

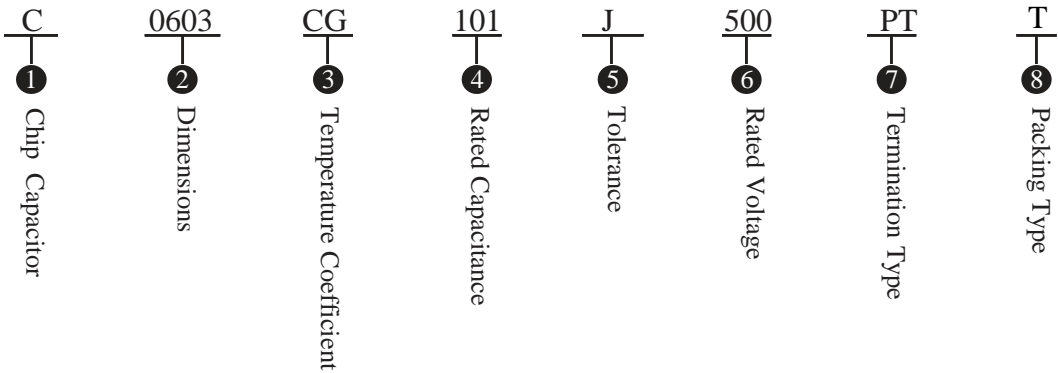
NP0 Dielectric Non-Magnetic Multilayer Ceramic Capacitors



◆ Product Features

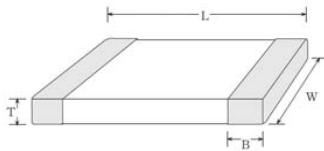
Non-Magnetism, Suitable for MRI

◆ 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
1206	3.2±0.2	1.6±0.2	1.40	0.25	0.76
1210	3.2±0.2	2.5±0.2	2.00	0.25	0.76

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)	Code	Rated Voltage (DC)
25	25V	251	250V
50	50V	501	500V
101	100V	102	1000V
201	200V	202	2000V

⑧ Packing Type

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

⑤ Tolerance

Code	Tolerance	Capacitance Range
B	±0.1pF	<10pF
C	±0.25pF	
D	±0.5pF	
F	±1%	≥10pF
G	±2%	
J	±5%	

⑦ Termination Type

Code	Termination Type
P	Non-magnetic Copper Plated 100% Sn(RoHS)
C	Palladium Silver

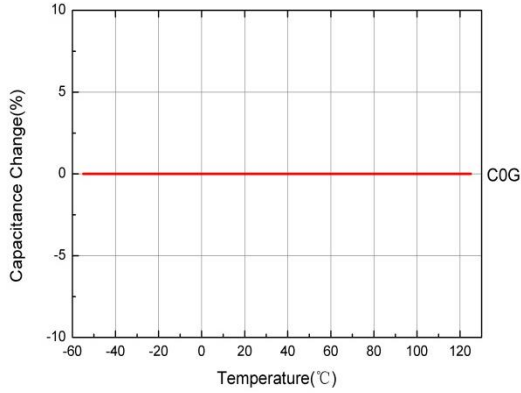
◆ Rated Capacitance Range Table (Unit:pF)

Dielectric	COG																						
	0603					0805				1206						1210							
	25	50	100	200	250	50	100	200	250	50	100	200	250	500	1000	2000	50	100	200	250	500	1000	2000
Capacitance	1pF																						
	10pF																						
	101 100pF																						
	102 1000pF			561	331	331										681	391						561
	103 10nF	102	102				272	272	182	182					392					123	123	102	
	104 100nF										103	103	822	822				153	153	153			

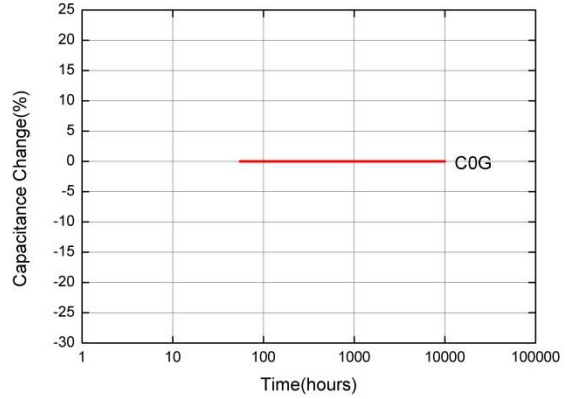
Remark: special capacitance, tolerance and WVDC are available, consult with PASSIVE PLUS.

◆ Characteristics Curve

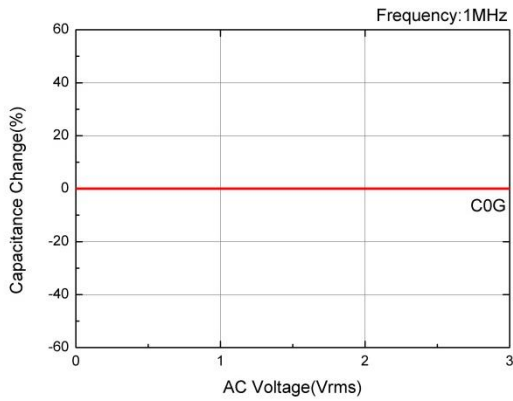
Capacitance vs Temperature



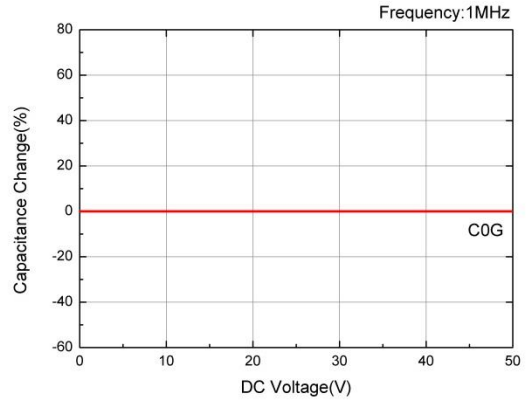
Capacitance Change vs Aging



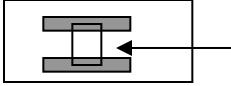
Capacitance Change vs AC Voltage



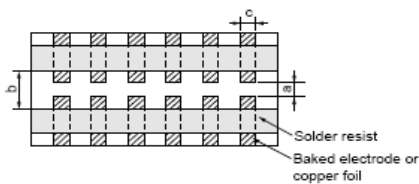
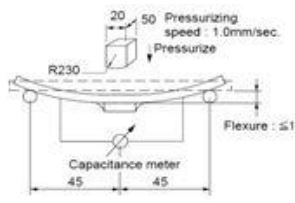
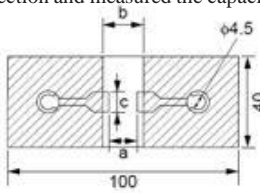
Capacitance Change vs DC Voltage



◆ Specifications and Test Methods

NO.	Item	Specification	Test Method												
1	Operating Temperature Range	-55 °C ~ +125 °C													
2	Rated Voltage	See pages 68	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	2.5 RV for 5 seconds, $RV \leq 500VDC$; 1.5 RV for 5 seconds, $500VDC < RV \leq 1250V DC$; 1.2 RV for 5 seconds, $RV > 1250VDC$; RV-Rated Voltage,												
6	Insulation Resistance	More than $10G\Omega$	The insulation resistance shall be measured with the rated voltage at 25° C, 75%oRH and within 1 minute of charging.												
7	Capacitance	Within the specified tolerance	The capacitance/Q shall be measured at 25 °C 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>$1 \pm 0.1MHz$</td> <td>$1 \pm 0.2V_{rms}$</td> </tr> </tbody> </table>	Frequency	Voltage	$1 \pm 0.1MHz$	$1 \pm 0.2V_{rms}$								
Frequency	Voltage														
$1 \pm 0.1MHz$	$1 \pm 0.2V_{rms}$														
9	Temperature Coefficient	$0 \pm 30ppm/^{\circ}C$ Capacitance drift: Within 0.3% or 0.05pF (whichever is large)	<p>The temperature cycling sequential is from the step 1 through 5. The temperature coefficient shall be within the specified tolerance for the temperature coefficient. The temperature coefficient equals $[(Ci-C3)/C3]/(Ti-T3)$. 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>$25 \pm 2^{\circ}C$</td> </tr> <tr> <td>2</td> <td>$55 \pm 3^{\circ}C$</td> </tr> <tr> <td>3</td> <td>$25 \pm 2^{\circ}C$</td> </tr> <tr> <td>4</td> <td>$125 \pm 3^{\circ}C$</td> </tr> <tr> <td>5</td> <td>$25 \pm 2^{\circ}C$</td> </tr> </tbody> </table>	Step	Temperature	1	$25 \pm 2^{\circ}C$	2	$55 \pm 3^{\circ}C$	3	$25 \pm 2^{\circ}C$	4	$125 \pm 3^{\circ}C$	5	$25 \pm 2^{\circ}C$
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5	$25 \pm 2^{\circ}C$														
10	Adhesive strength of Termination	No removal of the erminations or other defect shall occur	<p>Solder a capacitor to test jig (glass epoxy board) shown in fig below using a eutectic solder, then apply 10N force in the direction of the arrow.</p> <p>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>  <p>10Newton Glass Epoxy Resin Board</p>												

◆ Specifications and Test Methods

NO.	Item		Specification	Test Method												
11	Vibration Resistance	Appearance	No defect or abnormality	<p>Solder the capacitor to test jig (glass epoxy board) shown in fig below. 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 1.5 mm. 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).</p> 												
		Capacitance	Within the specified tolerance													
		Q	$Q \geq 1000$													
12	Deflection	No cracking or marking defects shall occur, $\Delta C/C < 5\%$	<p>Solder the capacitor to the glass epoxy boards shown in below fig. Then apply a force in the direction and measured the capacitance.</p> 													
		 <table border="1" data-bbox="1071 1139 1306 1255"> <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> <tr> <td>1206</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> </tbody> </table>		Size	a	b	C	0603	1.0	3.0	1.2	0805	1.2	4.0	1.65	1206
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13	Solderability of Termination	More than 75% of the terminations is to be soldered evenly and continuously.	<p>Immerse the capacitor first in an 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 250 ± 5 °C.</p>													
14	Resistance to Soldering Heat	Appearance	No marking defects	<p>Preheat capacitor at 120 °C to 200 °C for 1 minute. Then immerse the capacitor in a eutectic solder at 260 °C to 265 °C for 10 ± 1 second, the immersed depth is 10mm. Set it for 24 ± 2 hours at room.</p>												
		Capacitance Range	Less than $\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is larger)													
		Q	$Q \geq 1000$													
		Insulation Resistance	More than $10\text{G}\Omega$													

◆ Specifications and Test Methods

NO.	Item		Specification	Test Method															
15	Temperture Cycle	Appearance	No marking defects	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 $\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is larger)																
		Q	$Q \geq 1000$																
		Insulation Resistance	More than $10\text{G}\Omega$																
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Step	Temperature(°C)	Time(minutes)																	
1	Min.operating temp. -3 to 0	30 ± 3																	
2	Room temperature	2to3																	
3	Max.operating temp. -3 to 0	30 ± 3																	
4	Room temperature	2to3																	
16	Humidity Steady State	Appearance	No marking defects	Set the capacitor at 40 ± 2 °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 $1\text{G}\Omega$																
17	Humidity Load	Appearance	No marking defects	Apply the rated voltage(500V_{max}) at 40 ± 2 °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 $\pm 7.5\%$ or $\pm 0.75\text{pF}$ (Whichever is larger)																
		Q	$Q \geq 1000$																
		Insulation Resistance	More than $1\text{G}\Omega$																
18	High Temperature Load	Appearance	No marking defects	Apply a voltage for 1000 ± 12 hours at 125 ± 3 °C, and set it for 24 ± 2 hours at room temperature, then easure. The charge/discharge current is less than 50mA. Apply voltage: < 500V, apply 200% rated voltage; 500V, apply 150% rated voltage; > 500V, apply 120% rated voltage;															
		Capacitance Range	Less than $\pm 3\%$ or $\pm 0.3\text{pF}$ (Whichever is larger)																
		Q	$Q \geq 1000$																
		Insulation Resistance	More than $1\text{G}\Omega$																