

◆ Part Numbering

C 0603 CG 101 J 500 P T
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① **C**: General Purpose Non-Magnetic Multilayer Ceramic Capacitors.

② Dimensions:

unit: millimeter

Size Inch(mm)	L	W	T	B(Min)	B(Max)
0603	1.60±0.10	0.80±0.10	0.80±0.10	0.20	0.50
0805	2.00±0.20	1.20±0.20	1.40±0.20	0.25	0.60
1206	3.20±0.20	1.60±0.20	1.40±0.20	0.25	0.60
1210	3.20±0.20	2.50±0.20	2.00±0.20	0.25	0.70

③ Temperature coefficient

Type	Temperature Characteristics
CG	0±30ppm/°C
X7R	±15%

④ Rated Capacitance

Capacitance is less than 10pF, for example:1R0=1.0pF, R denote decimal point..

Capacitance greater than 10pF, for example:101=100pF, the third number is the power of 10.

unit: V

CG	0603					0805				1206					1210					
Code.	25	50	100	200	250	50	100	200	250	50	100	200	250	500	50	100	200	250	500	1000
1R0																				
1R2																				
1R5																				
1R8																				
2R2																				
2R7																				
3R3																				
3R9																				
4R7																				
5R6																				
6R8																				
8R2																				
100																				
120																				
150																				
180																				
220																				
270																				
330																				
390																				

General Purpose Non-Magnetic Multilayer Ceramic Capacitor

unit: V

CG	0603					0805				1206					1210					
Code.	25	50	100	200	250	50	100	200	250	50	100	200	250	500	50	100	200	250	500	1000
470																				
560																				
680																				
820																				
101																				
121																				
151																				
181																				
221																				
271																				
331																				
391																				
471																				
561																				
681																				
821																				
102																				

unit: V

X7R	0603					0805				1206					1206					
Code.	25	50	100	200	250	50	100	200	250	50	100	200	250	500	50	100	200	250	500	1000
331																				
471																				
681																				
821																				
102																				
152																				
222																				
332																				
472																				
682																				
103																				
153																				
223																				
333																				
473																				
683																				
104																				

⑤ Capacitance Tolerance

Code	B	C	D	G	J	K
Tolerance	±0.1pF	±0.25pF	±0.5pF	±2%	±5%	±10%

⑥ Rated voltage

Code	Rated voltage(V)	Code	Rated voltage(V)
250	25V	251	250V
500	50V	501	500V
101	100V	102	1000V
201	200V		

⑦ Termination Type

P: Cu/Ni

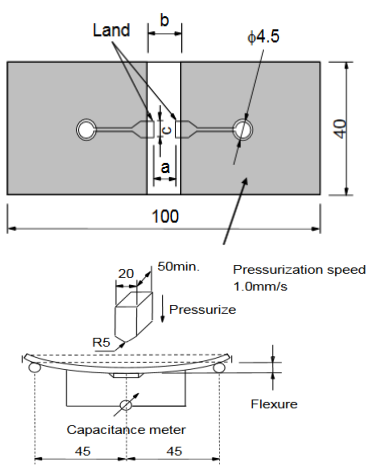
⑧ Packaging Type

T: Tape carrier packing

	A0 (mm)	B0 (mm)	K0 (mm)	W (mm)	P0 (mm)	P1 (mm)	T (mm)	F (mm)	Qty/min	Qty/reel	Tape Material
0603	1.05	1.80	0.90	8.00	4.00	4.00	0.90	3.50	1000	4000	paper
0805	1.40	2.20	1.20	8.00	4.00	4.00	0.22	3.50	1000	3000	plastic
1206	1.91	3.51	1.30	8.00	4.00	4.00	0.25	3.50	1000	3000	plastic
1210	2.85	3.50	1.95	8.00	4.00	4.00	0.25	3.50	1000	3000	plastic

◆ Specification and Test Methods

No.	Item	Specification	Test method																				
1	Operating temperature	C0G: -55°C ~ 125°C X7R: -55°C ~ 125°C																					
2	Appearance	No defects or abnormality	Visual inspection: ×10 microscope.																				
3	Dimensions	See the previous page	Caliper inspection																				
4	Capacitance	Shall be within the applicable tolerance specified.	<table border="1"> <thead> <tr> <th>Type</th><th>Capacitance</th><th>Test voltage</th><th>Test frequency</th></tr> </thead> <tbody> <tr> <td>Class 1</td><td>≤ 1000pF</td><td>1.0 ± 0.2Vrms</td><td>1MHz ± 10%</td></tr> <tr> <td>(C0G)</td><td>> 1000pF</td><td>1.0 ± 0.2Vrms</td><td>1KHz ± 10%</td></tr> <tr> <td>Class 2</td><td>≤ 10μF</td><td>1.0 ± 0.2Vrms</td><td>1KHz ± 10%</td></tr> <tr> <td>(X7R)</td><td>> 10μF</td><td>0.5 ± 0.2Vrms</td><td>120Hz ± 20%</td></tr> </tbody> </table>	Type	Capacitance	Test voltage	Test frequency	Class 1	≤ 1000pF	1.0 ± 0.2Vrms	1MHz ± 10%	(C0G)	> 1000pF	1.0 ± 0.2Vrms	1KHz ± 10%	Class 2	≤ 10μF	1.0 ± 0.2Vrms	1KHz ± 10%	(X7R)	> 10μF	0.5 ± 0.2Vrms	120Hz ± 20%
Type	Capacitance	Test voltage	Test frequency																				
Class 1	≤ 1000pF	1.0 ± 0.2Vrms	1MHz ± 10%																				
(C0G)	> 1000pF	1.0 ± 0.2Vrms	1KHz ± 10%																				
Class 2	≤ 10μF	1.0 ± 0.2Vrms	1KHz ± 10%																				
(X7R)	> 10μF	0.5 ± 0.2Vrms	120Hz ± 20%																				
5	D.F	C0G C ≥ 30pF; Q ≥ 1000; C < 30pF; Q ≥ 400 + 20C. X7R: D.F. ≤ 2.5%	Before initial measurement (X7R only) to apply de-aging at 150°C for 1hr then set for 24 ± 2hrs at room temp.																				
6	Insulation resistance (IR)	No less than 10GΩ or 500MΩ·μF, whichever is smaller.	Voltage: DC Rated Voltage Charging Time: 1~2 min Charge/discharge current: 50mA max. Measurement Temperature: 25°C Measurement Humidity: 75%																				
7	Dielectric withstanding voltage (DWV)	Shall be no evidence of breakdown or visible evidence of arcing or damage.	Test Voltage: Rated voltage ≤ 500V: 250% of the rated voltage 500V < Rated voltage ≤ 1250V: 150% of the rated voltage Rated voltage > 1250V: 120% of the rated voltage Applied Time: 5 s; Charge/discharge current: 50mA max.																				

No.	Item	Specification	Test method																				
8	Temperature coefficient	<table><tr><th>Type</th><th>Temperature coefficient ppm/°C</th></tr><tr><td>C0G</td><td>0 ±30</td></tr></table> <table><tr><th>Type</th><th>Temperature Characteristics</th></tr><tr><td>X7R</td><td>±15%</td></tr></table>	Type	Temperature coefficient ppm/°C	C0G	0 ±30	Type	Temperature Characteristics	X7R	±15%	Conduct the five cycles according to the temperatures as below. <table><tr><th>step</th><th>temperature °C</th></tr><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></table> C0G: $TC=\frac{C_x-C_3}{C_3 \times \Delta T} \times 10^6 \text{ ppm/}^{\circ}\text{C}$ X7R $TC=\frac{C_x-C_3}{C_3} \times 100 (\%)$	step	temperature °C	1	25 ±2	2	-55 ±3	3	25 ±2	4	125 ±3	5	25 ±2
Type	Temperature coefficient ppm/°C																						
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2	-55 ±3																						
3	25 ±2																						
4	125 ±3																						
5	25 ±2																						
9	Adhesive Strength of Termination	No removal of the terminations or other defect should occur.	Pressurizing force: 0603: 5N; 0805/1206/1210: 10N Test time: 10 ±1 sec.																				
10	Bending strength	No cracking shall occur. Cap change: C0G: within ±5% or 0.5pF whichever is larger X7R: within ±12.5%	Solder the capacitor on test jig (glass epoxy board). Then apply a force in the direction shown in below fig. Flexure: 1mm; Holding time: 5 ±1s  Fig.2 (in mm)																				
11	Solderability of termination	Shall be at least 85 percent covered with a smooth solder coating.	Immerse the capacitor in a eutectic solution requirement temperature (235±5°C) for 2±0.5 seconds. Capacitor shall be immersed to a depth of 10mm.																				

No.	Item	Specification		Test method
12	Resistance to soldering Heat	Appearance	No evidence of mechanical damage or delamination or exposed.	Immerse the capacitor in a eutectic solution at $260\pm5^{\circ}\text{C}$ for 10 ± 1 seconds. Capacitor shall be immersed to a depth of 10mm. And following a minimum 10 minutes to maximum 24 hours cooling period.
		Capacitance Change ΔC	C0G: within $\pm 2.5\%$ or 0.25pF (whichever is larger) X7R: within $\pm 12.5\%$	
		D.F.	To meet initial requirement.	
		IR	No less than $10\text{G}\Omega$ or $500\text{M}\Omega\cdot\mu\text{F}$, Whichever is smaller.	
13	Temperature Cycle	Appearance	No evidence of mechanical damage.	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 Change ΔC	C0G: within $\pm 2.5\%$ or 0.25pF (whichever is larger) X7R: within $\pm 7.5\%$	
		D.F.	To meet initial requirement.	
		IR	No less than $10\text{G}\Omega$ or $500\text{M}\Omega\cdot\mu\text{F}$, Whichever is smaller.	

step	Temperature	Time(Min)
1	$-55^{\circ}\text{C}(0\sim-3^{\circ}\text{C})$	30 ± 3
2	25°C	$2\sim3$
3	$125^{\circ}\text{C}(0\sim-3)$	30 ± 3
4	25°C	$2\sim3$