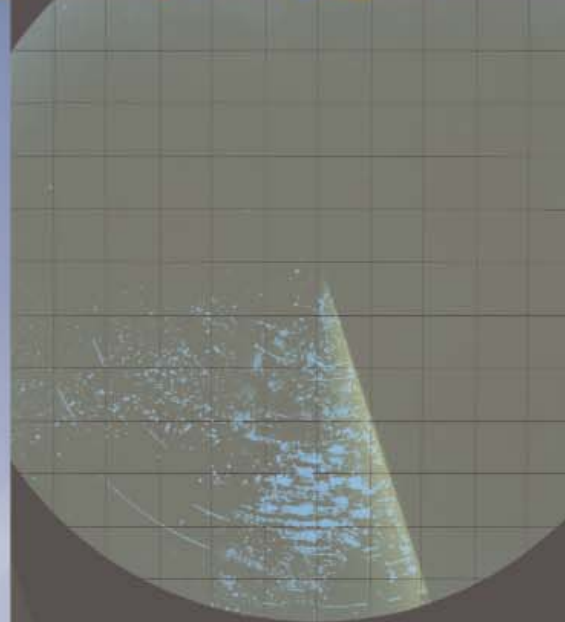
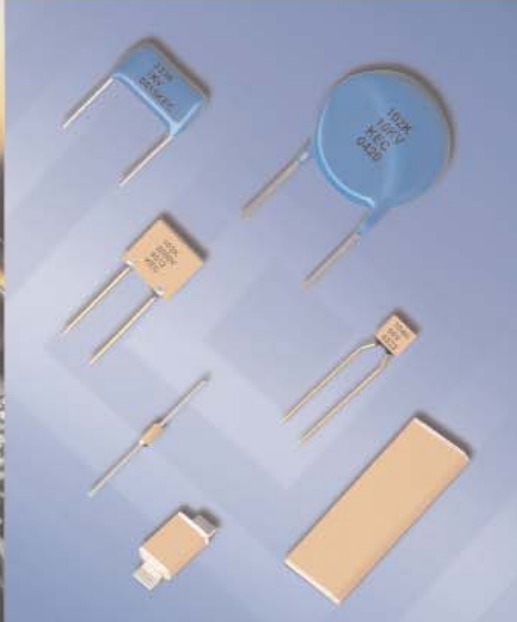


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# High Temperature High Voltage Ceramic Capacitors

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F-3106F 2/08

The Capacitance Company  
**KEMET**  
CHARGED.™

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# High Temperature, High Voltage Performance Characteristics

## GENERAL SPECIFICATIONS

### Working Voltage:

|     |   |
|-----|---|
| C0G | 50, 100, 200, 500, 1k, 2k, 3k, 4k, 5k, 7.5k, 10k, 15k, 20k                |
| X7R | 50, 100, 200, 500, 1k, 2k, 3k, 4k, 5k, 7.5k, 10k, 15k, 20k, 30k, 40k, 50k |
| X5U | 3k, 4k, 5k, 7.5k, 10k, 15k, 20k   |

### Temperature Characteristics:

|     |  |
|-----|--|
| C0G | 0 + 30 PPM / °C from -55°C to +125°C (1) |
| X7R | +15% from -55°C to +125°C                |
| X5U | +22%, -56% from -55°C to +85°C           |

### Capacitance Tolerance:

|     |   |
|-----|---|
| C0G | +0.5pF, +1%, +2%, +5%, +10%               |
| X7R | ±5%, ±10%, ±20%, +80% / -20%, +100% / -0% |
| X5U | ±5%, ±10%, ±20%, +80% / -20%, +100% / -0% |

### Construction:

Epoxy encapsulated - meets flame test requirements of UL Standard 94V-0.  
High-temperature solder - meets EIA RS-198, Method 302, Condition B (260°C for 10 seconds)

### Termination Material:

Check individual Series: Part Number and Ordering Information for Termination Materials offered in each series.

### Solderability:

MIL-STD 202, Method 208  
(Test Method: ANSI/J-STD-002)  
Test A for through-hole mount and surface mount leaded.  
Test B for surface mount leadless components.

### Terminal Strength:

MIL-STD 202, Method 208, Condition A (2.3kg or 5 lbs)

### Resistance to Solvents:

MIL-STD 202, Method 215

### Resistance to Soldering Heat:

MIL-STD 202, Method 210, Test Condition C

## ELECTRICAL

### Capacitance @ 25°C:

Within specified tolerance and following test conditions per MIL-STD 202, Method 305.  
C0G, X7R & X5U  
> 100pF with 1.0 vrms @ 1 kHz with 1.0 vrms  
< 100pF with 1.0 vrms @ 1 MHz with 1.0 vrms

### Dissipation Factor @ 25°C:

Same test conditions as capacitance.  
C0G - 0.15% maximum  
X7R - 2.5% maximum  
X5U - 2.5% maximum

### Insulation Resistance @25°C:

MIL-STD 202, Method 302  
C0G & X7R:  
100 gigohm or 1 gigohm x uF, whichever is less.  
<500V test @ rated voltage, >1kV test @ 500V.  
X5U:  
10 gigohm or 100 megohm x uF, whichever is less.  
<500V test @ rated voltage, >1kV test @ 500V.

### Dielectric Withstanding Voltage:

MIL-STD 202, Method 301  
<200V test @ 250% of rated voltage  
500V to 1250V test @ 150% of rated voltage  
>1251V test @ 120% of rated voltage

## ENVIRONMENTAL

### Vibration:

MIL-STD 202, Method 204, Condition D (20g)

### Shock:

MIL-STD 202, Method 213, Condition I (100g)

### Life Test:

MIL-STD 202, Method 108

### <200V

C0G - 200% rated voltage @ +125°C  
X7R - 200% rated voltage @ +125°C

### >500V

C0G - rated voltage @ +125°C  
X7R - rated voltage @ +125°C  
X5U - rated voltage @ +85°C

### Post Test Limits @ 25°C are:

#### Capacitance Change:

C0G (< 200V) - +3% or 0.25pF, whichever is greater.  
C0G (> 500V) - +3% or 0.50pF, whichever is greater.  
X7R - +20% of initial value (2)

#### Dissipation Factor:

C0G - 0.25% maximum  
X7R & X5U - 3.0% maximum

#### Insulation Resistance:

C0G & X7R:  
100 gigohm or 1 gigohm x uF, whichever is less.  
<500V test @ rated voltage, >1kV test @ 500V.

#### X5U:

10 gigohm or 100 megohm x uF, whichever is less.  
<500V test @ rated voltage, >1kV test @ 500V.

### Moisture Resistance:

MIL-STD 202, Method 106

Post Test Limits @ 25°C are:

#### Capacitance Change:

C0G (< 200V) - +3% or 0.25pF, whichever is greater.  
C0G (> 500V) - +3% or 0.50pF, whichever is greater.  
X7R - +20% of initial value (2)

#### Dissipation Factor:

C0G - 0.25% maximum  
X7R & X5U - 3.0% maximum

#### Insulation Resistance:

C0G & X7R:  
100 gigohm or 1 gigohm x uF, whichever is less.  
<500V test @ rated voltage, >1kV test @ 500V.

#### X5U:

10 gigohm or 100 megohm x uF, whichever is less.  
<500V test @ rated voltage, >1kV test @ 500V.

### Thermal Shock:

MIL-STD 202, Method 107, Condition A

C0G & X7R: -55°C to 125°C

X5U: -55°C to 85°C

- (1) +53 PPM -30 PPM/ °C from +25°C to -55°C, +60 PPM below 10pF.
- (2) X7R & X5U dielectrics exhibit aging characteristics; therefore, it is highly recommended that capacitors be deaged for 2 hours at 150°C and stabilized at room temperature for 48 hours before capacitance measurements are made.

|   | HIGH TEMPERATURE | HIGH VOLTAGE |
|---|------------------|--------------|
| <b>MILITARY &amp; AEROSPACE</b>                   |                  |              |
| Avionics  | X                | X            |
| Radar Systems                                     | X                | X            |
| Telemetry, Data Tx/Rx                             |                  | X            |
| Control Systems                                   | X                |              |
| <b>MEDICAL</b>                                    |                  |              |
| .5 to 1.5 Tesla MR1 &                             |                  | X            |
| NM1 Tuning Coils                                  |                  | X            |
| 1 to 3 Tesla MR1 Gradient                         |                  | X            |
| Coils & Magnetic Rings                            |                  | X            |
| CT-Scanner  |                  | X            |
| Medical MRI                                       |                  | X            |
| X-Ray Generator                                   | X                | X            |
| <b>SEMICONDUCTOR</b>                              |                  |              |
| RF Tuning Networks                                |                  | X            |
| RF Power Supplies                                 |                  | X            |
| Semiconductor Manufacturing                       | X                |              |
| <b>SECURITY</b>                                   |                  |              |
| Handheld Scanners                                 |                  | X            |
| Intruder Detection Systems                        |                  | X            |
| Luggage Scanners                                  |                  | X            |
| Metal/Explosive Detector                          |                  | X            |
| <b>OTHER</b>                                      |                  |              |
| LCD Backlight Inverter                            |                  | X            |
| Electric Ballast for CFL                          | X                | X            |
| Electric Ballast for Fluorescent Lamp             | X                | X            |
| Measurement Equipment                             | X                | X            |
| Microwave/Convection Ovens                        | X                | X            |
| <b>POWER SUPPLY</b>                               |                  |              |
| HV Power Supply                                   | X                | X            |
| Power Station Equipment                           |                  | X            |
| Power Supply for Air Conditioner, Washing Machine |                  | X            |
| Inverter Power Supply-AC                          | X                |              |
| <b>TELECOM</b>                                    |                  |              |
| Base Station Power amps                           |                  | X            |
| Broadcasting Equipment                            |                  | X            |
| <b>MODEM</b>                                      |                  |              |
| DAA Modem   |                  | X            |
| xDSL Modem  |                  | X            |
| LAN, Router, HUB, Switches                        |                  | X            |
| RF Power Amplifiers                               |                  | X            |
| <b>INDUSTRIAL</b>                                 |                  |              |
| Oil Rigging, Down Hole, Mining                    | X                | X            |

# KEMET High Voltage Technical Summary

|                            | ELECTRICAL                                   |   |  | ENVIRONMENTAL                                     | MECHANICAL              |
|----------------------------|--|---|--|---|-------------------------|
|                            | Voltage Range                                | Capacitance Range   | Dissipation Factor                               | Operating Temperature Range                       | Configuration           |
| <b>HIGH VOLTAGE</b>        |  |   |  |   |                         |
| Radial Conformally Coated  |  |   |  |   |                         |
| Std                        | C0G/X7R: 500 to 10k VDC                      | C0G:12 pF - .330µF<br>X7R: 220 pF - 5.6 µF                      | C0G: 0.15% max<br>X7R: 2.5% max                  | C0G: -55°C to + 125°C<br>X7R: -55°C to + 125°C    | Radial                  |
| Mil-PRF-49467 Equivalent   | C0G/X7R: 600 to 5k VDC                       | C0G: 12 pF - .68 µF<br>X7R: 27 pF - .47 µF                      | C0G: 0.15% max<br>X7R: 2.5% max                  | C0G/X7R: -55°C to + 125°C                         | Radial                  |
| Space Quality              | C0G/X7R: 500 to 10k VDC                      | C0G/X7R: 560 pF - 2.20µF  | C0G: 0.15% max<br>X7R: 2.5% max                  | C0G/X7R: -55°C to + 125°C                         | Radial                  |
| Ceramic Surface Mount Chip |  |   |  |   |                         |
| Military                   | C0G/X7R: 500 to 5k VDC                       | C0G: 12 pF - .10 µF<br>X7R: 270 pF -2.50 µF                     | C0G: 0.15% max<br>X7R: 2.5% max                  | C0G/X7R: -55°C to + 125°C                         | Chip                    |
| Leaded Chips J or L lead   | C0G/X7R: 500 to 10k VDC                      | C0G: 12 pF-.330 µF<br>X7R: 220 pF-5.6 µF                        | C0G: 0.15% max<br>X7R: 2.5% max                  | C0G/X7R: -55°C to + 125°C                         | Leaded Chip J or L Lead |
| Disc                       | C0G/X5U: 3k to 20k VDC,<br>X7R:3k to 50k VDC | C0G: 1.2 pF-236 pF<br>X7R: 10 p -7400 pF<br>X5U: 80 pF-17300 pF | C0G: 0.15% max<br>X7R: 2.5% max<br>X5U: 2.5% max | C0G/X7R: -55°C to + 125°C<br>X5U: -55°C to + 85°C | Disc                    |
| Disc Stack                 | C0G/X7R/X5U: 5k to 20k VDC                   | C0G: 1.2 pF-141 pF<br>X7R: 37 pF-4400 pF<br>X5U: 80 pF-10400 pF | C0G: 0.15% max<br>X7R: 2.5% max<br>X5U: 2.5% max | C0G/X7R: -55°C to + 125°C<br>X5U: -55°C to + 85°C | Disc Stack              |

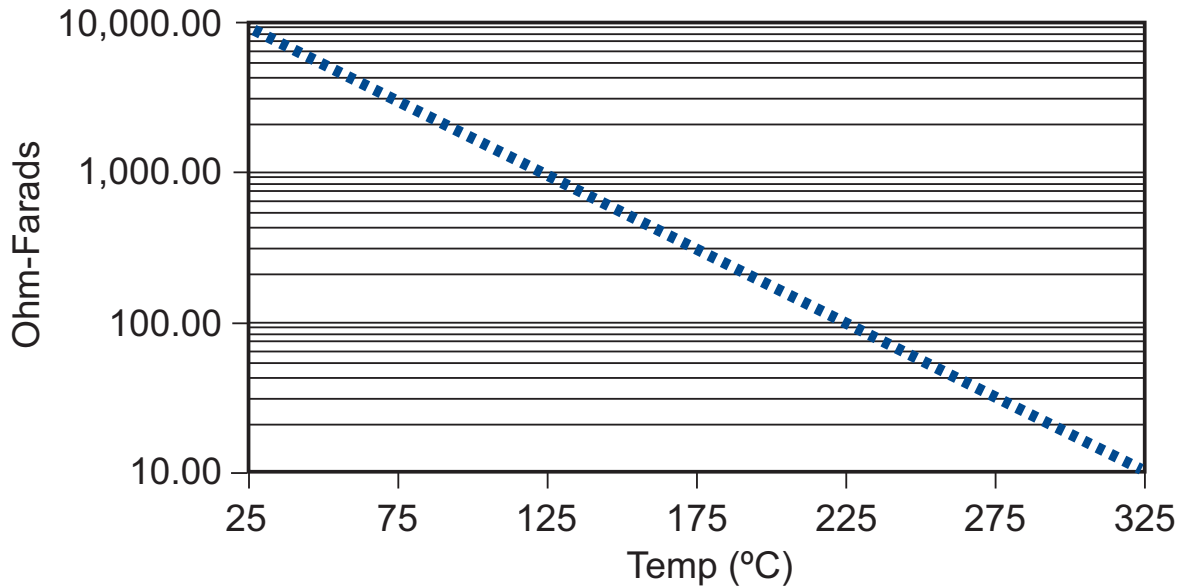
## HIGH TEMPERATURE

|                             |                 |   |   |                  |              |
|-----------------------------|-----------------|---|---|------------------|--------------|
| Hi Temp (HT/HP)             | 100 to 200 VDC  | -C0G: 22 pF-.100 µF<br>X7R:1000 pF-1.0µF    | C0G 0.15%<br>X7R Type 2.0%<br>X7R 2.50% | -55°C to + 200°C | Axial/Radial |
| Hi Temp Hi Volt (HV)        | 500 to 4000 VDC | C0G: 390 pF-.015 µF<br>X7R:1400 pF- .270 µF | C0G 0.15%<br>X7R Type 2.0%<br>X7R 2.50% | -55°C to + 200°C | Radial       |
| Ceramic Cased Capacitor     |                 |   |   |                  |              |
| Std 125°C (SCR/SRR/SCA/SRA) | 50 to 200 VDC   | C0G: 1.0 pF- .12 µF<br>X7R:100 pF- 6.8 µF   | C0G 0.15%<br>X7R 2.50%                  | -55°C to + 125°C | Axial/Radial |
| 200°C (ACR/ARR/ACA/ARA)     | 50 to 100 VDC   | C0G: 1.0 pF- .12 µF<br>X7R:100 pF- 3.3 µF   | C0G 0.15%<br>X7R 2.50%                  | -55°C to + 200°C | Axial/Radial |
| 260°C (TCR/TRR/TCA/TRA)     | 50 to 100 VDC   | C0G: 1.0 pF- .12 µF<br>X7R:100 pF- 3.3 µF   | C0G 0.15%<br>X7R 2.50%                  | -55°C to + 260°C | Axial/Radial |
| Hi Temp Hi Volt (VCR/VRR)   | 500 to 5000 VDC | C0G: 10 pF-.056 µF<br>X7R:330 pF-1.2µF      | C0G 0.15%<br>X7R 2.50%                  | -55°C to + 200°C | Radial       |

**DIELECTRIC COMPARISONS**

| Features                                | Ultra Stable      | Semi-Stable High Voltage | Semi-Stable Hi-Temp | Temp/Volt Dependent |
|---|-------------------|--------------------------|---------------------|---------------------|
| Dielectric Type                         | C0G (NP0)         | X7R                      | X7R type            | X5U                 |
| Temperature Coefficient                 | 0 ±30ppm/°C       | ±15%                     | +15/-40%            | +22-56%             |
| Operating Temp. Range                   | -55 to +200°C     | -55 to +125°C            | -55 to +200°C       | -55 to +125°C       |
| Dissipation Factor                      | 0.1% max.         | 2.5% max.                | 2.0% max.           | 2.5% max.           |
| Aging Rate                              | None              | -2.0% max/dec. hour      | -2.0% max/dec. hour | -2.0% max/dec. hour |
| Voltage Range                           | 25 to 20k VDC     | 50 to 50k VDC            | 25 to 4k VDC        | Up to 20K VDC       |
| Standard Tolerance                      | J, K, M           | K, M, P, Z               | K, M, P, Z          | M, P, Z             |
| Coefficient of Thermal Expansion @ 25°C | 9 X 10-6 IN/IN °C | 11 X 10-6 IN/IN °C       | 11 X 10-6 IN/IN °C  | 11 X 10-6 IN/IN °C  |

**TYPICAL INSULATION RESISTANCE VS. TEMP (°C)  
FOR C0G, NP0 & X7R DIELECTRICS**



# High Temperature (+200°C) Axial and Radial Ceramic Capacitors

## HT/HP Series

### FEATURES

The HT/HP Series is used in robust applications

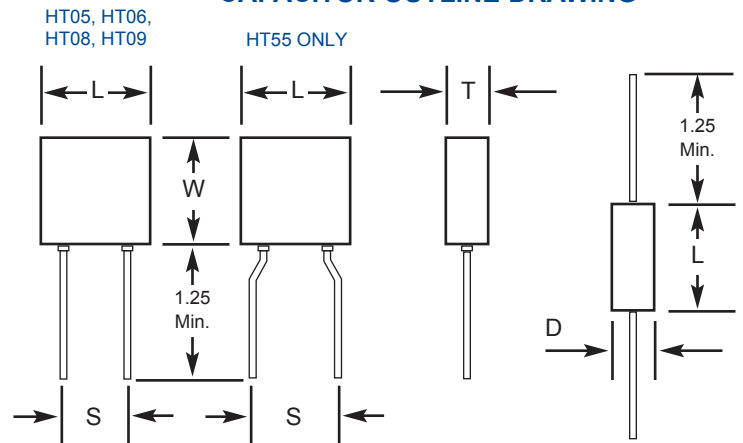
- Down Hole
- Industrial
- Harsh Environments

Where a Radial/Axial coated capacitor can withstand high temperatures (200°C).

#### NOTE:

Other tolerances, higher capacitance values, voltages, or special package configurations are available upon request.

### CAPACITOR OUTLINE DRAWING



### DIMENSIONS

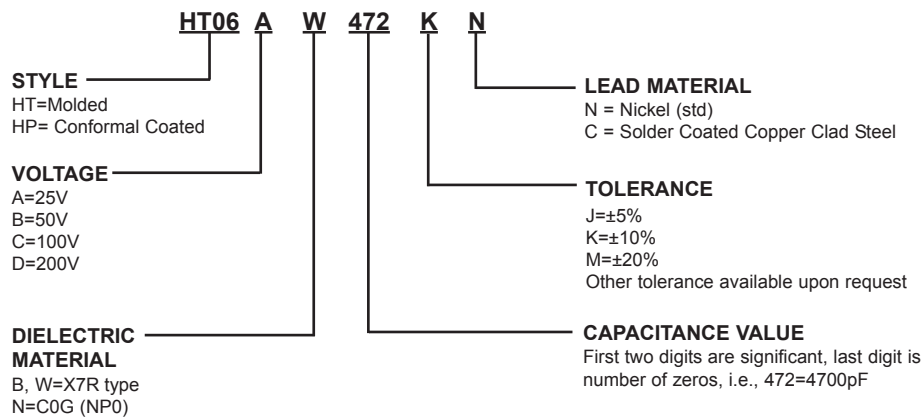
Molded (HT) and Conformal Coated (HP), Radial Lead Types

| Style | Sizes in Inches (mm) max |              |               | Lead Spacing<br>±0.030 (S) |
|-------|--------------------------|--------------|---------------|----------------------------|
|       | Length (L)               | Width (W)    | Thickness (T) |                            |
| HT05  | .200 (5.08)              | .200 (5.08)  | .100 (2.54)   | .100 (2.54)                |
| HT55  | .200 (5.08)              | .200 (5.08)  | .100 (2.54)   | .200 (5.08)                |
| HT06  | .300 (7.62)              | .300 (7.62)  | .150 (3.81)   | .200 (5.08)                |
| HT08  | .500 (12.70)             | .500 (12.70) | .250 (6.35)   | .400 (10.16)               |
| HT09  | .700 (17.78)             | .400 (10.16) | .200 (5.08)   | .500 (12.70)               |

Tubular Case, Axial Lead Types

| Style | Sizes in Inches (mm) max |              |
|-------|--------------------------|--------------|
|       | Length (L)               | Diameter (D) |
| HT11  | .170 (4.32)              | .100 (2.54)  |
| HT13  | .260 (6.60)              | .135 (3.43)  |
| HT14  | .400 (10.16)             | .155 (3.94)  |
| HT15  | .500 (12.70)             | .200 (5.08)  |
| HT16  | .750 (19.05)             | .375 (9.52)  |

### PART NUMBER AND ORDERING INFORMATION



#### MARKING

(HT05, HT55, HT11)

472K

KEC

(All other sizes)

HT06AW472K

KEC

Date Code

For CONFORMAL COATED types, change style number to HPXX. HP dimensions will be reduced slightly.

**COG & X7R DIELECTRIC**

| COG RADIAL |           |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
|------------|-----------|-------------|-------------|-----|-------------|-------------|-----|-------------|-------------|-----|--------------|--------------|-----|--------------|--------------|-----|--|--|
| STYLE      |           | HT/HP 05    |             |     | HT/HP 55    |             |     | HT/HP 06    |             |     | HT/HP 08     |              |     | HT/HP 09     |              |     |  |  |
| Cap        | Cap Code  | 50          | 100         | 200 | 50          | 100         | 200 | 50          | 100         | 200 | 50           | 100          | 200 | 50           | 100          | 200 |  |  |
|            |           | L MAX       | .200 (5.08) |     |             | .200 (5.08) |     |             | .300 (7.62) |     |              | .500 (12.70) |     |              | .700 (17.78) |     |  |  |
|            | W MAX     | .200 (5.08) |             |     | .200 (5.08) |             |     | .300 (7.62) |             |     | .500 (12.70) |              |     | .400 (10.16) |              |     |  |  |
|            | T MAX     | .100 (2.54) |             |     | .100 (2.54) |             |     | .150 (3.81) |             |     | .250 (6.35)  |              |     | .200 (5.08)  |              |     |  |  |
|            | S± .030   | .100 (2.54) |             |     | .200 (5.08) |             |     | .200 (5.08) |             |     | .400 (10.16) |              |     | .500 (12.70) |              |     |  |  |
|            | Lead Dia. | .025 (.635) |             |     | .025 (.635) |             |     | .025 (.635) |             |     | .025 (.635)  |              |     | .025 (.635)  |              |     |  |  |
|            | Cap Code  | WVDC        |             |     | WVDC        |             |     | WVDC        |             |     | WVDC         |              |     | WVDC         |              |     |  |  |
| 22pF       | 220       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 27         | 270       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 33         | 330       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 39         | 390       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 47         | 470       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 56         | 560       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 68         | 680       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 82         | 820       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 100        | 101       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 120        | 121       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 150        | 151       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 180        | 181       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 220        | 221       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 270        | 271       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 330        | 331       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 390        | 391       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 470        | 471       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 560        | 561       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 680        | 681       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 820        | 821       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1000       | 102       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1200       | 122       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1500       | 152       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1800       | 182       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 2200       | 222       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 2700       | 272       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 3300       | 332       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 3900       | 392       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 4700       | 472       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 5600       | 562       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 6800       | 682       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 8200       | 822       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| .010 uF    | 103       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.012      | 123       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.015      | 153       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.018      | 183       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.022      | 223       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.027      | 273       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.033      | 333       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.039      | 393       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.047      | 473       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.056      | 563       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.068      | 683       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.082      | 823       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.10       | 104       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.12       | 124       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |

| X7R RADIAL |           |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
|------------|-----------|-------------|-------------|-----|-------------|-------------|-----|-------------|-------------|-----|--------------|--------------|-----|--------------|--------------|-----|--|--|
| STYLE      |           | HT/HP 05    |             |     | HT/HP 55    |             |     | HT/HP 06    |             |     | HT/HP 08     |              |     | HT/HP 09     |              |     |  |  |
| Cap        | Cap Code  | 50          | 100         | 200 | 50          | 100         | 200 | 50          | 100         | 200 | 50           | 100          | 200 | 50           | 100          | 200 |  |  |
|            |           | L MAX       | .200 (5.08) |     |             | .200 (5.08) |     |             | .300 (7.62) |     |              | .500 (12.70) |     |              | .700 (17.78) |     |  |  |
|            | W MAX     | .200 (5.08) |             |     | .200 (5.08) |             |     | .300 (7.62) |             |     | .500 (12.70) |              |     | .400 (10.16) |              |     |  |  |
|            | T MAX     | .100 (2.54) |             |     | .100 (2.54) |             |     | .150 (3.81) |             |     | .250 (6.35)  |              |     | .200 (5.08)  |              |     |  |  |
|            | S± .030   | .100 (2.54) |             |     | .200 (5.08) |             |     | .200 (5.08) |             |     | .400 (10.16) |              |     | .500 (12.70) |              |     |  |  |
|            | Lead Dia. | .025 (.635) |             |     | .025 (.635) |             |     | .025 (.635) |             |     | .025 (.635)  |              |     | .025 (.635)  |              |     |  |  |
|            | Cap Code  | WVDC        |             |     | WVDC        |             |     | WVDC        |             |     | WVDC         |              |     | WVDC         |              |     |  |  |
| 1000pF     | 102       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1200       | 122       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1500       | 152       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1800       | 182       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 2200       | 222       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 2700       | 272       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 3300       | 332       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 3900       | 392       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 4700       | 472       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 5600       | 562       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 6800       | 682       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 8200       | 822       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| .010 uF    | 103       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.012      | 123       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.015      | 153       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.018      | 183       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.022      | 223       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.027      | 273       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.033      | 333       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.039      | 393       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.047      | 473       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.056      | 563       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.068      | 683       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.082      | 823       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.10       | 104       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.12       | 124       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.15       | 154       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.18       | 184       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.22       | 224       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.27       | 274       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.33       | 334       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.39       | 394       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.47       | 474       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.56       | 564       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.68       | 684       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 0.82       | 824       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1.0        | 105       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1.2        | 125       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1.5        | 155       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 1.8        | 185       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 2.2        | 225       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 2.7        | 275       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 3.3        | 335       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 3.9        | 395       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 4.7        | 475       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |
| 5.6        | 565       |             |             |     |             |             |     |             |             |     |              |              |     |              |              |     |  |  |



# High Temperature (+200°C) Axial and Radial Ceramic Capacitors HT/HP Series

## COG & X7R DIELECTRIC

| COG AXIAL |           |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
|-----------|-----------|-------------|-----|-----|-------------|-----|-----|--------------|-----|-----|--------------|-----|-----|--------------|-----|-----|
| STYLE     |           | HT/HP 11    |     |     | HT/HP 13    |     |     | HT/HP 14     |     |     | HT/HP 15     |     |     | HT/HP 16     |     |     |
| Cap       | L MAX     | .170 (4.32) |     |     | .260 (6.60) |     |     | .400 (10.16) |     |     | .500 (12.70) |     |     | .750 (19.05) |     |     |
|           | D MAX     | .100 (2.54) |     |     | .135 (3.43) |     |     | .155 (3.94)  |     |     | .200 (5.08)  |     |     | .375 (9.52)  |     |     |
|           | Lead Dia. | .025 (.635) |     |     | .025 (.635) |     |     | .025 (.635)  |     |     | .025 (.635)  |     |     | .025 (.635)  |     |     |
| Cap Code  |           | WVDC        |     |     | WVDC        |     |     | WVDC         |     |     | WVDC         |     |     | WVDC         |     |     |
|           |           | 50          | 100 | 200 | 50          | 100 | 200 | 50           | 100 | 200 | 50           | 100 | 200 | 50           | 100 | 200 |
| 5.6pF     | 569       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 6.8       | 689       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 8.2       | 829       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 10        | 100       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 12        | 120       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 15        | 150       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 18        | 180       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 22        | 220       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 27        | 270       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 33        | 330       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 39        | 390       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 47        | 470       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 56        | 560       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 68        | 680       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 82        | 820       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 100       | 101       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 120       | 121       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 150       | 151       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 180       | 181       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 220       | 221       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 270       | 271       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 330       | 331       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 390       | 391       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 470       | 471       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 560       | 561       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 680       | 681       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 820       | 821       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1000      | 102       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1200      | 122       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1500      | 152       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1800      | 182       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 2200      | 222       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 2700      | 272       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 3300      | 332       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 3900      | 392       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 4700      | 472       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 5600      | 562       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 6800      | 682       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 8200      | 822       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| .010 uF   | 103       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.012     | 123       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.015     | 153       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.018     | 183       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.022     | 223       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.027     | 273       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.033     | 333       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.039     | 393       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.047     | 473       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.056     | 563       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.068     | 683       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.082     | 823       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.10      | 104       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |

| X7R AXIAL |           |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
|-----------|-----------|-------------|-----|-----|-------------|-----|-----|--------------|-----|-----|--------------|-----|-----|--------------|-----|-----|
| STYLE     |           | HT/HP 11    |     |     | HT/HP 13    |     |     | HT/HP 14     |     |     | HT/HP 15     |     |     | HT/HP 16     |     |     |
| Cap       | L MAX     | .170 (4.32) |     |     | .260 (6.60) |     |     | .400 (10.16) |     |     | .500 (12.70) |     |     | .750 (19.05) |     |     |
|           | D MAX     | .100 (2.54) |     |     | .135 (3.43) |     |     | .155 (3.94)  |     |     | .200 (5.08)  |     |     | .375 (9.52)  |     |     |
|           | Lead Dia. | .025 (.635) |     |     | .025 (.635) |     |     | .025 (.635)  |     |     | .025 (.635)  |     |     | .025 (.635)  |     |     |
| Cap Code  |           | WVDC        |     |     | WVDC        |     |     | WVDC         |     |     | WVDC         |     |     | WVDC         |     |     |
|           |           | 50          | 100 | 200 | 50          | 100 | 200 | 50           | 100 | 200 | 50           | 100 | 200 | 50           | 100 | 200 |
| 100pF     | 101       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 120       | 121       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 150       | 151       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 180       | 181       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 220       | 221       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 270       | 271       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 330       | 331       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 390       | 391       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 470       | 471       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 560       | 561       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 680       | 681       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 820       | 821       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1000      | 102       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1200      | 122       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1500      | 152       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1800      | 182       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 2200      | 222       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 2700      | 272       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 3300      | 332       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 3900      | 392       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 4700      | 472       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 5600      | 562       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 6800      | 682       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 8200      | 822       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| .010uF    | 103       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.012     | 123       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.015     | 153       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.018     | 183       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.022     | 223       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.027     | 273       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.033     | 333       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.039     | 393       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.047     | 473       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.056     | 563       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.068     | 683       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.082     | 823       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.1       | 104       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.12      | 124       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.15      | 154       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.18      | 184       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.22      | 224       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.27      | 274       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.33      | 334       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.39      | 394       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.47      | 474       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.56      | 564       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.68      | 684       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 0.82      | 824       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1.0       | 105       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1.2       | 125       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1.5       | 155       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 1.8       | 185       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 2.2       | 225       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |
| 2.7       | 275       |             |     |     |             |     |     |              |     |     |              |     |     |              |     |     |

### FEATURES

The HV series not only withstands high temperatures (200°C), but also offers high voltage (500-4000 VDC)

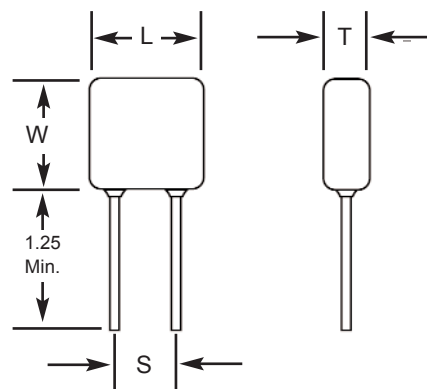
To be used in robust applications

- Down Hole
- Industrial
- Harsh Environments

**NOTE:**

Other tolerances, higher capacitance values, voltages, or special package configurations are available upon request.

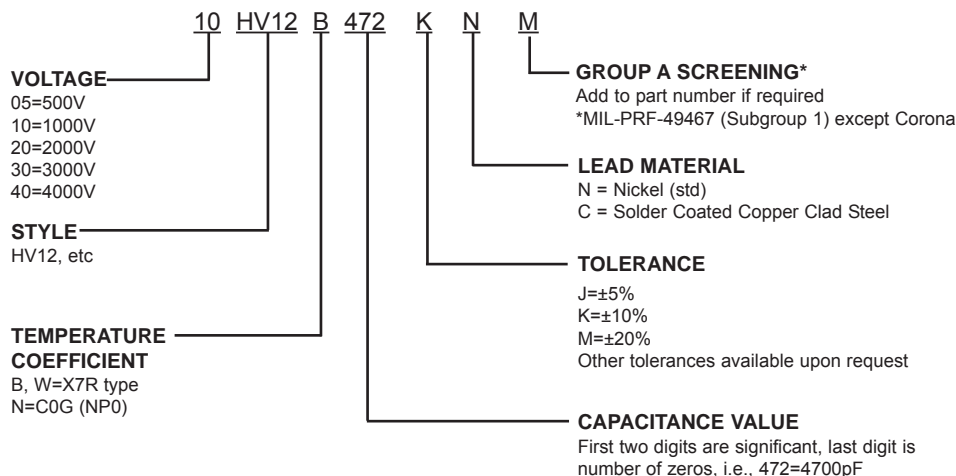
### CAPACITOR OUTLINE DRAWING



### DIMENSIONS

| Style | Sizes in Inches (mm) max. |              |               | Lead Spacing ±0.030 (S) |
|-------|---------------------------|--------------|---------------|-------------------------|
|       | Length (L)                | Width (W)    | Thickness (T) |                         |
| HV10  | .250 (6.35)               | .220 (5.59)  | .150 (3.81)   | .170 (4.32)             |
| HV11  | .320 (8.13)               | .300 (7.62)  | .250 (6.35)   | .200 (5.08)             |
| HV12  | .420 (10.67)              | .400 (10.16) | .250 (6.35)   | .300 (7.62)             |
| HV13  | .520 (13.21)              | .500 (12.70) | .300 (7.62)   | .400 (10.16)            |
| HV14  | .620 (15.75)              | .500 (12.70) | .300 (7.62)   | .500 (12.70)            |
| HV15  | .720 (18.29)              | .700 (17.78) | .300 (7.62)   | .600 (15.24)            |
| HV16  | .820 (20.83)              | .700 (17.78) | .350 (8.89)   | .700 (17.78)            |

### PART NUMBER AND ORDERING INFORMATION



**MARKING**

(HV10, HV11)  
472M  
KEC  
Date Code

(All other sizes)  
HV12B472M  
1kV  
KEC  
Date Code

# High Temperature (+200°C), High Voltage Radial Ceramic Capacitors HV Series

## COG DIELECTRIC

| STYLE  |                            | HV10        |    |     | HV11        |    |    |     | HV12         |    |    |     | HV13         |    |    |     | HV14         |    |    |    |     | HV15         |    |    |    |     | HV16         |    |    |    |  |
|--------|----------------------------|-------------|----|-----|-------------|----|----|-----|--------------|----|----|-----|--------------|----|----|-----|--------------|----|----|----|-----|--------------|----|----|----|-----|--------------|----|----|----|--|
| Cap    | L MAX                      | .250 (6.35) |    |     | .320 (8.13) |    |    |     | .420 (10.67) |    |    |     | .520 (13.21) |    |    |     | .620 (15.75) |    |    |    |     | .720 (18.29) |    |    |    |     | .820 (20.83) |    |    |    |  |
|        | W MAX                      | .220 (5.59) |    |     | .300 (7.62) |    |    |     | .400 (10.16) |    |    |     | .500 (12.70) |    |    |     | .500 (12.70) |    |    |    |     | .700 (17.78) |    |    |    |     | .700 (17.78) |    |    |    |  |
|        | T MAX                      | .150 (3.81) |    |     | .250 (6.35) |    |    |     | .250 (6.35)  |    |    |     | .300 (7.62)  |    |    |     | .300 (7.62)  |    |    |    |     | .300 (7.62)  |    |    |    |     | .350 (8.89)  |    |    |    |  |
|        | S ± .030                   | .170 (4.32) |    |     | .200 (5.08) |    |    |     | .300 (7.62)  |    |    |     | .400 (10.16) |    |    |     | .500 (12.70) |    |    |    |     | .600 (15.24) |    |    |    |     | .700 (17.78) |    |    |    |  |
|        | Lead Dia.<br>+0.004/-0.002 | .025 (.635) |    |     | .025 (.635) |    |    |     | .025 (.635)  |    |    |     | .025 (.635)  |    |    |     | .025 (.635)  |    |    |    |     | .025 (.635)  |    |    |    |     | .025 (.635)  |    |    |    |  |
|        | Cap Code                   | WVDC        |    |     | WVDC        |    |    |     | WVDC         |    |    |     | WVDC         |    |    |     | WVDC         |    |    |    |     | WVDC         |    |    |    |     | WVDC         |    |    |    |  |
|        | 500                        | 1k          | 2k | 500 | 1k          | 2k | 3k | 500 | 1k           | 2k | 3k | 500 | 1k           | 2k | 3k | 500 | 1k           | 2k | 3k | 4k | 500 | 1k           | 2k | 3k | 4k | 500 | 1k           | 2k | 3k | 4k |  |
| 12pF   | 120                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 15     | 150                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 18     | 180                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 22     | 220                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 27     | 270                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 33     | 330                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 39     | 390                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 47     | 470                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 56     | 560                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 68     | 680                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 82     | 820                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 100    | 101                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 120    | 121                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 150    | 151                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 180    | 181                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 220    | 221                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 270    | 271                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 330    | 331                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 390    | 391                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 470    | 471                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 560    | 561                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 680    | 681                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 820    | 821                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 1000   | 102                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 1200   | 122                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 1500   | 152                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 1800   | 182                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 2200   | 222                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 2700   | 272                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 3300   | 332                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 3900   | 392                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 4700   | 472                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 5600   | 562                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 6800   | 682                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 8200   | 822                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 0.01uF | 103                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 0.012  | 123                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |
| 0.015  | 153                        |             |    |     |             |    |    |     |              |    |    |     |              |    |    |     |              |    |    |    |     |              |    |    |    |     |              |    |    |    |  |

**X7R DIELECTRIC**

| STYLE  |                            | HV10        |    |    | HV11        |    |    | HV12         |    |    | HV13         |    |    |    | HV14         |    |    |    | HV15         |     |    |    | HV16         |    |     |    |    |    |    |
|--------|----------------------------|-------------|----|----|-------------|----|----|--------------|----|----|--------------|----|----|----|--------------|----|----|----|--------------|-----|----|----|--------------|----|-----|----|----|----|----|
| Cap    | L MAX                      | .250 (6.35) |    |    | .320 (8.13) |    |    | .420 (10.67) |    |    | .520 (13.21) |    |    |    | .620 (15.75) |    |    |    | .720 (18.29) |     |    |    | .820 (20.83) |    |     |    |    |    |    |
|        | W MAX                      | .220 (5.59) |    |    | .300 (7.62) |    |    | .400 (10.16) |    |    | .500 (12.70) |    |    |    | .500 (12.70) |    |    |    | .700 (17.78) |     |    |    | .700 (17.78) |    |     |    |    |    |    |
|        | T MAX                      | .150 (3.81) |    |    | .250 (6.35) |    |    | .250 (6.35)  |    |    | .300 (7.62)  |    |    |    | .300 (7.62)  |    |    |    | .300 (7.62)  |     |    |    | .350 (8.89)  |    |     |    |    |    |    |
|        | S± .030                    | .170 (4.32) |    |    | .200 (5.08) |    |    | .300 (7.62)  |    |    | .400 (10.16) |    |    |    | .500 (12.70) |    |    |    | .600 (15.24) |     |    |    | .700 (17.78) |    |     |    |    |    |    |
|        | Lead Dia.<br>+0.004/-0.002 | .025 (.635) |    |    | .025 (.635) |    |    | .025 (.635)  |    |    | .025 (.635)  |    |    |    | .025 (.635)  |    |    |    | .025 (.635)  |     |    |    | .025 (.635)  |    |     |    |    |    |    |
|        | Cap Code                   | WVDC        |    |    | WVDC        |    |    | WVDC         |    |    | WVDC         |    |    |    | WVDC         |    |    |    | WVDC         |     |    |    | WVDC         |    |     |    |    |    |    |
|        |                            | 500         | 1k | 2k | 500         | 1k | 2k | 500          | 1k | 2k | 500          | 1k | 2k | 3k | 500          | 1k | 2k | 3k | 4k           | 500 | 1k | 2k | 3k           | 4k | 500 | 1k | 2k | 3k | 4k |
| 270pF  | 271                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 330    | 331                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 390    | 391                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 470    | 471                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 560    | 561                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 680    | 681                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 820    | 821                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 1000   | 102                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 1200   | 122                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 1500   | 152                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 1800   | 182                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 2200   | 222                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 2700   | 272                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 3300   | 332                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 3900   | 392                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 4700   | 472                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 5600   | 562                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 6800   | 682                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 8200   | 822                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.01uF | 103                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.012  | 123                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.015  | 153                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.018  | 183                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.022  | 223                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.027  | 273                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.033  | 333                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.039  | 393                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.047  | 473                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.056  | 563                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.068  | 683                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.082  | 823                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.10   | 104                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.12   | 124                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.15   | 154                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.18   | 184                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.22   | 224                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.27   | 274                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.33   | 334                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.39   | 394                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |
| 0.47   | 474                        |             |    |    |             |    |    |              |    |    |              |    |    |    |              |    |    |    |              |     |    |    |              |    |     |    |    |    |    |

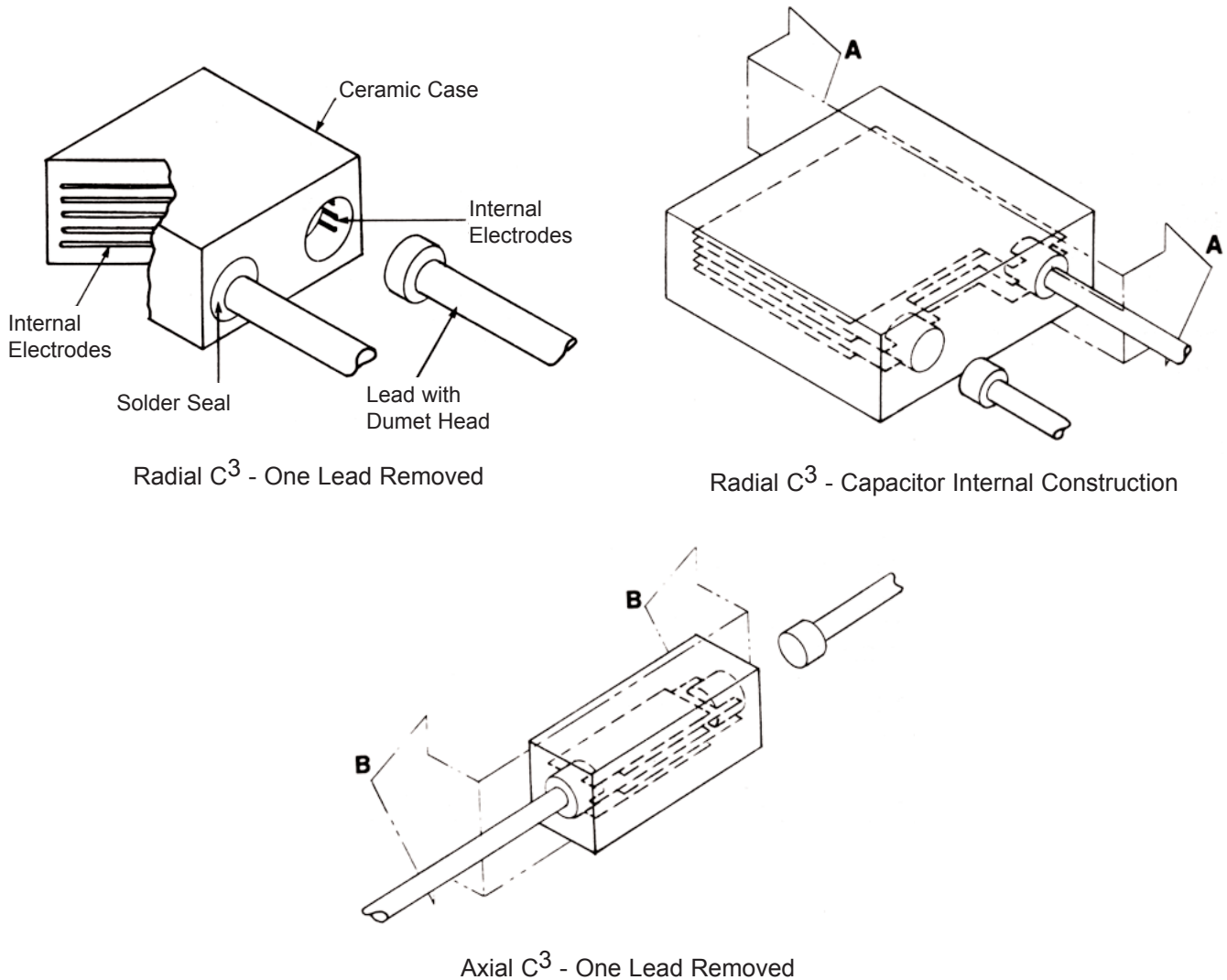
# High Temperature Ceramic Cased Capacitors C<sup>3</sup>

## C3 GENERAL INFORMATION

Monolithic ceramic capacitors are capable of withstanding and operating at temperatures up to +260°C when properly designed and manufactured for this application. A design has been developed which is ideal for operation at these high temperatures. This design is a Ceramic Cased Capacitor (C<sup>3</sup>) as described in PATENT #4,931,899.

The advantages of the C<sup>3</sup> construction at 125°C, 200°C and 260°C are:

- Uniform coefficient of linear expansion eliminates chip cracking during thermal shock.
- No "pull-away" of epoxy potting from epoxy case at elevated temperatures.
- Resistant to moisture penetration.
- Superior volumetric efficiency



## COG

COG (NP0) capacitors which exhibit little change in capacitance with variations in temperature, are used in RF oscillators, precision timing circuits, wave filters and other circuits requiring a predictable linear temperature coefficient.

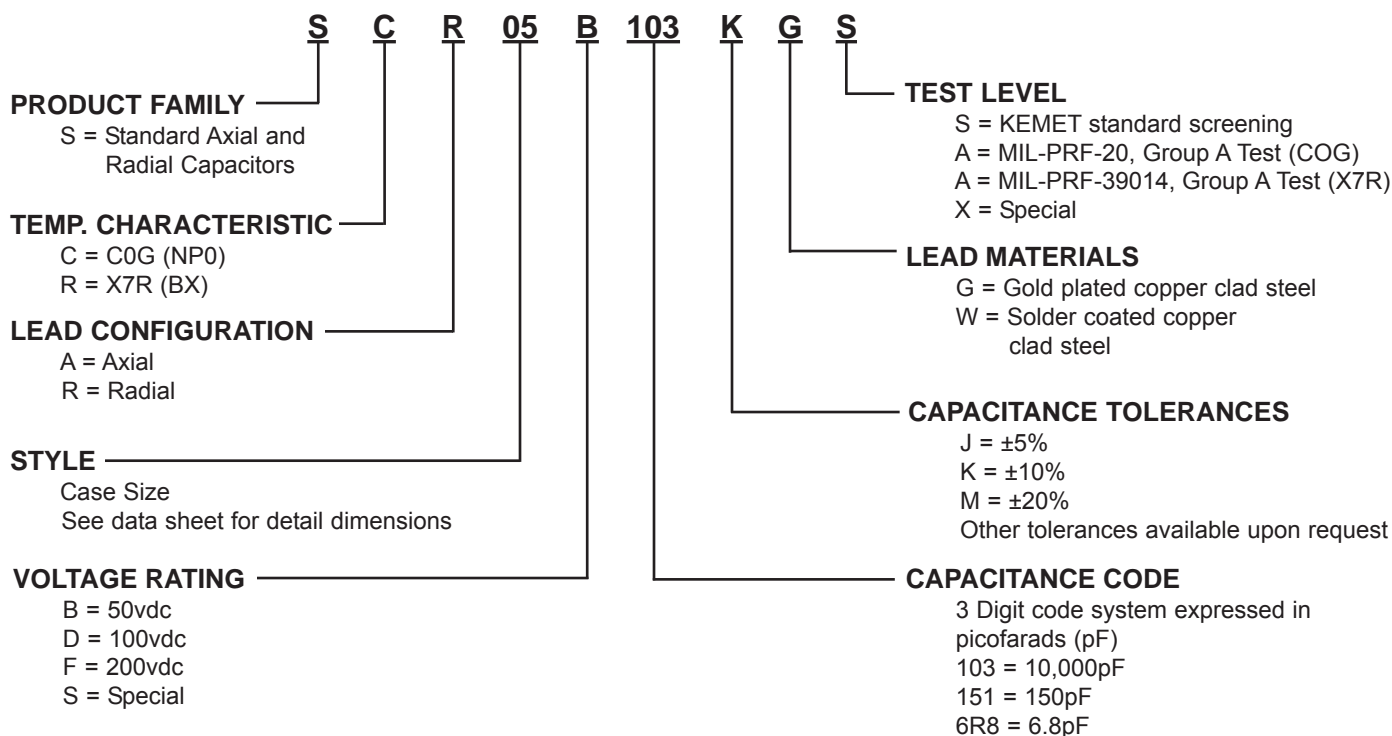
## X7R

BX and X7R capacitors are used in coupling circuits (IF and RF); for bypassing and decoupling in computers and stereo systems; power supply line filtering and frequency discrimination.

### INSTALLATION:

Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated between 18-30 watts. Soldering temperature should not exceed +300°C. For wave soldering, the parts should be slowly heated to +150°C and, after soldering, be allowed to cool down slowly to +90°C to preclude thermal shocking of the parts.

### PART NUMBER AND ORDERING INFORMATION



#### MARKING

|                   |      |
|-------------------|------|
| Manufacturer's ID | KEC  |
| Capacitance       | 106J |
| Voltage           | 50V  |
| Date Code         | 123  |

Note: Solderability testing is not required for gold leaded parts.







# High Temperature Standard (+200°C) Axial and Radial Ceramic Cased Capacitors (C<sup>3</sup>) ACR/ARR/ACA/ARA Series

High temperature ceramic cased capacitors, with a new, unique design concept, are ideally suited for continuous operation up to +200°C. Problems associated with epoxy cased/epoxy potted capacitors, such as material deterioration, cracks in cases and potted areas, are nonexistent, even at +200°C.

## COG

COG (NPO) capacitors, which exhibit little change in capacitance with variations in temperature, are used in RF oscillators, precision timing circuits, wave filters, and other circuits requiring a predictable linear temperature coefficient.

## X7R

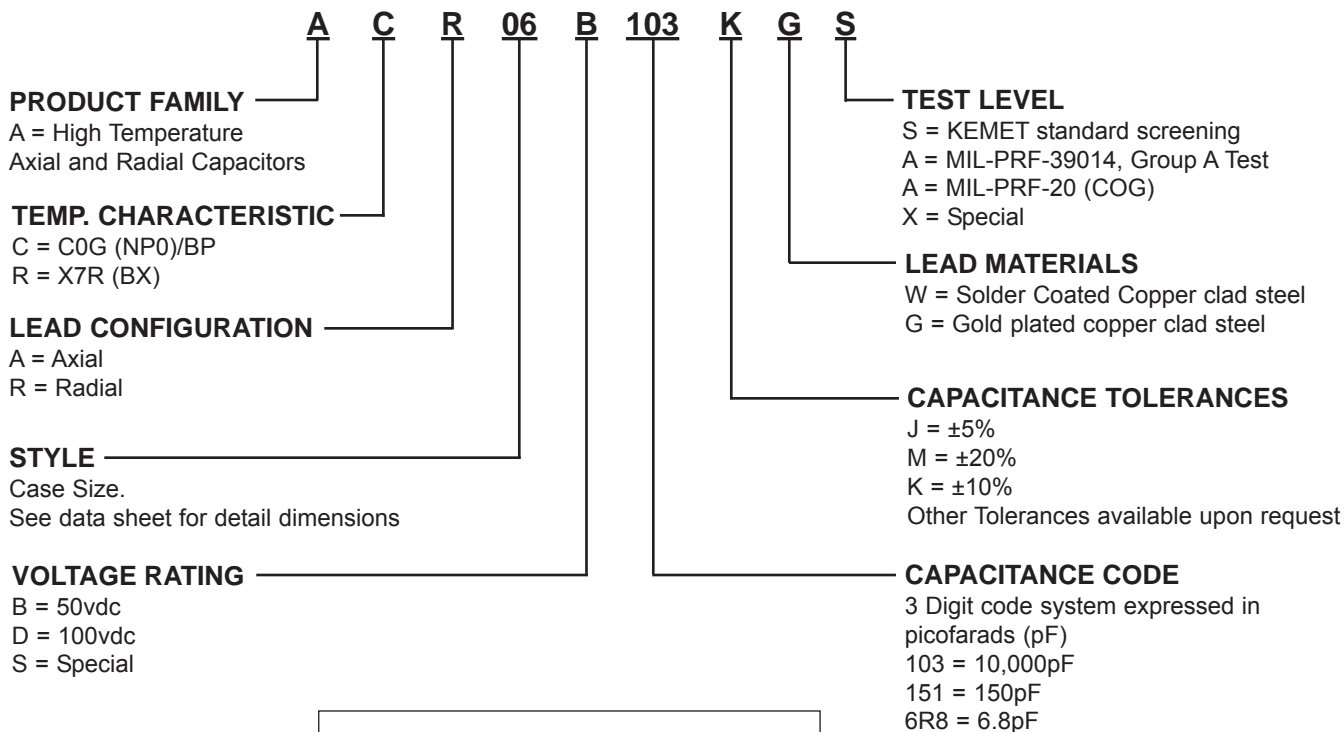
Specially formulated X7R ceramic materials result in a retention of 40% of the +25°C capacitance. Dissipation factor drops from 1.25% at +25°C to 0.1% at +200°C. At +120°C the ceramic undergoes a transformation (crystalline inversion) resulting in the material changing from ferroelectric to paraelectric - no piezoelectric behavior.

Typical applications include oil well logging (down hole), jet engine controls and geophysical pressure probes.

## INSTALLATION:

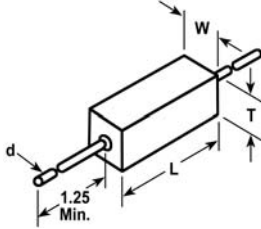
Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated between 18-30 watts. Soldering temperature should not exceed +300°C.

## PART NUMBER AND ORDERING INFORMATION

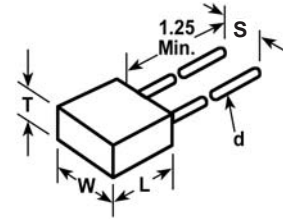


| MARKING           |      |
|-------------------|------|
| Manufacturer's ID | KEC  |
| Capacitance       | 106J |
| Voltage           | 50V  |
| Date Code         | 123  |

**AXIAL**  
All Dimensions  
in Inches (mm)



**RADIAL**  
All Dimensions  
in Inches (mm)



### COG DIELECTRIC

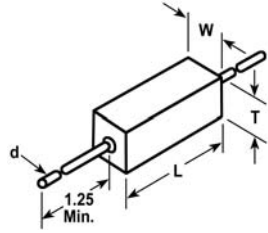
|         |                  | AXIAL                     |                           |                           |                           |                           |                           |                           |                           |                           |                           | RADIAL                    |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
|---------|------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| STYLE   |                  | 16                        |                           | 25                        |                           | 39                        |                           | 50                        |                           | 69                        |                           | 05                        |                           | 06                        |                           | 07                        |                           | 08                        |                           | 09                        |                           |                           |
| Cap     | L <sub>MAX</sub> | .170 (4.32)               | .270 (6.86)               | .400 (10.16)              | .520 (13.21)              | .720 (18.29)              | .200 (5.08)               | .300 (7.62)               | .300 (7.62)               | .500 (12.70)              | .500 (12.70)              | .200 (5.08)               | .300 (7.62)               | .300 (7.62)               | .500 (12.70)              | .500 (12.70)              | .100 (2.54)               | .100 (2.54)               | .150 (3.81)               | .100 (2.54)               | .150 (3.81)               |                           |
|         | W <sub>MAX</sub> | .080 (2.03)               | .100 (2.54)               | .150 (3.81)               | .265 (6.73)               | .370 (9.40)               | .200 (5.08)               | .300 (7.62)               | .300 (7.62)               | .500 (12.70)              | .500 (12.70)              | .200 (5.08)               | .300 (7.62)               | .300 (7.62)               | .500 (12.70)              | .500 (12.70)              | .100 (2.54)               | .100 (2.54)               | .150 (3.81)               | .100 (2.54)               | .150 (3.81)               |                           |
|         | T <sub>MAX</sub> | .080 (2.03)               | .100 (2.54)               | .150 (3.81)               | .160 (4.06)               | .160 (4.06)               | .100 (2.54)               | .100 (2.54)               | .150 (3.81)               | .100 (2.54)               | .100 (2.54)               | .200 ± .015 (5.08 ± .38)  | .200 ± .015 (5.08 ± .38)  | .200 ± .015 (5.08 ± .38)  | .400 ± .015 (10.16 ± .38) | .400 ± .015 (10.16 ± .38) | .100 (2.54)               | .100 (2.54)               | .150 (3.81)               | .100 (2.54)               | .150 (3.81)               |                           |
|         | s                | ---                       | ---                       | ---                       | ---                       | ---                       | .200 ± .015 (5.08 ± .38)  | .200 ± .015 (5.08 ± .38)  | .200 ± .015 (5.08 ± .38)  | .400 ± .015 (10.16 ± .38) | .400 ± .015 (10.16 ± .38) | .200 ± .015 (5.08 ± .38)  | .200 ± .015 (5.08 ± .38)  | .200 ± .015 (5.08 ± .38)  | .400 ± .015 (10.16 ± .38) | .400 ± .015 (10.16 ± .38) | .100 (2.54)               | .100 (2.54)               | .150 (3.81)               | .100 (2.54)               | .150 (3.81)               |                           |
|         | d                | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .025 ± .002 (.635 ± .051) | .025 ± .002 (.635 ± .051) | .025 ± .002 (.635 ± .051) | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .025 ± .002 (.635 ± .051) | .025 ± .002 (.635 ± .051) | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .025 ± .002 (.635 ± .051) | .025 ± .002 (.635 ± .051) | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .020 ± .002 (.508 ± .051) | .025 ± .002 (.635 ± .051) | .025 ± .002 (.635 ± .051) | .025 ± .002 (.635 ± .051) |
|         | Cap Code         |                           | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       | 50                        | 100                       |
|         | 5.6pF            | 569                       |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 6.8     | 689              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 8.2     | 829              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 10      | 100              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 12      | 120              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 15      | 150              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 18      | 180              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 22      | 220              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 27      | 270              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 33      | 330              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 39      | 390              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 47      | 470              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 56      | 560              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 68      | 680              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 82      | 820              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 100     | 101              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 120     | 121              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 150     | 151              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 180     | 181              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 220     | 221              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 270     | 271              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 330     | 331              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 390     | 391              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 470     | 471              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 560     | 561              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 680     | 681              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 820     | 821              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 1000    | 102              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 1200    | 122              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 1500    | 152              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 1800    | 182              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 2200    | 222              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 2700    | 272              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 3300    | 332              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 3900    | 392              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 4700    | 472              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 5600    | 562              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 6800    | 682              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 8200    | 822              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.01 μF | 103              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.012   | 123              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.015   | 153              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.018   | 183              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.022   | 223              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.027   | 273              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.033   | 333              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.039   | 393              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.047   | 473              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.056   | 563              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.068   | 683              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.082   | 823              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.10    | 104              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.12    | 124              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
| 0.15    | 154              |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |

# High Temperature Standard (+200°C) Axial and Radial Ceramic Cased Capacitors (C<sup>3</sup>)

## ARR/ARA Series

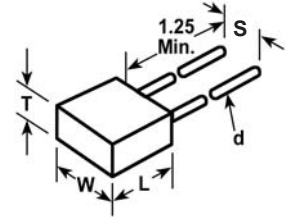
### AXIAL

All Dimensions  
in Inches (mm)



### RADIAL

All Dimensions  
in Inches (mm)



### X7R DIELECTRIC

|          |          | AXIAL |     |    |     |    |     |    |     |    |     | RADIAL |     |    |     |    |     |    |     |    |     |
|----------|----------|-------|-----|----|-----|----|-----|----|-----|----|-----|--------|-----|----|-----|----|-----|----|-----|----|-----|
| STYLE    | Cap Code | 16    |     | 25 |     | 39 |     | 50 |     | 69 |     | 05     |     | 06 |     | 07 |     | 08 |     | 09 |     |
|          |          | 50    | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50     | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 |
| L MAX    |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| W MAX    |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| T MAX    |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| s        |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| d        |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| Cap Code |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          |          |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 100pF    | 101      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 121      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 150      | 151      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 181      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 220      | 221      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 271      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 330      | 331      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 391      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 470      | 471      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 561      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 680      | 681      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 821      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 1000     | 102      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 122      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 1500     | 152      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 182      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 2200     | 222      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 272      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 3300     | 332      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 392      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 4700     | 472      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 562      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 6800     | 682      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 822      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.01 μF  | 103      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 123      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.015    | 153      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 183      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.022    | 223      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 273      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.033    | 333      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 393      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.047    | 473      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 563      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.068    | 683      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 823      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.10     | 104      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 124      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.15     | 154      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 184      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.22     | 224      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 274      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.33     | 334      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 394      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.47     | 474      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 564      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 0.68     | 684      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 824      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 1.0      | 105      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 125      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 1.5      | 155      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 185      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 2.2      | 225      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 275      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
| 3.3      | 335      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |
|          | 395      |       |     |    |     |    |     |    |     |    |     |        |     |    |     |    |     |    |     |    |     |

High temperature ceramic cased capacitors, with a new, unique design concept, are ideally suited for continuous operation up to +260°C. Problems associated with epoxy cased/epoxy potted capacitors, such as material deterioration, cracks in cases and potted areas, are nonexistent, even at +260°C.

**COG**

COG (NP0) capacitors, which exhibit little change in capacitance with variations in temperature, are used in RF oscillators, precision timing circuits, wave filters, and other circuits requiring a predictable linear temperature coefficient.

**X7R**

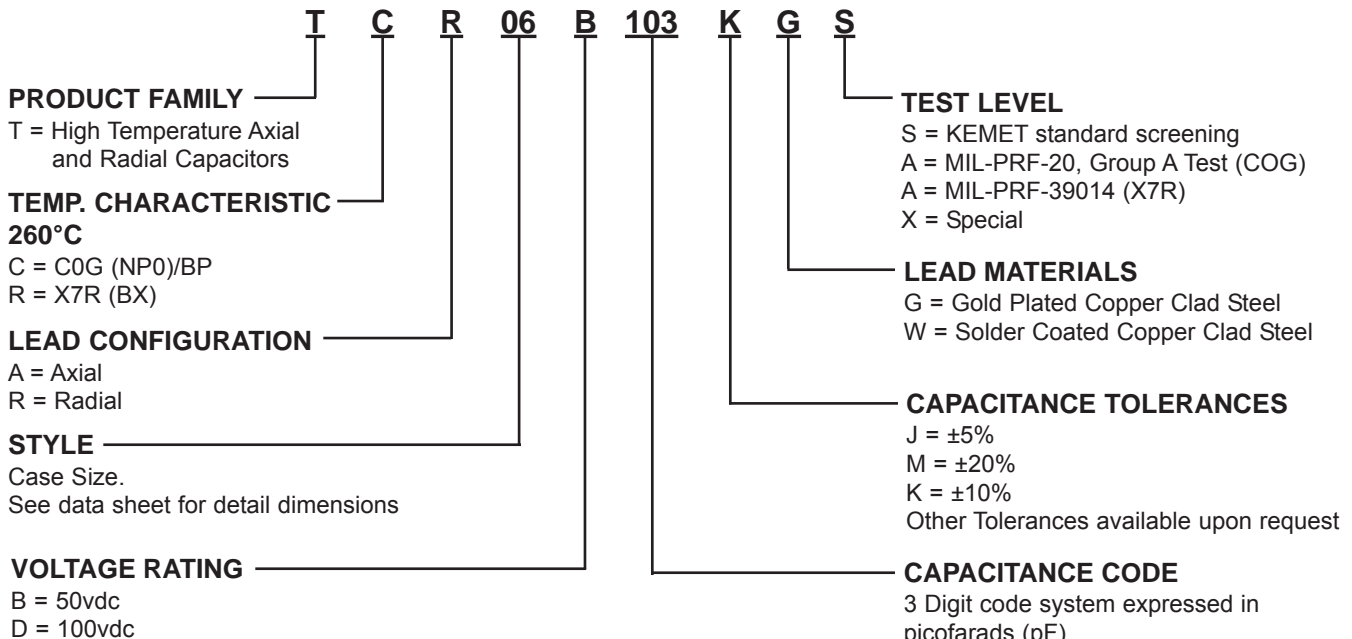
Conventional X7R materials lose up to 75% of the +25°C capacitance. Dissipation factor drops from 1.25% at +25°C to 0.2% at +260°C. At +120°C the ceramic undergoes a transformation (crystalline inversion) resulting in the material changing from ferroelectric to paraelectric - no piezoelectric behavior.

Typical applications include oil well logging (down hole), jet engine controls and geophysical pressure probes.

**INSTALLATION:**

Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated 18-30 watts. Remove all traces of flux or other contamination resulting from the soldering operation. An intermittent conducting path between the leads, at high voltage, could cause breakdown. Soldering temperature should not exceed +300°C.

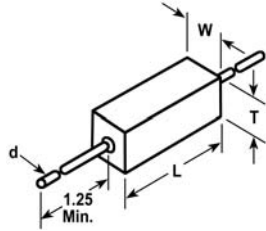
**PART NUMBER AND ORDERING INFORMATION**



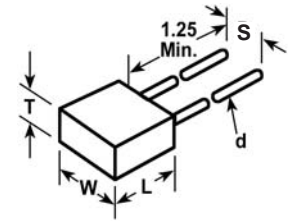
| MARKING           | EXAMPLE |
|-------------------|---------|
| Manufacturer's ID | KEC     |
| Capacitance       | 106J    |
| Voltage           | 50V     |
| Date Code         | 123     |
| Red dot = +260°C  | •       |

# High Temperature (+260°C) Axial and Radial Ceramic Cased Capacitors (C<sup>3</sup>) TCR/TCA Series

**AXIAL**  
All Dimensions  
in Inches (mm)



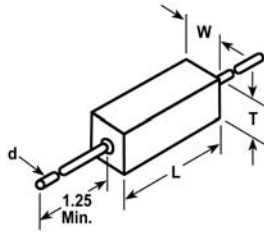
**RADIAL**  
All Dimensions  
in Inches (mm)



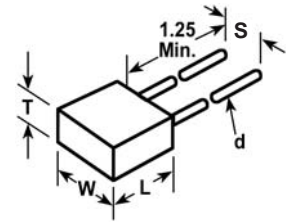
## COG DIELECTRIC

|         |                  | AXIAL                        |     |                              |     |                              |     |                              |     |                              |     | RADIAL                       |     |                              |     |                              |     |                              |     |                              |     |
|---------|------------------|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|
| STYLE   |                  | 16                           |     | 25                           |     | 39                           |     | 50                           |     | 69                           |     | 05                           |     | 06                           |     | 07                           |     | 08                           |     | 09                           |     |
| Cap     | L <sub>MAX</sub> | .170 (4.32)                  |     | .270 (6.86)                  |     | .400 (10.16)                 |     | .520 (13.21)                 |     | .720 (18.29)                 |     | .200 (5.08)                  |     | .300 (7.62)                  |     | .300 (7.62)                  |     | .500 (12.70)                 |     | .500 (12.70)                 |     |
|         | W <sub>MAX</sub> | .080 (2.03)                  |     | .100 (2.54)                  |     | .150 (3.81)                  |     | .265 (6.73)                  |     | .370 (9.40)                  |     | .200 (5.08)                  |     | .300 (7.62)                  |     | .300 (7.62)                  |     | .500 (12.70)                 |     | .500 (12.70)                 |     |
|         | T <sub>MAX</sub> | .080 (2.03)                  |     | .100 (2.54)                  |     | .150 (3.81)                  |     | .160 (4.06)                  |     | .160 (4.06)                  |     | .100 (2.54)                  |     | .100 (2.54)                  |     | .150 (3.81)                  |     | .100 (2.54)                  |     | .150 (3.81)                  |     |
|         | s                | ---                          |     | ---                          |     | ---                          |     | ---                          |     | ---                          |     | .200 ± .015<br>(5.08 ± .38)  |     | .200 ± .015<br>(5.08 ± .38)  |     | .200 ± .015<br>(5.08 ± .38)  |     | .400 ± .015<br>(10.16 ± .38) |     | .400 ± .015<br>(10.16 ± .38) |     |
|         | d                | .020 ± .002<br>(.508 ± .051) |     | .020 ± .002<br>(.508 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .020 ± .002<br>(.508 ± .051) |     | .020 ± .002<br>(.508 ± .051) |     | .020 ± .002<br>(.508 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     |
|         | Cap Code         | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     | WVDC                         |     |
|         |                  | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 | 50                           | 100 |
| 5.6pF   | 569              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 6.8     | 689              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 8.2     | 829              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 10      | 100              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 12      | 120              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 15      | 150              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 18      | 180              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 22      | 220              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 27      | 270              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 33      | 330              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 39      | 390              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 47      | 470              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 56      | 560              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 68      | 680              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 82      | 820              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 100     | 101              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 120     | 121              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 150     | 151              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 180     | 181              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 220     | 221              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 270     | 271              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 330     | 331              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 390     | 391              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 470     | 471              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 560     | 561              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 680     | 681              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 820     | 821              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 1000    | 102              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 1200    | 122              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 1500    | 152              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 1800    | 182              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 2200    | 222              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 2700    | 272              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 3300    | 332              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 3900    | 392              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 4700    | 472              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 5600    | 562              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 6800    | 682              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 8200    | 822              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.01 μF | 103              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.012   | 123              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.015   | 153              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.018   | 183              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.022   | 223              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.027   | 273              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.033   | 333              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.039   | 393              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.047   | 473              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.056   | 563              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.068   | 683              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.082   | 823              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.10    | 104              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.12    | 124              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |
| 0.15    | 154              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |                              |     |

**AXIAL**  
All Dimensions  
in Inches (mm)



**RADIAL**  
All Dimensions  
in Inches (mm)



**X7R DIELECTRIC**

|         |                  | AXIAL                        |     |                              |     |                              |     |                              |     |                              |     | RADIAL                       |    |                              |     |                              |    |                              |     |                              |    |  |
|---------|------------------|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|-----|------------------------------|----|------------------------------|-----|------------------------------|----|------------------------------|-----|------------------------------|----|--|
| STYLE   |                  | 16                           |     | 25                           |     | 39                           |     | 50                           |     | 69                           |     | 05                           |    | 06                           |     | 07                           |    | 08                           |     | 09                           |    |  |
| Cap     | L <sub>MAX</sub> | .170 (4.32)                  |     | .270 (6.86)                  |     | .400 (10.16)                 |     | .520 (13.21)                 |     | .720 (18.29)                 |     | .200 (5.08)                  |    | .300 (7.62)                  |     | .300 (7.62)                  |    | .500 (12.70)                 |     | .500 (12.70)                 |    |  |
|         | W <sub>MAX</sub> | .080 (2.03)                  |     | .100 (2.54)                  |     | .150 (3.81)                  |     | .265 (6.73)                  |     | .370 (9.40)                  |     | .200 (5.08)                  |    | .300 (7.62)                  |     | .300 (7.62)                  |    | .500 (12.70)                 |     | .500 (12.70)                 |    |  |
|         | T <sub>MAX</sub> | .080 (2.03)                  |     | .100 (2.54)                  |     | .150 (3.81)                  |     | .160 (4.06)                  |     | .160 (4.06)                  |     | .100 (2.54)                  |    | .100 (2.54)                  |     | .150 (3.81)                  |    | .100 (2.54)                  |     | .150 (3.81)                  |    |  |
|         | S                | ---                          |     | ---                          |     | ---                          |     | ---                          |     | ---                          |     | .200 ± .015<br>(5.08 ± .38)  |    | .200 ± .015<br>(5.08 ± .38)  |     | .200 ± .015<br>(5.08 ± .38)  |    | .400 ± .015<br>(10.16 ± .38) |     | .400 ± .015<br>(10.16 ± .38) |    |  |
|         | d                | .020 ± .002<br>(.508 ± .051) |     | .020 ± .002<br>(.508 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .025 ± .002<br>(.635 ± .051) |     | .020 ± .002<br>(.508 ± .051) |    | .020 ± .002<br>(.508 ± .051) |     | .020 ± .002<br>(.508 ± .051) |    | .025 ± .002<br>(.635 ± .051) |     | .025 ± .002<br>(.635 ± .051) |    |  |
|         | Cap Code         | WVDC                         | 50  |                              | 100 |                              | 50  |                              | 100 |                              | 50  |                              | 50 |                              | 100 |                              | 50 |                              | 100 |                              | 50 |  |
|         |                  |                              | 100 |                              | 50  |                              | 100 |                              | 50  |                              | 100 |                              | 50 |                              | 100 |                              | 50 |                              | 100 |                              | 50 |  |
|         | 100pF            | 101                          |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
|         | 120              | 121                          |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
|         | 150              | 151                          |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 180     | 181              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 220     | 221              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 270     | 271              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 330     | 331              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 390     | 391              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 470     | 471              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 560     | 561              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 680     | 681              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 820     | 821              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1000    | 102              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1200    | 122              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1500    | 152              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1800    | 182              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 2200    | 222              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 2700    | 272              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 3300    | 332              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 3900    | 392              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 4700    | 472              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 5600    | 562              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 6800    | 682              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 8200    | 822              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.01 μF | 103              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.012   | 123              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.015   | 153              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.018   | 183              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.022   | 223              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.027   | 273              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.033   | 333              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.039   | 393              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.047   | 473              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.056   | 563              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.068   | 683              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.082   | 823              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.10    | 104              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.12    | 124              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.15    | 154              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.18    | 184              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.22    | 224              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.27    | 274              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.33    | 334              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.39    | 394              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.47    | 474              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.56    | 564              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.68    | 684              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 0.82    | 824              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1.0     | 105              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1.2     | 125              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1.5     | 155              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 1.8     | 185              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 2.0     | 205              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 2.2     | 225              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 2.7     | 275              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 3.3     | 335              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |
| 3.9     | 395              |                              |     |                              |     |                              |     |                              |     |                              |     |                              |    |                              |     |                              |    |                              |     |                              |    |  |

# High Temperature (+200°C), High Voltage Radial Ceramic Cased Capacitors (C<sup>3</sup>)

## VCR/VRR Series

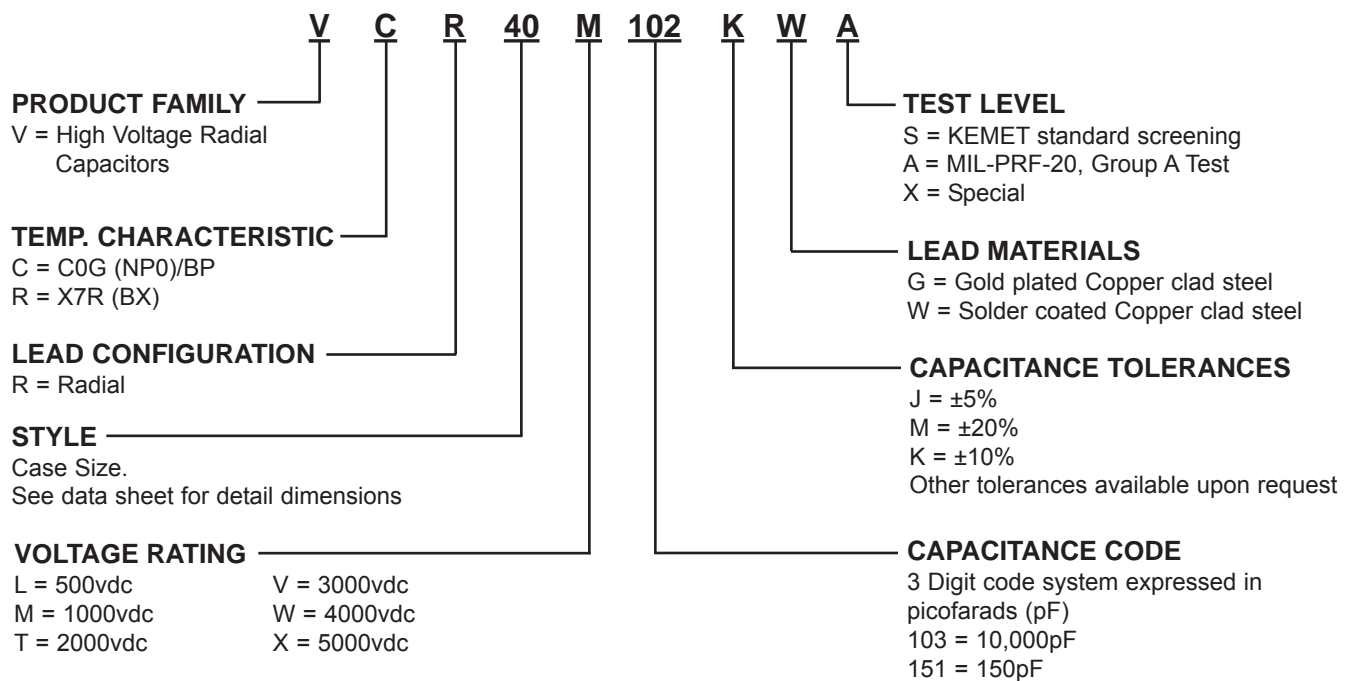
Ceramic cased capacitors, with a new, unique design concept which eliminates potential problems associated with conventional epoxy cased epoxy potted capacitors.

Major application is high voltage power supplies. High voltage capacitors are also utilized on high voltage meter multiplier and RF circuits.

### INSTALLATION:

Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated 18-30 watts. Remove all traces of flux or other contamination resulting from the soldering operation. An intermittent conducting path between the leads, at high voltage, could cause breakdown. Soldering temperature should not exceed +300°C.

### PART NUMBER AND ORDERING INFORMATION



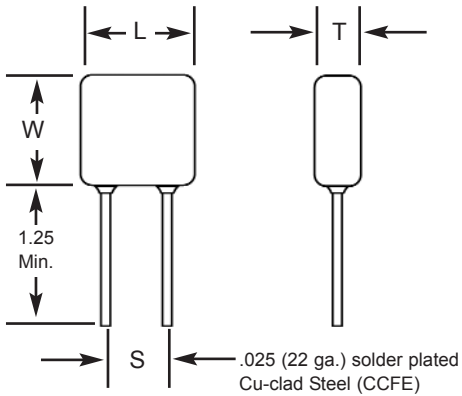
| MARKING           | EXAMPLE |
|-------------------|---------|
| Manufacturer's ID | KEC     |
| Capacitance       | 106J    |
| Voltage           | 500V    |
| Date Code         | 123     |







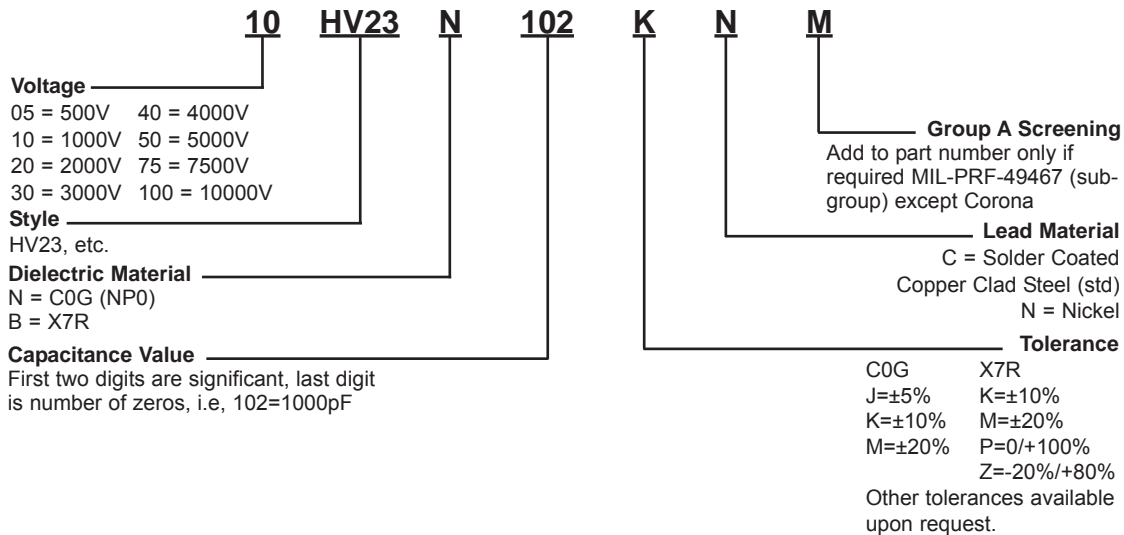
**CAPACITOR OUTLINE DRAWING**



**DIMENSIONS**

| Style | Sizes in Inches (mm) max. |              |               | Lead Spacing<br>±0.030 (S) |
|-------|---------------------------|--------------|---------------|----------------------------|
|       | Length (L)                | Width (W)    | Thickness (T) |                            |
| HV20  | .250 (6.35)               | .220 (5.59)  | .200 (5.08)   | .170 (4.32)                |
| HV21  | .320 (8.13)               | .280 (7.11)  | .250 (6.35)   | .220 (5.59)                |
| HV22  | .370 (9.40)               | .300 (7.62)  | .250 (6.35)   | .275 (6.98)                |
| HV23  | .470 (11.94)              | .400 (10.16) | .270 (6.89)   | .375 (9.52)                |
| HV24  | .570 (14.48)              | .500 (12.70) | .270 (6.89)   | .475 (12.06)               |
| HV25  | .670 (17.02)              | .600 (15.24) | .270 (6.89)   | .575 (14.60)               |
| HV26  | .770 (19.56)              | .720 (18.29) | .270 (6.89)   | .675 (17.14)               |
| HV30  | .450 (11.43)              | .220 (5.59)  | .200 (5.08)   | .300 (7.62)                |
| HV31  | .550 (13.97)              | .280 (7.11)  | .250 (6.35)   | .400 (10.16)               |
| HV33  | .850 (21.59)              | .400 (10.16) | .270 (6.89)   | .700 (17.78)               |
| HV34  | 1.050 (26.67)             | .500 (12.70) | .270 (6.89)   | .975 (24.76)               |
| HV35  | 1.250 (31.75)             | .600 (15.24) | .270 (6.89)   | 1.175 (29.84)              |
| HV36  | 1.450 (36.83)             | .720 (18.29) | .270 (6.89)   | 1.375 (34.92)              |

**PART NUMBER AND ORDERING INFORMATION**



**MARKING**

| (HV20, HV21) | (All Other Sizes) |
|--------------|-------------------|
| 103K         | HV24A103K         |
| 1 kV         | 1 kV              |
| KEC          | KEC               |
| Date Code    | Date Code         |







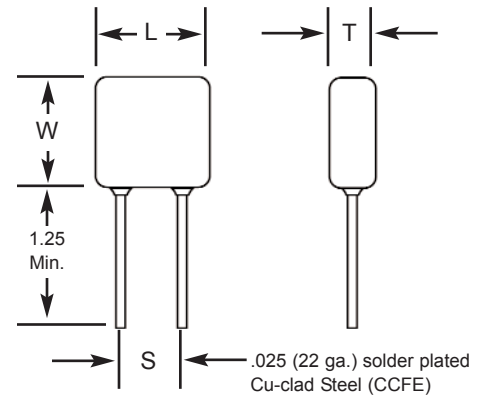


# High Voltage MIL-PRF-49467 (Equivalent) HV Series

## FEATURES

1. Electrical characteristics and environmental information on these parts may be obtained by referring to MIL-PRF-49467.
2. All parts are conformal coated multilayer ceramic.
3. Designed to provide excellent long-term reliability.
4. Parts are Group A screened per MIL-PRF-49467 which includes 100% Corona testing and meet all other specification requirements.
5. Designed for surface, sea and airborne military and commercial high-reliability applications.
6. No IR degradation over life.
7. BR (X7R) V/Tc is -40% at rated voltage and BZ (X7R) V/Tc is -40% at 60% rated voltage.
8. BX characteristic (-25%) on BR parts is approximately 52% rated voltage.
9. 100% Non-destructive test by means of CSAM inspection available.

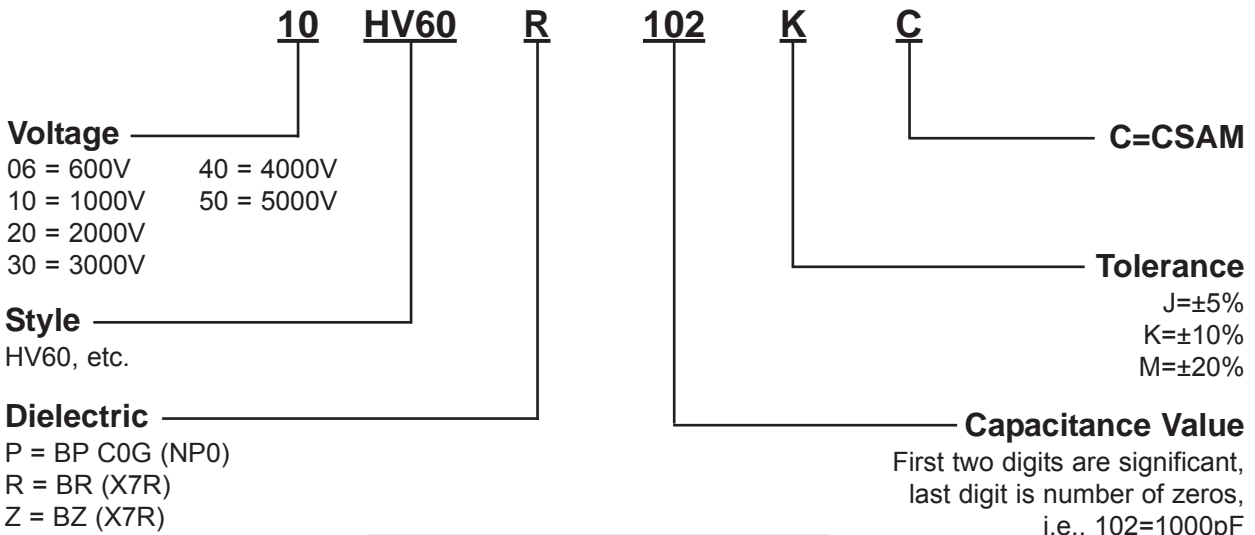
## CAPACITOR OUTLINE DRAWING



## DIMENSIONS

| Style | Sizes in Inches (mm) max. |              |               | Lead Spacing<br>±0.030 (S) |
|-------|---------------------------|--------------|---------------|----------------------------|
|       | Length (L)                | Width (W)    | Thickness (T) |                            |
| HV60  | .250 (6.35)               | .220 (5.59)  | .200 (5.08)   | .170 (4.32)                |
| HV61  | .320 (8.13)               | .280 (7.11)  | .250 (6.35)   | .220 (5.59)                |
| HV62  | .370 (9.40)               | .300 (7.62)  | .250 (6.35)   | .275 (6.98)                |
| HV63  | .470 (11.94)              | .400 (10.16) | .270 (6.86)   | .375 (9.52)                |
| HV64  | .570 (14.48)              | .500 (12.70) | .270 (6.86)   | .475 (12.06)               |
| HV65  | .670 (17.02)              | .600 (15.24) | .270 (6.86)   | .575 (14.60)               |
| HV66  | .770 (19.56)              | .720 (18.29) | .270 (6.86)   | .675 (17.14)               |
| HV68  | 1.300 (33.02)             | .600 (15.24) | .270 (6.86)   | 1.175 (29.84)              |
| HV69  | 1.500 (38.10)             | .720 (18.29) | .270 (6.86)   | 1.375 (34.92)              |

## PART NUMBER AND ORDERING INFORMATION



### MARKING

| (HV60, HV61) | (All Other Sizes) |
|--------------|-------------------|
| 102K         | HV63R102K         |
| 1 kV         | 1 kV              |
| KEC          | KEC               |
| Date Code    | Date Code         |





# High Voltage MIL-PRF-49467 (Equivalent) HV Series

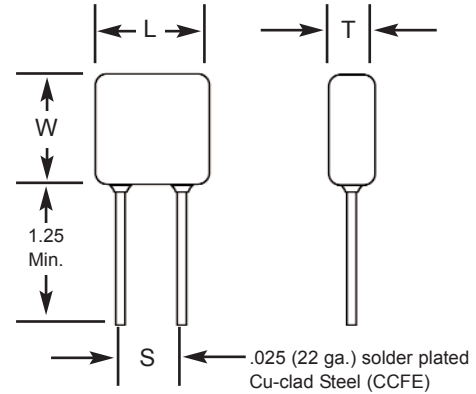
## X7R DIELECTRIC

| STYLE                      |       | HV60        |    |    | HV61        |    |    | HV62        |     |    | HV63         |    |     |    | HV64         |    |    |     | HV65         |    |    |    | HV66         |    |    |    | HV 68         |    |    | HV 69         |    |    |    |    |    |    |    |    |    |
|----------------------------|-------|-------------|----|----|-------------|----|----|-------------|-----|----|--------------|----|-----|----|--------------|----|----|-----|--------------|----|----|----|--------------|----|----|----|---------------|----|----|---------------|----|----|----|----|----|----|----|----|----|
| Cap                        | L MAX | .250 (6.35) |    |    | .320 (8.13) |    |    | .370 (9.40) |     |    | .470 (11.94) |    |     |    | .570 (14.48) |    |    |     | .670 (17.02) |    |    |    | .770 (19.56) |    |    |    | 1.300 (33.02) |    |    | 1.500 (38.10) |    |    |    |    |    |    |    |    |    |
|                            | W MAX | .220 (5.59) |    |    | .280 (7.11) |    |    | .300 (7.62) |     |    | .400 (10.16) |    |     |    | .500 (12.70) |    |    |     | .600 (15.24) |    |    |    | .720 (18.29) |    |    |    | .600 (15.24)  |    |    | .720 (18.29)  |    |    |    |    |    |    |    |    |    |
|                            | T MAX | .200 (5.08) |    |    | .250 (6.35) |    |    | .250 (6.35) |     |    | .270 (6.86)  |    |     |    | .270 (6.86)  |    |    |     | .270 (6.86)  |    |    |    | .270 (6.86)  |    |    |    | .270 (6.86)   |    |    | .270 (6.86)   |    |    |    |    |    |    |    |    |    |
| S± .030                    |       | .170 (4.32) |    |    | .220 (5.59) |    |    | .275 (6.98) |     |    | .375 (9.52)  |    |     |    | .475 (12.06) |    |    |     | .575 (14.60) |    |    |    | .675 (17.14) |    |    |    | 1.175 (29.84) |    |    | 1.375 (34.92) |    |    |    |    |    |    |    |    |    |
| Lead Dia.<br>+0.004/-0.002 |       | .025 (.635) |    |    | .025 (.635) |    |    | .025 (.635) |     |    | .025 (.635)  |    |     |    | .025 (.635)  |    |    |     | .025 (.635)  |    |    |    | .025 (.635)  |    |    |    | 0.025 (.635)  |    |    | 0.025 (.635)  |    |    |    |    |    |    |    |    |    |
|                            |       | WVDC        |    |    | WVDC        |    |    | WVDC        |     |    | WVDC         |    |     |    | WVDC         |    |    |     | WVDC         |    |    |    | WVDC         |    |    |    | WVDC          |    |    | WVDC          |    |    |    |    |    |    |    |    |    |
| Cap Code                   |       | 600         | 1k | 2k | 600         | 1k | 2k | 3k          | 600 | 1k | 2k           | 3k | 600 | 1k | 2k           | 3k | 4k | 600 | 1k           | 2k | 3k | 4k | 5k           | 1k | 2k | 3k | 4k            | 5k | 1k | 2k            | 3k | 4k | 5k | 3k | 4k | 5k | 3k | 4k | 5k |
| 270pF                      | 271   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 330                        | 331   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 390                        | 391   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 470                        | 471   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 560                        | 561   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 680                        | 681   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 820                        | 821   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 1000                       | 102   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 1200                       | 122   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 1500                       | 152   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 1800                       | 182   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 2200                       | 222   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 2700                       | 272   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 3300                       | 332   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 3900                       | 392   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 4700                       | 472   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 5600                       | 562   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 6800                       | 682   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 8200                       | 822   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.01uF                     | 103   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.012                      | 123   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.015                      | 153   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.018                      | 183   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.022                      | 223   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.027                      | 273   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.033                      | 333   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.039                      | 393   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.047                      | 473   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.056                      | 563   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.068                      | 683   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.082                      | 823   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.10                       | 104   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.12                       | 124   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.15                       | 154   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.18                       | 184   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.22                       | 224   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.27                       | 274   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.33                       | 334   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.39                       | 394   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |
| 0.47                       | 474   |             |    |    |             |    |    |             |     |    |              |    |     |    |              |    |    |     |              |    |    |    |              |    |    |    |               |    |    |               |    |    |    |    |    |    |    |    |    |

### FEATURES

1. Conforms to MIL-PRF-49467. (Group A Screening, Subgroup 1)
2. 100% Corona tested.
3. No IR degradation over life.
4. High density, low DF ceramic.
5. Conservative and proven design is recommended for non-repairable applications such as spacecraft.
6. CSAM inspection is available and is recommended for space applications.
7. Burn-in in a non-contaminating inert fluid is standard for  $\geq 2\text{KV}$ ; optional for 500V or 1 KV parts.

### CAPACITOR OUTLINE DRAWING



### DIMENSIONS

| Style | Sizes in Inches (mm) max. |              |               | Lead Spacing<br>$\pm 0.030$ (S) |
|-------|---------------------------|--------------|---------------|---------------------------------|
|       | Length (L)                | Width (W)    | Thickness (T) |                                 |
| HS20  | .250 (6.35)               | .220 (5.59)  | .200 (5.08)   | .170 (4.32)                     |
| HS21  | .320 (8.13)               | .280 (7.11)  | .250 (6.35)   | .220 (5.59)                     |
| HS22  | .370 (9.40)               | .300 (7.62)  | .250 (6.35)   | .275 (6.98)                     |
| HS30  | .450 (11.43)              | .220 (5.59)  | .200 (5.08)   | .300 (7.62)                     |
| HS23  | .470 (11.94)              | .400 (10.16) | .270 (6.89)   | .375 (9.52)                     |
| HS31  | .550 (13.97)              | .280 (7.11)  | .250 (6.35)   | .400 (10.16)                    |
| HS24  | .570 (14.48)              | .500 (12.70) | .270 (6.89)   | .475 (12.06)                    |
| HS25  | .670 (17.02)              | .600 (15.24) | .270 (6.89)   | .575 (14.60)                    |
| HS26  | .770 (19.56)              | .720 (18.29) | .270 (6.89)   | .675 (17.14)                    |
| HS33  | .850 (21.59)              | .400 (10.16) | .270 (6.89)   | .700 (17.78)                    |
| HS34  | 1.050 (26.67)             | .500 (12.70) | .270 (6.89)   | .975 (24.76)                    |
| HS35  | 1.250 (31.75)             | .600 (15.24) | .270 (6.89)   | 1.175 (29.84)                   |
| HS36  | 1.450 (36.83)             | .720 (18.29) | .270 (6.89)   | 1.375 (34.92)                   |

### PART NUMBER AND ORDERING INFORMATION

**VOLTAGE** 10 HS24 B 103 K C F **INERT LIQUID (BURN-IN)**  
 05 = 500V      40 = 4000V  
 10 = 1000V    50 = 5000V  
 20 = 2000V    75 = 7500V  
 30 = 3000V    100 = 10,000V  
 Std. for  $\geq 2\text{kV}$ ;  
 Add "F" if required  
 for 500V or 1kV parts

**STYLE** \_\_\_\_\_  
 HS24, etc.

**DIELECTRIC** \_\_\_\_\_  
 B = X7R  
 N = BP C0G (NP0)

**CAPACITANCE VALUE** \_\_\_\_\_  
 First two digits are significant,  
 last digit is number of zeros,  
 i.e., 103=10000pF

**C=C SAM**

**TOLERANCE**  
 J =  $\pm 5\%$   
 K =  $\pm 10\%$   
 M =  $\pm 20\%$   
 P = 0/+100%  
 Z = -20%/+80%

| MARKING      |                   |
|--------------|-------------------|
| (HS20, HV21) | (All Other Sizes) |
| 103K         | HS24B103K         |
| 1 kV         | 1 kV              |
| KEC          | KEC               |
| Date Code    | Date Code         |

# High Voltage Space Quality MLC (-55° to +125°C) HS Series

## COG DIELECTRIC

| STYLE                      |       | HS 20       |    |    | HS 21       |    |    | HS 22       |    |    | HS 23        |    |    |    | HS 24        |    |    |    |    | HS 25        |     |    |    |    | HS 26        |    |     |    |    |    |    |    |
|----------------------------|-------|-------------|----|----|-------------|----|----|-------------|----|----|--------------|----|----|----|--------------|----|----|----|----|--------------|-----|----|----|----|--------------|----|-----|----|----|----|----|----|
| Cap                        | L MAX | .250 (6.35) |    |    | .320 (8.13) |    |    | .370 (9.40) |    |    | .470 (11.94) |    |    |    | .570 (14.48) |    |    |    |    | .670 (17.02) |     |    |    |    | .770 (19.56) |    |     |    |    |    |    |    |
|                            | W MAX | .220 (5.59) |    |    | .280 (7.11) |    |    | .300 (7.62) |    |    | .400 (10.16) |    |    |    | .500 (12.70) |    |    |    |    | .600 (15.24) |     |    |    |    | .720 (18.29) |    |     |    |    |    |    |    |
|                            | T MAX | .200 (5.08) |    |    | .250 (6.35) |    |    | .250 (6.35) |    |    | .270 (6.86)  |    |    |    | .270 (6.86)  |    |    |    |    | .270 (6.86)  |     |    |    |    | .270 (6.86)  |    |     |    |    |    |    |    |
| S± .030                    |       | .170 (4.32) |    |    | .220 (5.59) |    |    | .275 (6.98) |    |    | .375 (9.52)  |    |    |    | .475 (12.06) |    |    |    |    | .575 (14.60) |     |    |    |    | .675 (17.14) |    |     |    |    |    |    |    |
| Lead Dia.<br>+0.004/-0.002 |       | .025 (.635) |    |    | .025 (.635) |    |    | .025 (.635) |    |    | .025 (.635)  |    |    |    | .025 (.635)  |    |    |    |    | .025 (.635)  |     |    |    |    | .025 (.635)  |    |     |    |    |    |    |    |
|                            |       | WVDC        |    |    | WVDC        |    |    | WVDC        |    |    | WVDC         |    |    |    | WVDC         |    |    |    |    | WVDC         |     |    |    |    | WVDC         |    |     |    |    |    |    |    |
| Cap Code                   |       | 500         | 1k | 2k | 500         | 1k | 2k | 500         | 1k | 2k | 500          | 1k | 2k | 3k | 500          | 1k | 2k | 3k | 4k | 5k           | 500 | 1k | 2k | 3k | 4k           | 5k | 500 | 1k | 2k | 3k | 4k | 5k |
| 12pF                       | 120   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 15                         | 150   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 18                         | 180   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 22                         | 220   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 27                         | 270   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 33                         | 330   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 39                         | 390   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 47                         | 470   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 56                         | 560   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 68                         | 680   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 82                         | 820   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 100                        | 101   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 120                        | 121   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 150                        | 151   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 180                        | 181   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 220                        | 221   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 270                        | 271   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 330                        | 331   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 390                        | 391   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 470                        | 471   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 560                        | 561   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 680                        | 681   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 820                        | 821   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 1000                       | 102   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 1200                       | 122   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 1500                       | 152   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 1800                       | 182   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 2200                       | 222   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 2700                       | 272   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 3300                       | 332   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 3900                       | 392   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 4700                       | 472   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 5600                       | 562   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 6800                       | 682   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 8200                       | 822   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.010uF                    | 103   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.012                      | 123   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.015                      | 153   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.018                      | 183   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.022                      | 223   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.027                      | 273   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.033                      | 333   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.039                      | 393   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.047                      | 473   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.056                      | 563   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.068                      | 683   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.082                      | 823   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.10                       | 104   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.12                       | 124   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |
| 0.15                       | 154   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |     |    |    |    |              |    |     |    |    |    |    |    |



# High Voltage Space Quality MLC (-55° to +125°C) HS Series

## X7R DIELECTRIC

| STYLE                      |       | HS 20       |    |    | HS 21       |    |    | HS 22       |    |    | HS 23        |    |    |    | HS 24        |    |    |    |    | HS 25        |    |    |    |    | HS 26        |     |    |    |    |    |    |
|----------------------------|-------|-------------|----|----|-------------|----|----|-------------|----|----|--------------|----|----|----|--------------|----|----|----|----|--------------|----|----|----|----|--------------|-----|----|----|----|----|----|
| Cap                        | L MAX | .250 (6.35) |    |    | .320 (8.13) |    |    | .370 (9.40) |    |    | .470 (11.94) |    |    |    | .570 (14.48) |    |    |    |    | .670 (17.02) |    |    |    |    | .770 (19.56) |     |    |    |    |    |    |
|                            | W MAX | .220 (5.59) |    |    | .280 (7.11) |    |    | .300 (7.62) |    |    | .400 (10.16) |    |    |    | .500 (12.70) |    |    |    |    | .600 (15.24) |    |    |    |    | .720 (18.29) |     |    |    |    |    |    |
|                            | T MAX | .200 (5.08) |    |    | .250 (6.35) |    |    | .250 (6.35) |    |    | .270 (6.86)  |    |    |    | .270 (6.86)  |    |    |    |    | .270 (6.86)  |    |    |    |    | .270 (6.86)  |     |    |    |    |    |    |
| S± .030                    |       | .170 (4.32) |    |    | .220 (5.59) |    |    | .275 (6.98) |    |    | .375 (9.52)  |    |    |    | .475 (12.06) |    |    |    |    | .575 (14.60) |    |    |    |    | .675 (17.14) |     |    |    |    |    |    |
| Lead Dia.<br>+0.004/-0.002 |       | .025 (.635) |    |    | .025 (.635) |    |    | .025 (.635) |    |    | .025 (.635)  |    |    |    | .025 (.635)  |    |    |    |    | .025 (.635)  |    |    |    |    | .025 (.635)  |     |    |    |    |    |    |
|                            |       | WVDC        |    |    | WVDC        |    |    | WVDC        |    |    | WVDC         |    |    |    | WVDC         |    |    |    |    | WVDC         |    |    |    |    | WVDC         |     |    |    |    |    |    |
| Cap Code                   |       | 500         | 1k | 2k | 500         | 1k | 2k | 500         | 1k | 2k | 500          | 1k | 2k | 3k | 500          | 1k | 2k | 3k | 4k | 500          | 1k | 2k | 3k | 4k | 5k           | 500 | 1k | 2k | 3k | 4k | 5k |
| 270pF                      | 271   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 330                        | 331   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 390                        | 391   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 470                        | 471   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 560                        | 561   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 680                        | 681   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 820                        | 821   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1000                       | 102   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1200                       | 122   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1500                       | 152   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1800                       | 182   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 2200                       | 222   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 2700                       | 272   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 3300                       | 332   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 3900                       | 392   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 4700                       | 472   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 5600                       | 562   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 6800                       | 682   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 8200                       | 822   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.010uF                    | 103   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.012                      | 123   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.015                      | 153   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.018                      | 183   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.022                      | 223   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.027                      | 273   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.033                      | 333   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.039                      | 393   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.047                      | 473   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.056                      | 563   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.068                      | 683   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.082                      | 823   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.10                       | 104   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.12                       | 124   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.15                       | 154   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.18                       | 184   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.22                       | 224   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.27                       | 274   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.33                       | 334   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.39                       | 394   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.47                       | 474   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.56                       | 564   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.68                       | 684   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 0.82                       | 824   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1.0                        | 105   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1.2                        | 125   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1.5                        | 155   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 1.8                        | 185   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 2.2                        | 225   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |
| 2.7                        | 275   |             |    |    |             |    |    |             |    |    |              |    |    |    |              |    |    |    |    |              |    |    |    |    |              |     |    |    |    |    |    |

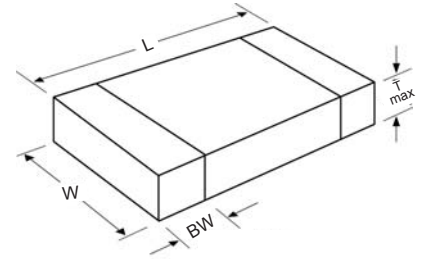


# High Voltage Ceramic Chip (+125°C) Military Equivalent

## FEATURES

1. The ceramic chip capacitors described in this section are the types used in our other high voltage ceramic multilayer product lines.
2. Types BP available as described in MIL-PRF-49467.
3. Group A and B screening per MIL-PRF-49467 available. - TCVC exceptions apply.
4. Ceramic chip capacitors are extremely sensitive to thermal shock damage during installation. Wherever possible, processes involving infrared or vapor phase soldering systems should be utilized.
5. Higher voltages available upon request.
6. Where nickel barrier termination is required, bandwidth dimensions may exceed the standard dimension listed.

## CERAMIC CHIP OUTLINE DRAWING

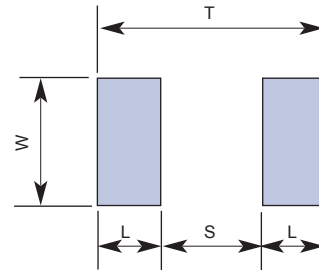


## DIMENSIONS

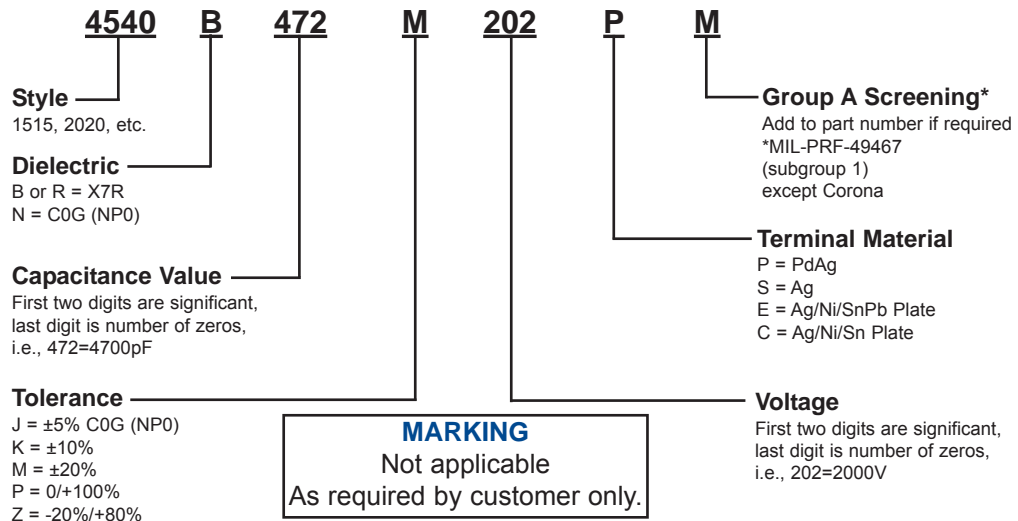
| Style | Length (L)<br>Inches (mm) | Width (W)<br>Inches (mm) | Thickness (T) max<br>Inches (mm) | Bandwidth (BW)<br>Inches |
|-------|---------------------------|--------------------------|----------------------------------|--------------------------|
| 1515  | .150 ±.015 (3.81 ±.38)    | .150 ±.015 (3.81 ±.38)   | .140 (3.55)                      | .010 - .030"             |
| 1812  | .180 ±.020 (4.57 ±.51)    | .120 ±.015 (3.05 ±.38)   | .100 (2.54)                      | .010 - .040"             |
| 1825  | .180 ±.020 (4.57 ±.51)    | .250 ±.020 (6.35 ±.51)   | .160 (4.07)                      | .010 - .040"             |
| 2020  | .200 ±.020 (5.08 ±.51)    | .200 ±.020 (5.08 ±.51)   | .180 (3.55)                      | .010 - .040"             |
| 2225  | .220 ±.020 (5.59 ±.51)    | .250 ±.020 (6.35 ±.51)   | .200 (5.08)                      | .010 - .040"             |
| 2520  | .250 ±.020 (6.35 ±.51)    | .200 ±.020 (5.08 ±.51)   | .180 (4.57)                      | .030 - .060"             |
| 3333  | .330 ±.030 (8.38 ±.76)    | .330 ±.030 (8.38 ±.76)   | .220 (5.59)                      | .030 - .060"             |
| 3530  | .350 ±.030 (8.89 ±.76)    | .300 ±.030 (7.62 ±.76)   | .220 (5.59)                      | .030 - .060"             |
| 4040  | .400 ±.030 (10.2 ±.76)    | .400 ±.030 (10.2 ±.76)   | .220 (5.59)                      | .030 - .060"             |
| 4540  | .450 ±.030 (11.43 ±.76)   | .400 ±.030 (10.2 ±.76)   | .220 (5.59)                      | .030 - .060"             |
| 5440  | .540 ±.030 (13.7 ±.76)    | .400 ±.030 (10.2 ±.76)   | .220 (5.59)                      | .030 - .060"             |
| 5550  | .550 ±.030 (14.0 ±.76)    | .500 ±.030 (12.7 ±.76)   | .220 (5.59)                      | .030 - .060"             |
| 6560  | .650 ±.030 (16.5 ±.76)    | .600 ±.030 (15.2 ±.76)   | .220 (5.59)                      | .030 - .060"             |

## RECOMMENDED SOLDER PAD PATTERN DIMENSIONS

| Chip Size | T (Total Length) |       | S (Separation) |       | W (Pad Width) |       | L (Pad Length) |       |
|-----------|------------------|-------|----------------|-------|---------------|-------|----------------|-------|
|           | mm               | in.   | mm             | in.   | mm            | in.   | mm             | in.   |
| 1515      | 5.20             | 0.205 | 1.90           | 0.075 | 4.34          | 0.171 | 1.65           | 0.065 |
| 1812      | 5.390            | 0.232 | 2.30           | 0.091 | 3.70          | 0.146 | 1.80           | 0.071 |
| 1825      | 5.90             | 0.232 | 2.30           | 0.091 | 6.90          | 0.272 | 1.80           | 0.071 |
| 2020      | 6.50             | 0.256 | 2.80           | 0.110 | 5.62          | 0.221 | 1.85           | 0.073 |
| 2225      | 7.00             | 0.276 | 3.30           | 0.130 | 6.80          | 0.268 | 1.85           | 0.073 |
| 2520      | 8.68             | 0.342 | 4.98           | 0.196 | 5.62          | 0.221 | 1.85           | 0.073 |
| 3333      | 10.91            | 0.430 | 7.11           | 0.280 | 9.27          | 0.365 | 1.90           | 0.075 |
| 3530      | 11.51            | 0.453 | 7.61           | 0.300 | 8.51          | 0.335 | 1.95           | 0.077 |
| 4040      | 12.88            | 0.507 | 8.88           | 0.350 | 11.05         | 0.435 | 2.00           | 0.079 |
| 4540      | 14.21            | 0.559 | 10.15          | 0.400 | 11.05         | 0.435 | 2.03           | 0.080 |
| 5440      | 16.51            | 0.650 | 10.41          | 0.410 | 11.05         | 0.435 | 3.05           | 0.120 |
| 5550      | 18.92            | 0.745 | 12.82          | 0.505 | 13.59         | 0.535 | 3.05           | 0.120 |
| 6560      | 19.80            | 0.780 | 13.20          | 0.520 | 16.13         | 0.635 | 3.30           | 0.130 |



## PART NUMBER AND ORDERING INFORMATION







# High Voltage Ceramic Chip (+125°C) Military Equivalent

## COG DIELECTRIC

| STYLE   |            | 4040                         |     |    |    |    | 4540                         |     |    |    |    | 5440                          |    |     |    |    | 5550                         |    |     |    |    | 6560                         |    |    |     |    |    |    |    |
|---------|------------|------------------------------|-----|----|----|----|------------------------------|-----|----|----|----|-------------------------------|----|-----|----|----|------------------------------|----|-----|----|----|------------------------------|----|----|-----|----|----|----|----|
| Cap     | L          | .400 ± .030<br>(10.16 ± .76) |     |    |    |    | .450 ± .030<br>(11.43 ± .76) |     |    |    |    | 0.540 ± .030<br>(13.72 ± .76) |    |     |    |    | .550 ± .030<br>(13.97 ± .76) |    |     |    |    | .650 ± .030<br>(16.51 ± .76) |    |    |     |    |    |    |    |
|         | W          | .400 ± .030<br>(10.16 ± .76) |     |    |    |    | .400 ± .030<br>(10.16 ± .76) |     |    |    |    | .400 ± .030<br>(10.16 ± .76)  |    |     |    |    | .500 ± .030<br>(12.70 ± .76) |    |     |    |    | .600 ± .030<br>(15.20 ± .76) |    |    |     |    |    |    |    |
|         | T MAX      | .220 (5.59)                  |     |    |    |    | .220 (5.59)                  |     |    |    |    | .220 (5.59)                   |    |     |    |    | .220 (5.59)                  |    |     |    |    | .220 (5.59)                  |    |    |     |    |    |    |    |
|         | Band Width | 0.030 - 0.060                |     |    |    |    | 0.030 - 0.060                |     |    |    |    | 0.030 - 0.060                 |    |     |    |    | 0.030 - 0.060                |    |     |    |    | 0.030 - 0.060                |    |    |     |    |    |    |    |
|         | Cap Code   | WVDC                         |     |    |    |    | WVDC                         |     |    |    |    | WVDC                          |    |     |    |    | WVDC                         |    |     |    |    | WVDC                         |    |    |     |    |    |    |    |
|         |            |                              | 500 | 1k | 2k | 3k | 4k                           | 500 | 1k | 2k | 3k | 4k                            | 5k | 500 | 1k | 2k | 3k                           | 4k | 500 | 1k | 2k | 3k                           | 4k | 5k | 500 | 1k | 2k | 3k | 4k |
| 15pF    | 150        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 18      | 180        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 22      | 220        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 27      | 270        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 33      | 330        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 39      | 390        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 47      | 470        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 56      | 560        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 68      | 680        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 82      | 820        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 100     | 101        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 120     | 121        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 150     | 151        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 180     | 181        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 220     | 221        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 270     | 271        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 330     | 331        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 390     | 391        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 470     | 471        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 560     | 561        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 680     | 681        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 820     | 821        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 1000    | 102        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 1200    | 122        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 1500    | 152        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 1800    | 182        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 2200    | 222        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 2700    | 272        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 3300    | 332        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 3900    | 392        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 4700    | 472        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 5600    | 562        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 6800    | 682        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 8200    | 822        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.010uF | 103        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.012   | 123        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.015   | 153        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.018   | 183        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.022   | 223        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.027   | 273        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.033   | 333        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.039   | 393        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.047   | 473        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.056   | 563        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.068   | 683        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.082   | 823        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |
| 0.10    | 104        |                              |     |    |    |    |                              |     |    |    |    |                               |    |     |    |    |                              |    |     |    |    |                              |    |    |     |    |    |    |    |

X7R DIELECTRIC

| STYLE   |            | 1515                        |    |     | 1812                        |    |     | 1825                        |    |    |     | 2020                        |    |    |     | 2225                         |    |    |     | 2520                        |    |    |     | 3333                        |    |    |     | 3530                        |    |    |     |    |    |    |    |  |  |  |
|---------|------------|-----------------------------|----|-----|-----------------------------|----|-----|-----------------------------|----|----|-----|-----------------------------|----|----|-----|------------------------------|----|----|-----|-----------------------------|----|----|-----|-----------------------------|----|----|-----|-----------------------------|----|----|-----|----|----|----|----|--|--|--|
| Cap     | L          | .150 ± .015<br>(3.81 ± .38) |    |     | .180 ± .020<br>(4.57 ± .51) |    |     | .180 ± .020<br>(4.57 ± .51) |    |    |     | .200 ± .020<br>(5.08 ± .51) |    |    |     | .220 ± 0.020<br>(5.59 ± .51) |    |    |     | .250 ± .020<br>(6.35 ± .51) |    |    |     | .330 ± .030<br>(8.38 ± .76) |    |    |     | .350 ± .030<br>(8.89 ± .76) |    |    |     |    |    |    |    |  |  |  |
|         | W          | .150 ± .015<br>(3.81 ± .38) |    |     | .120 ± .015<br>(3.05 ± .38) |    |     | .250 ± .020<br>(6.35 ± .51) |    |    |     | .200 ± .020<br>(5.08 ± .51) |    |    |     | .250 ± .020<br>(6.35 ± .51)  |    |    |     | .200 ± .020<br>(5.08 ± .51) |    |    |     | .330 ± .030<br>(8.38 ± .76) |    |    |     | .300 ± .030<br>(7.62 ± .76) |    |    |     |    |    |    |    |  |  |  |
|         | T MAX      | .140 (3.55)                 |    |     | .100 (2.54)                 |    |     | .160 (4.07)                 |    |    |     | .180 (4.57)                 |    |    |     | .200 (5.08)                  |    |    |     | .180 (4.57)                 |    |    |     | .220 (5.59)                 |    |    |     | .220 (5.59)                 |    |    |     |    |    |    |    |  |  |  |
|         | Band Width | 0.010-0.030                 |    |     | 0.010-0.040                 |    |     | 0.010-0.040                 |    |    |     | 0.010-0.040                 |    |    |     | 0.010-0.040                  |    |    |     | 0.030-0.060                 |    |    |     | 0.030-0.060                 |    |    |     | 0.030-0.060                 |    |    |     |    |    |    |    |  |  |  |
|         | Cap Code   | WVDC                        |    |     | WVDC                        |    |     | WVDC                        |    |    |     | WVDC                        |    |    |     | WVDC                         |    |    |     | WVDC                        |    |    |     | WVDC                        |    |    |     | WVDC                        |    |    |     |    |    |    |    |  |  |  |
|         | 500        | 1k                          | 2k | 500 | 1k                          | 2k | 500 | 1k                          | 2k | 3k | 500 | 1k                          | 2k | 3k | 500 | 1k                           | 2k | 3k | 500 | 1k                          | 2k | 3k | 500 | 1k                          | 2k | 3k | 500 | 1k                          | 2k | 3k | 500 | 1k | 2k | 3k | 4k |  |  |  |
| 270pF   | 271        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 330     | 331        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 390     | 391        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 470     | 471        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 560     | 561        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 680     | 681        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 820     | 821        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 1000    | 102        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 1200    | 122        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 1500    | 152        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 1800    | 182        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 2200    | 222        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 2700    | 272        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 3300    | 332        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 3900    | 392        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 4700    | 472        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 5600    | 562        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 6800    | 682        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 8200    | 822        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.010uF | 103        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.012   | 123        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.015   | 153        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.018   | 183        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.022   | 223        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.027   | 273        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.033   | 333        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.039   | 393        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.047   | 473        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.056   | 563        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.068   | 683        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.082   | 823        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.10    | 104        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.12    | 124        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.15    | 154        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.18    | 184        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.22    | 224        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.27    | 274        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.33    | 334        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.39    | 394        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.47    | 474        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.56    | 564        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.68    | 684        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |
| 0.82    | 824        |                             |    |     |                             |    |     |                             |    |    |     |                             |    |    |     |                              |    |    |     |                             |    |    |     |                             |    |    |     |                             |    |    |     |    |    |    |    |  |  |  |

# High Voltage Ceramic Chip (+125°C) Military Equivalent

## X7R DIELECTRIC

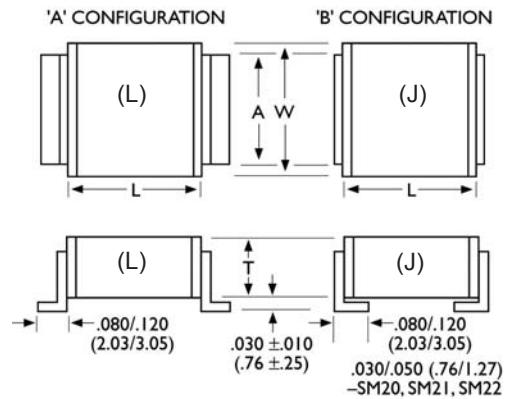
| STYLE   |            | 4040                         |    |    |    |    | 4540                         |    |    |    |    | 5440                         |     |    |    |    | 5550                         |     |    |    |    | 6560                         |    |     |    |    |    |    |    |
|---------|------------|------------------------------|----|----|----|----|------------------------------|----|----|----|----|------------------------------|-----|----|----|----|------------------------------|-----|----|----|----|------------------------------|----|-----|----|----|----|----|----|
| Cap     | L          | .400 ± .030<br>(10.16 ± .76) |    |    |    |    | .450 ± .030<br>(11.43 ± .76) |    |    |    |    | .540 ± .030<br>(13.72 ± .76) |     |    |    |    | .550 ± .030<br>(13.97 ± .76) |     |    |    |    | .650 ± .030<br>(16.51 ± .76) |    |     |    |    |    |    |    |
|         | W          | .400 ± .030<br>(10.16 ± .76) |    |    |    |    | .400 ± .030<br>(10.16 ± .76) |    |    |    |    | .400 ± .030<br>(10.16 ± .76) |     |    |    |    | .500 ± .030<br>(12.70 ± .76) |     |    |    |    | .600 ± .030<br>(15.20 ± .76) |    |     |    |    |    |    |    |
|         | T MAX      | .220 (5.59)                  |    |    |    |    | .220 (5.59)                  |    |    |    |    | .220 (5.59)                  |     |    |    |    | .220 (5.59)                  |     |    |    |    | .220 (5.59)                  |    |     |    |    |    |    |    |
|         | Band Width | 0.030 - 0.060                |    |    |    |    | 0.030 - 0.060                |    |    |    |    | 0.030 - 0.060                |     |    |    |    | 0.030 - 0.060                |     |    |    |    | 0.030 - 0.060                |    |     |    |    |    |    |    |
|         | Cap Code   | WVDC                         |    |    |    |    | WVDC                         |    |    |    |    | WVDC                         |     |    |    |    | WVDC                         |     |    |    |    | WVDC                         |    |     |    |    |    |    |    |
|         |            | 500                          | 1k | 2k | 3k | 4k | 500                          | 1k | 2k | 3k | 4k | 5k                           | 500 | 1k | 2k | 3k | 4k                           | 500 | 1k | 2k | 3k | 4k                           | 5k | 500 | 1k | 2k | 3k | 4k | 5k |
| 470pF   | 471        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 560     | 561        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 680     | 681        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 820     | 821        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1000    | 102        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1200    | 122        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1500    | 152        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1800    | 182        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 2200    | 222        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 2700    | 272        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 3300    | 332        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 3900    | 392        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 4700    | 472        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 5600    | 562        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 6800    | 682        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 8200    | 822        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.010uF | 103        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.012   | 123        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.015   | 153        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.018   | 183        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.022   | 223        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.027   | 273        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.033   | 333        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.039   | 393        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.047   | 473        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.056   | 563        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.068   | 683        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.082   | 823        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.10    | 104        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.12    | 124        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.15    | 154        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.18    | 184        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.22    | 224        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.27    | 274        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.33    | 334        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.39    | 394        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.47    | 474        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.56    | 564        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.68    | 684        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 0.82    | 824        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1.0     | 105        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1.2     | 125        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1.5     | 155        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 1.8     | 185        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 2.2     | 225        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |
| 2.7     | 275        |                              |    |    |    |    |                              |    |    |    |    |                              |     |    |    |    |                              |     |    |    |    |                              |    |     |    |    |    |    |    |

## FEATURES

1. Silver plated copper alloy terminal for easy soldering.
2. Mounting tabs are designed to minimize the effect of thermal stress introduced by the differences in coefficient of thermal expansion between the capacitor and the mounting surface.
3. Low ESR.
4. High current discharge capability.
5. Group A and B screening per MIL-PRF-49467 available .
6. Standard lead configuration is 'B'.(J) If lead configuration is left out of part number the lead style is assumed to be 'B'.

## CAPACITOR OUTLINE DRAWING

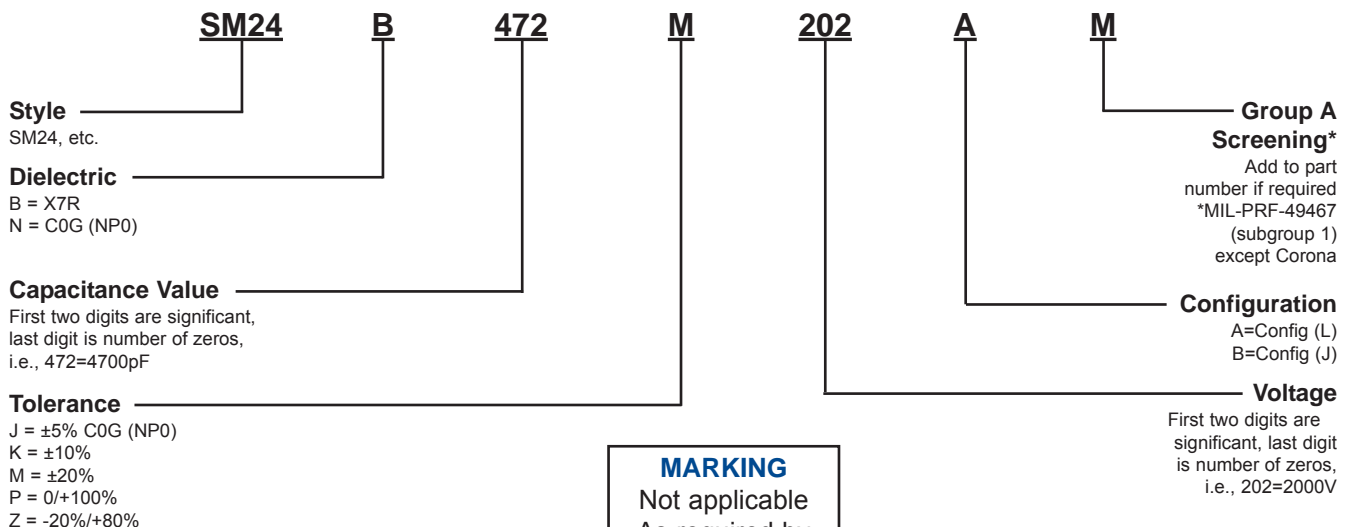
### STANDARD



## DIMENSIONS

| Style | Length (L)<br>Inches (mm) | Width (W)<br>Inches (mm) | Thickness (T) max<br>Inches (mm) | Tab (A) max<br>Inches (mm) |
|-------|---------------------------|--------------------------|----------------------------------|----------------------------|
| SM20  | .150 ±.015 (3.81 ±.38)    | .150 ±.015 (3.81 ±.38)   | .130 (3.30)                      | .100 (2.54)                |
| SM21  | .200 ±.020 (5.08 ±.51)    | .200 ±.020 (5.08 ±.51)   | .180 (4.57)                      | .100 (2.54)                |
| SM22  | .250 ±.020 (6.35 ±.51)    | .200 ±.020 (5.08 ±.51)   | .180 (4.57)                      | .100 (2.54)                |
| SM23  | .350 ±.030 (8.89 ±.76)    | .300 ±.030 (7.62 ±.76)   | .220 (5.59)                      | .200 (5.08)                |
| SM24  | .450 ±.030 (11.43 ±.76)   | .400 ±.030 (10.20 ±.76)  | .220 (5.59)                      | .300 (7.62)                |
| SM25  | .550 ±.030 (14.00 ±.76)   | .500 ±.030 (12.70 ±.76)  | .220 (5.59)                      | .400 (10.2)                |
| SM26  | .650 ±.030 (16.50 ±.76)   | .600 ±.030 (15.20 ±.76)  | .220 (5.59)                      | .500 (12.7)                |
| SM30  | .300 ±.030 (7.62 ±.76)    | .150 ±.015 (3.81 ±.38)   | .140 (3.55)                      | .100 (2.54)                |
| SM31  | .400 ±.030 (10.20 ±.76)   | .200 ±.020 (5.08 ±.51)   | .130 (3.30)                      | .100 (2.54)                |
| SM33  | .700 ±.030 (17.08 ±.76)   | .300 ±.030 (7.62 ±.76)   | .180 (4.57)                      | .200 (5.08)                |
| SM34  | .900 ±.030 (22.90 ±.76)   | .400 ±.030 (10.20 ±.76)  | .220 (5.59)                      | .300 (7.62)                |
| SM35  | 1.100 ±.030 (27.90 ±.76)  | .500 ±.030 (12.70 ±.76)  | .220 (5.59)                      | .400 (10.2)                |
| SM36  | 1.350 ±.030 (33.00 ±.76)  | .600 ±.030 (15.20 ±.76)  | .220 (5.59)                      | .500 (12.7)                |

## PART NUMBER AND ORDERING INFORMATION



**MARKING**  
Not applicable  
As required by customer only.











# High Voltage Disc Ceramic Capacitor

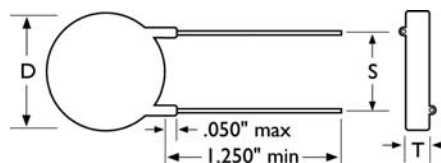
## D Series

### FEATURES

Disc ceramic capacitors made under strict quality control procedures are a reliable component. Special attention is given to the ceramic pressing operation to assure high and uniform ceramic density.

These parts are manufactured for the quality conscious customer. Parts are available screened to MIL-PRF-49467 established reliability specification.

### CAPACITOR OUTLINE DRAWING



### INSTALLATION

Higher-voltage parts may require further encapsulation to prevent surface breakdown. Parts should be cleaned and oven dried at 85°C before further encapsulation. Silicone rubbers or an epoxy may be used. De-airing of encapsulants is recommended. We recommend that a heat sink be attached to the lead between the soldering iron and the capacitor during installation soldering. Testing of higher-voltage parts before encapsulation may be done in a suitable dielectric fluid such as Freon.

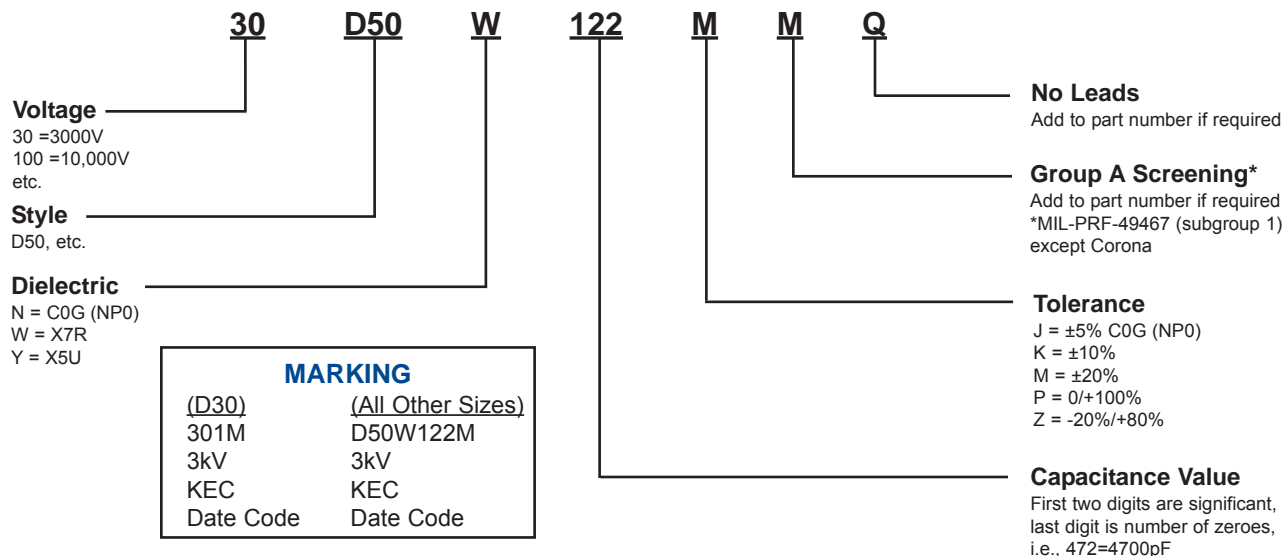
### DIELECTRIC COMPARISON

| CERAMIC TYPE                                | C0G (NP0)  | X7R  | X5U  |
|---|--|--|--|
| Dissipation Factor                          | 0.1%   | 2.5%   | 2.5%   |
| Temperature Coefficient                     | ±30ppm/°C  | ±15%   | +22% -56%  |
| Voltage Coefficient                         | 0  | -20%   | N/A  |
| Dielectric Withstanding Voltage Test        | 3 to 15kV at 1.5x rated, 20 to 50kV at rated +10kV | 3 to 15kV at 1.5x rated, 20 to 50kV at rated +10kV | 3 to 15kV at 1.5x rated, 20 to 50kV at rated +10kV |
| Insulation Resistance (25°C)                | 100k megohms or 1k megohms-μF, whichever is less   | 100k megohms or 1k megohms-μF, whichever is less   | 10k megohms or 100 megohms-μF, whichever is less   |
| Operating Temperature Range (rated voltage) | -55°C to +125°C                                    | -55°C to +125°C                                    | -55°C to +85°C                                     |

**Thickness:** 3kV = 0.15 (3.81)  
**Inches (mm) max.** 5kV = 0.20 (5.08)  
 7.5kV = 0.28 (7.11)  
 10kV = 0.35 (8.89)  
 15kV = 0.45 (11.43)  
 20kV = 0.55 (13.97)  
 30kV = 0.95 (24.13)  
 40kV = 1.20 (30.48)  
 50kV = 1.50 (38.10)

**Lead Type:** Solder plated, copper-clad steel (CCFE)-  
 D30, D40: 0.025" (22GA)  
 D50 & Larger: 0.032" (20GA)

### PART NUMBER AND ORDERING INFORMATION



### 3K VDC

| Disc Style | D Max. | S ±.030 | C0G (NP0) |       | X7R    |        | X5U     |         |
|------------|--------|---------|-----------|-------|--------|--------|---------|---------|
|            |        |         | Min.      | Max.  | Min.   | Max.   | Min.    | Max.    |
| D30        | .30    | .250    | 7.8pF     | 9.6pF | 250pF  | 300pF  | 520pF   | 700pF   |
| D40        | .40    | .250    | 20pF      | 25pF  | 630pF  | 770pF  | 1300pF  | 1800pF  |
| D50        | .50    | .375    | 36pF      | 44pF  | 1100pF | 1400pF | 2400pF  | 3200pF  |
| D75        | .75    | .375    | 80pF      | 98pF  | 2500pF | 3100pF | 5300pF  | 7200pF  |
| D90        | .90    | .500    | 123pF     | 150pF | 3800pF | 4700pF | 8200pF  | 11000pF |
| D100       | 1.00   | .500    | 145pF     | 178pF | 4600pF | 5600pF | 9700pF  | 13000pF |
| D120       | 1.20   | .500    | 193pF     | 236pF | 6000pF | 7400pF | 12900pF | 17300pF |

### 5K VDC

|      |      |      |       |       |        |        |        |         |
|------|------|------|-------|-------|--------|--------|--------|---------|
| D30  | .30  | .250 | 4.7pF | 5.7pF | 150pF  | 180pF  | 310pF  | 420pF   |
| D40  | .40  | .250 | 12pF  | 15pF  | 380pF  | 460pF  | 810pF  | 1100pF  |
| D50  | .50  | .375 | 21pF  | 26pF  | 670pF  | 820pF  | 1400pF | 1900pF  |
| D75  | .75  | .375 | 48pF  | 59pF  | 1500pF | 1800pF | 3200pF | 4300pF  |
| D90  | .90  | .500 | 74pF  | 90pF  | 2300pF | 2800pF | 4900pF | 6600pF  |
| D100 | 1.00 | .500 | 87pF  | 107pF | 2700pF | 3300pF | 5800pF | 7800pF  |
| D120 | 1.20 | .500 | 116pF | 141pF | 3600pF | 4400pF | 7700pF | 10400pF |

### 7.5K VDC

|      |      |      |       |       |        |        |        |        |
|------|------|------|-------|-------|--------|--------|--------|--------|
| D30  | .30  | .250 | 3.1pF | 3.8pF | 100pF  | 120pF  | 210pF  | 280pF  |
| D40  | .40  | .250 | 8.1pF | 9.9pF | 250pF  | 310pF  | 540pF  | 720pF  |
| D50  | .50  | .375 | 14pF  | 17pF  | 450pF  | 550pF  | 950pF  | 1300pF |
| D75  | .75  | .375 | 32pF  | 39pF  | 1000pF | 1200pF | 2100pF | 2900pF |
| D90  | .90  | .500 | 49pF  | 60pF  | 1500pF | 1900pF | 3300pF | 4400pF |
| D100 | 1.00 | .500 | 58pF  | 71pF  | 1800pF | 2200pF | 3900pF | 5200pF |
| D120 | 1.20 | .500 | 77pF  | 94pF  | 2400pF | 3000pF | 5100pF | 6900pF |

### 10K VDC

|      |      |      |        |        |        |        |        |        |
|------|------|------|--------|--------|--------|--------|--------|--------|
| D30  | .30  | .250 | 2.4pF  | 2.9pF  | 70pF   | 90pF   | 160pF  | 210pF  |
| D40  | .40  | .250 | 6.1pF  | 7.4pF  | 190pF  | 230pF  | 400pF  | 540pF  |
| D50  | .50  | .375 | 10.7pF | 13.1pF | 330pF  | 410pF  | 710pF  | 960pF  |
| D75  | .75  | .375 | 24pF   | 29pF   | 750pF  | 920pF  | 1600pF | 2200pF |
| D90  | .90  | .500 | 37pF   | 45pF   | 1200pF | 1400pF | 2500pF | 3300pF |
| D100 | 1.00 | .500 | 44pF   | 53pF   | 1400pF | 1700pF | 2900pF | 3900pF |
| D120 | 1.20 | .500 | 58pF   | 71pF   | 1800pF | 2200pF | 3900pF | 5200pF |

### 15K VDC

|      |      |      |       |       |        |        |        |        |
|------|------|------|-------|-------|--------|--------|--------|--------|
| D30  | .30  | .250 | 1.6pF | 1.9pF | 50pF   | 60pF   | 100pF  | 140pF  |
| D40  | .40  | .250 | 4.0pF | 4.9pF | 130pF  | 150pF  | 270pF  | 360pF  |
| D50  | .50  | .375 | 7.1pF | 8.7pF | 220pF  | 270pF  | 480pF  | 640pF  |
| D75  | .75  | .375 | 16pF  | 20pF  | 500pF  | 610pF  | 1100pF | 1400pF |
| D90  | .90  | .500 | 25pF  | 30pF  | 770pF  | 940pF  | 1600pF | 2200pF |
| D100 | 1.00 | .500 | 29pF  | 36pF  | 910pF  | 1100pF | 1900pF | 2600pF |
| D120 | 1.20 | .500 | 39pF  | 47pF  | 1200pF | 1500pF | 2600pF | 3500pF |

### 20K VDC

|      |      |      |       |       |       |        |        |        |
|------|------|------|-------|-------|-------|--------|--------|--------|
| D30  | .30  | .250 | 1.2pF | 1.4pF | 37pF  | 45pF   | 80pF   | 110pF  |
| D40  | .40  | .250 | 3.0pF | 3.7pF | 100pF | 120pF  | 200pF  | 270pF  |
| D50  | .50  | .375 | 5.3pF | 6.5pF | 170pF | 200pF  | 360pF  | 480pF  |
| D75  | .75  | .375 | 12pF  | 15pF  | 380pF | 460pF  | 800pF  | 1100pF |
| D90  | .90  | .500 | 18pF  | 22pF  | 580pF | 700pF  | 1200pF | 1600pF |
| D100 | 1.00 | .500 | 22pF  | 27pF  | 680pF | 830pF  | 1500pF | 2000pF |
| D120 | 1.20 | .500 | 29pF  | 35pF  | 910pF | 1100pF | 1900pF | 2600pF |

### 30K, 40K & 50K VDC

| Disc Style | D Max. | S ±.030 | 30kVDC |       | 40kVDC |       | 50kVDC |       |
|------------|--------|---------|--------|-------|--------|-------|--------|-------|
|            |        |         | X7R    |       | X7R    |       | X7R    |       |
|            |        |         | Min.   | Max.  | Min.   | Max.  | Min.   | Max.  |
| D30        | .30    | .250    | 20pF   | 30pF  | 18pF   | 22pF  | 10pF   | 20pF  |
| D40        | .40    | .250    | 60pF   | 80pF  | 50pF   | 60pF  | 40pF   | 50pF  |
| D50        | .50    | .375    | 110pF  | 140pF | 80pF   | 100pF | 70pF   | 80pF  |
| D75        | .75    | .375    | 250pF  | 310pF | 190pF  | 230pF | 150pF  | 180pF |
| D90        | .90    | .500    | 380pF  | 470pF | 290pF  | 350pF | 230pF  | 280pF |
| D100       | 1.00   | .500    | 460pF  | 560pF | 340pF  | 420pF | 270pF  | 330pF |
| D120       | 1.20   | .500    | 600pF  | 740pF | 450pF  | 550pF | 360pF  | 440pF |

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