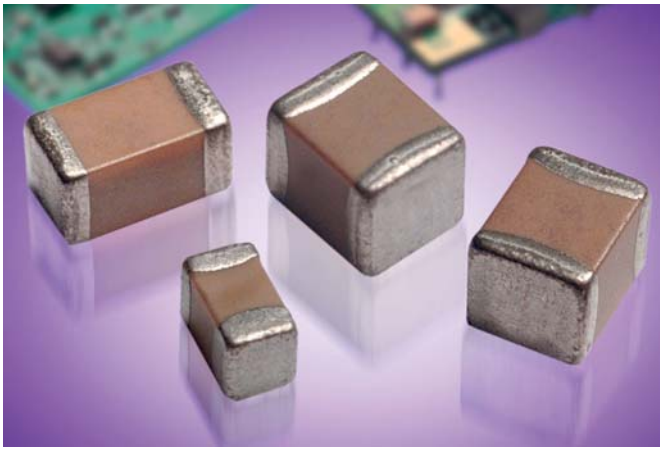
C0G (NP0) Dielectric

General Specifications



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 ±30ppm/°C which is less than ±0.3% ΔC from -55°C to +125°C. Capacitance drift or hysteresis for C0G (NP0) ceramics is negligible at less than ±0.05% versus up to ±2% for films. Typical capacitance change with life is less than ±0.1% for C0G (NP0), one-fifth that shown by most other dielectrics. C0G (NP0) formulations show no aging characteristics.

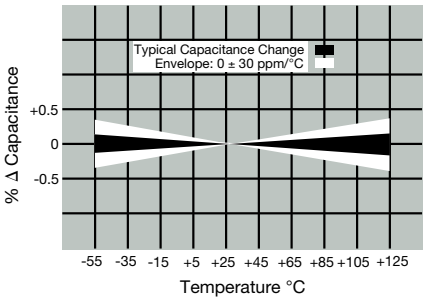
RoHS COMPLIANT

PART NUMBER (see page 2 for complete part number explanation)

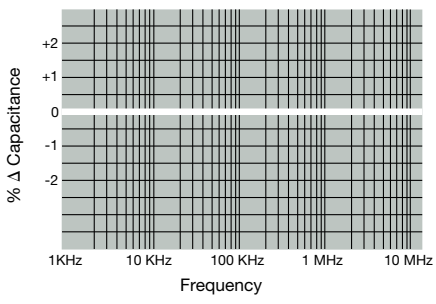
0805	5	A	101	J	A	T	2	A
Size (L" x W")	**Voltage** 6.3V = 6 10V = Z 16V = Y 25V = 3 50V = 5 100V = 1 200V = 2 500V = 7	**Dielectric** C0G (NP0) = A	**Capacitance Code (In pF)** 2 Sig. Digits + Number of Zeros	**Capacitance Tolerance** B = ±.10 pF (<10pF) C = ±.25 pF (<10pF) D = ±.50 pF (<10pF) F = ±1% (≥ 10 pF) G = ±2% (≥ 10 pF) J = ±5% K = ±10%	**Failure Rate** A = Not Applicable	**Terminations** T = Plated Ni and Sn **Contact Factory For** **1 = Pd/Ag Term** **7 = Gold Plated** **NOT RoHS COMPLIANT**	**Packaging** 2 = 7" Reel 4 = 13" Reel U = 4mm TR (01005)	**Special Code** A = Std. Product **Contact Factory For Multiples**

NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers. Contact factory for non-specified capacitance values.

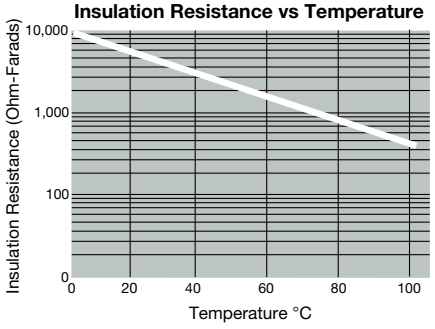
Temperature Coefficient



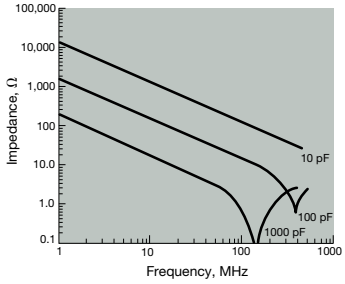
Δ Capacitance vs. Frequency



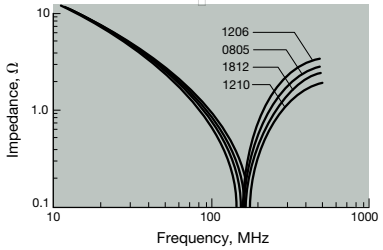
Insulation Resistance vs Temperature



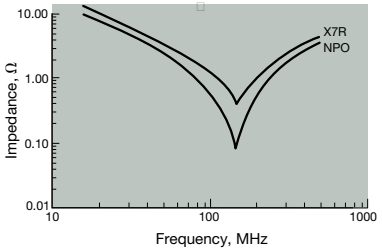
Variation of Impedance with Cap Value
Impedance vs. Frequency
0805 - C0G (NP0)
10 pF vs. 100 pF vs. 1000 pF



Variation of Impedance with Chip Size
Impedance vs. Frequency
1000 pF - C0G (NP0)

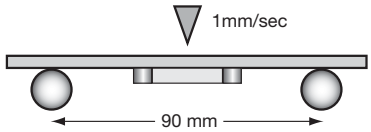


Variation of Impedance with Ceramic Formulation
Impedance vs. Frequency
1000 pF - C0G (NP0) vs X7R
0805



C0G (NP0) Dielectric

Specifications and Test Methods

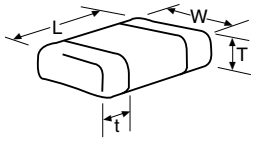
Parameter/Test		NP0 Specification Limits	Measuring Conditions
Operating Temperature Range		-55ºC to +125ºC	Temperature Cycle Chamber
Capacitance		Within specified tolerance	Freq.: 1.0 MHz ± 10% for cap ≤ 1000 pF 1.0 kHz ± 10% for cap > 1000 pF Voltage: 1.0Vrms ± .2V
Q		<30 pF: Q≥ 400+20 x Cap Value ≥30 pF: Q≥ 1000	
Insulation Resistance		100,000MΩ or 1000MΩ - µF, whichever is less	Charge device with rated voltage for 60 ± 5 secs @ room temp/humidity
Dielectric Strength		No breakdown or visual defects	Charge device with 300% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max) Note: Charge device with 150% of rated voltage for 500V devices.
Resistance to Flexure Stresses	Appearance	No defects	Deflection: 2mm Test Time: 30 seconds 
	Capacitance Variation	±5% or ±.5 pF, whichever is greater	
	Q	Meets Initial Values (As Above)	
	Insulation Resistance	≥ Initial Value x 0.3	
Solderability		≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic solder at 230 ± 5ºC for 5.0 ± 0.5 seconds
Resistance to Solder Heat	Appearance	No defects, <25% leaching of either end terminal	Dip device in eutectic solder at 260ºC for 60 seconds. Store at room temperature for 24 ± 2 hours before measuring electrical properties.
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	
	Q	Meets Initial Values (As Above)	
	Insulation Resistance	Meets Initial Values (As Above)	
	Dielectric Strength	Meets Initial Values (As Above)	
Thermal Shock	Appearance	No visual defects	Step 1: -55ºC ± 2º / 30 ± 3 minutes
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	Step 2: Room Temp / ≤ 3 minutes
	Q	Meets Initial Values (As Above)	Step 3: +125ºC ± 2º / 30 ± 3 minutes
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp / ≤ 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and measure after 24 hours at room temperature
Load Life	Appearance	No visual defects	Charge device with twice rated voltage in test chamber set at 125ºC ± 2ºC for 1000 hours (+48, -0). Remove from test chamber and stabilize at room temperature for 24 hours before measuring.
	Capacitance Variation	≤ ±3.0% or ± .3 pF, whichever is greater	
	Q (C=Nominal Cap)	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	
	Dielectric Strength	Meets Initial Values (As Above)	
Load Humidity	Appearance	No visual defects	Store in a test chamber set at 85ºC ± 2ºC/ 85% ± 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied. Remove from chamber and stabilize at room temperature for 24 ± 2 hours before measuring.
	Capacitance Variation	≤ ±5.0% or ± .5 pF, whichever is greater	
	Q	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	
	Dielectric Strength	Meets Initial Values (As Above)	

C0G (NP0) Dielectric

Capacitance Range

PREFERRED SIZES ARE SHADED

SIZE		0101*	0201		0402			0603					0805					1206					
Soldering		Reflow Only	Reflow Only		Reflow/Wave			Reflow/Wave					Reflow/Wave					Reflow/Wave					
Packaging		All Paper	All Paper		All Paper			All Paper					Paper/Embossed					Paper/Embossed					
(L) Length	mm	0.40 ± 0.02	0.60 ± 0.03		1.00 ± 0.10			1.60 ± 0.15					2.01 ± 0.20					3.20 ± 0.20					
	(in.)	(0.016 ± 0.0008)	(0.024 ± 0.001)		(0.040 ± 0.004)			(0.063 ± 0.006)					(0.079 ± 0.008)					(0.126 ± 0.008)					
(W) Width	mm	0.20 ± 0.02	0.30 ± 0.03		0.50 ± 0.10			0.81 ± 0.15					1.25 ± 0.20					1.60 ± 0.20					
	(in.)	(0.008 ± 0.0008)	(0.011 ± 0.001)		(0.020 ± 0.004)			(0.032 ± 0.006)					(0.049 ± 0.008)					(0.063 ± 0.008)					
(t) Terminal	mm	0.10 ± 0.04	0.15 ± 0.05		0.25 ± 0.15			0.35 ± 0.15					0.50 ± 0.25					0.50 ± 0.25					
	(in.)	(0.004 ± 0.016)	(0.006 ± 0.002)		(0.010 ± 0.006)			(0.014 ± 0.006)					(0.020 ± 0.010)					(0.020 ± 0.010)					
	WVDC	16	25	50	16	25	50	16	25	50	100	200	16	25	50	100	200	16	25	50	100	200	500
Cap	0.5		A		C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
(pF)	1.0	B	A		C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	1.2	B	A		C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	1.5	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	1.8	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	2.2	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	2.7	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	3.3	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	3.9	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	4.7	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	5.6	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	6.8	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	8.2	B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J
	10	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	12	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	15	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	18	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	22	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	27	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	33	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	39	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	47	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	56	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	68	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	82	B	A	A	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	100	B	A	A	C	C	C	G	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	J	J	J	J	J	J	M
	330				C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	M
	390				C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	M
	470				C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	M
	560				C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	M
	680				C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	P
	820				C	C	C	G	G	G			J	J	J	J	J	J	J	J	J	M	
	1000				C	C	C	G	G	G			J	J	J	J	J	J	J	J	J	Q	
	1200							G	G	G			J	J	J	J		J	J	J	J	Q	
	1500							G	G	G			J	J	J	J		J	J	J	M	Q	
	1800							G	G	G			J	J	J	N		J	J	M	M	Q	
	2200							G	G	G			N	N	N	N		J	J	M	P	Q	
	2700							G	G	G			N	N	N	N		J	J	M	P	Q	
	3300							G	G	G			P	P	P	N		J	J	M	P	Q	
	3900												P	P	P	N		J	J	M	P		
	4700												P	P	P	N		J	J	M	P		
	5600												P	P	P			J	J	M	P		
	6800												P	P	P			M	M	M	P		
	8200												P	P	P			M	M	M	P		
Cap	0.010												P	P	P			N	N	N	P		
(µF)	0.012																						
	0.015																						
	0.018																						
	0.022																						
	0.027																						
	0.033																						
	0.039																						
	0.047																						
	0.068																						
	0.082																						
	0.1																						
	WVDC	16	25	50	16	25	50	16	25	50	100	200	16	25	50	100	200	16	25	50	100	200	500
SIZE		0101*	0201		0402			0603					0805					1206					



Letter	A	B	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.22 (0.009)	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)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
	PAPER						EMBOSSED							

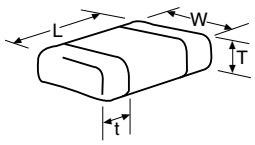
*EIA 01005

C0G (NP0) Dielectric

Capacitance Range

PREFERRED SIZES ARE SHADED

SIZE		1210					1812					1825			2220			2225		
Soldering		Reflow Only					Reflow Only					Reflow Only			Reflow Only			Reflow Only		
Packaging		Paper/Embossed					All Embossed					All Embossed			All Embossed			All Embossed		
(L) Length	mm (in.)	3.20 ± 0.20 (0.126 ± 0.008)					4.50 ± 0.30 (0.177 ± 0.012)					4.50 ± 0.30 (0.177 ± 0.012)			5.70 ± 0.40 (0.225 ± 0.016)			5.72 ± 0.25 (0.225 ± 0.010)		
(W) Width	mm (in.)	2.50 ± 0.20 (0.098 ± 0.008)					3.20 ± 0.20 (0.126 ± 0.008)					6.40 ± 0.40 (0.252 ± 0.016)			5.00 ± 0.40 (0.197 ± 0.016)			6.35 ± 0.25 (0.250 ± 0.010)		
(t) Terminal	mm (in.)	0.50 ± 0.25 (0.020 ± 0.010)					0.61 ± 0.36 (0.024 ± 0.014)					0.61 ± 0.36 (0.024 ± 0.014)			0.64 ± 0.39 (0.025 ± 0.015)			0.64 ± 0.39 (0.025 ± 0.015)		
	WVDC	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200	50	100	200
Cap (pF)	0.5																			
	1.0																			
	1.2																			
	1.5																			
	1.8																			
	2.2																			
	2.7																			
	3.3																			
	3.9																			
	4.7																			
	5.6																			
	6.8																			
	8.2																			
	10					J														
	12					J														
	15					J														
	18					J														
	22					J														
	27					J														
	33					J														
	39					J														
	47					J														
	56					J														
	68					J														
	82					J														
	100					J														
	120					J														
	150					J														
	180					J														
	220					J														
	270					J														
	330					J														
	390					M														
	470					M														
	560	J	J	J	J	M														
	680	J	J	J	K	P														
	820	J	J	J	K	P														
	1000	J	J	P	P	P	K	K	N	N	M	M	M	M				M	M	P
	1200	P	P	P	P	P	K	K	N	N	M	M	M	M				M	M	P
	1500	P	P	P	P	P	K	K	N	N	M	M	M	M				M	M	P
	1800	P	P	P	P		K	K	N	N	M	M	M	M				M	M	P
	2200	P	P	P	P		K	K	N	N	P	X	X	M				M	M	P
	2700	P	P	P	P		K	K	N	P	Q	X	X	M				M	M	P
	3300	P	P	P			K	K	N	P	Q	X	X	X			X	M	M	P
	3900	P	P	P			K	K	N	P	Q	X	X	X			X	M	M	P
	4700	P	P	P			K	K	N	P	Q	X	X	X	X	X	X	M	M	P
	5600	P	P	P			K	K	P	P	X	X	X	X	X	X	X	M	M	P
	6800	P	P	P			K	K	X	X		X	X	X	X	X	X	M	M	P
	8200	P	P				K	M				X	X	X	X	X	X	M	M	P
Cap (µF)	0.010	P	N				K	M				X	X	X	X	X	X	M	M	P
	0.012	P	N				K	M				X	X	X	X	X	X	M	M	P
	0.015						P	P				X	X	X	X	X	X	M	M	Y
	0.018						P	P				X	X	X	X	X	X	M	M	Y
	0.022						P	P				X	X	X	X	X		M	Y	Y
	0.027						P	P				X	X	Y	X	X		P	Y	Y
	0.033						P	P				X	X		X	X		X	Y	Y
	0.039						X	X				X			Y			X	Y	Y
	0.047						X	X				X			Y			X	Z	
	0.068						Z	Z							Z			X	Z	
	0.082						Z	Z							Z			X	Z	
	0.1						Z	Z							Z			Z	Z	
	WVDC	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200	50	100	200
	SIZE	1210					1812					1825			2220			2225		



Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	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)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
	PAPER					EMBOSSED							

Mouser Electronics

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AVX:

08055A330KAT4A 08055A330MAT2A 08055A331FAT2A 08055A331FAT4A 08055A331GAT2A 08055A331JAT2A 08055A331JAT4A 08055A331KAT2A 08055A331KAT4A 08055A332JAT2A 08055A360GAT2A 08055A360JAT2A 08055A390FAT2A 08055A390FAT4A 08055A390GAT2A 08055A390JAT2A 08055A390JAT4A 08055A390KAT2A 08055A390KAT4A 08055A391FAT2A 08055A391FAT4A 08055A391GAT2A 08055A391JAT2A 08055A391JAT4A 08055A391KAT2A 08055A391KAT4A 08055A392JAT2A 08055A3R0CAT2A 08055A3R3BAT2A 08055A3R3CAT2A 08055A0R5BAT2A 08055A0R5CAT2A 08055A100BAT2A 08055A100CAT2A 08055A100CAT4A 08055A100DAT2A 08055A100DAT4A 08055A100FAT2A 08055A100JAT2A 08055A101FAT2A 08055A101FAT4A 08055A101GAT2A 08055A101JAJ2A 08055A101JAT2A 08055A101JAT4A 08055A101KAT2A 08055A101KAT4A 08055A101MAT2A 08055A102FAT2A 08055A102GAT2A 08055A102JAT2A 08055A102JAT4A 08055A102JBT1A 08055A102KAT2A 08055A102KAT4A 08055A102KBT1A 08055A110JAT2A 08055A120CAT2A 08055A120JAT2A 08055A121FAT2A 08055A121FAT4A 08055A121JAT2A 08055A121JAT4A 08055A121KAT2A 08055A121KAT4A 08055A122FAT2A 08055A122FAT4A 08055A122JAT2A 08055A122JAT4A 08055A122KAT2A 08055A131JAT2A 08055A132JAT2A 08055A150GAT2A 08055A150JAT2A 08055A150JAT4A 08055A151FAT2A 08055A151FAT4A 08055A151GAT2A 08055A151JAT2A 08055A151JAT4A 08055A151KAT2A 08055A151KAT4A 08055A6R8DAT2A 08055A6R8DAT4A 08055A750FAT2A 08055A750JAT2A 08055A751JAT2A 08055A7R5CAT2A 08055A7R5DAT2A 08055A820FAT2A 08055A820FAT4A 08055A820JAT2A 08055A820JAT4A 08055A820KAT2A 08055A820KAT4A 08055A821FAT2A 08055A821FAT4A 08055A821JAT2A 08055A821KAT2A 08055A821KAT4A