

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.

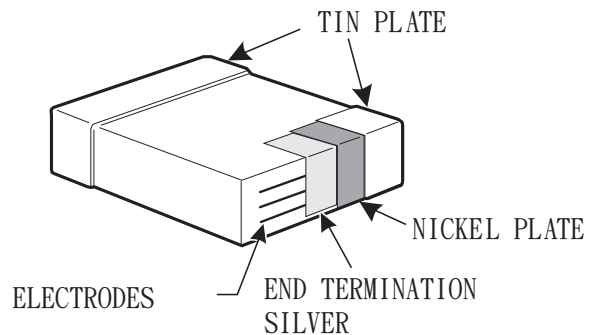
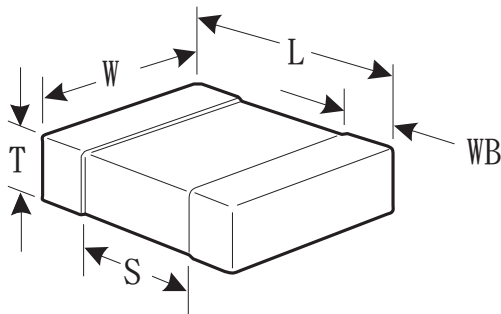
FEATURES

- 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	
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

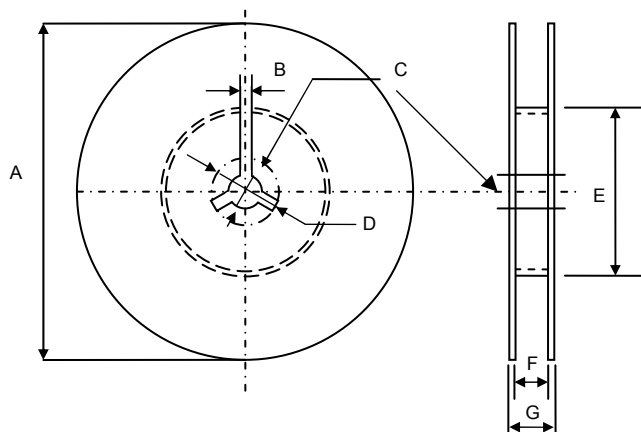
Type		Dimension(mm)				Voltage	Capacitance(pF)
Size Code	Metric Expression	L	W	T	WB		
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.1	10V	0R5~471
						16V	0R5~471
						25V	1R0~471
						50V	1R0~221
0603	1608	1.60±0.1	0.80±0.10	0.80±0.1	0.30±0.1	25V	0R5~102
						50V	0R5~102
						100V	0R5~561
			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



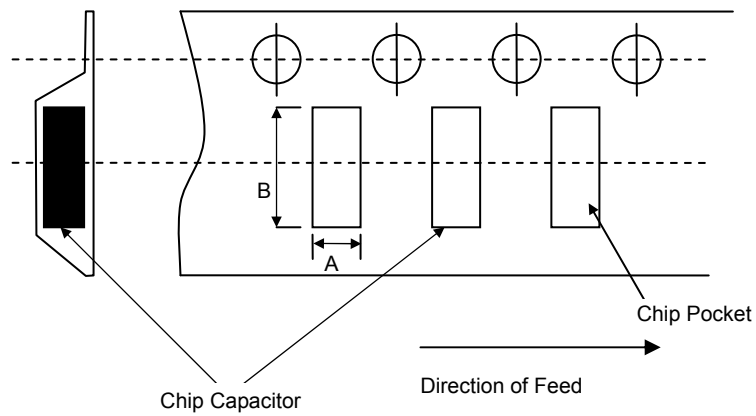
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Paper Tape

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

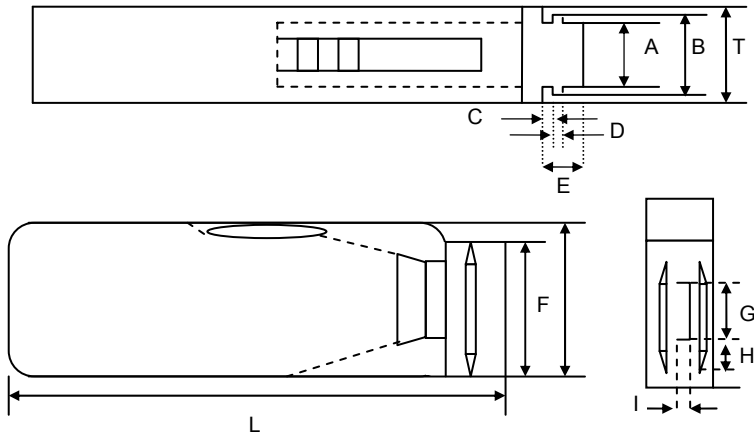
Size	A	B
0402	0.5±0.2	1.2±0.2
0603	0.8±0.2	2.0±0.2
0805	1.65±0.2	2.4±0.2
1206	2.0±0.2	3.6±0.2



Cartridge

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

Symbol	F	W	G	H	L	I
Dimension	31.5±0.2-0	36±0.0.2	19±0.35	7±0.35	110±0.7	5±0.35



Packaging Quantity

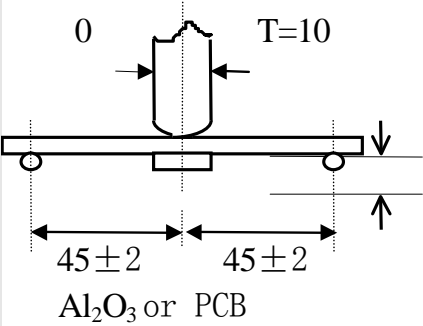
Size	Quantity		
	Paper Tape Taping	Embossed Taping	Normal Bulk
0402	10000		10000
0603	4000		4000
0805	4000	2000 / 3000	4000
1206	4000	2000 / 3000	4000
1210		2000 / 3000	
1812		1000	
2225			
3035			

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NPO(COG) DIELECTRIC CHARACTERISTIC INDUCTION & TEST METHOD

Item	Specification	Test Method									
Operating Temperature Range	-55°C ~ 125°C										
Appearance	<ol style="list-style-type: none"> 1. Good ceramic body color continuity 2. The chips have no visual damages and must be very smooth. 3. No exposed inner-electrode, cracks or holes 4. The outer electrode should have no cracks, holes damages or surface oxidation 5. No outer electrode prolongation or the prolongation is less than half of that of the termination width. 	Check by using microscope ≥10X									
Dimensions	Within the specified dimensions	Using micrometer or vernier calipers									
Capacitance	Within the specified tolerance	<ol style="list-style-type: none"> 1. Measuring Temperature: 25°C±5°C, Humidity: 30% ~ 75% 2. Measuring Voltage: 1.0±0.2V 3. Measuring Frequency: C<1000pF, 1.0±0.1MHz, C≥1000pF, 1.0±0.1KHz 									
Dissipation Factor (DF)	≤0.15%										
Insulation Resistance	≥5x10 ¹⁰ Ω	Must measure at rated voltage and measure the IR within 60±5s									
Withstanding Voltage	>3Ur	Must measure at 3 times rated voltage, dwell time: 60±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	<ol style="list-style-type: none"> 1. Pre-heat for 60±5min at 150+0/-10°C, then set it for 24±2hrs at room temperature 2. 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±5°C eutectic solder solution for 2±0.5s. Dipping speed: 25±2.5mm/s									
Resistance to Soldering	Appearance	No defects visible									
	Capacitance Change Ratio	≤±2.5% or ±0.25pF (whichever larger)									
	D.F.	Max 0.15%									
	I.R.	More than 50000MΩ									
		<ol style="list-style-type: none"> 1. Pre-heat for 60±5min at 150+0/-10°C, then set it for 24±2hrs at room temperature 2. Pre-heat the capacitor according to the chart below. Dip the capacitor into 260±5°C eutectic solder solution for 10±1s. Then set it for 24±2hrs at room temperature, then measure. 									
		Dipping speed: 25±2.5mm/s									
		<table border="1"> <thead> <tr> <th>Stage</th> <th>Temperature</th> <th>Timer</th> </tr> </thead> <tbody> <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> </tbody> </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															
	D.F.	Max 0.15%															
Bending Resistance	No removal of termination, crack or visible damage.		Capacitors mounted on a substrate. The board shall then be bent by 1mm at a rate of 1mm/sec with 10N force														
																	
Temperature Cycle	No damage or abnormalities visible		<ol style="list-style-type: none"> Heat the capacitor for 60±5min at 150+0/10°C, and then set it for 24 hrs at room temperature. Perform five cycles according to the four heat treatments listed below. Set it for 24±2hrs at room temperature, then measure. 														
			<table border="1"> <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%															
Life Test	I.R.	More than 10000MΩ	<ol style="list-style-type: none"> 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. Remove and set it for 24±2 hours at room temperature, then measure. 														
	Appearance	No defects or abnormalities															
	Capacitance Change Ratio	≤±5% or ±0.5pF (whichever larger)															
	D.F.	Max 0.15%															
	I.R.	More than 10000MΩ															