

MLCC – NPO (COG)

NPO/COG for General-use is class I high frequency capacitor, its capacitance is very stable, almost will not change along with the temperature, voltage and time. Specially be suitable for high frequency circuits.

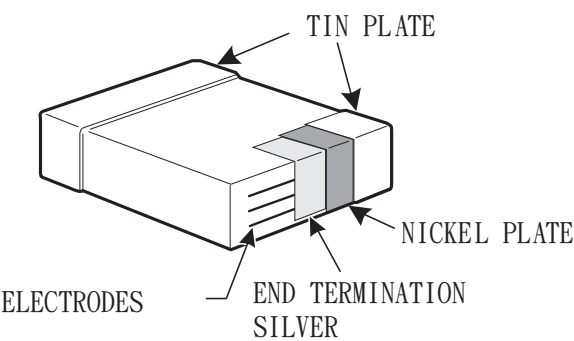
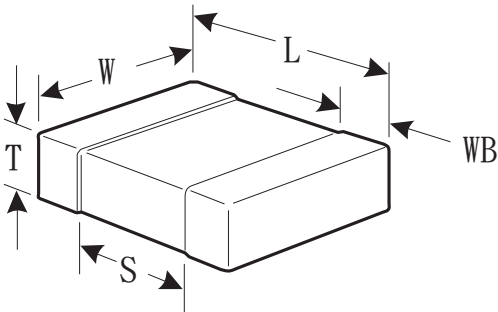
FEATURES

- Miniature size
- Wide capacitance, TC, voltage and tolerance range
- Industry standard sizes
- Available for wave, reflow or vapor phase solder

HOW TO ORDER

0805	CG		102		J		500		N		T	
I	I		I		I		I		I		I	
A	B		C		D		E		F		G	
Size Code	Dielectric		Capacitance(pF)		Tolerance		Rated Voltage		Termination		Packaging Style	
0402	CG	COG (NPO)	1R0	1pF	B	±0.10pF	160	16V	S	Silver	No Mark	Bulk
0603			100	10pF	C	±0.25pF	250	250V	N	Nickel Barrier Tin Plating	T	Tape & Reel
0805			101	100pF	D	±0.5pF	500	50V			B	Bulk Package
1206			102	1000pF	F	±1.0%	630	63V				
			103	10000pF	G	±2.0%	101	100V				
					J	±5.0%	201	200V				
					K	±10%	501	500V				
					M	±20%	102	1000V				
						202	2000V					

TERMINATION DIAGRAMS



NOTE: Other Termination Available Upon Request (Contact Factory)

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SIZE CODE CAPACITANCE and VOLTAGE

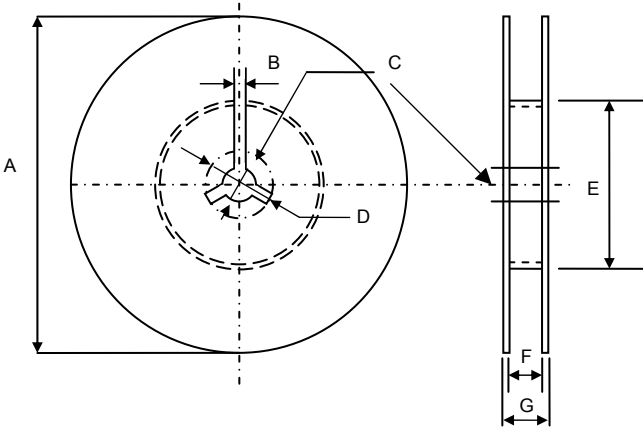
Type		Dimension(mm)				Voltage	Capacitance(pF)
Size Code	Metric Expression	L	W	T	WB		NPO(COG)
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.1	10V	0R5~471
						16V	0R5~471
						25V	1R0~471
						50V	1R0~221
0603	1608	1.60±0.1	0.80±0.10	0.80±0.1	0.30±0.1	25V	0R5~102
						50V	0R5~102
						100V	0R5~561
						200V	0R5~331
0805	2012	2.00±0.20	1.25±0.20	0.80±0.10	0.5±0.25	25V	0R5~472
				1.00±0.10		50V	0R5~472
				1.25±0.20		100V	0R5~102
						200V	0R5~821
						500V	0R5~471
1206	3216	3.20±0.30	1.60±0.20	0.80±0.10	0.50±0.25	25V	0R5~153
				1.00±0.10		50V	0R5~153
				1.25±0.20		100V	0R5~152
						200V	0R5~102
						500V	0R5~821
1210	3225	3.20±0.30	2.50±0.30		0.75±0.25	1000V	0R5~471
						2000V	0R5~682
				1.25±0.30		25V	561~153
				1.25±0.30		50V	561~153
						100V	561~472
						200V	101~472
						500V	101~222
						1000V	101~102
						2000V	101~561

PACKAGING

Structure and Dimension

Tape & Reel

A	B	C	D	E	F	G
178±2.00	3.00	13±0.50	21±0.80	50 min	10.0±1.50	12 max
330±2.00	3.00	13±0.50	21±0.80	50 min	10.0±1.50	12 max



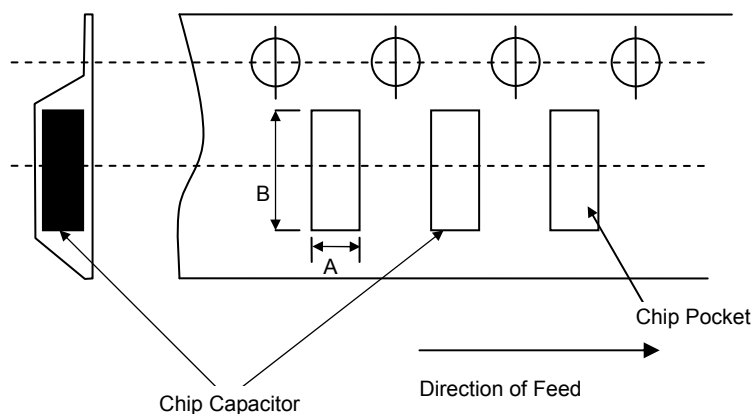
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Paper Tape

Size	A	B
0402	0.6 ± 0.2	1.1 ± 0.2
0603	1.1 ± 0.2	1.4 ± 0.2
0805	1.45 ± 0.2	2.3 ± 0.2
1206	1.8 ± 0.2	3.4 ± 0.2

Embossed Tape

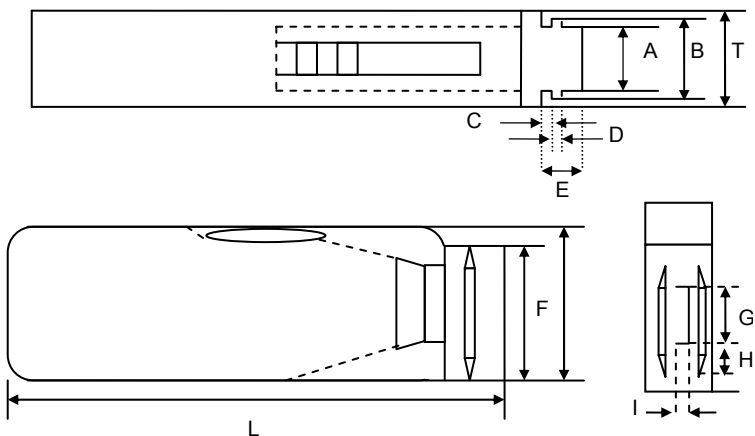
Size	A	B
0402	0.5 ± 0.2	1.2 ± 0.2
0603	0.8 ± 0.2	2.0 ± 0.2
0805	1.65 ± 0.2	2.4 ± 0.2
1206	2.0 ± 0.2	3.6 ± 0.2



Cartridge

Symbol	A	B	D	C	T	E
Dimension	6.8 ± 0.1	8.8 ± 0.1	12 ± 0.1	$15 \pm 0.1-0$	2 ± 0.1	4.7 ± 0.1

Symbol	F	W	G	H	L	I
Dimension	$31.5 \pm 0.2-0$	36 ± 0.2	19 ± 0.35	7 ± 0.35	110 ± 0.7	5 ± 0.35



Packaging Quantity

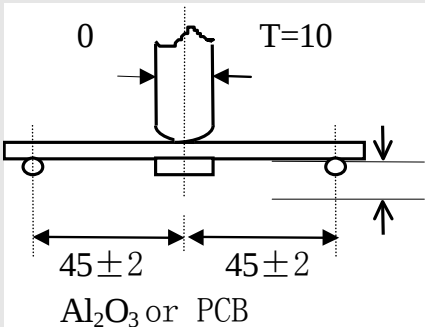
Size	Quantity		
	Paper Tape Taping	Embossed Taping	Normal Bulk
0402	10000		10000
0603	4000		4000
0805	4000	2000 / 3000	4000
1206	4000	2000 / 3000	4000
1210		2000 / 3000	
1812		1000	
2225			
3035			

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NPO(COG) DIELECTRIC CHARACTERISTIC INDUCTION & TEST METHOD

Item	Specification	Test Method									
Operating Temperature Range	-55°C ~ 125°C										
Appearance	- Good ceramic body color continuity - The chips have no visual damages and must be very smooth. - No exposed inner-electrode, cracks or holes - The outer electrode should have no cracks, holes damages or surface oxidation - No outer electrode prolongation or the prolongation is less than half of that of the termination width.	Check by using microscope $\geq 10X$									
Dimensions	Within the specified dimensions	Using micrometer or vernier calipers									
Capacitance	Within the specified tolerance	- Measuring Temperature: 25°C$\pm$5°C, Humidity: 30% ~ 75% - Measuring Voltage: 1.0$\pm$0.2V - Measuring Frequency: C<1000pF, 1.0$\pm$0.1MHz, C$\geq$1000pF, 1.0$\pm$0.1KHz									
Dissipation Factor (DF)	$\leq 0.15\%$										
Insulation Resistance	$\geq 5 \times 10^{10} \Omega$	Must measure at rated voltage and measure the IR within 60 $\pm$ 5s									
Withstanding Voltage	$> 3U_r$	Must measure at 3 times rated voltage, dwell time: 60 $\pm$ 1s, no short and the changing/discharging current less than 50mA									
Capacitance Temperature Characteristic	Must meet the capacitor character temperature coefficient requirements within the operating temperature range	- Pre-heat for 60$\pm$5min at 150$\pm$0/-10°C, then set it for 24$\pm$2hrs at room temperature - Measure the capacitance at -55~125°C or -55~85°C, the capacitance change ration comparing to that of 25°C must be within the specified range.									
Solderability	Tin coverage should be 95% of the outer electrode	Dip the capacitor into ethanol or colophony solution, and then dip it into 235 $\pm$ 5°C eutectic solder solution for 2 $\pm$ 0.5s. Dipping speed: 25 $\pm$ 2.5mm/s									
Resistance to Soldering	Appearance	No defects visible									
	Capacitance Change Ratio	$\leq \pm 2.5\%$ or $\pm 0.25pF$ (whichever larger)									
	D.F.	Max 0.15%									
	I.R.	More than 50000M Ω									
		- Pre-heat for 60$\pm$5min at 150$\pm$0/-10°C, then set it for 24$\pm$2hrs at room temperature - Pre-heat the capacitor according to the chart below. Dip the capacitor into 260$\pm$5°C eutectic solder solution for 10$\pm$1s. Then set it for 24$\pm$2hrs at room temperature, then measure.									
		Dipping speed: 25 $\pm$ 2.5mm/s									
		<table> <tr> <th>Stage</th><th>Temperature</th><th>Timer</th></tr> <tr> <td>1</td><td>100°C ~ 120°C</td><td>1 min.</td></tr> <tr> <td>2</td><td>170°C ~ 200°C</td><td>1 min.</td></tr> </table>	Stage	Temperature	Timer	1	100°C ~ 120°C	1 min.	2	170°C ~ 200°C	1 min.
Stage	Temperature	Timer									
1	100°C ~ 120°C	1 min.									
2	170°C ~ 200°C	1 min.									

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Item	Specification		Test method														
Adhesive Strength of Termination	No removal of the terminations or other defect shall occur		Capacitors mounted on a substrate, a force of 5N applied perpendicular to the plane of the substrate and parallel to the line joining the center of the terminations for 10±1s														
	Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should 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, shall be traversed in approximately 1min. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (a total of 6 hours).														
Vibration Resistance	Capacitance	Within the specified tolerance range	Capacitors mounted on a substrate. The board shall then be bent by 1mm at a rate of 1mm/sec with 10N force														
	D.F.	Max 0.15%															
Bending Resistance	No removal of termination, crack or visible damage.																
Temperature Cycle	No damage or abnormalities visible		1. Heat the capacitor for 60±5min at 150+0/10°C, and then set it for 24 2hrs at room temperature. 2. Perform five cycles according to the four heat treatments listed below. Set it for 24±2hrs at room temperature, then measure.														
			<table><thead><tr><th>Stage</th><th>Temperature(°C)</th><th>Time(min.)</th></tr></thead><tbody><tr><td>1</td><td>Lowest operating temperature ±3</td><td>30±3</td></tr><tr><td>2</td><td>Normal Temperature</td><td>2~3</td></tr><tr><td>3</td><td>High operating temperature ±2</td><td>30±3</td></tr><tr><td>4</td><td>Normal temperature</td><td>2~3</td></tr></tbody></table>	Stage	Temperature(°C)	Time(min.)	1	Lowest operating temperature ±3	30±3	2	Normal Temperature	2~3	3	High operating temperature ±2	30±3	4	Normal temperature
Stage	Temperature(°C)	Time(min.)															
1	Lowest operating temperature ±3	30±3															
2	Normal Temperature	2~3															
3	High operating temperature ±2	30±3															
4	Normal temperature	2~3															
Humidity Steady State & Laod	Appearance	No defects or abnormalities	Set the capacitor for 500+24/-0 hours at the condition of 40±2°C and 90-95% humidity. Then remove and set it for 24±2 hours at room temperature, then measure. Load: Apply rated voltage to the capacitor for 500+24/-0 hours at the condition of 40±2°C and 90-95% humidity. Remove and set it for 24±2 hours at room temperature, then measure.														
	Capacitance Change Ratio	≤±5% or ±0.5pF (whichever larger)															
	D.F.	Max 0.15%															
	I.R.	More than 10000MΩ															
Life Test	Appearance	No defects or abnormalities	1. Apply two times the rated voltage to the capacitor for 1000±12 hours at the upper temperature limits, the charging current should be less than 50mA. 2. Remove and set it for 24±2 hours at room temperature, then measure.														
	Capacitance Change Ratio	≤±5% or ±0.5pF (whichever larger)															
	D.F.	Max 0.15%															
	I.R.	More than 10000MΩ															