

### Features

- Stringent dimensional tolerance allow highly reliable, highly speed automatic chip placement on PCBs.;
- Terminations are plated with Ni and solder, suited to flow and reflow soldering.
- High insulation resistance and high reliability.
- These capacitors have temperature characteristics ranging from COG to Y5V, applied to general electronic equipment, and instrument panel house electronic appliance.



### Capacitor Selection

The choice of dielectric is largely determined by the temperature stability required:

- NPO(COG)**  
Ultra stable Class I dielectric, with predictable change of electrical properties on temperature, voltage, frequency and time. Used in circuits requiring stable performance.
- X7R**  
Stable Class II dielectric, with predictable change of properties with temperature, voltage, frequency and time. Used as blocking, coupling, by-passing and frequency discriminating elements. This dielectric is ferroelectric and offers higher capacitance ranges than class I.
- Y5V(Z5U)**  
General purpose Class II dielectric with highest dielectric constant and greater variation of properties with temperature and test conditions. Very high capacitance per unit volume and suited for application as well as filtering, transient suppression blocking, and charge storage application.

### General Specification

	COG(NPO)	X7R	Y5V (Z5U)
Capacitance Range	0.2pF~10nF	100pF~4.7uF	1000pF~10uF
Capacitance Tolerance	Preferred $\pm 5\%$ , $\pm 10\%$ . For values $\leq 10\text{pF}$ , Preferred tolerance is $\pm 5\%$ pF, also available $\pm 0.25\text{pF}$	Preferred $\pm 10\%$ , $\pm 20\%$ .	+80/~20%
Operating Temperature Range	-55~125°C	-55~125°C	-30~85°C
Temperature Characteristic	0 $\pm$ 30ppm/°C	within $\pm 15\%$	within +22/-82%
Rated Voltage	25V, 50V, 100V, 200V	6.3V, 10V, 16V, 25V, 50V, 100V	10V, 16V, 25V, 50V
Dissipation Factor and "Q"	$C_R \geq 30\text{pF}$ , $Q \geq 1000$ $C_R < 30\text{pF}$ , $Q \geq 400+20$	For 6.3V: DF $\leq 5.0\%$ ; For 16V and 10V: DF $\leq 3.5\%$ ; For 25V min: DF $\leq 2.5\%$ .	For 10V: 12.5% max; For 16V :9.0% max; For 25V min :5.0% max.
Insulation Resistance	more than 10GΩ	10GΩ min. or 500ΩF min, Whichever is less	10GΩ min. or 500ΩF min, Whichever is less
Dielectric Withstanding Voltage	250% rated voltage	250% rated voltage	250% rated voltage
Test Voltage	250% rated voltage	1 $\pm$ 0.2Vrms	1 $\pm$ 0.2Vrms
Test Frequency	For values $\geq 1000\text{pF}$ : 1KHz For values $\leq 1000\text{pF}$ : 1MHz	1KHz	1KHz

### Dimension, Capacitance, Voltage Table

Size	Dimension (mm)					Voltage	Capacitance		
	L	W	T	e	g min		COG(NPO)	X7R	Y5V(Z5U)
0402	1.0 $\pm$ 0.05	0.5 $\pm$ 0.05	0.5 $\pm$ 0.05	0.15~0.3	0.4	10V		100pF~0.1uF	1.0nF~0.22uF
						16V		100pF~47nF	1.0nF~0.1uF
						25V	0.2pF~100pF	100pF~22nF	1.0nF~22nF
						50V		100pF~22nF	1.0nF~10nF
						100V			
						200V			
0603	1.6 $\pm$ 0.1	0.8 $\pm$ 0.1	0.8 $\pm$ 0.1	0.2~0.5	0.5	10V		100pF~0.22uF	2.2nF~1.0uF
						16V		100pF~0.1uF	2.2nF~0.33uF
						25V	0.2pF~1.0nF	100pF~47nF	2.2nF~0.22uF
						50V	0.2pF~1.0nF	100pF~15nF	2.2nF~56nF
						100V	0.2pF~300pF	100pF~47nF	
						200V			
0805	2.0 $\pm$ 0.1	1.25 $\pm$ 0.1	0.6 $\pm$ 0.1	0.2~0.7	0.7	10V		1.0nF~2.2uF	10nF~4.7uF
			16V				100pF~0.47uF	10nF~2.2uF	
			25V			0.5pF~4.7nF	100pF~0.22uF	10nF~1.0uF	
			50V			0.5pF~2.2nF	100pF~0.1uF	10nF~0.33uF	
			100V			0.5pF~1.0nF	100pF~22nF		
			200V			0.5pF~470pF			
1206	3.2 $\pm$ 0.2	1.6 $\pm$ 0.2	0.6 $\pm$ 0.1	0.2~0.7	0.7	10V		1.0nF~4.7uF	10nF~10uF
			16V				1.0nF~1.0uF	10nF~4.7uF	
			25V			0.5pF~10nF	1.0nF~1.0uF	10nF~2.2uF	
			50V			0.5pF~4.7nF	1.0nF~2.2uF	10nF~1.0uF	
			100V			0.5pF~2.2nF	1.0nF~0.1uF		
			200V			0.5pF~1.0nF			

### Packaging

- Dimension of reel
- a. Tape & Reel packaging

φ 180mm 盘 Reel

b. 纸带 Paper tape

φ 330mm 盘 Reel

c. 塑料带 Embossed tape

片状产品 Component

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型号 Type	A	B
0603	1.05 $\pm$ 0.1	1.85 $\pm$ 0.1
0805(T $\leq$ 1.0mm)	1.55 $\pm$ 0.15	2.3 $\pm$ 0.15
1206(T $\leq$ 1.0mm)	2.0 $\pm$ 0.2	3.6 $\pm$ 0.2

型号 Type	A	B
0805(T=1.25mm)	1.45 $\pm$ 0.2	2.25 $\pm$ 0.2
1206(T>1mm)	1.9 $\pm$ 0.2	3.5 $\pm$ 0.2
1210(T>1mm)	2.8 $\pm$ 0.2	3.5 $\pm$ 0.2

- Tapes for capacitors are wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
- The top tape and base tape are not attached at the end of the tape for a minimum of 5 pitches.
- Part of the leader and part of the empty tape shall be attached to the end of the tape as follows.
- Number of missing capacitor is less than 0.1% of the total number quoted per reel or 1pc, whichever is greater, and are not continuous.
- The top tape and bottom tape shall not protrude beyond the edges of the tape and shall not cover sprocket holes.
- Cumulative tolerance of sprocket holes, 10 pitches:  $\pm 0.3\text{mm}$ .
- Peeling off force: 0.1 to 0.6N in the direction shown down.

