

# 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  $0 \pm 30 \text{ ppm}/^\circ\text{C}$  which is less than  $\pm 0.3\% \Delta C$  from  $-55^\circ\text{C}$  to  $+125^\circ\text{C}$ . 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 no aging characteristics.

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

**0805**

**Size**  
(L" x W")

**5**

**Voltage**  
6.3V = 6  
10V = Z  
16V = Y  
25V = 3  
50V = 5  
100V = 1  
200V = 2  
500V = 7

**A**

**Dielectric**  
C0G (NP0) = A

**101**

**Capacitance Code (In pF)**  
2 Sig. Digits +  
Number of  
Zeros

**J**

**Capacitance Tolerance**  
B =  $\pm 10 \text{ pF}$  ( $< 10 \text{ pF}$ )  
C =  $\pm 25 \text{ pF}$  ( $< 10 \text{ pF}$ )  
D =  $\pm 50 \text{ pF}$  ( $< 10 \text{ pF}$ )  
F =  $\pm 1\%$  ( $\geq 10 \text{ pF}$ )  
G =  $\pm 2\%$  ( $\geq 10 \text{ pF}$ )  
J =  $\pm 5\%$   
K =  $\pm 10\%$

**A**

**Failure Rate**  
A = Not  
Applicable

**T**

**Terminations**  
T = Plated Ni  
and Sn  
7 = Gold Plated

**2**

**Packaging**  
2 = 7" Reel  
4 = 13" Reel  
7 = Bulk Cass.  
9 = Bulk

**A**

**Special Code**  
A = Std.  
Product

**Contact Factory For**  
1 = Pd/Ag Term

**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.

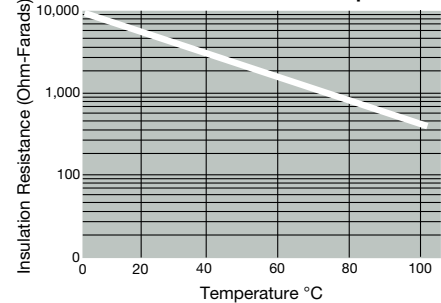
**Temperature Coefficient**



**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



# COG (NP0) Dielectric



## Specifications and Test Methods

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

# COG (NP0) Dielectric



## Capacitance Range

### PREFERRED SIZES ARE SHADED

SIZE		01005			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 (in.)	0.40 ± 0.02 (0.016 ± 0.0008)			0.60 ± 0.03 (0.024 ± 0.001)			1.00 ± 0.10 (0.040 ± 0.004)			1.60 ± 0.15 (0.063 ± 0.006)				2.01 ± 0.20 (0.079 ± 0.008)					3.20 ± 0.20 (0.126 ± 0.008)				
(W) Width	mm (in.)	0.20 ± 0.02 (0.008 ± 0.0008)			0.30 ± 0.03 (0.011 ± 0.001)			0.50 ± 0.10 (0.020 ± 0.004)			0.81 ± 0.15 (0.032 ± 0.006)				1.25 ± 0.20 (0.049 ± 0.008)					1.60 ± 0.20 (0.063 ± 0.008)				
(t) Terminal	mm (in.)	0.10 ± 0.04 (0.004 ± 0.016)			0.15 ± 0.05 (0.006 ± 0.002)			0.25 ± 0.15 (0.010 ± 0.006)			0.35 ± 0.15 (0.014 ± 0.006)				0.50 ± 0.25 (0.020 ± 0.010)					0.50 ± 0.25 (0.020 ± 0.010)				
WVDC		16			25	50	16	25	50	16	25	50	100	16	25	50	100	200	16	25	50	100	200	500
Cap (pF)	0.5	A			C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J
	1.0	B			A	C	C	C	G	G	G	G	J	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	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	J	J	J	J	J	J	J	J	J	J	J
	12	B			A	A	C	C	C	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	J	J	J	J	J	J	J	J	J	J	J
	18	B			A	A	C	C	C	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	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	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	47				A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	56				A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	68				A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	82				A	A	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	100				A	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	G	J	J	J	J	M	J	J	J	J	J	M
	470						C	C	C	G	G	G	G	J	J	J	J	M	J	J	J	J	J	M
	560									G	G	G	G	J	J	J	J	M	J	J	J	J	J	M
	680									G	G	G	G	J	J	J	J		J	J	J	J	J	P
	820									G	G	G	G	J	J	J	J		J	J	J	J	J	M
	1000									G	G	G	G	J	J	J	J		J	J	J	J	J	Q
	1200													J	J	J	J		J	J	J	J	J	Q
	1500													J	J	J	J		J	J	J	M	J	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																		J	J	M			
	8200																		J	J	M			
	0.010																		M	M				
	0.012																		M	M				
	0.015																							
	0.018																							
	0.022																							
	0.027																							
	0.033																							
	0.039																							
	0.047																							
	0.068																							
	0.082																							
	0.1																							
WVDC		25			50	16	25	50	16	25	50	100	16	25	50	100	200	16	25	50	100	200	500	
Letter		01005			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							EMBOSS							





## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9