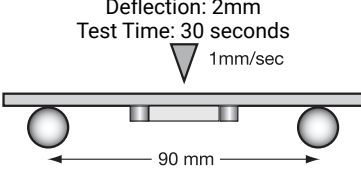


COG (NP0) Dielectric

Specifications and Test Methods



Parameter/Test		NP0 Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +125°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance	Freq.: 1.0 MHz $\pm$ 10% for cap $\leq$ 1000 pF 1.0 kHz $\pm$ 10% for cap $>$ 1000 pF Voltage: 1.0Vrms $\pm$.2V	
Q		<30 pF: $Q \geq 400+20 \times \text{Cap Value}$ ≥ 30 pF: $Q \geq 1000$		
Insulation Resistance		100,000M Ω or 1000M Ω - μ F, whichever is less	Charge device with rated voltage for 60 $\pm$ 5 secs @ room temp/humidity	
Dielectric Strength		No breakdown or visual defects	Charge device with 250% 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		
	Capacitance Variation	$\pm 5\%$ or ± 5 pF, whichever is greater		
	Q	Meets Initial Values (As Above)		
	Insulation Resistance	$\geq$ Initial Value $\times$ 0.3		
Solderability		$\geq 95\%$ of each terminal should be covered with fresh solder	Dip device in eutectic solder at 230 $\pm$ 5°C for 5.0 $\pm$ 0.5 seconds	
Resistance to Solder Heat	Appearance	No defects, $<25\%$ leaching of either end terminal	Dip device in eutectic solder at 260°C for 60sec- onds. Store at room temperature for 24 $\pm$ 2 hours before measuring electrical properties.	
	Capacitance Variation	$\leq \pm 2.5\%$ 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: -55°C $\pm$ 2°	30 $\pm$ 3 minutes
	Capacitance Variation	$\leq \pm 2.5\%$ or ± 25 pF, whichever is greater	Step 2: Room Temp	≤ 3 minutes
	Q	Meets Initial Values (As Above)	Step 3: +125°C $\pm$ 2°	30 $\pm$ 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 125°C $\pm$ 2°C for 1000 hours (+48, -0). Remove from test chamber and stabilize at room temperature for 24 hours before measuring.	
	Capacitance Variation	$\leq \pm 3.0\%$ or $\pm .3$ pF, whichever is greater		
	Q (C=Nominal Cap)	≥ 30 pF: $Q \geq 350$ ≥ 10 pF, <30 pF: $Q \geq 275 + 5C/2$ <10 pF: $Q \geq 200 + 10C$		
	Insulation Resistance	$\geq$ Initial Value $\times$ 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		
Load Humidity	Appearance	No visual defects	Store in a test chamber set at 85°C $\pm$ 2°C/ 85% $\pm$ 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied. Remove from chamber and stabilize at room temperature for 24 $\pm$ 2 hours before measuring.	
	Capacitance Variation	$\leq \pm 5.0\%$ or $\pm .5$ pF, whichever is greater		
	Q	≥ 30 pF: $Q \geq 350$ ≥ 10 pF, <30 pF: $Q \geq 275 + 5C/2$ <10 pF: $Q \geq 200 + 10C$		
	Insulation Resistance	$\geq$ Initial Value $\times$ 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		

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 ± 0.09		1.00 ± 0.10		1.60 ± 0.15				2.01 ± 0.20					3.20 ± 0.20																
	(in.)	(0.016 ± 0.0008)		(0.024 ± 0.004)		(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 ± 0.09		0.50 ± 0.10		0.81 ± 0.15				1.25 ± 0.20					1.60 ± 0.20																
	(in.)	(0.008 ± 0.0008)		(0.011 ± 0.004)		(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 ± 0.0016)		(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		100		200		250		16		25		50		100		200		250		500	
Cap (pF)	0.5			A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	1.0	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	1.2	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	1.5	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	1.8	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	2.2	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	2.7	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	3.3	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	3.9	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	4.7	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	5.6	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	6.8	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	8.2	B		A		A		C		C		C		G		G		G		G		J		J		J		J		J			
	10	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	12	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	15	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	18	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	22	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	27	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	33	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	39	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	47	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	56	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	68	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	82	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	100	B		A		A		C		C		C		G		G		G		G		G		J		J		J		J			
	120							C		C		C		G		G		G		G		G		J		J		J		J			
	150							C		C		C		G		G		G		G		G		J		J		J		J			
	180							C		C		C		G		G		G		G		G		J		J		J		J			
	220							C		C		C		G		G		G		G		G		J		J		J		J			
	270							C		C		C		G		G		G		G		G		J		J		J		J			
	330							C		C		C		G		G		G		G		G		J		J		J		J			
	390							C		C		C		G		G		G		G		G		J		J		J		J			
	470							C		C		C		G		G		G		G		G		J		J		J		J			
	560							C		C		C		G		G		G		G		G		J		J		J		J			
	680							C		C		C		G		G		G		G		G		J		J		J		J			
	820							C		C		C		G		G		G		G		G		J		J		J		J			
	1000							C		C		C		G		G		G		G		G		J		J		J		J			
	1200													G		G		G		G		G		J		J		J		J			
	1500													G		G		G		G		G		J		J		J		J			
	1800													G		G		G		G		G		J		J		J		J			
	2200													G		G		G		G		G		N		N		N		N			
	2700													G		G		G		G		G		N		N		N		N			
	3300													G		G		G		G		G		P		N		N		N			
	3900													G		G		G		G		G		P		P		P		P			
	4700													G		G		G		G		G		P		P		P		P			
	5600																							P		P		P		P			
	6800																							P		P		P		P			
	8200																							P		P		P		P			
Cap (μF)	0.010																							P		P		P		P			
	0.012																							P		P		P		P			
	0.015																							P		P		P		P			
	0.018																							P		P		P		P			
	0.022																							P		P		P		P			
	0.027																							P		P		P		P			
	0.033																																
	0.039																																
	0.047																																
	0.068																																
	0.082																																
	0.1																																
WVDC		16		25		50		16		25		50		100		200		16		25		50		100		200		250		500			
SIZE		0101*		0201		0402		0603				0805					1206																
Letter		A	B	C	E	G			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						EMBOSSD																									

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	3.20 ± 0.20					4.50 ± 0.30					4.50 ± 0.30			5.70 ± 0.40			5.72 ± 0.25		
	(in.)	(0.126 ± 0.008)					(0.177 ± 0.012)					(0.177 ± 0.012)			(0.225 ± 0.016)			(0.225 ± 0.010)		
W) Width	mm	2.50 ± 0.20					3.20 ± 0.20					6.40 ± 0.40			5.00 ± 0.40			6.35 ± 0.25		
	(in.)	(0.098 ± 0.008)					(0.126 ± 0.008)					(0.252 ± 0.016)			(0.197 ± 0.016)			(0.250 ± 0.010)		
(t) Terminal	mm	0.50 ± 0.25					0.61 ± 0.36					0.61 ± 0.36			0.64 ± 0.39			0.64 ± 0.39		
	(in.)	(0.020 ± 0.010)					(0.024 ± 0.014)					(0.024 ± 0.014)			(0.025 ± 0.015)			(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	0.5																			
(pF)	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	P	K	K	N	N	M	M	M	M				M	M	P
	2200	P	P	P	P	N	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	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	Y	X	X	X		X	X	M	M	P
	5600	P	P	P			K	K	P	P	Y	X	X	X		X	X	M	M	P
	6800	P	P	P			K	K	Q	Q		X	X	X		X	X	M	M	P
	8200	P	P				K	M	Q	Q		X	X	X		X	X	M	M	P
Cap	0.010	N	N				K	M	Q	Q		X	X	X		X	X	M	M	P
(pF)	0.012	N	N				K	M	Q			X	X	X		X	X	M	M	P
	0.015						P	P	Q			X	X	X		X	X	M	M	Y
	0.018						P	P	Q			X	X	X		X	X	M	M	Y
	0.022						P	P	Q			X	X	X		X	X	M	Y	Y
	0.027						Q	Q	X			X	X	Y		X	X	P	Y	Y
	0.033						Q	Q	X			X	X			X	X	X	Y	Y
	0.039						X	X	X			X				Y		X	Y	Y
	0.047						X	X	X			X				Y		X	Z	
	0.068						Z	Z	Y							Z		X	Z	
	0.082						Z	Z	Y							Z		X	Z	
	0.1						Z	Z	Z							Z		X	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	B	C	E	G						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												

