

# 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                     | 5                                                                                                          | A                                  | 101                                                                | J                                                                                                                                                                                                                                                                                                      | A                                         | T                                           | 2                                                                     | A                                       |
|--------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------|
| <b>Size</b><br>(L" x W") | <b>Voltage</b><br>6.3V = 6<br>10V = Z<br>16V = Y<br>25V = 3<br>50V = 5<br>100V = 1<br>200V = 2<br>500V = 7 | <b>Dielectric</b><br>C0G (NP0) = A | <b>Capacitance Code (In pF)</b><br>2 Sig. Digits + Number of Zeros | <b>Capacitance Tolerance</b><br>B = $\pm 10 \text{ pF}$ ( $< 10 \text{ pF}$ )<br>C = $\pm 25 \text{ pF}$ ( $< 10 \text{ pF}$ )<br>D = $\pm 50 \text{ pF}$ ( $< 10 \text{ pF}$ )<br>F = $\pm 1\%$ ( $\geq 10 \text{ pF}$ )<br>G = $\pm 2\%$ ( $\geq 10 \text{ pF}$ )<br>J = $\pm 5\%$<br>K = $\pm 10\%$ | <b>Failure Rate</b><br>A = Not Applicable | <b>Terminations</b><br>T = Plated Ni and Sn | <b>Packaging</b><br>2 = 7" Reel<br>4 = 13" Reel<br>U = 4mm TR (01005) | <b>Special Code</b><br>A = Std. Product |

**Contact Factory For**  
1 = Pd/Ag Term  
7 = Gold Plated  
**NOT RoHS COMPLIANT**

**Contact Factory For Multiples**

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



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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)                                                                           |                                                                                                                                                                                                                                        |                    |

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## Capacitance Range



PREFERRED SIZES ARE SHADED

| SIZE           |                 | 0101*                           |                 | 0201                           |                 | 0402                           |                 | 0603                           |                 |    |                 |      | 0805                           |    |                 |     |                 | 1206                           |                 |    |                 |     |                 |     |                 |  |                 |  |
|----------------|-----------------|---------------------------------|-----------------|--------------------------------|-----------------|--------------------------------|-----------------|--------------------------------|-----------------|----|-----------------|------|--------------------------------|----|-----------------|-----|-----------------|--------------------------------|-----------------|----|-----------------|-----|-----------------|-----|-----------------|--|-----------------|--|
| Soldering      |                 | Reflow Only                     |                 | Reflow Only                    |                 | Reflow/Wave                    |                 | Reflow/Wave                    |                 |    |                 |      | Reflow/Wave                    |    |                 |     |                 | Reflow/Wave                    |                 |    |                 |     |                 |     |                 |  |                 |  |
| Packaging      |                 | All Paper                       |                 | All Paper                      |                 | All Paper                      |                 | All Paper                      |                 |    |                 |      | Paper/Embossed                 |    |                 |     |                 | Paper/Embossed                 |                 |    |                 |     |                 |     |                 |  |                 |  |
| (L) Length     | mm<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  | 200                            | 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               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 2.2            | B               |                                 | A               | A                              | C               | C                              | C               | G                              | 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               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 3.3            | B               |                                 | A               | A                              | C               | C                              | C               | G                              | 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               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 4.7            | B               |                                 | A               | A                              | C               | C                              | C               | G                              | 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               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 6.8            | B               |                                 | A               | A                              | C               | C                              | C               | G                              | 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               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 10             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | 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               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 15             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | 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               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 22             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 27             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 33             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 39             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 47             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 56             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 68             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 82             | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 100            | B               |                                 | A               | A                              | C               | C                              | C               | G                              | G               | G  | G               | G    | G                              | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 120            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 150            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 180            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | J   |                 |  |                 |  |
| 220            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | M   |                 |  |                 |  |
| 270            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | M   |                 |  |                 |  |
| 330            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | M   |                 |  |                 |  |
| 390            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | M   |                 |  |                 |  |
| 470            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | M   |                 |  |                 |  |
| 560            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | M   |                 |  |                 |  |
| 680            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | P   |                 |  |                 |  |
| 820            |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | P   |                 |  |                 |  |
| 1000           |                 |                                 |                 |                                | C               | C                              | C               | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | Q   |                 |  |                 |  |
| 1200           |                 |                                 |                 |                                |                 |                                |                 | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | Q   |                 |  |                 |  |
| 1500           |                 |                                 |                 |                                |                 |                                |                 | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | J                              | J               | J  | J               | J   | J               | Q   |                 |  |                 |  |
| 1800           |                 |                                 |                 |                                |                 |                                |                 | G                              | G               | G  | G               | G    |                                | J  | J               | J   | J               | N                              | N               | J  | M               | M   | M               | Q   |                 |  |                 |  |
| 2200           |                 |                                 |                 |                                |                 |                                |                 | G                              | G               | G  | G               | G    |                                | N  | N               | N   | N               | N                              | N               | J  | J               | M   | P               | Q   |                 |  |                 |  |
| 2700           |                 |                                 |                 |                                |                 |                                |                 | G                              | G               | G  | G               | G    |                                | N  | N               | N   | N               | N                              | N               | J  | J               | M   | P               | Q   |                 |  |                 |  |
| 3300           |                 |                                 |                 |                                |                 |                                |                 | G                              | G               | G  | G               | G    |                                | P  | P               | P   | P               | N                              | N               | J  | J               | M   | P               | Q   |                 |  |                 |  |
| 3900           |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                | P  | P               | P   | P               | N                              | N               | J  | J               | M   | P               |     |                 |  |                 |  |
| 4700           |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                | P  | P               | P   | P               | N                              | N               | J  | J               | M   | P               |     |                 |  |                 |  |
| 5600           |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                | P  | P               | P   | P               |                                |                 | J  | J               | M   | P               |     |                 |  |                 |  |
| 6800           |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                | P  | P               | P   | P               |                                |                 | M  | M               | M   | P               |     |                 |  |                 |  |
| 8200           |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                | P  | P               | P   | P               |                                |                 | M  | M               | M   | P               |     |                 |  |                 |  |
| Cap<br>(μF)    | 0.010           |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                | P  | P               | P   | P               |                                |                 | N  | N               | N   | P               |     |                 |  |                 |  |
| 0.012          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.015          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.018          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.022          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.027          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.033          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.039          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.047          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.068          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.082          |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| 0.1            |                 |                                 |                 |                                |                 |                                |                 |                                |                 |    |                 |      |                                |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |
| WVDC           | 16              |                                 | 25              | 50                             | 16              | 25                             | 50              | 16                             | 25              | 50 | 100             | 200  | 16                             | 25 | 50              | 100 | 200             | 16                             | 25              | 50 | 100             | 200 | 500             |     |                 |  |                 |  |
| SIZE           | 0101*           |                                 | 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                       |    |                 |     |                 |                                |                 |    |                 |     |                 |     |                 |  |                 |  |



\*EIA 01005



# 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               | K               | P               |                 |                 |                 |                 |                 |                 |                 |                 |    |                 |     |    |     |                 |   |  |  |
|                | 820   | J               | J               | J               | K               | P               |                 |                 |                 |                 |                 |                 |                 |                 |    |                 |     |    |     |                 |   |  |  |
|                | 1000  | J               | J               | P               | P               | P               | K               | K               | N               | N               | M               | M               | M               | M               |    |                 |     |    | M   | M               | P |  |  |
|                | 1200  | P               | P               | P               | P               | P               | K               | K               | N               | N               | M               | M               | M               | M               |    |                 |     |    | M   | M               | P |  |  |
|                | 1500  | P               | P               | P               | P               | P               | K               | K               | N               | N               | M               | M               | M               | M               |    |                 |     |    | M   | M               | P |  |  |
|                | 1800  | P               | P               | P               | P               |                 | K               | K               | N               | N               | M               | M               | M               | M               |    |                 |     |    | M   | M               | P |  |  |
|                | 2200  | P               | P               | P               | P               |                 | K               | K               | N               | N               | P               | X               | X               | M               |    |                 |     |    | M   | M               | P |  |  |
|                | 2700  | P               | P               | P               | P               |                 | K               | K               | N               | P               | Q               | X               | X               | M               |    |                 |     |    | M   | M               | P |  |  |
|                | 3300  | P               | P               | P               |                 |                 | K               | K               | N               | P               | Q               | X               | X               | X               |    |                 | X   |    | M   | M               | P |  |  |
|                | 3900  | P               | P               | P               |                 |                 | K               | K               | N               | P               | Q               | X               | X               | X               |    |                 | X   |    | M   | M               | P |  |  |
|                | 4700  | P               | P               | P               |                 |                 | K               | K               | N               | P               | Q               | X               | X               | X               | X  | X               | X   |    | M   | M               | P |  |  |
|                | 5600  | P               | P               | P               |                 |                 | K               | K               | P               | P               | X               | X               | X               | X               | X  | X               | X   |    | M   | M               | P |  |  |
|                | 6800  | P               | P               | P               |                 |                 | K               | K               | X               | X               |                 | X               | X               | X               | X  | X               | X   |    | M   | M               | P |  |  |
|                | 8200  | P               | P               |                 |                 |                 | K               | M               |                 |                 |                 | X               | X               | X               | X  | X               | X   |    | M   | M               | P |  |  |
| Cap (μF)       | 0.010 | P               | N               |                 |                 |                 | K               | M               |                 |                 |                 | X               | X               | X               | X  | X               | X   |    | M   | M               | P |  |  |
|                | 0.012 | P               | N               |                 |                 |                 | K               | M               |                 |                 |                 | X               | X               | X               | X  | X               | X   |    | M   | M               | P |  |  |
|                | 0.015 |                 |                 |                 |                 |                 | P               | P               |                 |                 |                 | X               | X               | X               | X  | X               | X   |    | M   | M               | Y |  |  |
|                | 0.018 |                 |                 |                 |                 |                 | P               | P               |                 |                 |                 | X               | X               | X               | X  | X               | X   | X  | M   | M               | Y |  |  |
|                | 0.022 |                 |                 |                 |                 |                 | P               | P               |                 |                 |                 | X               | X               | X               | X  | X               | X   |    | M   | Y               | Y |  |  |
|                | 0.027 |                 |                 |                 |                 |                 | P               | P               |                 |                 |                 | X               | X               | Y               | X  | X               |     | P  | Y   | Y               |   |  |  |
|                | 0.033 |                 |                 |                 |                 |                 | P               | P               |                 |                 |                 | X               | X               |                 | X  | X               |     | X  | Y   | Y               |   |  |  |
|                | 0.039 |                 |                 |                 |                 |                 | X               | X               |                 |                 |                 | X               |                 |                 | Y  |                 |     | X  | Y   | Y               |   |  |  |
|                | 0.047 |                 |                 |                 |                 |                 | X               | X               |                 |                 |                 | X               |                 |                 | Y  |                 |     | X  | Z   |                 |   |  |  |
|                | 0.068 |                 |                 |                 |                 |                 | Z               | Z               |                 |                 |                 |                 |                 |                 | Z  |                 |     | X  | Z   |                 |   |  |  |
|                | 0.082 |                 |                 |                 |                 |                 | Z               | Z               |                 |                 |                 |                 |                 |                 | Z  |                 |     | X  | Z   |                 |   |  |  |
|                | 0.1   |                 |                 |                 |                 |                 | Z               | Z               |                 |                 |                 |                 |                 |                 | Z  |                 |     | X  | Z   |                 |   |  |  |
| WVDC           |       | 25              | 50              | 100             | 200             | 500             | 25              | 50              | 100             | 200             | 500             | 50              | 100             | 200             | 50 | 100             | 200 | 50 | 100 | 200             |   |  |  |
| SIZE           |       | 1210            |                 |                 |                 |                 | 1812            |                 |                 |                 |                 | 1825            |                 |                 |    | 2220            |     |    |     | 2225            |   |  |  |
| Letter         |       | A               | C               | E               | G               | J               | K               | M               | N               | P               | Q               | X               | Y               | Z               |    |                 |     |    |     |                 |   |  |  |
| Max. Thickness |       | 0.33<br>(0.013) | 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           |                 |                 |                 |                 | EMBOSS          |                 |                 |                 |                 |                 |                 |                 |    |                 |     |    |     |                 |   |  |  |

