

# 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**

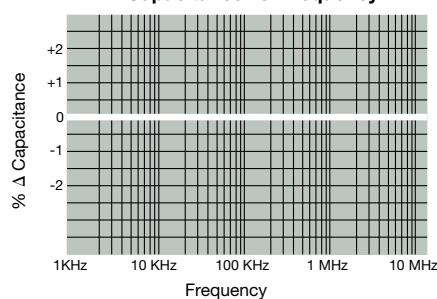
**Special Code**  
A = Std. Product

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

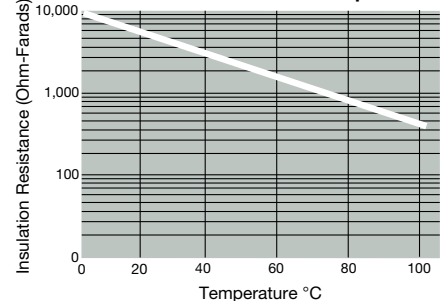
**Temperature Coefficient**



**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<br>(in.)     | 0.40 ± 0.02<br>(0.016 ± 0.0008) |                 | 0.60 ± 0.03<br>(0.024 ± 0.001) |                 | 1.00 ± 0.10<br>(0.040 ± 0.004) |                 | 1.60 ± 0.15<br>(0.063 ± 0.006) |                 |                 |                 | 2.01 ± 0.20<br>(0.079 ± 0.008) |                 |                 |     |     | 3.20 ± 0.20<br>(0.126 ± 0.008) |    |    |     |     |     |     |
| (W) Width      | mm<br>(in.)     | 0.20 ± 0.02<br>(0.008 ± 0.0008) |                 | 0.30 ± 0.03<br>(0.011 ± 0.001) |                 | 0.50 ± 0.10<br>(0.020 ± 0.004) |                 | 0.81 ± 0.15<br>(0.032 ± 0.006) |                 |                 |                 | 1.25 ± 0.20<br>(0.049 ± 0.008) |                 |                 |     |     | 1.60 ± 0.20<br>(0.063 ± 0.008) |    |    |     |     |     |     |
| (t) Terminal   | mm<br>(in.)     | 0.10 ± 0.04<br>(0.004 ± 0.016)  |                 | 0.15 ± 0.05<br>(0.006 ± 0.002) |                 | 0.25 ± 0.15<br>(0.010 ± 0.006) |                 | 0.35 ± 0.15<br>(0.014 ± 0.006) |                 |                 |                 | 0.50 ± 0.25<br>(0.020 ± 0.010) |                 |                 |     |     | 0.50 ± 0.25<br>(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<br>(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   | J   |
|                | 1.2             | B                               |                 | A                              |                 | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 1.5             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 1.8             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 2.2             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 2.7             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 3.3             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 3.9             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 4.7             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 5.6             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 6.8             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 8.2             | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | J               | J               | J   | J   | J                              | J  | J  | J   | J   | J   | J   |
|                | 10              | B                               |                 | A                              | A               | C                              | C               | C                              | G               | G               | G               | G                              | 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                              |                 | C                              | C               | C                              | G               | G               | G               | G                              | J               | 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   | J   |
|                | 56              |                                 |                 | A                              |                 | C                              | C               | C                              | G               | G               | G               | G                              | J               | 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   | J   |
|                | 82              |                                 |                 | A                              |                 | C                              | C               | C                              | G               | G               | G               | G                              | J               | 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   | 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   | M   |     |
|                | 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   | N   |                                | 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  | M   |     |     |     |
| Cap<br>(μF)    | 8200            |                                 |                 |                                |                 |                                |                 |                                |                 |                 |                 |                                |                 |                 |     |     |                                | M  | M  |     |     |     |     |
|                | 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<br>(0.013) | 0.22<br>(0.009)                 | 0.56<br>(0.022) | 0.71<br>(0.028)                | 0.90<br>(0.035) | 0.94<br>(0.037)                | 1.02<br>(0.040) | 1.27<br>(0.050)                | 1.40<br>(0.055) | 1.52<br>(0.060) | 1.78<br>(0.070) | 2.29<br>(0.090)                | 2.54<br>(0.100) | 2.79<br>(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 |  |  |  |
|                | 1200         | J               | J            | J            | M            | M            | K               | K            | K            | K            | M            | M               | M            | M   |    |                 |     |    | M   | M               | P |  |  |  |
|                | 1500         | J               | J            | J            | M            | M            | K               | K            | K            | K            | M            | M               | M            | M   |    |                 |     |    | M   | M               | P |  |  |  |
|                | 1800         | J               | J            | J            | M            |              | K               | K            | K            | K            | M            | M               | M            | M   |    |                 |     |    | M   | M               | P |  |  |  |
|                | 2200         | J               | J            | J            | Q            |              | K               | K            | K            | K            | P            | M               | M            | M   |    |                 |     |    | M   | M               | P |  |  |  |
|                | 2700         | J               | J            | J            | Q            |              | K               | K            | K            | P            | Q            | M               | M            | M   |    |                 |     |    | M   | M               | P |  |  |  |
|                | 3300         | J               | J            | J            |              |              | K               | K            | K            | P            | Q            | M               | M            | M   |    |                 | X   |    | M   | M               | P |  |  |  |
|                | 3900         | J               | J            | M            |              |              | K               | K            | K            | P            | Q            | M               | M            | M   |    |                 | X   | X  | M   | M               | P |  |  |  |
|                | 4700         | J               | J            | M            |              |              | K               | K            | K            | P            | Q            | M               | M            | M   |    | X               | X   | X  | M   | M               | P |  |  |  |
|                | 5600         | J               | J            |              |              |              | K               | K            | M            | P            | X            | M               | M            | M   |    | X               | X   | X  | M   | M               | P |  |  |  |
|                | 6800         | J               | J            |              |              |              | K               | K            | M            | X            |              | M               | M            | M   |    | X               | X   | X  | M   | M               | P |  |  |  |
|                | 8200         | J               | J            |              |              |              | K               | M            | M            |              |              | M               | M            |     |    | X               | X   | X  | M   | M               | P |  |  |  |
| Cap (μF)       | 0.010        | J               | J            |              |              |              | K               | M            | M            |              |              | M               | M            |     |    | X               | X   | X  | M   | M               | P |  |  |  |
|                | 0.012        | J               | J            |              |              |              | K               | M            |              |              |              | M               | M            |     |    | X               | X   | X  | M   | M               | P |  |  |  |
|                | 0.015        |                 |              |              |              |              | M               | M            |              |              |              | M               | M            |     |    | X               | X   | X  | M   | M               | Y |  |  |  |
|                | 0.018        |                 |              |              |              |              | M               | M            |              |              |              | P               | M            |     |    | X               | X   | X  | M   | M               | Y |  |  |  |
|                | 0.022        |                 |              |              |              |              | M               | M            |              |              |              | P               |              |     |    | X               | X   |    | M   | Y               | Y |  |  |  |
|                | 0.027        |                 |              |              |              |              | M               | M            |              |              |              | P               |              |     |    | X               | X   |    | P   | 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         | A            | C               | E            | G            | J            | K            | M               | N            | P            | Q            | X            | Y               | Z            |     |    |                 |     |    |     |                 |   |  |  |  |
| Max. Thickness | 0.33 (0.013) | 0.56 (0.022)    | 0.71 (0.028) | 0.90 (0.035) | 0.94 (0.037) | 1.02 (0.040) | 1.27 (0.050)    | 1.40 (0.055) | 1.52 (0.060) | 1.78 (0.070) | 2.29 (0.090) | 2.54 (0.100)    | 2.79 (0.110) |     |    |                 |     |    |     |                 |   |  |  |  |
|                | PAPER        |                 |              |              |              |              |                 | EMBOSS       |              |              |              |                 |              |     |    |                 |     |    |     |                 |   |  |  |  |

