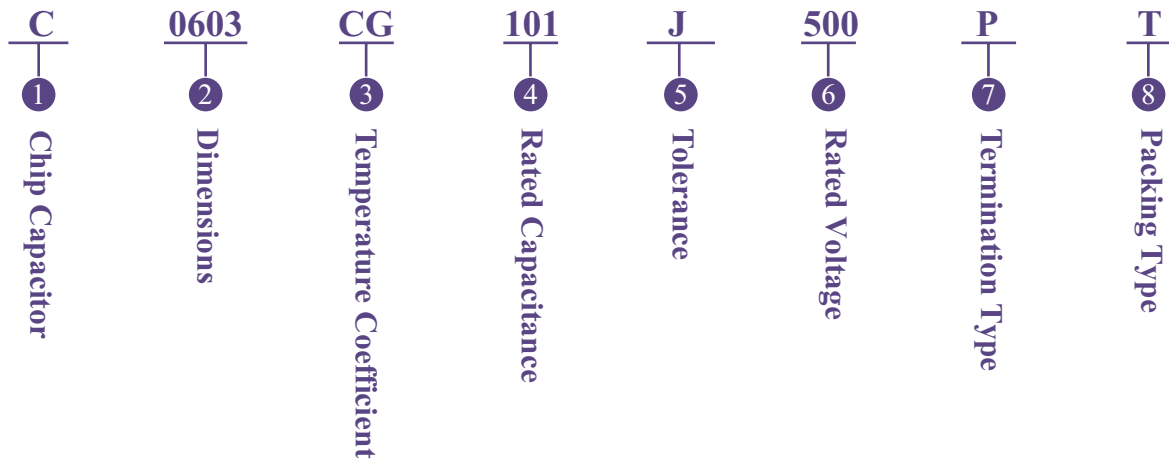


NPO Dielectric Non-Magnetism Multilayer Ceramic Capacitors

◆ Product Features

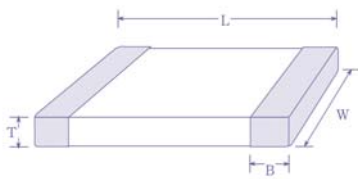
Non-Magnetism, Suitable for MRI

◆ Part Numbering



① Chip Capacitor

② Dimensions



| Type | Dimensions(Unit:mm) | | | | |
|------|---------------------|-----------|-----------|--------|---------|
| | L | W | T(max) | B(min) | B (max) |
| 0603 | 1.6 ± 0.1 | 0.8 ± 0.1 | 0.8 ± 0.1 | 0.20 | 0.50 |
| 0805 | 2.0 ± 0.2 | 1.2 ± 0.2 | 1.40 | 0.25 | 0.70 |

③ Temperature Coefficient

| Code(EIA) | Temperature Coefficients | Operating Temperature Range |
|-----------|--------------------------|-----------------------------|
| CG(C0G) | 0 ± 30ppm/°C | -55°C ~ +125°C |

④ Rated Capacitance

| Code | Capacitance |
|------|-------------|
| 1R5 | 1.5pF |
| 101 | 100pF |

⑥ Rated voltage

| Code | Rated Voltage(DC) |
|------|-------------------|
| 500 | 50V |
| 101 | 100V |
| 201 | 200V |

⑧ Packing Type

| Code | Packing Type |
|------|-----------------------|
| T | Tape carrier packing |
| B | Bulk packing in a bag |

⑤ Tolerance

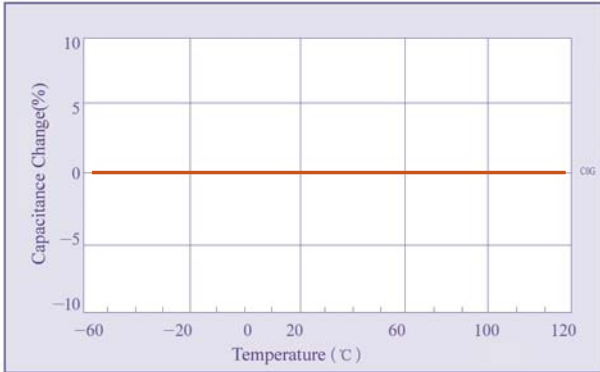
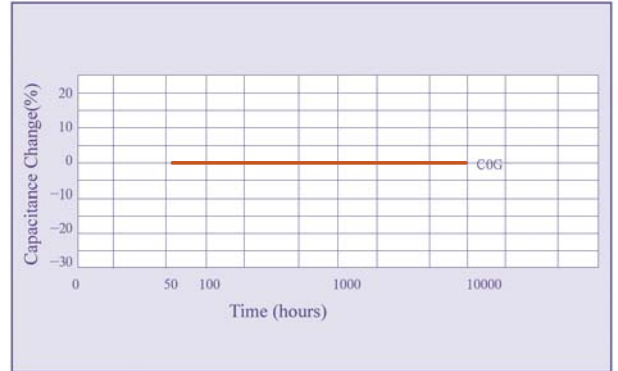
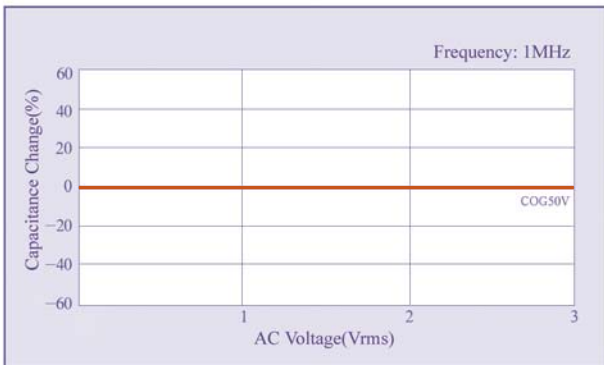
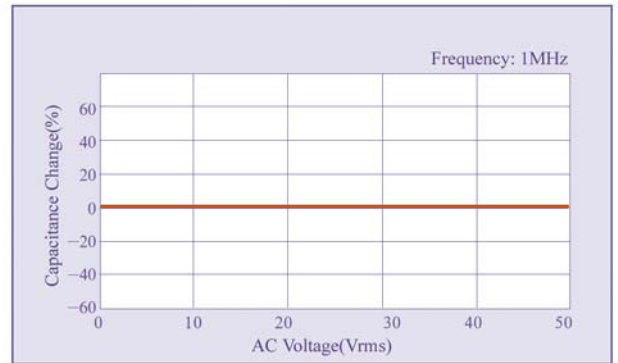
| Code | Tolerance | Capacitance Range |
|------|---------------------|--------------------|
| B | $\pm 0.1\text{pF}$ | < 10pF |
| C | $\pm 0.25\text{pF}$ | |
| D | $\pm 0.5\text{pF}$ | |
| F | $\pm 1\%$ | $\geq 10\text{pF}$ |
| G | $\pm 2\%$ | |
| J | $\pm 5\%$ | |

⑦ Termination Type


| Code | Termination Type |
|------|--|
| P | Non-magnetic Copper Plated 100% Sn(RoHS) |

◆ Rated Capacitance Range Table (Unit:pF)

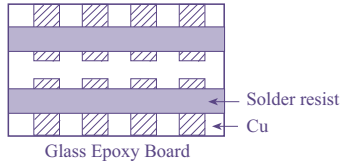
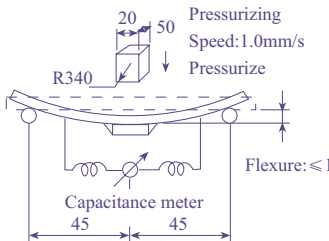
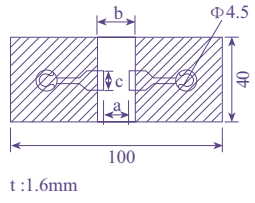
| T.C. | Dimensions | Volt. | Capacitance Range (pF) | | | |
|------|------------|-------|------------------------|-----|-----|-----|
| | | | 0.1 | 100 | 200 | 220 |
| CG | 0603 | 50V | 0.1 | 100 | | |
| | 0805 | 50V | 0.2 | | | 220 |
| | 0805 | 100V | 0.2 | 100 | | |

◆ Characteristics Curve
Capacitance vs Temperature

Capacitance Change vs Aging

Capacitance Change vs AC Voltage

Capacitance Change vs DC Voltage


◆ Specifications and Test Methods

| No. | Item | Specification | Test Method | | | | | | | | | | | | |
|------------|----------------------------------|--|---|-----------|-------------|------------|-------------|---|-----------|---|---------|---|----------|---|---------|
| 1 | Operating Temperature Range | -55℃ ~ +125℃ | | | | | | | | | | | | | |
| 2 | Rated Voltage | See the previous pages | The rated voltage means the maximum direct voltage or peak value of pulse voltage which may be applied continuously to a capacitor. | | | | | | | | | | | | |
| 3 | Appearance | No defects or abnormality | Visual inspection | | | | | | | | | | | | |
| 4 | Dimensions | See the previous pages | Callipers inspection | | | | | | | | | | | | |
| 5 | Dielectric Strength | No defects or abnormality | No failure shall be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA. | | | | | | | | | | | | |
| 6 | Insulation Resistance | More than 1000000MΩ | The insulation resistance shall be measured with the rated voltage at 25℃, 75%RH and within 1 minute of charging. | | | | | | | | | | | | |
| 7 | Capacitance | Within the specified tolerance | The capacitance/Q shall be measured at 25℃ with the frequency and voltage shown in the table. | | | | | | | | | | | | |
| 8 | Q | Q is not less than 1000 | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Frequency</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>1 ± 0.1MHz</td> <td>1 ± 0.2Vrms</td> </tr> </tbody> </table> | | Frequency | Voltage | 1 ± 0.1MHz | 1 ± 0.2Vrms | | | | | | | | |
| Frequency | Voltage | | | | | | | | | | | | | | |
| 1 ± 0.1MHz | 1 ± 0.2Vrms | | | | | | | | | | | | | | |
| 9 | Temperature Coefficient | See the previous pages capacitance drift: Within 0.3% or 0.05pF (whichever is large) | <p>The temperature cycling sequential is from step 1 through 5, The temperature coefficient shall be within the specified tolerance for the temperature coefficient. The temperature coefficient equal $[(C_i - C_3)/C_3]/(T_i - T_3)$. The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the capacitance value in step 3.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25 ± 2℃</td> </tr> <tr> <td>2</td> <td>- 55 ± 3℃</td> </tr> <tr> <td>3</td> <td>25 ± 2℃</td> </tr> <tr> <td>4</td> <td>125 ± 3℃</td> </tr> <tr> <td>5</td> <td>25 ± 2℃</td> </tr> </tbody> </table> | Step | Temperature | 1 | 25 ± 2℃ | 2 | - 55 ± 3℃ | 3 | 25 ± 2℃ | 4 | 125 ± 3℃ | 5 | 25 ± 2℃ |
| Step | Temperature | | | | | | | | | | | | | | |
| 1 | 25 ± 2℃ | | | | | | | | | | | | | | |
| 2 | - 55 ± 3℃ | | | | | | | | | | | | | | |
| 3 | 25 ± 2℃ | | | | | | | | | | | | | | |
| 4 | 125 ± 3℃ | | | | | | | | | | | | | | |
| 5 | 25 ± 2℃ | | | | | | | | | | | | | | |
| 10 | Adhesive Strength of Termination | No removal of the terminations or other defect shall occur | <p>Solder a capacitor to test jig (glass epoxy board) shown in below fig using a eutectic solder, then apply 10N force in the direction of the arrow. The soldering should be done either by hand iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.</p>  | | | | | | | | | | | | |

◆ Specifications and Test Methods

| No. | Item | Specification | Test Method | | | | | | | | | | | | |
|------|------------------------------|---|--|------|---|---|---|------|-----|-----|-----|------|-----|-----|------|
| 11 | Appearance | No defect or abnormality | Solder the capacitor to test jig (glass epoxy board) shown in below fig. Soldering should be done either by hand iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock. The capacitor shall be subjected to a simple harmonic motion having a total amplitude of 1.5mm, The frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total 6 hours) | | | | | | | | | | | | |
| | Capacitance | Within the specified tolerance | | | | | | | | | | | | | |
| | Q | $Q \geq 1000$ | | | | | | | | | | | | | |
| | Vibration Resistance | |  | | | | | | | | | | | | |
| 12 | Deflection | No cracking or marking defects shall occur, $\Delta C/C < 10\%$ | Solder the capacitor to the glass epoxy boards shown in below fig. Then apply a force in the direction and measured the capacitance. | | | | | | | | | | | | |
| | |  |  <table border="1" data-bbox="1177 1227 1428 1332"> <thead> <tr> <th>Size</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>0805</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> </tbody> </table> | Size | a | b | c | 0603 | 1.0 | 3.0 | 1.2 | 0805 | 1.2 | 4.0 | 1.65 |
| Size | a | b | c | | | | | | | | | | | | |
| 0603 | 1.0 | 3.0 | 1.2 | | | | | | | | | | | | |
| 0805 | 1.2 | 4.0 | 1.65 | | | | | | | | | | | | |
| 13 | Solderability of Termination | More than 75% of the terminations is to be soldered evenly and continuously. | Immerse the capacitor first in a ethanol solution of rosin, Preheat at 80°C to 120°C for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2 ± 0.5 seconds at $230 \pm 5^\circ\text{C}$. | | | | | | | | | | | | |
| 14 | Appearance | No marking defects | Preheat capacitor at 120°C to 200°C for 1 minutes, Then immerse the capacitor in a eutectic solder at 260°C to 265°C for 10 ± 1 seconds, the immersed depth is 10mm. Set it for 24 ± 2 hours at room. | | | | | | | | | | | | |
| | Capacitance Range | Less than $\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is larger) | | | | | | | | | | | | | |
| | Q | $Q \geq 1000$ | | | | | | | | | | | | | |
| | Insulation Resistance | More than 100000M | | | | | | | | | | | | | |
| | Resistance to Soldering Heat | | | | | | | | | | | | | | |

◆ Specifications and Test Methods

| No. | Item | Specification | Test Method | | | | | | | | | | | | | | | |
|------|-----------------------------|-----------------------|--|--|-----------------|---------------|---|-----------------------------|------------|---|------------------|--------|---|-----------------------------|------------|---|------------------|--------|
| 15 | Temperature Cycle | Appearance | Fix the capacitor to the supporting jig in the same manner and under the same conditions as (11). Perform the five cycles according to the four heat treatments listed in the following table. Set it for 24 ± 2 hours at room temperature. | | | | | | | | | | | | | | | |
| | | Capacitance Range | | Less than $\pm 1\%$ or $\pm 0.25\text{pF}$ (Whichever is larger) | | | | | | | | | | | | | | |
| | | Q | | $Q \geq 1000$ | | | | | | | | | | | | | | |
| | | Insulation Resistance | | More than $100000\text{M}\Omega$ | | | | | | | | | | | | | | |
| | | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Time(minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min.operating temp. -3 to 0</td> <td>30 ± 3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>2 to 3</td> </tr> <tr> <td>3</td> <td>Max.operating temp. -3 to 0</td> <td>30 ± 3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>2 to 3</td> </tr> </tbody> </table> | Step | Temperature(°C) | Time(minutes) | 1 | Min.operating temp. -3 to 0 | 30 ± 3 | 2 | Room temperature | 2 to 3 | 3 | Max.operating temp. -3 to 0 | 30 ± 3 | 4 | Room temperature | 2 to 3 |
| Step | Temperature(°C) | Time(minutes) | | | | | | | | | | | | | | | | |
| 1 | Min.operating temp. -3 to 0 | 30 ± 3 | | | | | | | | | | | | | | | | |
| 2 | Room temperature | 2 to 3 | | | | | | | | | | | | | | | | |
| 3 | Max.operating temp. -3 to 0 | 30 ± 3 | | | | | | | | | | | | | | | | |
| 4 | Room temperature | 2 to 3 | | | | | | | | | | | | | | | | |
| 16 | Humidity Steady State | Appearance | Sit the capacitor at $40 \pm 2^\circ\text{C}$ and 90% to 95% humidity for 500 ± 12 hours. Remove and let sit for 24 ± 2 hours at room temperature, then measure. | | | | | | | | | | | | | | | |
| | | Capacitance Range | | Less than $\pm 5\%$ or $\pm 0.5\text{pF}$ (Whichever is larger) | | | | | | | | | | | | | | |
| | | Q | | $Q \geq 1000$ | | | | | | | | | | | | | | |
| | | Insulation Resistance | | More than $100000\text{M}\Omega$ | | | | | | | | | | | | | | |
| 17 | Humidity Load | Appearance | Apply the rated voltage at $40 \pm 2^\circ\text{C}$ and 90% to 95% humidity for 500 ± 12 hours. Remove and let sit for 24 ± 2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. | | | | | | | | | | | | | | | |
| | | Capacitance Range | | Less than $\pm 5\%$ or $\pm 0.5\text{pF}$ (Whichever is larger) | | | | | | | | | | | | | | |
| | | Q | | $Q \geq 1000$ | | | | | | | | | | | | | | |
| | | Insulation Resistance | | More than $100000\text{M}\Omega$ | | | | | | | | | | | | | | |
| 18 | High Temperature Load | Appearance | Apply a voltage of 150% of the rated voltage for 1000 ± 12 hours at $125 \pm 3^\circ\text{C}$, and set it for 24 ± 2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. | | | | | | | | | | | | | | | |
| | | Capacitance Range | | Less than $\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is larger) | | | | | | | | | | | | | | |
| | | Q | | $Q \geq 1000$ | | | | | | | | | | | | | | |
| | | Insulation Resistance | | More than $100000\text{M}\Omega$ | | | | | | | | | | | | | | |