10% for Cap > 1000PF, 25°C at ambient temperature.

X7R: Apply 1.0±0.2Vrms, 1.0KHz±10%, at 25°C ambient temperature.

Y5V: Apply 1.0±0.2Vrms, 1.0KHz±10%, at 20°C ambient temperature.

**Note 1:**  
**X7R/X5R**

| Rated Vol. | D.F.  | Exception of D.F. |  |  |  |
|------------|-------|-------------------|--|--|--|
| ≥50V       | ≤2.5% | ≤3%               | 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF             |  |  |
| 25V        | ≤3.5% | ≤5%               | 0805≥1μF; 1210≥10μF                                |  |  |
|            |       | ≤7%               | 0603≥0.33μF  |  |  |
| 16V        | ≤3.5% | ≤5%               | 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF |  |  |
|            |       | ≤10%              | 1210≥22μF; 0603≥0.68μF                             |  |  |
| 10V        | ≤5.0% | ≤10%              | 0603≥1μF; 0805≥2.2μF                               |  |  |

**Y5V**

| Rated Vol.   | D.F.   | Exception of D.F. |   |  |  |
|--------------|--------|-------------------|---|--|--|
| ≥50V         | ≤5.0%  | 7.0%              | 0603≥0.1μF; 0805≥0.47μF                         |  |  |
| 25V          | ≤5.0%  | ≤7%               | 0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF; 1206≥1μF |  |  |
|              |        | ≤9%               | 0402≥0.068μF; 0603≥0.47μF                       |  |  |
| 16V(C<1.0μF) | ≤7.0%  | ≤9%               | 0402≥0.068μF; 0603≥0.68μF                       |  |  |
| 16V(C≥1.0μF) | ≤9.0%  | ≤12.5%            | 0805≥4.7μF; 1206≥10μF; 1210≥22μF; 1812≥47μF     |  |  |
| 10V          | ≤12.5% | ---               | ---   |  |  |

**◆ Capacitance Range**

| Dielectric    | NPO (COG) |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
|---------------|-----------|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|------|------|------|----|----|
|               | 0201      |    |    | 0402 |    |    |    | 0603 |    |    |    | 0805 |    |    |    | 1206 |    |    |    | 1210 |    |    |    | 1812 |    |    | 1825 | 2220 | 2225 |    |    |
|               | Size      | 10 | 25 | 50   | 10 | 16 | 25 | 50   | 10 | 16 | 25 | 50   | 10 | 16 | 25 | 50   | 10 | 16 | 25 | 50   | 10 | 16 | 25 | 50   | 10 | 16 | 25   | 50   | 50   | 50 | 50 |
| Rated Voltage | 10        | 25 | 50 | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50   | 50   | 50   | 50 |    |
| 0.1pF(0P1)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 0.2pF(0P2)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 0.3pF(0P3)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 0.4pF(0P4)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 0.5pF(0P5)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 1.0pF(1P0)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 1.2pF(1P2)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 1.5pF(1P5)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 1.8pF(1P8)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 2.2pF(2P2)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 2.7pF(2P7)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 3.3pF(3P3)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 3.9pF(3P9)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 4.7pF(4P7)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 5.6pF(5P6)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 6.8pF(6P8)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 8.2pF(8P2)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 10pF(100)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 12pF(120)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 15pF(150)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 18pF(180)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 22pF(220)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 27pF(270)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 33pF(330)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 39pF(390)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 47pF(470)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 56pF(560)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 68pF(680)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 82pF(820)     |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 100pF(101)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 120pF(121)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 150pF(151)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 180pF(181)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 220pF(221)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 270pF(271)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 330pF(331)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 390pF(391)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 470pF(471)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 560pF(561)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 680pF(681)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |
| 820pF(821)    |           |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |      |      |      |    |    |





### ◆ Capacitance Range

| Dielectric    | Y5V  |    |    |    |      |    |    |    |      |    |    |    |    |
|---------------|------|----|----|----|------|----|----|----|------|----|----|----|----|
|               | 0402 |    |    |    | 0603 |    |    |    | 0805 |    |    |    |    |
|               | 10   | 16 | 25 | 50 | 6.3  | 10 | 16 | 25 | 50   | 10 | 16 | 25 | 50 |
| Rated Voltage |      |    |    |    |      |    |    |    |      |    |    |    |    |
| Capacitance   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.010μF(103)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.012μF(123)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.015μF(153)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.018μF(183)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.022μF(223)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.027μF(273)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.033μF(333)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.039μF(393)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.047μF(473)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.056μF(563)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.068μF(683)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.082μF(823)  |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.10μF(104)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.12μF(124)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.15μF(154)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.18μF(184)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.22μF(224)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.27μF(274)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.33μF(334)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.39μF(394)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.47μF(474)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.56μF(564)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.68μF(684)   |      |    |    |    |      |    |    |    |      |    |    |    |    |
| 0.82μF(824)   |      |    |    |    |      |    |    |    |      |    |    |    |    |

### ◆ Capacitance Range

| Dielectric    | Y5V  |    |    |    |      |    |    |    |      |    |    |    |
|---------------|------|----|----|----|------|----|----|----|------|----|----|----|
|               | 1206 |    |    |    | 1210 |    |    |    | 1812 |    |    |    |
|               | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50 | 10   | 16 | 25 | 50 |
| Rated Voltage |      |    |    |    |      |    |    |    |      |    |    |    |
| Capacitance   |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.010μF(103)  |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.015μF(153)  |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.022μF(223)  |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.033μF(333)  |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.047μF(473)  |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.068μF(683)  |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.10μF(104)   |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.15μF(154)   |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.22μF(224)   |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.33μF(334)   |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.47μF(474)   |      |    |    |    |      |    |    |    |      |    |    |    |
| 0.68μF(684)   |      |    |    |    |      |    |    |    |      |    |    |    |
| 1.0μF(105)    |      |    |    |    |      |    |    |    |      |    |    |    |