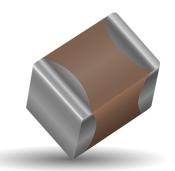
COG (NPO) Dielectric

General Specifications



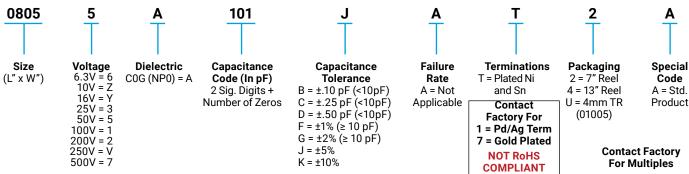


COG (NPO) is the most popular formulation of the "temperature-compensating," EIA Class I ceramic materials. Modern COG (NPO) formulations contain neodymium, samarium and other rare earth oxides.

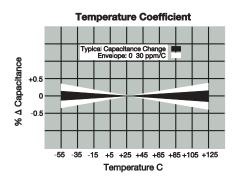
COG (NP0) ceramics offer one of the most stable capacitor dielectrics available. Capacitance change with temperature is 0 ±30ppm/°C which is less than ±0.3% C from -55°C to +125°C. Capacitance drift or hysteresis for COG (NPO) ceramics is negligible at less than ±0.05% versus up to ±2% for films. Typical capacitance change with life is less than ±0.1% for COG (NPO), one-fifth that shown by most other dielectrics. COG (NPO) formulations show no aging characteristics.

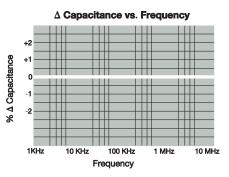
PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

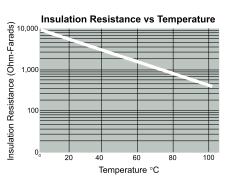


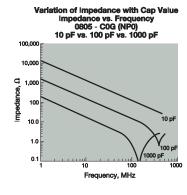


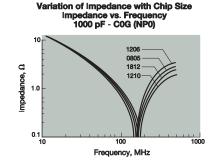
NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers. Contact factory for non-specified capacitance values.

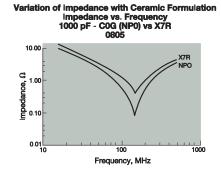












COG (NP0) Dielectric





Parame	ter/Test	NP0 Specification Limits	Measuring Conditions					
	perature Range	-55°C to +125°C	Temperature Cycle Chamber					
	citance Q	Within specified tolerance <30 pF: Q≥ 400+20 x Cap Value ≥30 pF: Q≥ 1000	Freq.: 1.0 MHz ± 10% for cap ≤ 1000 pF 1.0 kHz ± 10% for cap > 1000 pF Voltage: 1.0Vrms ± .2V					
Insulation	Resistance	100,000MΩ or 1000MΩ - μ F, whichever is less	Charge device with rated voltage for 60 ± 5 sec @ room temp/humidity	ecs				
Dielectric	: Strength	No breakdown or visual defects	Charge device with 250% of rated voltage for 1 seconds, w/charge and discharge current limit to 50 mA (max) Note: Charge device with 150% of rated voltage for 500V devices.	ted				
	Appearance	No defects						
Resistance to	Capacitance Variation	±5% or ±.5 pF, whichever is greater	Deflection: 2mm Test Time: 30 seconds 1 mm/sec					
Flexure	Q	Meets Initial Values (As Above)	V					
Stresses	Insulation Resistance	≥ Initial Value x 0.3	90 mm	m				
Solde	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic solder at 230 ± 5°C for 5. 0.5 seconds	.0 ±				
	Appearance	No defects, <25% leaching of either end terminal						
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	Dip device in eutectic solder at 260°C for 60sec- onds. Store at room temperature					
Resistance to	Q	Meets Initial Values (As Above)						
Solder Heat	Insulation Resistance	Meets Initial Values (As Above)	for 24 ± 2hours before measuring electrical properties.	aı				
	Dielectric Strength	Meets Initial Values (As Above)						
	Appearance	No visual defects	Step 1: -55°C ± 2° 30 ± 3 minutes					
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	Step 2: Room Temp ≤ 3 minutes					
Thermal Shock	Q	Meets Initial Values (As Above)	Step 3: +125°C ± 2° 30 ± 3 minutes					
memar encek	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					
	Appearance	No visual defects						
	Capacitance Variation	≤ ±3.0% or ± .3 pF, whichever is greater	Charge device with twice rated voltage in test					
Load Life	Q (C=Nominal Cap)	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	chamber set at 125°C ± 2°C for 1000 hours (+48, -0). Remove from test chamber and stabilize at					
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	room temperature for 24 hours before measuring.					
	Dielectric Strength	Meets Initial Values (As Above)	<u> </u>					
	Appearance	No visual defects						
	Capacitance Variation	≤ ±5.0% or ± .5 pF, whichever is greater	Store in a test chamber set at 85°C ± 2°C/ 85%	% +				
Load Humidity	Q	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	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.					
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)						
	Dielectric Strength	Meets Initial Values (As Above)						

COG (NP0) Dielectric





PREFERRED SIZES ARE SHADED

OIZE		0101+	000	1	_	0400				0000			1			0805			1			1006			
SIZE Solderir		0101* Reflow Only	020 Reflow		Ref	0402 low/W	ave		Re	0603 eflow/W	lave		Reflow/Wave						1206 Reflow/Wave						
Packagi		All Paper	All Pa			II Pape				All Pape			Paper/Embossed						Paper/Embossed						
(L) Length	mm	0.40 ± 0.02	0.60 ±	0.09		00 ± 0.		1.60 ± 0.15					2.01 ± 0.20						3.20 ± 0.20						
(L) Length	(in.)	(0.016 ± 0.0008)	(0.024 ±		<u> </u>	40 ± 0.				063 ± 0.						79 ± 0.00	8)					.126 ± 0.			
W) Width	mm (in.)	0.20 ± 0.02 (0.008 ± 0.0008)	0.30 ± (0.011 ±			50 ± 0. 20 ± 0.				0.81 ± 0.			1.25 ± 0.20 (0.049 ± 0.008)						1.60 ± 0.20 (0.063 ± 0.008)						
	(in.) mm	0.10 ± 0.04	0.15 ±		<u> </u>	25 ± 0.		(0.032 ± 0.006) (0.049 ± 0.008) 0.35 ± 0.15 0.50 ± 0.25								0.50 ± 0.25									
(t) Terminal	(in.)	(0.004 ± 0.0016)	(0.006 ±			10 ± 0.								0.50 ± 0.25 (0.020 ± 0.010)					0.50 ± 0.25 (0.020 ± 0.010)						
	WVDĆ	16	25	50	16	25	50	16 25 50 100 200					16	25	50	100	200	250	16	25	50	100	200	250	500
Сар	0.5	_	Α	Α	С	С	С	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
(pF)	1.0 1.2	B B	A	A	C	C	C	G G	G G	G G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	1.5	В	A	A A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	1.8	В	Α	Α	С	С	С	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	2.2	В	Α	Α	С	С	С	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	2.7 3.3	B B	A	A	C	C	C	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	3.9	В	A	A A	C	C	C	G	G G	G G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	4.7	В	Α	Α	С	С	С	G	G	G	G		J	J	J	J	Ĵ	Ĵ	J	J	J	J	J	J	Ĵ
	5.6	В	Α	Α	С	С	С	G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	J	J
	6.8 8.2	B B	A	A A	C	C	C	G G	G G	G G	G		J	J	J	J	J	J	J	J	J	J	J	J	J J
	10	В	A	A	С	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	12	В	A	Α	С	С	С	G	G	G	G	G	Ĵ	J	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	J	J	Ĵ	Ĵ	J	Ĵ
	15	В	Α	Α	С	С	С	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	18	В	A	A	С	С	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	22 27	B B	A	A A	C	C	C	G G	G G	G G	G	G G	J	J	J J	J	J	J	J	J	J	J	J	J	J
	33	В	A	A	С	С	С	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	39	В	Α	Α	С	С	С	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	47	B B	A	A	С	С	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	56 68	В	A	A A	C	C C	C	G G	G G	G G	G G	G G	J	J	J	J	J	J	J	J	J	J	J	J	J
	82	В	A	A	C	C	c	G	G	G	G	G	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	J	Ĵ	Ĵ	Ĵ	Ĵ
	100	В	Α	Α	С	С	С	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	120				С	С	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	150 180				C	C	C	G	G G	G G	G	G	J	J	J	J	J	J N	J	J	J	J	J	J	J
	220				С	С	c	G	G	G	G	G	Ĵ	J	Ĵ	J	N	N	J	J	J	J	J	J	J
	270				С	С	С	G	G	G	G		J	J	J	J	N	N	J	J	J	J	J	J	J
	330 390				C	C	C	G G	G G	G G	G G		J	J	J	J	N N	N N	J	J	J	J	J	J	J
	470				C	C	C	G	G	G	G		J	J	J	J	N	N	J	J	J	J	J	J	J
	560				С	С	С	G	G	G	G		J	J	J	J	N	N	J	J	J	J	J	J	J
	680				С	С	C	G	G	G	G		J	J	J	J	N	N	J	J	J	J	J	J	J
	750 820				C	C	C	G G	G G	G G	G G		J	J	J	J	N N	N N	J	J	J	J	J	J	J
	1000				С	С	C	G	G	G	G		J	J	J	J	N	N	J	J	J	J	J	J	J
	1200							G	G	G			J	J	J	J	Р	Р	J	J	J	J	J	J	J
	1500							G	G	G			J	J	J	J	P	P	J	J	J	M	Q	P	P
	1800 2200							G G	G G	G G			J P	J P	J P	J P	P P	P P	J	J	M	P P	Q Q	P P	P P
	2700							G	G	G	L		P	Р	P	P	P	P	J	Ĵ	М	P	Q	P	P
	3300							G	G	G			P	P	P	P	P	P	J	J	М	P	Q	Х	P
	3900 4700							G G	G G	G			P P	P P	P P	P P	P P	P P	J	J	M	P P	X	X	X X
	5600							G	G	G			P	P	P	P P	Ρ .	, P	J	J	M	P	X	X	X
	6800												P	P	Р				M	M	М	P	X	x	X
	8200												Р	Р	Р				Р	Р	Р	Р	X	Х	
Cap	0.010												P P	P P	P P				P	P X	P	P	Х	Х	
(μF)	0.012 0.015												P	P					X	X	X	X			
	0.018		1		√ -W		. —												Х	X	X	Х			
	0.022		$\overline{}$		7	<													X	X	X	Х			
	0.027	— · ·		\	1,)									l				X	X	X	X			
	0.033		_)			_	-												x	X	X	^			
	0.047		<u></u>																Х	Х	Х				
	0.068		⁴ t	*															Х	Х	Х				
	0.082		' Ì				I												X	Х	X				
WVDC		16	25	50	16	25	50	16	25	50	100	200	16	25	50	100	200	250	16	25	50	100	200	250	500
SIZE		0101*	020	01		0402				0603						0805						1206			

Letter	Α	В	С	Е	G	J	K	М	N	Р	Q	Х	Υ	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 (0.05 5)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)			
	PAPER							EMBOSSED									

COG (NP0) Dielectric





PREFERRED SIZES ARE SHADED

SIZE				1210					1812				1825	,		2220			2225	
Soldering				Reflow Only	,				Reflow Only	/			Reflow Onl	y		Reflow Onl	у	R	eflow Only	
Packaging			Pa	per/Emboss	sed		All Embossed						All Embossed			All Embossed			l Embossed	d
	mm			3.20 ± 0.20			4.50 ± 0.30 (0.177 ± 0.012)						4.50 ± 0.30			5.70 ± 0.40 (0.225 ± 0.016)			5.72 ± 0.25	2)
	(in.) mm			0.126 ± 0.00 2.50 ± 0.20			(0.177 ± 0.012) 3.20 ± 0.20						(0.177 ± 0.012) 6.40 ± 0.40			(0.225 ± 0.016) 5.00 ± 0.40			(0.225 ± 0.010) 6.35 ± 0.25	
	(in.)	(0.098 ± 0.008)						3.20 ± 0.20 (0.126 ± 0.008)						16)	(0.197 ± 0.016)			(0.250 ± 0.010)		0)
	mm	0.50 ± 0.25							0.61 ± 0.36				0.61 ± 0.30		0.64 ± 0.39			0.64 ± 0.39		
	(in.) VDC	25	50	0.020 ± 0.01 100	0) 200	500	25	50 50	.024 ± 0.01	4) 200	500	(0.024 ± 0.014) 50 100 200			(0.025 ± 0.015) 50 100 200			(0.025 ± 0.015) 50 100 200		
	3.9	25	50	100	200	500	25	50	100	200	300	30	100	200	50	100	200	50	100	200
	4.7																			
	5.6																			
1	6.8																			
	8.2						_	_	_		_						\sqcup		\sqcup	
	10	M M	M M	M M	M M	M M	P P	P P	P P	P P	P P					١.,		~	N	
	12 15	M	M	M	M	M	P	P	P	P	P						<	$\overline{}$	7	
	18	M	M	M	M	M	P	P	P	P	P					† (.]	ノ、エァ᠊┼	
	22	M	М	М	М	М	Р	Р	Р	Р	Р					_	$\overline{}$			
	27	М	М	М	М	М	Р	Р	Р	Р	Р					1	ميد	-	اِ	
	33	М	М	M	М	М	P	Р	P	P	P						Tt	l	,	
	39 47	M P	M P	M P	M P	M P	P P	P P	P P	P P	P P									
	56	P	P	P	P	P	P	P	P	P	P									
	68	P	P	P	P	P	P	P	P	P	P									
	82	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р									
	100	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р									
1	120	Р	Р	P	P	Р	Р	P	P	P	P									
	150 180	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P								\vdash	
•	220	P	P	P	P	P	P	P	P	P	P									
	270	P	P	P	P	P	P	P	P	Р	P									
3	330	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р					Ì				
	390	Р	Р	P	Р	Р	P	Р	Р	Р	Р									
	470	P	P	P	P	P	P	P P	P	P	P P								\vdash	
	560 680	P P	P P	P P	P P	P P	P P	P	P P	P P	P									
	820	Р	P	Р	P.	P	Р	P	P	P	P									
10	000	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р	М	М	М				М	М	Р
1	200	Р	Р	P	Р	Р	Р	Р	Р	Р	P	М	М	М				М	М	Р
	500	P	P	P	P	P	P	P	P	P	P	М	M	M				M	М	P
•	800 200	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	M X	M X	M M				M M	M M	P P
	700	P	P	P	P	P	P	P	P	P	Q	x	×	M				M	M	P
	300	P	P	P	P	P	P	P	P	P	Q	X	X	X			Х	М	M	P
	900	Р	Р	P	Р	Р	Р	Р	Р	Р	Q	×	X	x			Х	М	М	Р
	700	P	P	P	P	P	P	P	P	P	Y	X	X	X	X	X	X	M	M	P
	600 800	P P	P P	P P	P X	P X	P P	P P	P Q	P Q	Y	X X	X X	X X	X	X X	X X	M M	M M	P P
1	200	P	P	P	×	X	P	P	Q	Q	Y	×	×	x	×	×	×	M	M	P
	010	P	P	X	X	X	P	P	Q	Q	Y	X	X	X	X	X	X	M	M	P
(pF) 0.0	012	Х	х	x	х	Х	Р	Р	Q	х	Y	х	X	х	х	x	х	М	М	Р
	015	X	X	X	Z	Z	P	P	Q	X	Y	X	X	X	X	X	X	М	М	Y
	018 022	X X	X X	Z Z	Z Z		P P	P P	X	X X	Y	X X	X X	X	X X	X	Х	M M	M Y	Y
	022	X	Z	Z	Z		Q	X	X	Z		X	X	Y	X	X		IMI P	Y	Y
	033	X	Z	Z	Z		Q	X	X	Z		X	X		X	X		X	Y	Y
	039	Z	z	z			x	X	Z	Z		X			Y			X	Y	Y
	047	Z	Z	Z			Х	Х	Z	Z		Х			Υ			Х	Z	
	068						Z	Z	Z						Z			X	Z	
	082						Z Z	Z Z	Z Z						Z Z			X Z	Z Z	
	VDC	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200	50	100	200
	SIZE	_0		1210	_50	550		- 50	1812		- 550	30	1825		30	2220			2225	230

Letter	Α	В	С	E	G	J	K	М	N	Р	Q	Х	Υ	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								