

C0G (NP0) is the most popular formulation of the “temperature-compensating” EIA Class I ceramic materials. Modern C0G (NP0) formulations contain neodymium, samarium and other rare earth oxides.

C0G (NP0) ceramics offer one of the most stable capacitor dielectrics available. Capacitance change with temperature is $0 \pm 30 \text{ ppm}/^\circ\text{C}$ which is less than $\pm 0.3\% \Delta C$ from -55°C to 125°C . Capacitance drift or hysteresis for C0G (NP0) ceramics is negligible at less than $\pm 0.05\%$ versus up to $\pm 2\%$ for films. Typical capacitance change with life is less than $\pm 0.1\%$ for C0G (NP0), one-fifth that shown by most other dielectrics. C0G (NP0) formulations show aging characteristics.

X7R formulations are called “temperature stable” ceramics and fall into EIA Class II materials. X7R is the most popular of these intermediate dielectric constant materials. Its temperature variation of capacitance is within $\pm 15\%$ from -55°C to 125°C . This capacitance change is non linear.

Capacitance for X7R varies under the influence of electrical operating conditions such as voltage and frequency.

X7R dielectric chip usage covers the broad spectrum of industrial applications where known changes in capacitance due to applied voltages are acceptable.

Y5V formulations are for general purpose use in a limited temperature range. They have a wide temperature characteristic of $+22\% \sim -82\%$ capacitance change over the operating temperature range of -30°C to 85°C .

These characteristics make Y5V ideal for decoupling applications within limited temperature range.

	C0G (NP0)	X7R	Y5V
Capacitance Range	0.5pF to 0.10uF	100pF to 22uF	1000pF to 22uF
Rated Voltage (U_R)	16Vdc to 500Vdc	6.3Vdc to 500Vdc	6.3Vdc to 50Vdc
Dielectric Strength	No defects or abnormalities. No failure should be observed when 250% of the rated voltage (above 200V of the rated voltage for 150%) is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA		
Capacitance (C_R)	Within the specified tolerance $C_R \leq 1000\text{pF}$: 1MHz $C_R > 1000\text{pF}$: 1KHz Both are 1Vrms, 25°C	Within the specified tolerance $C_R \leq 10\text{uF}$: 1KHz, 1Vrms $C_R > 10\text{uF}$: 120Hz, 0.5Vrms Both are 25°C	
Dissipation Factor ($\tan\delta$) or Q Value	$C \geq 30\text{pF}$, $Q \geq 1000$; $C < 30\text{pF}$, $Q \geq 400 + 20C_R$	>50V: ≤ 0.025 (≤ 0.050 for $\geq 0.068\text{uF}$) 25V & 50V: ≤ 0.025 (≤ 0.050 for $\geq 10\text{uF}$) 16V & 10V: ≤ 0.035 <10V : ≤ 0.050 (≤ 0.100 for $\geq 3.3\text{uF}$)	25V and over: ≤ 0.050 for $< 0.1\text{uF}$ ≤ 0.090 for $\geq 0.1\text{uF}$ 16V & 10V: ≤ 0.125 Below 10V: ≤ 0.150
	Measured Condition see “Capacitance”.		
Insulation Resistance	More than $10000\text{M}\Omega$ or $500\text{M}\Omega \cdot \text{uF}$ (whichever is less). The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RH maximum and within 2 minutes of charging, provided the charge/discharge current is less than 50mA.		
Operating Temperature Range	-55°C to $+125^\circ\text{C}$	-55°C to $+125^\circ\text{C}$	-25°C to $+85^\circ\text{C}$

COG (NPO) Dielectric

SIZE		0201		0402			0603				0805					1206						
Rated Voltage	DC	25	50	16	25	50	16	25	50	100	16	25	50	100	200	16	25	50	100	200	500	
Capacitance (pF)	0.5		A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	1.0		A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	1.2		A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	1.5	A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	1.8	A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	-	A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	27	A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	33	A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	39	A		C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	47	A		C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	56	A		C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	68	A		C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	82	A		C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	100	A		C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	120			C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	150			C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	180			C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	
	220			C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	M	
	270			C	C	C	G	G	G	G	J	J	J	J	M	J	J	J	J	J	M	
	330			C	C	C	G	G	G	G	J	J	J	J	M	J	J	J	J	J	M	
	390			C	C	C	G	G	G		J	J	J	J	M	J	J	J	J	J	M	
	470			C	C	C	G	G	G		J	J	J	J	M	J	J	J	J	J	M	
	560						G	G	G		J	J	J	J	M	J	J	J	J	J	M	
	680						G	G	G		J	J	J	J		J	J	J	J	J	P	
	820						G	G	G		J	J	J	J		J	J	J	J	M		
	1000						G	G	G		J	J	J	J		J	J	J	J	Q		
	1200										J	J	J			J	J	J	J	Q		
	1500										J	J	J			J	J	J	M	Q		
	1800										J	J	J			J	J	M	M			
	2200										J	J	N			J	J	M	P			
	2700										J	J	N			J	J	M	P			
	3300										J	J				J	J	M	P			
	3900										J	J				J	J	M	P			
	4700										J	J				J	J	M	P			
	5600															J	J	M				
	6800															M	M					
	8200															M	M					
Capacitance (μF)	0.010															M	M					
	0.012																					
	0.015																					

SIZE		1210					1812					1825			2220			2225		
Rated Voltage	DC	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200	50	100	200
Capacitance (pF)	10					J														
	~					J														
	270					J														
	330					J														
	390					M														
	470					M														
	560	J	J	J	J	M														
	680	J	J	J	J	M														
	820	J	J	J	J	M														
	1000	J	J	J	J	M	K	K	K	K	M	M	M	M				M	M	P
	1200	J	J	J	J	M	K	K	K	K	M	M	M	M				M	M	P
	1500	J	J	J	M	M	K	K	K	K	M	M	M	M				M	M	P
	1800	J	J	J	M		K	K	K	K	M	M	M	M				M	M	P
	2200	J	J	J	Q		K	K	K	K	P	M	M	M				M	M	P
	2700	J	J	J	Q		K	K	K	P	Q	M	M	M				M	M	P
	3300	J	J	J			K	K	K	P	Q	M	M	M			X	M	M	P
	3900	J	J	M			K	K	K	P	Q	M	M	M			X	M	M	P
	4700	J	J	M			K	K	K	P	Q	M	M	M	X	X	X	M	M	P
	5600	J	J				K	K	M	P	X	M	M	M	X	X	X	M	M	P
	6800	J	J				K	K	M	X		M	M	M	X	X	X	M	M	P
	8200	J	J				K	M	M			M	M	M	X	X	X	M	M	P
Capacitance (μF)	0.010	J	J				K	M	M			M	M		X	X	X	M	M	P
	0.012	J	J				K	M				M	M		X	X	X	M	M	P
	0.015						M	M				M	M		X	X	X	M	M	Y
	0.018						M	M				P	M		X	X	X	M	M	Y
	0.022						M	M				P			X	X		M	Y	Y
	0.027						M	M				P			X	X		M	Y	Y
	0.033						M	M				P			X	X		P		
	0.039						M	M				P			Y			P		
	0.047						M	M				P			Y			P		
	0.068						M	M										P		
	0.082						M	M										Q		
	0.100																	Q		

X7R Dielectric

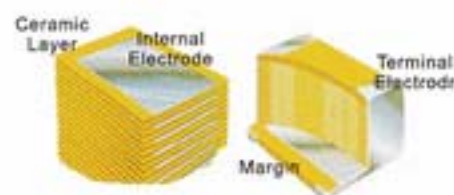
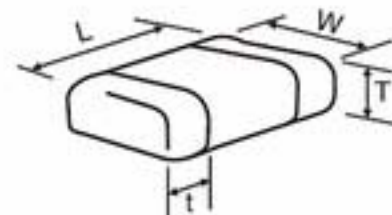
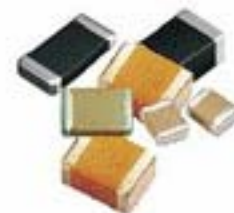
Y5V Dielectric

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Shape and Dimensions

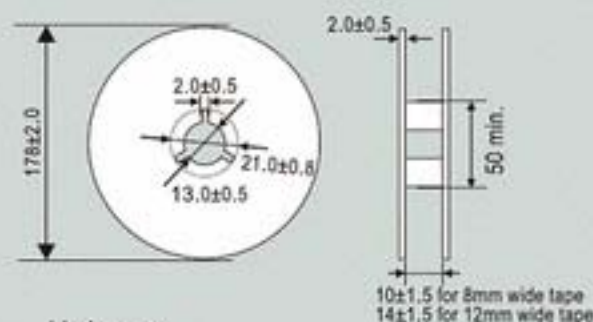
Size	Length (L) mm (in.)	Width (W) mm (in.)	Terminal (t) mm (in.)	Soldering	Packaging	Remarks
0201	0.60±0.03 (0.024±0.001)	0.30±0.03 (0.011±0.001)	0.15±0.05 (0.006±0.002)	Reflow	Paper	-
0402	1.00±0.10 (0.040±0.004)	0.50±0.10 (0.020±0.004)	0.25±0.15 (0.010±0.006)	Reflow	Paper	□
0603	1.60±0.15 (0.063±0.006)	0.81±0.15 (0.032±0.006)	0.35±0.15 (0.014±0.006)	Reflow	Paper	□
0805	2.01±0.20 (0.079±0.008)	1.25±0.20 (0.049±0.008)	0.50±0.25 (0.020±0.010)	Reflow or Wave	Embossed or Paper	□
1206	3.20±0.20 (0.126±0.008)	1.60±0.20 (0.063±0.008)	0.50±0.25 (0.020±0.010)	Reflow or Wave	Embossed or Paper	□
1210	3.20±0.20 (0.126±0.008)	2.50±0.20 (0.098±0.008)	0.50±0.25 (0.020±0.010)	Reflow	Embossed or Paper	□
1812	4.50±0.30 (0.177±0.012)	3.20±0.20 (0.126±0.008)	0.61±0.36 (0.024±0.014)	Reflow	Embossed	□
1825	4.50±0.30 (0.177±0.012)	6.40±0.40 (0.252±0.016)	0.61±0.36 (0.024±0.014)	Reflow	Embossed	□
2220	5.70±0.40 (0.225±0.016)	5.00±0.40 (0.197±0.016)	0.64±0.39 (0.025±0.015)	Reflow	Embossed	□
2225	5.72±0.25 (0.225±0.010)	6.35±0.25 (0.250±0.010)	0.64±0.39 (0.025±0.015)	Reflow Only	Embossed	□



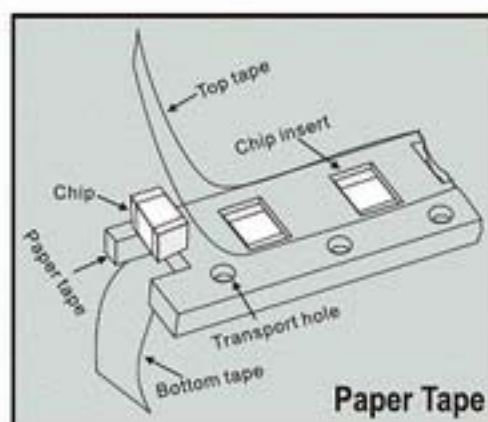
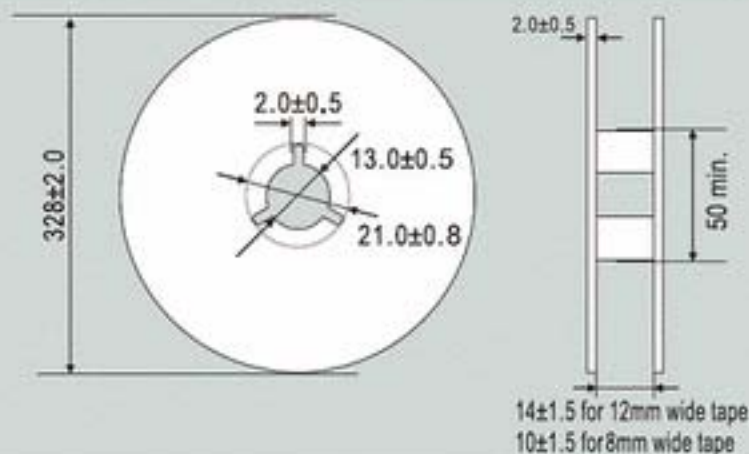
Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness (T)	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	0.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
	PAPER					EMBOSSSED							

Packing

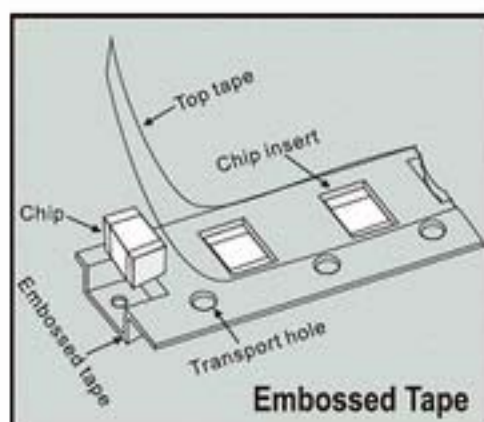
Reel Dimensions



Unit:mm



Paper Tape



Embossed Tape

Note:

Catalog due to limited space, can not be made with a variety of taping products one by one describing the standard size, it is necessary, check out our company to provide approval sheet to our company or business consulting.