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.

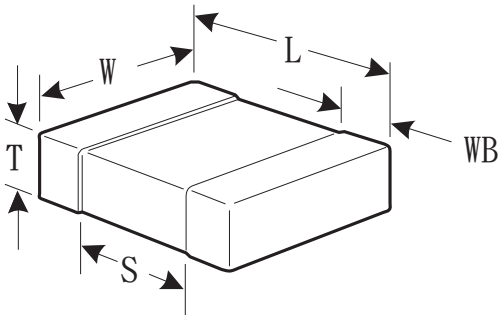
FEATURES

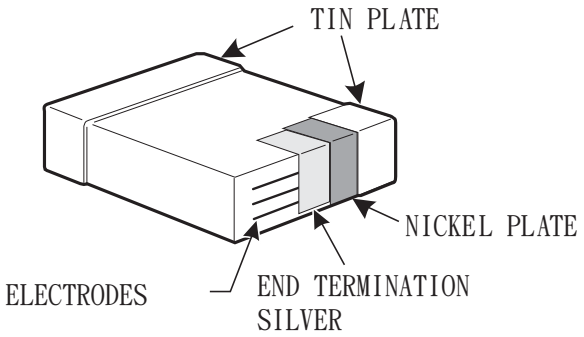
- Miniature size
- Wide capacitance, TC, voltage and tolerance range
- Industry standard sizes
- Available for wave, reflow or vapor phase solder

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	T	Tape & Reel
0805			101	100pF	D	±0.5pF	500	50V		Tin Plating	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

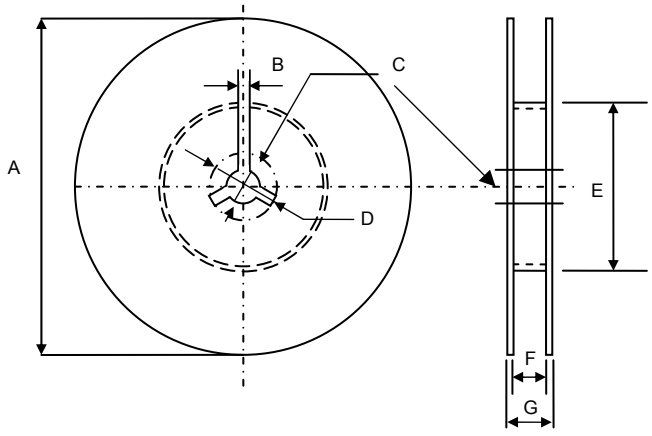
Type		Dimension(mm)				Voltage	Capacitance(pF)
Size Code	Metric Expression	L	W	T	WB		NPO(COG)
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.1	10V	0R5~471
						16V	0R5~471
						25V	1R0~471
						50V	1R0~221
0603	1608	1.60±0.1	0.80±0.10	0.80±0.1	0.30±0.1	25V	0R5~102
						50V	0R5~102
						100V	0R5~561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



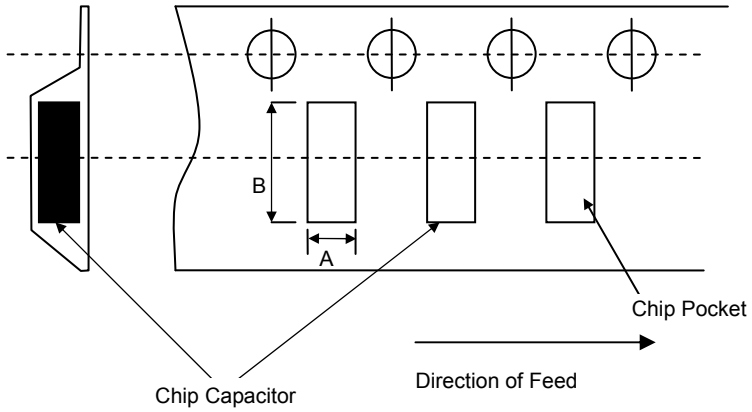
MLCC – NPO (COG)

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

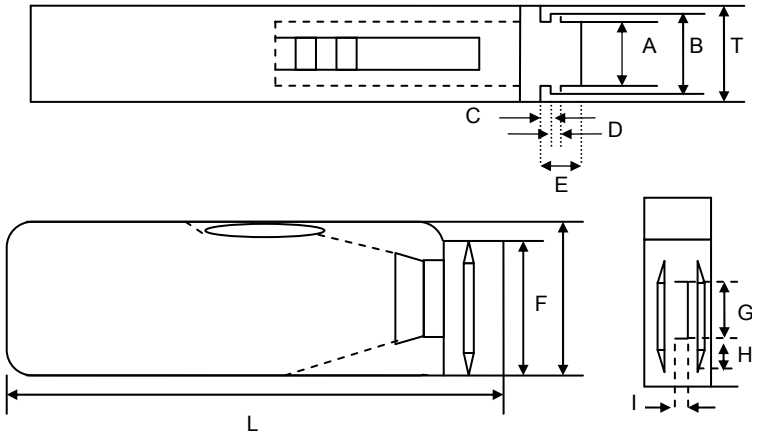
Size	A	B
0402	0.5±0.2	1.2±0.2
0603	0.8±0.2	2.0±0.2
0805	1.65±0.2	2.4±0.2
1206	2.0±0.2	3.6±0.2



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±0-0.1	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			

MLCC – NPO (COG)

NPO(COG) DIELECTRIC CHARACTERISTIC INDUCTION & TEST METHOD

<table>
<tr><th>Item</th><th colspan="2">Specification</th><th>Test Method</th></tr>
<tr><td>Operating Temperature Range</td><td colspan="2">-55°C ~ 125°C</td><td></td></tr>
<tr><td>Appearance</td><td colspan="2">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.</td><td>Check by using microscope ≥10X</td></tr>
<tr><td>Dimensions</td><td colspan="2">Within the specified dimensions</td><td>Using micrometer or vernier calipers</td></tr>
<tr><td>Capacitance</td><td colspan="2">Within the specified tolerance</td><td rowspan="2">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</td></tr>
<tr><td>Dissipation Factor (DF)</td><td colspan="2">≤0.15%</td></tr>
<tr><td>Insulation Resistance</td><td colspan="2">≥5x10^{10}Ω</td><td>Must measure at rated voltage and measure the IR within 60±5s</td></tr>
<tr><td>Withstanding Voltage</td><td colspan="2">>3Ur</td><td>Must measure at 3 times rated voltage, dwell time: 60±1s, no short and the changing/discharging current less than 50mA</td></tr>
<tr><td>Capacitance Temperature Characteristic</td><td colspan="2">Must meet the capacitor character temperature coefficient requirements within the operating temperature range</td><td>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.</td></tr>
<tr><td>Solderability</td><td colspan="2">Tin coverage should be 95% of the outer electrode</td><td>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</td></tr>
<tr><td rowspan="4">Resistance to Soldering</td><td>Appearance</td><td>No defects visible</td><td rowspan="4">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><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></td></tr>
<tr><td>Capacitance Change Ratio</td><td>≤±2.5% or ±0.25pF (whichever larger)</td></tr>
<tr><td>D.F.</td><td>Max 0.15%</td></tr>
<tr><td>I.R.</td><td>More than 50000MΩ</td></tr>
</table>

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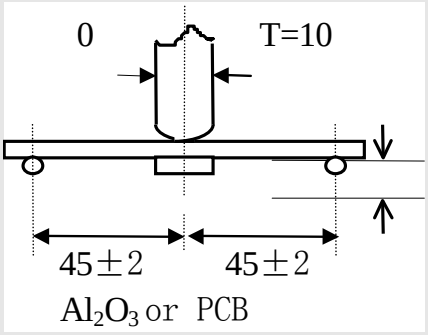
<tr><th>Item</th><th colspan="2">Specification</th><th>Test method</th></tr>
<tr><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the terminations or other defect shall occur</td><td>Capacitors mounted on a substrate, a force of 5N applied perpendicular to the plane of the substrate and parallel to the line joining the center of the terminations for 10±1s</td></tr>
<tr><td rowspan="3">Vibration Resistance</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="3">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).</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance range</td></tr>
<tr><td>D.F.</td><td>Max 0.15%</td></tr>
<tr><td>Bending Resistance</td><td colspan="2">No removal of termination, crack or visible damage.</td><td>Capacitors mounted on a substrate. The board shall then be bent by 1mm at a rate of 1mm/sec with 10N force
 
</td></tr>
<tr><td>Temperature Cycle</td><td colspan="2">No damage or abnormities visible</td><td>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><tr><th>Stage</th><th>Temperature(°C)</th><th>Time(min.)</th></tr><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></table></td></tr>
<tr><td rowspan="4">Humidity Steady State & Laod</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">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.</td></tr>
<tr><td>Capacitance Change Ratio</td><td>≤±5% or ±0.5pF (whichever larger)</td></tr>
<tr><td>D.F.</td><td>Max 0.15%</td></tr>
<tr><td>I.R.</td><td>More than 10000MΩ</td></tr>
<tr><td rowspan="4">Life Test</td><td>Appearance</td><td>No defects or abnormities</td><td rowspan="4">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.</td></tr>
<tr><td>Capacitance Change Ratio</td><td>≤±5% or ±0.5pF (whichever larger)</td></tr>
<tr><td>D.F.</td><td>Max 0.15%</td></tr>
<tr><td>I.R.</td><td>More than 10000MΩ</td></tr>
</table>