

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

**2**

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

**A**

**Special Code**  
A = Std. Product

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



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## 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<br>1.0 kHz $\pm$ 10% for cap > 1000 pF<br>Voltage: 1.0Vrms $\pm$ .2V                                                                                                                   |                    |
| Q                              |                       | $<30$ pF: $Q \geq 400 + 20 \times \text{Cap Value}$<br>$\geq 30$ pF: $Q \geq 1000$                      |                                                                                                                                                                                                                                        |                    |
| Insulation Resistance          |                       | 100,000M $\Omega$ or 1000M $\Omega$ - $\mu$ 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 300% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max)<br>Note: Charge device with 150% of rated voltage for 500V devices.                                                    |                    |
| Resistance to Flexure Stresses | Appearance            | No defects                                                                                              | Deflection: 2mm<br>Test Time: 30 seconds<br>                                                                                                        |                    |
|                                | Capacitance Variation | $\pm 5\%$ or $\pm .5$ 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 60 seconds. Store at room temperature for 24 $\pm$ 2 hours before measuring electrical properties.                                                                                          |                    |
|                                | Capacitance Variation | $\leq \pm 2.5\%$ or $\pm .25$ 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 $\pm .25$ pF, whichever is greater                                                  | Step 2: Room Temp                                                                                                                                                                                                                      | $\leq$ 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                                                                                                                                                                                                                      | $\leq$ 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).<br><br>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)     | $\geq 30$ pF: $Q \geq 350$<br>$\geq 10$ pF, <30 pF: $Q \geq 275 + 5C/2$<br>$<10$ 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.<br><br>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                     | $\geq 30$ pF: $Q \geq 350$<br>$\geq 10$ pF, <30 pF: $Q \geq 275 + 5C/2$<br>$<10$ pF: $Q \geq 200 + 10C$ |                                                                                                                                                                                                                                        |                    |
|                                | Insulation Resistance | $\geq$ Initial Value $\times$ 0.3 (See Above)                                                           |                                                                                                                                                                                                                                        |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                         |                                                                                                                                                                                                                                        |                    |

# C0G (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   |
|                | 1.0      | B                            |              | A                           |              | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 1.5      | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 2.2      | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 3.3      | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 4.7      | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 6.8      | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 10       | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 15       | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 22       | B                            |              | A                           | A            | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 39       |                              |              | A                           |              | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 56       |                              |              | A                           |              | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 82       |                              |              | A                           |              | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                | 120      |                              |              |                             |              | C                           | C            | C                           | G            | G            | G            | G                           | 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   |     |
|                |          |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 180      |                              |              |                             |              | C                           | C            | C                           | G            | G            | G            | G                           | 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   | M   |     |
|                | 270      |                              |              |                             |              | C                           | C            | C                           | G            | G            | G            | G                           | J            | J            | J            | J   | M                           | J  | J  | J   | J   | M   |     |
|                |          |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 330      |                              |              |                             |              | C                           | C            | C                           | G            | G            | G            | G                           | J            | J            | J            | J   | M                           | J  | J  | J   | J   | M   |     |
|                | 390      |                              |              |                             |              | C                           | C            | C                           | G            | G            | G            | G                           | J            | J            | J            | J   | M                           | J  | J  | J   | J   | M   |     |
|                | 470      |                              |              |                             |              | C                           | C            | C                           | G            | G            | G            | G                           | J            | J            | J            | J   | M                           | J  | J  | J   | J   | M   |     |
|                |          |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 560      |                              |              |                             |              |                             |              |                             | G            | G            | G            | G                           | J            | J            | J            | J   | M                           | J  | J  | J   | J   | M   |     |
|                | 680      |                              |              |                             |              |                             |              |                             | G            | G            | G            | G                           | J            | J            | J            | J   |                             | J  | J  | J   | J   | P   |     |
|                | 820      |                              |              |                             |              |                             |              |                             | G            | G            | G            | G                           | J            | J            | J            | J   |                             | J  | J  | J   | J   |     |     |
|                |          |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 1000     |                              |              |                             |              |                             |              |                             | G            | G            | G            | G                           | J            | J            | J            | J   |                             | J  | J  | J   | J   | Q   |     |
|                | 1200     |                              |              |                             |              |                             |              |                             |              |              |              |                             | J            | J            | J            | J   |                             | J  | J  | J   | J   | Q   |     |
|                | 1500     |                              |              |                             |              |                             |              |                             |              |              |              |                             | J            | J            | J            | J   |                             | J  | J  | J   | M   | Q   |     |
|                |          |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 1800     |                              |              |                             |              |                             |              |                             |              |              |              |                             | J            | J            | J            | J   |                             | J  | J  | M   | M   |     |     |
|                | 2200     |                              |              |                             |              |                             |              |                             |              |              |              |                             | J            | J            | J            | N   |                             | J  | J  | M   | P   |     |     |
|                | 2700     |                              |              |                             |              |                             |              |                             |              |              |              |                             | J            | 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  |     |     |     |     |
|                |          |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
| Cap (μF)       | 0.010    |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 0.012    |                              |              |                             |              |                             |              |                             |              |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |
|                | 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 |     |
| SIZE           |          | 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                        |              |                             |              |                             |              |                             | EMBOSSED     |              |              |                             |              |              |              |     |                             |    |    |     |     |     |     |



# 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             | 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 (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            | 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   | P |
|              | 1200           | J               | J            | J            | M            | M            | K               | K            | K            | K            | M            | M               | M            | M            |  |                 |     |     |   | M               | M   | M   | P |
|              | 1500           | J               | J            | J            | M            | M            | K               | K            | K            | K            | M            | M               | M            | M            |  |                 |     |     |   | M               | M   | M   | P |
|              | 1800           | J               | J            | J            | M            |              | K               | K            | K            | K            | M            | M               | M            | M            |  |                 |     |     |   | M               | M   | M   | P |
|              | 2200           | J               | J            | J            | Q            |              | K               | K            | K            | K            | P            | M               | M            | M            |  |                 |     |     |   | M               | M   | M   | P |
|              | 2700           | J               | J            | J            | Q            |              | K               | K            | K            | P            | Q            | M               | M            | M            |  |                 |     |     |   | M               | M   | M   | P |
|              | 3300           | J               | J            | J            |              |              | K               | K            | K            | P            | Q            | M               | M            | M            |  |                 | X   |     |   | M               | M   | M   | P |
|              | 3900           | J               | J            | M            |              |              | K               | K            | K            | P            | Q            | M               | M            | M            |  |                 | X   | X   |   | M               | M   | M   | P |
|              | 4700           | J               | J            | M            |              |              | K               | K            | K            | P            | Q            | M               | M            | M            |  |                 | X   | X   | X | M               | M   | M   | P |
|              | 5600           | J               | J            |              |              |              | K               | K            | M            | P            | X            | M               | M            | M            |  |                 | X   | X   | X | M               | M   | M   | P |
|              | 6800           | J               | J            |              |              |              | K               | K            | M            | X            |              | M               | M            | M            |  |                 | X   | X   | X | M               | M   | M   | P |
|              | 8200           | J               | J            |              |              |              | K               | M            | M            |              |              | M               | M            |              |  |                 | X   | X   | X | M               | M   | M   | P |
| Cap (µF)     | 0.010          | J               | J            |              |              |              | K               | M            | M            |              |              | M               | M            |              |  |                 | X   | X   | X | M               | M   | M   | P |
|              | 0.012          | J               | J            |              |              |              | K               | M            |              |              |              | M               | M            |              |  |                 | X   | X   | X | M               | M   | M   | P |
|              | 0.015          |                 |              |              |              |              | M               | M            |              |              |              | M               | M            |              |  |                 | X   | X   | X | M               | M   | M   | Y |
|              | 0.018          |                 |              |              |              |              | M               | M            |              |              |              | P               | M            |              |  |                 | X   | X   | X | M               | M   | M   | Y |
|              | 0.022          |                 |              |              |              |              | M               | M            |              |              |              | P               |              |              |  |                 | X   | X   |   | M               | Y   | Y   | Y |
|              | 0.027          |                 |              |              |              |              | M               | M            |              |              |              | P               |              |              |  |                 | X   | X   |   | P               | Y   | 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               |     |     |   |
|              | 0.1            |                 |              |              |              |              |                 |              |              |              |              |                 |              |              |  |                 |     |     |   | Q               |     |     |   |
| 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       | Max. Thickness | A               | C            | E            | G            | J            | K               | M            | N            | P            | Q            | X               | Y            | Z            |  |                 |     |     |   |                 |     |     |   |
|              |                | 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        |                |                 |              |              |              |              | EMBOSS          |              |              |              |              |                 |              |              |  |                 |     |     |   |                 |     |     |   |

