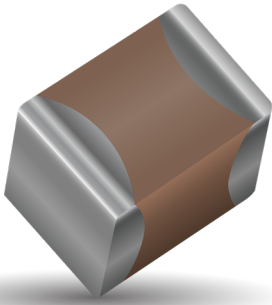


# C0G (NP0) Dielectric

## 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  $\pm 0.3\%$  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.

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



**0805**

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

**5**

**Voltage**  
4= 4.0V  
6= 6.3V  
Z= 10V  
Y=16V  
3=25V  
5= 50V  
1=100V  
2=200V  
V=250V  
7=500V

**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

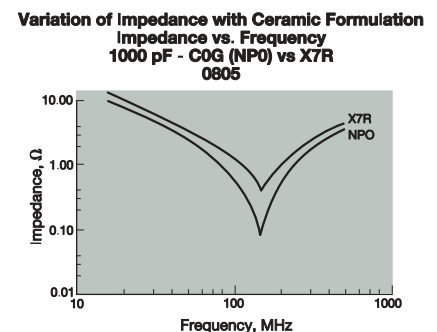
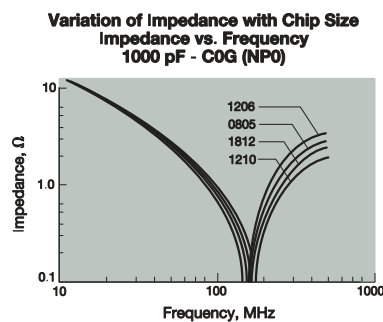
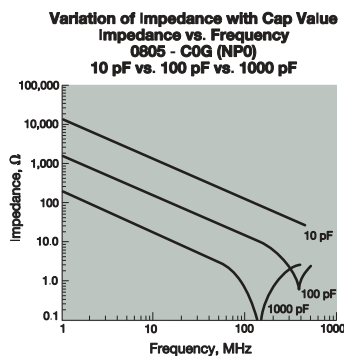
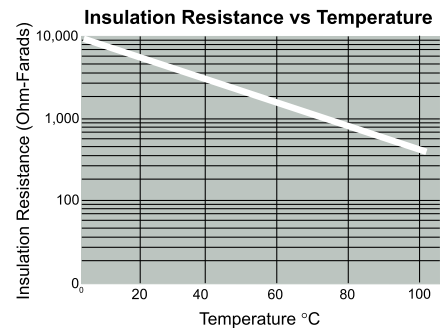
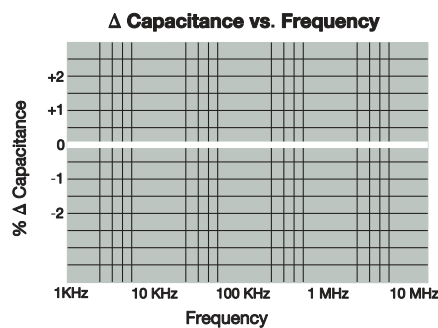
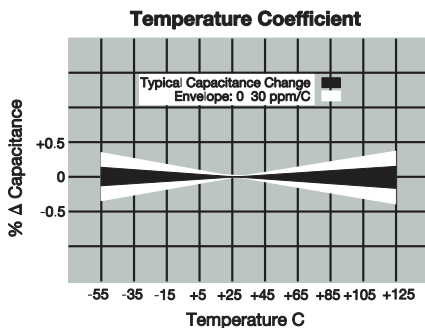
**2**

**Packaging**  
2 = 7" Reel  
4 = 13" Reel  
U = 4mm TR (01005)

**A**

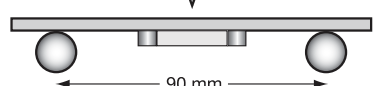
**Special Code**  
A = Std. Product

**Contact Factory For Multiples**



# C0G (NP0) Dielectric

## Specifications and Test Methods

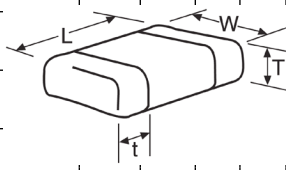
| Parameter/Test                 |                       | NP0 Specification Limits                                                                            | Measuring Conditions                                                                                                                                                                                                                   |                    |
|--------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 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                                                                                                                                                                                        |                    |
| Q                              |                       | <30 pF: Q $\geq$ 400+20 x Cap Value<br>$\geq$ 30 pF: Q $\geq$ 1000                                  | 1.0 kHz $\pm$ 10% for cap > 1000 pF                                                                                                                                                                                                    |                    |
| Insulation Resistance          |                       | 10,000M $\Omega$ or 500M $\Omega$ - $\mu$ F, whichever is less                                      | Voltage: 1.0Vrms $\pm$ .2V                                                                                                                                                                                                             |                    |
| Dielectric Strength            |                       | No breakdown or visual defects                                                                      | Charge device with rated voltage for 60 $\pm$ 5 secs @ room temp/humidity                                                                                                                                                              |                    |
| Resistance to Flexure Stresses | Appearance            | No defects                                                                                          | Deflection: 2mm<br>Test Time: 30 seconds<br>1mm/sec<br>                                                                                             |                    |
|                                | Capacitance Variation | $\pm$ 5% or $\pm$ .5 pF, whichever is greater                                                       |                                                                                                                                                                                                                                        |                    |
|                                | Q                     | Meets Initial Values (As Above)                                                                     |                                                                                                                                                                                                                                        |                    |
|                                | Insulation Resistance | $\geq$ Initial Value x 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 60sec- onds. 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 x 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 x 0.3 (See Above)                                                              |                                                                                                                                                                                                                                        |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                     |                                                                                                                                                                                                                                        |                    |

# C0G (NP0) Dielectric

## 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) |
| (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) |
| (t) Terminal | mm<br>(in.) | 0.10 ± 0.04<br>(0.004 ± 0.0016) | 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) |
| WVDC         | 16          | 25 50                           | 16 25 50                       | 16 25 50 100 200               | 16 25 50 100 200 250           | 16 25 50 100 200 250 500       |
| Cap (pF)     | 0.5         | A                               | A                              | C                              | C                              | C                              |
|              | 1.0         | B                               | A                              | C                              | C                              | C                              |
|              | 1.2         | B                               | A                              | C                              | C                              | C                              |
|              | 1.5         | B                               | A                              | C                              | C                              | C                              |
|              | 1.8         | B                               | A                              | C                              | C                              | C                              |
|              | 2.2         | B                               | A                              | C                              | C                              | C                              |
|              | 2.7         | B                               | A                              | C                              | C                              | C                              |
|              | 3.3         | B                               | A                              | C                              | C                              | C                              |
|              | 3.9         | B                               | A                              | C                              | C                              | C                              |
|              | 4.7         | B                               | A                              | C                              | C                              | C                              |
|              | 5.6         | B                               | A                              | C                              | C                              | C                              |
|              | 6.8         | B                               | A                              | C                              | C                              | C                              |
|              | 8.2         | B                               | A                              | C                              | C                              | C                              |
|              | 10          | B                               | A                              | C                              | C                              | C                              |
|              | 12          | B                               | A                              | C                              | C                              | C                              |
|              | 15          | B                               | A                              | C                              | C                              | C                              |
|              | 18          | B                               | A                              | C                              | C                              | C                              |
|              | 22          | B                               | A                              | C                              | C                              | C                              |
|              | 27          | B                               | A                              | C                              | C                              | C                              |
|              | 33          | B                               | A                              | C                              | C                              | C                              |
|              | 39          | B                               | A                              | C                              | C                              | C                              |
|              | 47          | B                               | A                              | C                              | C                              | C                              |
|              | 56          | B                               | A                              | C                              | C                              | C                              |
|              | 68          | B                               | A                              | C                              | C                              | C                              |
|              | 82          | B                               | A                              | C                              | C                              | C                              |
|              | 100         | B                               | A                              | C                              | C                              | C                              |
|              | 120         |                                 | A                              | C                              | C                              | C                              |
|              | 150         |                                 | A                              | C                              | C                              | C                              |
|              | 180         |                                 | A                              | C                              | C                              | C                              |
|              | 220         |                                 | A                              | C                              | C                              | C                              |
|              | 270         |                                 |                                | C                              | C                              | C                              |
|              | 330         |                                 |                                | C                              | C                              | C                              |
|              | 390         |                                 |                                | C                              | C                              | C                              |
|              | 470         |                                 |                                | C                              | C                              | C                              |
|              | 560         |                                 |                                | C                              | C                              | C                              |
|              | 680         |                                 |                                | C                              | C                              | C                              |
|              | 750         |                                 |                                | C                              | C                              | C                              |
|              | 820         |                                 |                                | C                              | C                              | C                              |
|              | 1000        |                                 |                                | C                              | C                              | C                              |
|              | 1200        |                                 |                                | G                              | G                              | G                              |
|              | 1500        |                                 |                                | G                              | G                              | G                              |
|              | 1800        |                                 |                                | G                              | G                              | G                              |
|              | 2200        |                                 |                                | G                              | G                              | G                              |
|              | 2700        |                                 |                                | G                              | G                              | G                              |
|              | 3300        |                                 |                                | G                              | G                              | G                              |
|              | 3900        |                                 |                                | G                              | G                              | G                              |
|              | 4700        |                                 |                                | G                              | G                              | G                              |
|              | 5600        |                                 |                                |                                |                                |                                |
|              | 6800        |                                 |                                |                                |                                |                                |
|              | 8200        |                                 |                                |                                |                                |                                |
| Cap (μF)     | 0.010       |                                 |                                |                                |                                |                                |
|              | 0.012       |                                 |                                |                                |                                |                                |
|              | 0.015       |                                 |                                |                                |                                |                                |
|              | 0.018       |                                 |                                |                                |                                |                                |
|              | 0.022       |                                 |                                |                                |                                |                                |
|              | 0.027       |                                 |                                |                                |                                |                                |
|              | 0.033       |                                 |                                |                                |                                |                                |
|              | 0.039       |                                 |                                |                                |                                |                                |
|              | 0.047       |                                 |                                |                                |                                |                                |
|              | 0.068       |                                 |                                |                                |                                |                                |
|              | 0.082       |                                 |                                |                                |                                |                                |
|              | 0.1         |                                 |                                |                                |                                |                                |
| WVDC         | 16          | 25 50                           | 16 25 50                       | 16 25 50 100 200               | 16 25 50 100 200 250           | 16 25 50 100 200 250 500       |
| SIZE         | 0101*       | 0201                            | 0402                           | 0603                           | 0805                           | 1206                           |



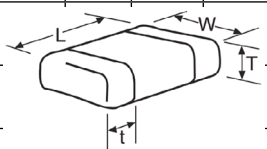
| Letter         | A               | B               | C               | E               | G               | J               | K               | M               | N               | P               | Q               | X               | Y               | Z               |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 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           |                 |                 |                 |                 |                 | EMBOSS          |                 |                 |                 |                 |                 |                 |                 |

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<br>(in.) | 3.20 ± 0.20<br>(0.126 ± 0.008) |    |     |     |     | 4.50 ± 0.30<br>(0.177 ± 0.012) |    |     |     |     | 4.50 ± 0.30<br>(0.177 ± 0.012) |     |     | 5.70 ± 0.40<br>(0.225 ± 0.016) |     |     | 5.72 ± 0.25<br>(0.225 ± 0.010) |     |     |
| (W) Width    | mm<br>(in.) | 2.50 ± 0.20<br>(0.098 ± 0.008) |    |     |     |     | 3.20 ± 0.20<br>(0.126 ± 0.008) |    |     |     |     | 6.40 ± 0.40<br>(0.252 ± 0.016) |     |     | 5.00 ± 0.40<br>(0.197 ± 0.016) |     |     | 6.35 ± 0.25<br>(0.250 ± 0.010) |     |     |
| (t) Terminal | mm<br>(in.) | 0.50 ± 0.25<br>(0.020 ± 0.010) |    |     |     |     | 0.61 ± 0.36<br>(0.024 ± 0.014) |    |     |     |     | 0.61 ± 0.36<br>(0.024 ± 0.014) |     |     | 0.64 ± 0.39<br>(0.025 ± 0.015) |     |     | 0.64 ± 0.39<br>(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<br>(pF)  |             | 3.9                            |    |     |     |     |                                |    |     |     |     |                                |     |     |                                |     |     |                                |     |     |
|              | 4.7         |                                |    |     |     |     |                                |    |     |     |     |                                |     |     |                                |     |     |                                |     |     |
|              | 5.6         |                                |    |     |     |     |                                |    |     |     |     |                                |     |     |                                |     |     |                                |     |     |
|              | 6.8         |                                |    |     |     |     |                                |    |     |     |     |                                |     |     |                                |     |     |                                |     |     |
|              | 8.2         |                                |    |     |     |     |                                |    |     |     |     |                                |     |     |                                |     |     |                                |     |     |
|              | 10          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 12          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 15          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 18          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 22          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 27          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 33          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 39          | M                              | M  | M   | M   | M   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 47          | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 56          | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 68          | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 82          | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 100         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 120         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 150         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 180         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 220         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 270         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 330         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 390         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 470         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 560         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 680         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 820         | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   |                                |     |     |                                |     |     |                                |     |     |
|              | 1000        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   | M                              | M   | M   |                                |     |     | M                              | M   | P   |
|              | 1200        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   | M                              | M   | M   |                                |     |     | M                              | M   | P   |
|              | 1500        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   | M                              | M   | M   |                                |     |     | M                              | M   | P   |
|              | 1800        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   | M                              | M   | M   |                                |     |     | M                              | M   | P   |
|              | 2200        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | P   | X                              | X   | M   |                                |     |     | M                              | M   | P   |
|              | 2700        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | Q   | X                              | X   | M   |                                |     |     | M                              | M   | P   |
|              | 3300        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | Q   | X                              | X   | X   |                                |     | X   | M                              | M   | P   |
|              | 3900        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | Q   | X                              | X   | X   |                                |     | X   | M                              | M   | P   |
|              | 4700        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | P   |
|              | 5600        | P                              | P  | P   | P   | P   | P                              | P  | P   | P   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | P   |
|              | 6800        | P                              | P  | P   | X   | X   | P                              | P  | Q   | Q   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | P   |
|              | 8200        | P                              | P  | P   | X   | X   | P                              | P  | Q   | Q   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | P   |
| Cap<br>(μF)  | 0.010       | P                              | P  | X   | X   | X   | P                              | P  | Q   | Q   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | P   |
|              | 0.012       | X                              | X  | X   | X   | X   | P                              | P  | Q   | X   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | P   |
|              | 0.015       | X                              | X  | X   | Z   | Z   | P                              | P  | Q   | X   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | Y   |
|              | 0.018       | X                              | X  | Z   | Z   |     | P                              | P  | X   | X   | Y   | X                              | X   | X   | X                              | X   | X   | M                              | M   | Y   |
|              | 0.022       | X                              | X  | Z   | Z   |     | P                              | P  | X   | X   |     | X                              | X   | X   | X                              | X   |     | M                              | Y   | Y   |
|              | 0.027       | X                              | Z  | Z   | Z   |     | Q                              | X  | X   | Z   |     | X                              | X   | Y   | X                              | X   |     | P                              | Y   | Y   |
|              | 0.033       | X                              | Z  | Z   | Z   |     | Q                              | X  | X   | Z   |     | X                              | X   |     | X                              | X   |     | X                              | Y   | Y   |
|              | 0.039       | Z                              | Z  | Z   |     |     | X                              | X  | Z   | Z   |     | X                              |     |     | Y                              |     |     | X                              | Y   | Y   |
|              | 0.047       | Z                              | Z  | Z   |     |     | X                              | X  | Z   | Z   |     | X                              |     |     | Y                              |     |     | X                              | Z   |     |
|              | 0.068       |                                |    |     |     |     | Z                              | Z  | Z   |     |     |                                |     |     | Z                              |     |     | X                              | Z   |     |
|              | 0.082       |                                |    |     |     |     | Z                              | Z  | Z   |     |     |                                |     |     | Z                              |     |     | X                              | Z   |     |
|              | 0.1         |                                |    |     |     |     | Z                              | Z  | Z   |     |     |                                |     |     | Z                              |     |     | Z                              | 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               | 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        |                 |                 |                 |                 |                 |                 |                 |