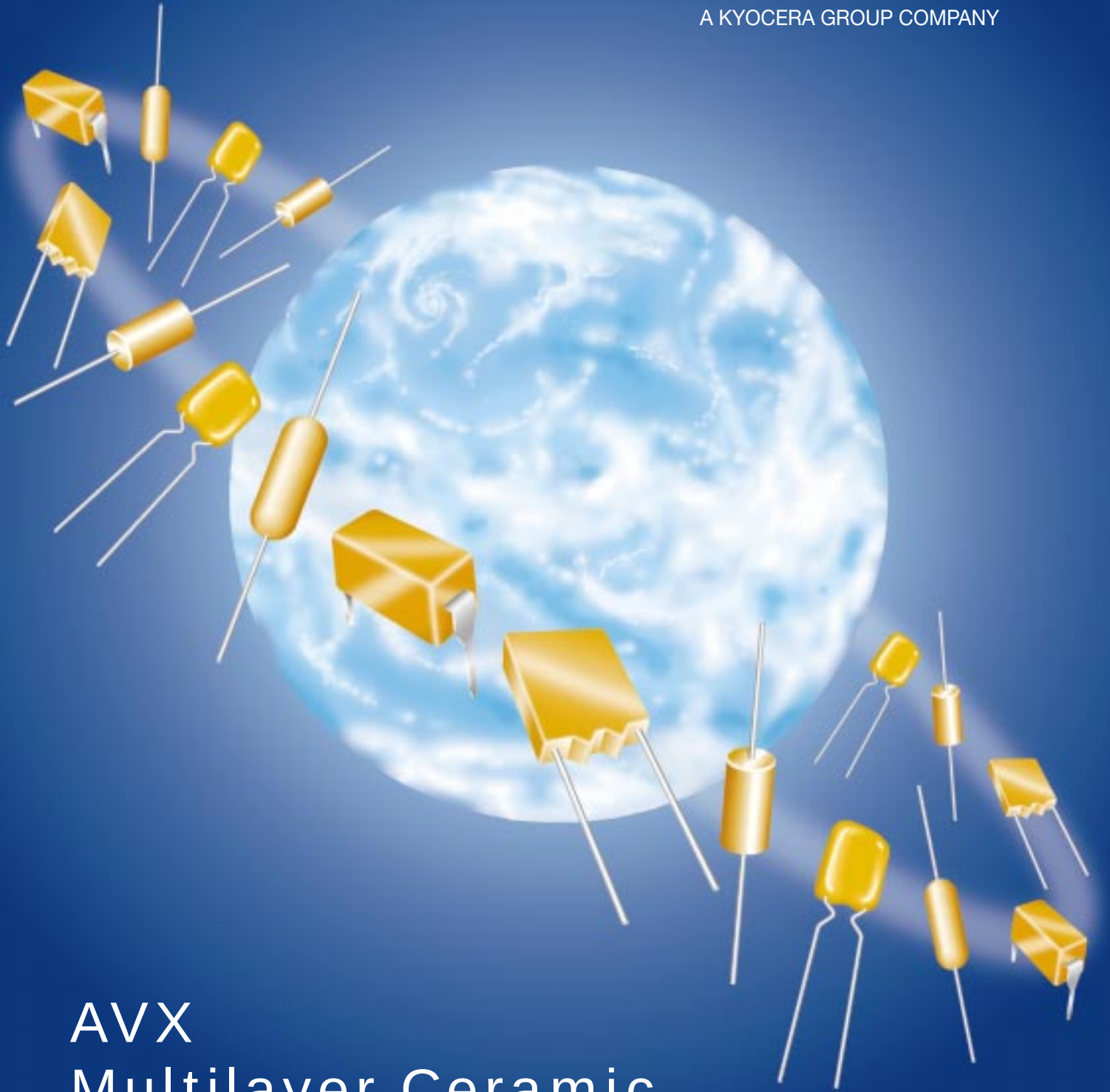


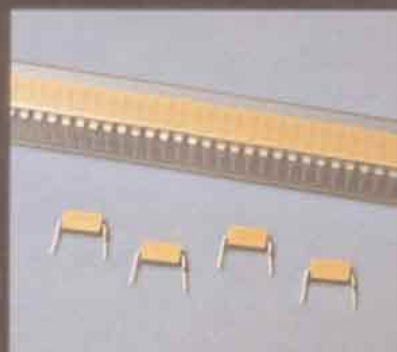
**AVX**  
A KYOCERA GROUP COMPANY



AVX  
Multilayer Ceramic  
Leaded Capacitors

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## GENERAL INFORMATION

A capacitor is a component which is capable of storing electrical energy. It consists of two conductive plates (electrodes) separated by insulating material which is called the dielectric. A typical formula for determining capacitance is:

$$C = \frac{.224 KA}{t}$$

**C** = capacitance (picofarads)

**K** = dielectric constant (Vacuum = 1)

**A** = area in square inches

**t** = separation between the plates in inches  
(thickness of dielectric)

**.224** = conversion constant  
(.0884 for metric system in cm)

**Capacitance** – The standard unit of capacitance is the farad. A capacitor has a capacitance of 1 farad when 1 coulomb charges it to 1 volt. One farad is a very large unit and most capacitors have values in the micro ( $10^{-6}$ ), nano ( $10^{-9}$ ) or pico ( $10^{-12}$ ) farad level.

**Dielectric Constant** – In the formula for capacitance given above the dielectric constant of a vacuum is arbitrarily chosen as the number 1. Dielectric constants of other materials are then compared to the dielectric constant of a vacuum.

**Dielectric Thickness** – Capacitance is indirectly proportional to the separation between electrodes. Lower voltage requirements mean thinner dielectrics and greater capacitance per volume.

**Area** – Capacitance is directly proportional to the area of the electrodes. Since the other variables in the equation are usually set by the performance desired, area is the easiest parameter to modify to obtain a specific capacitance within a material group.

**Energy Stored** – The energy which can be stored in a capacitor is given by the formula:

$$E = \frac{1}{2}CV^2$$

**E** = energy in joules (watts-sec)

**V** = applied voltage

**C** = capacitance in farads

**Potential Change** – A capacitor is a reactive component which reacts against a change in potential across it. This is shown by the equation for the linear charge of a capacitor:

$$I_{\text{ideal}} = C \frac{dV}{dt}$$

where

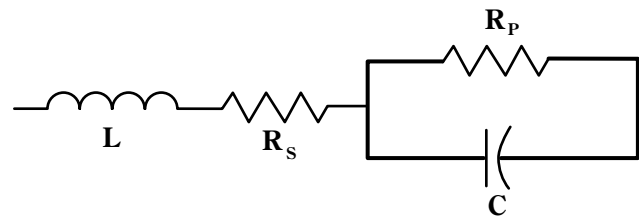
**I** = Current

**C** = Capacitance

**dV/dt** = Slope of voltage transition across capacitor

Thus an infinite current would be required to instantly change the potential across a capacitor. The amount of current a capacitor can “sink” is determined by the above equation.

**Equivalent Circuit** – A capacitor, as a practical device, exhibits not only capacitance but also resistance and inductance. A simplified schematic for the equivalent circuit is:



**C** = Capacitance

**R<sub>s</sub>** = Series Resistance

**L** = Inductance

**R<sub>p</sub>** = Parallel Resistance

**Reactance** – Since the insulation resistance ( $R_p$ ) is normally very high, the total impedance of a capacitor is:

$$Z = \sqrt{R_s^2 + (X_c - X_L)^2}$$

where

**Z** = Total Impedance

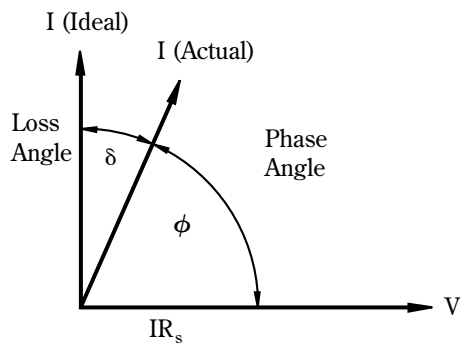
**R<sub>s</sub>** = Series Resistance

**X<sub>c</sub>** = Capacitive Reactance =  $\frac{1}{2\pi fC}$

**X<sub>L</sub>** = Inductive Reactance =  $2\pi fL$

The variation of a capacitor's impedance with frequency determines its effectiveness in many applications.

**Phase Angle** – Power Factor and Dissipation Factor are often confused since they are both measures of the loss in a capacitor under AC application and are often almost identical in value. In a “perfect” capacitor the current in the capacitor will lead the voltage by  $90^\circ$ .



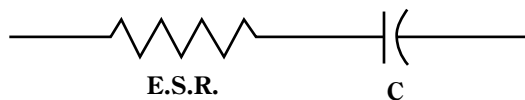
In practice the current leads the voltage by some other phase angle due to the series resistance  $R_s$ . The complement of this angle is called the loss angle and:

$$\text{Power Factor (P.F.)} = \cos \phi \text{ or } \sin \delta$$

$$\text{Dissipation Factor (D.F.)} = \tan \delta$$

for small values of  $\delta$  the tan and sine are essentially equal which has led to the common interchangeability of the two terms in the industry.

**Equivalent Series Resistance** – The term E.S.R. or Equivalent Series Resistance combines all losses both series and parallel in a capacitor at a given frequency so that the equivalent circuit is reduced to a simple R-C series connection.



## Dissipation Factor

The DF/PF of a capacitor tells what percent of the apparent power input will turn to heat in the capacitor.

$$\text{Dissipation Factor} = \frac{\text{E.S.R.}}{X_c} = (2 \pi f C) (\text{E.S.R.})$$

The watts loss are:

$$\text{Watts loss} = (2 \pi f C V^2) (\text{D.F.})$$

Very low values of dissipation factor are expressed as their reciprocal for convenience. These are called the “Q” or Quality factor of capacitors.

**Insulation Resistance** – Insulation Resistance is the resistance measured across the terminals of a capacitor and consists principally of the parallel resistance  $R_p$  shown in the equivalent circuit. As capacitance values and hence the area of dielectric increases, the I.R. decreases and hence the product ( $C \times IR$  or  $RC$ ) is often specified in ohm farads or more commonly megohm microfarads. Leakage current is determined by dividing the rated voltage by IR (Ohm’s Law).

**Dielectric Strength** – Dielectric Strength is an expression of the ability of a material to withstand an electrical stress. Although dielectric strength is ordinarily expressed in volts, it is actually dependent on the thickness of the dielectric and thus is also more generically a function of volts/mil.

**Dielectric Absorption** – A capacitor does not discharge instantaneously upon application of a short circuit, but drains gradually after the capacitance proper has been discharged. It is common practice to measure the dielectric absorption by determining the “reappearing voltage” which appears across a capacitor at some point in time after it has been fully discharged under short circuit conditions.

**Corona** – Corona is the ionization of air or other vapors which causes them to conduct current. It is especially prevalent in high voltage units but can occur with low voltages as well where high voltage gradients occur. The energy discharged degrades the performance of the capacitor and can in time cause catastrophic failures.

## CERAMIC CAPACITORS

Multilayer ceramic capacitors are manufactured by mixing the ceramic powder in an organic binder (slurry) and casting it by one technique or another into thin layers typically ranging from about 3 mils in thickness down to 1 mil or thinner.

Metal electrodes are deposited onto the green ceramic layers which are then stacked to form a laminated structure. The metal electrodes are arranged so that their terminations alternate from one edge of the capacitor to another. Upon sintering at high temperature the part becomes a monolithic block which can provide extremely high capacitance values in small mechanical volumes. Figure 1 shows a pictorial view of a multilayer ceramic capacitor.

Multilayer ceramic capacitors are available in a wide range of characteristics, Electronic Industries Association (EIA) and the military have established categories to help divide the

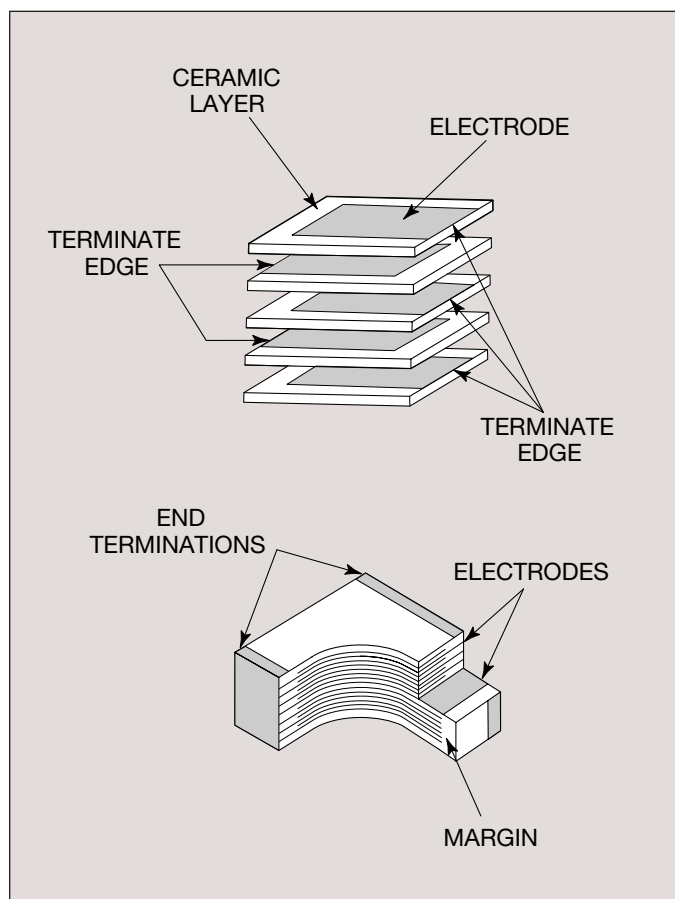


Figure 1

basic characteristics into more easily specified classes. The basic industry specification for ceramic capacitors is EIA specification RS-198 and as noted in the general section it specifies temperature compensating capacitors as Class 1 capacitors. These are specified by the military under specification MIL-C-20. General purpose capacitors with non-linear temperature coefficients are called Class 2 capacitors by EIA and are specified by the military under MIL-C-11015 and MIL-C-39014. The new high reliability military specification, MIL-C-123 covers both Class 1 and Class 2 dielectrics.

**Class 1** – Class 1 capacitors or temperature compensating capacitors are usually made from mixtures of titanates where barium titanate is normally not a major part of the mix. They have predictable temperature coefficients and in general, do not have an aging characteristic. Thus they are the most stable capacitor available. Normally the T.C.s of Class 1 temperature compensating capacitors are C0G (NP0) (negative-positive 0 ppm/°C). Class 1 extended temperature compensating capacitors are also manufactured in T.C.s from P100 through N2200.

**Class 2** – General purpose ceramic capacitors are called Class 2 capacitors and have become extremely popular because of the high capacitance values available in very small size. Class 2 capacitors are “ferro electric” and vary in capacitance value under the influence of the environmental and electrical operating conditions. Class 2 capacitors are affected by temperature, voltage (both AC and DC), frequency and time. Temperature effects for Class 2 ceramic capacitors are exhibited as non-linear capacitance changes with temperature.

Table 1: EIA Temperature Compensating Ceramic Capacitor Codes

| TC TOLERANCES <sup>(1)</sup>       |            |            |            |             |             |             |             |              |              |               |
|------------------------------------|------------|------------|------------|-------------|-------------|-------------|-------------|--------------|--------------|---------------|
| Capacitance<br>in pF               | NP0        | N030       | N080       | N150        | N220        | N330        | N470        | N750         | N1500        | N2200         |
| -55°C to +25°C in PPM/°C           |            |            |            |             |             |             |             |              |              |               |
| 10 and Over                        | +30<br>-75 | +30<br>-80 | +30<br>-90 | +30<br>-105 | +30<br>-120 | +60<br>-180 | +60<br>-210 | +120<br>-340 | +250<br>-670 | +500<br>-1100 |
| +25°C to +85°C in PPM/°C           |            |            |            |             |             |             |             |              |              |               |
| 10 and Over                        | ±30        | ±30        | ±30        | ±30         | ±30         | ±60         | ±60         | ±120         | ±250         | ±500          |
| Closest<br>MIL-C-20D<br>Equivalent | CG         | HG         | LG         | PG          | RG          | SH          | TH          | UJ           | NONE         | NONE          |
| EIA Desig.                         | C0G        | S1G        | U1G        | P2G         | R2G         | S2H         | T2H         | U2J          | P3K          | R3L           |

<sup>(1)</sup> Table 1 indicates the tolerance available on specific temperature characteristics. It may be noted that limits are established on the basis of measurements at +25°C and +85°C and that T.C. becomes more negative at low temperature. Wider tolerances are required on low capacitance values because of the effects of stray capacitance.

**Table 2: MIL and EIA Temperature Stable and General Application Codes**

| MIL CODE                                                                                                                                                                                              |                        |                         | EIA CODE                                                                                                                                                                   |                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Symbol                                                                                                                                                                                                | Temperature Range      |                         | Percent Capacity Change Over Temperature Range                                                                                                                             |                         |
| A                                                                                                                                                                                                     | -55°C to +85°C         |                         | RS198                                                                                                                                                                      | Temperature Range       |
| B                                                                                                                                                                                                     | -55°C to +125°C        |                         | X7                                                                                                                                                                         | -55°C to +125°C         |
| C                                                                                                                                                                                                     | -55°C to +150°C        |                         | X5                                                                                                                                                                         | -55°C to +85°C          |
|                                                                                                                                                                                                       |                        |                         | Y5                                                                                                                                                                         | -30°C to +85°C          |
|                                                                                                                                                                                                       |                        |                         | Z5                                                                                                                                                                         | +10°C to +85°C          |
| Symbol                                                                                                                                                                                                | Cap. Change Zero Volts | Cap. Change Rated Volts | Code                                                                                                                                                                       | Percent Capacity Change |
| R                                                                                                                                                                                                     | +15%, -15%             | +15%, -40%              | D                                                                                                                                                                          | ±3.3%                   |
| W                                                                                                                                                                                                     | +22%, -56%             | +22%, -66%              | E                                                                                                                                                                          | ±4.7%                   |
| X                                                                                                                                                                                                     | +15%, -15%             | +15%, -25%              | F                                                                                                                                                                          | ±7.5%                   |
| Y                                                                                                                                                                                                     | +30%, -70%             | +30%, -80%              | P                                                                                                                                                                          | ±10%                    |
| Z                                                                                                                                                                                                     | +20%, -20%             | +20%, -30%              | R                                                                                                                                                                          | ±15%                    |
|                                                                                                                                                                                                       |                        |                         | S                                                                                                                                                                          | ±22%                    |
|                                                                                                                                                                                                       |                        |                         | T                                                                                                                                                                          | +22%, -33%              |
|                                                                                                                                                                                                       |                        |                         | U                                                                                                                                                                          | +22%, -56%              |
|                                                                                                                                                                                                       |                        |                         | V                                                                                                                                                                          | +22%, -82%              |
| Temperature characteristic is specified by combining range and change symbols, for example BR or AW. Specification slash sheets indicate the characteristic applicable to a given style of capacitor. |                        |                         | EXAMPLE – A capacitor is desired with the capacitance value at 25°C to increase no more than 7.5% or decrease no more than 7.5% from -30°C to +85°C. EIA Code will be Y5F. |                         |

In specifying capacitance change with temperature for Class 2 materials, EIA expresses the capacitance change over an operating temperature range by a 3 symbol code. The first symbol represents the cold temperature end of the temperature range, the second represents the upper limit of the operating temperature range and the third symbol represents the capacitance change allowed over the operating temperature range. Table 2 provides a detailed explanation of the EIA system.

**Effects of Voltage** – Variations in voltage affects only the capacitance and dissipation factor. The application of DC voltage reduces both the capacitance and dissipation factor while the application of an AC voltage within a

reasonable range tends to increase both capacitance and dissipation factor readings. If a high enough AC voltage is applied, eventually it will reduce capacitance just as a DC voltage will. Figure 2 shows the effects of AC voltage.

Capacitor specifications specify the AC voltage at which to measure (normally 0.5 or 1 VAC) and application of the wrong voltage can cause spurious readings. Figure 3 gives the voltage coefficient of dissipation factor for various AC voltages at 1 kilohertz. Applications of different frequencies will affect the percentage changes versus voltages.

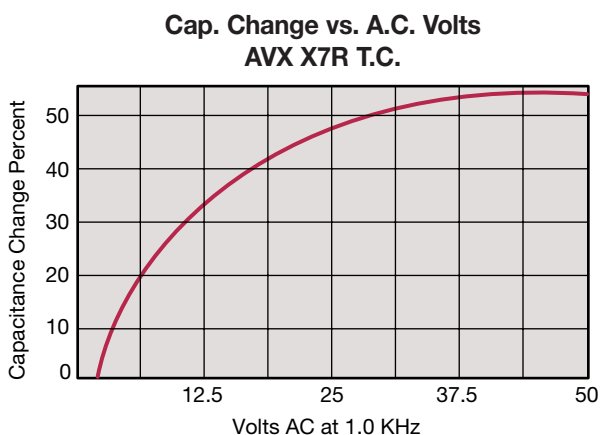


**Figure 2**

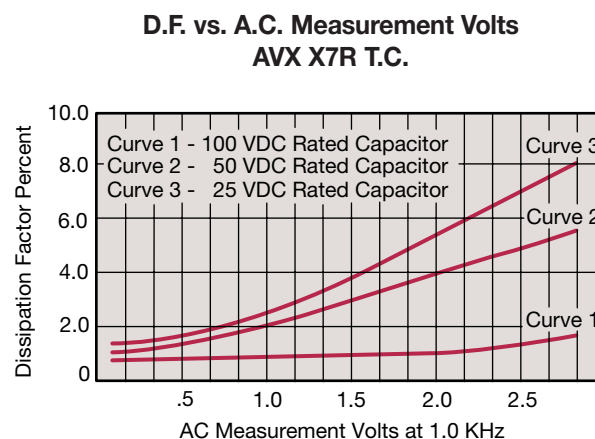


**Figure 3**

The effect of the application of DC voltage is shown in Figure 4. The voltage coefficient is more pronounced for higher K dielectrics. These figures are shown for room temperature conditions. The combination characteristic known as voltage temperature limits which shows the effects of rated voltage over the operating temperature range is shown in Figure 5 for the military BX characteristic.

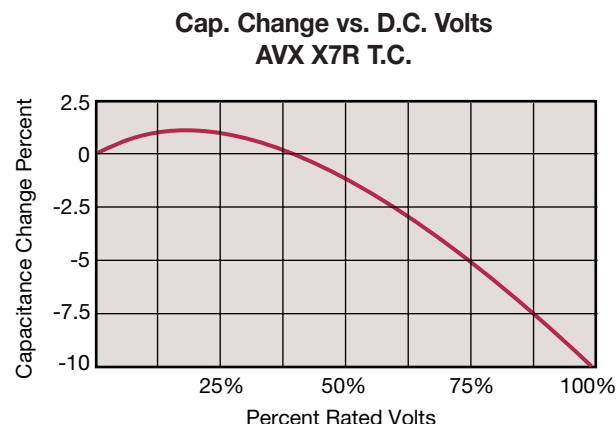


**Figure 4**

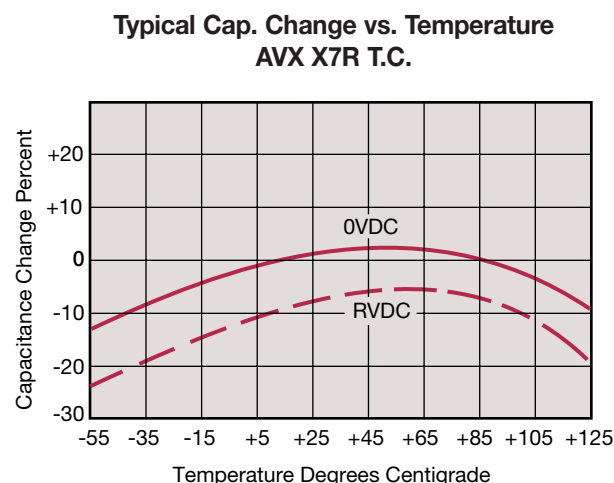


**Figure 5**

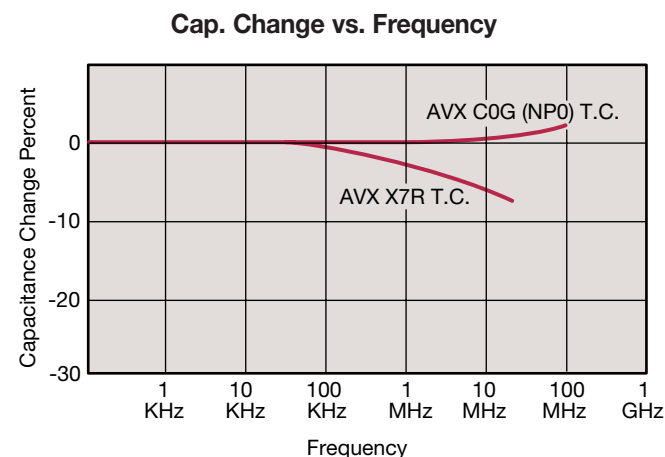


**Figure 6**

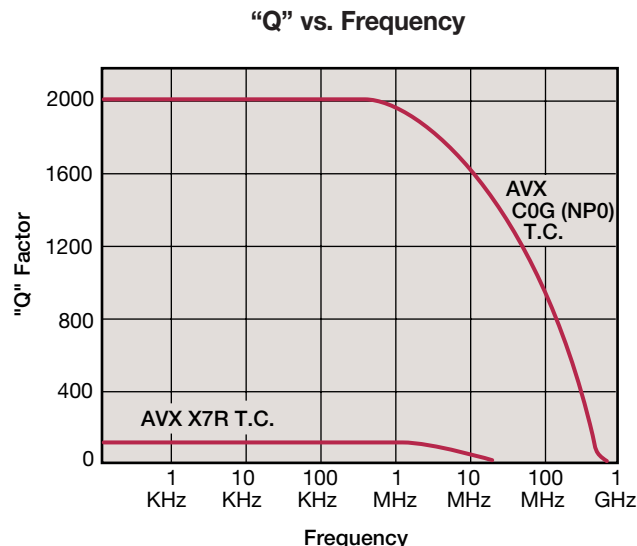


**Figure 7**

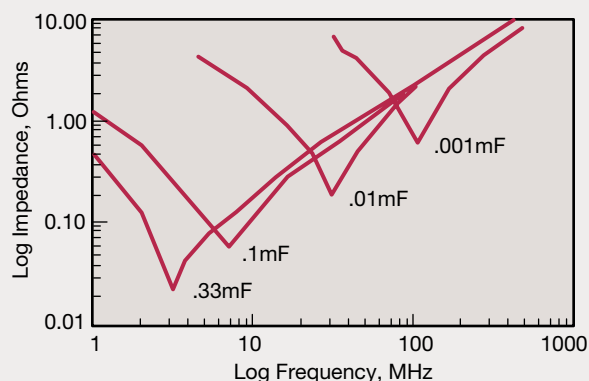
**Effects of Frequency** – Frequency affects capacitance and dissipation factor as shown in Figures 6 and 7.

Variation of impedance with frequency is an important consideration for decoupling capacitor applications. Lead length, lead configuration and body size all affect the impedance level over more than ceramic formulation variations. (Figure 8)

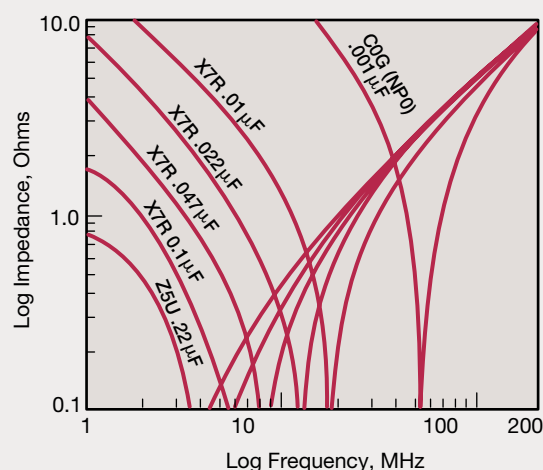
**Effects of Time** – Class 2 ceramic capacitors change capacitance and dissipation factor with time as well as temperature, voltage and frequency. This change with time is known as aging. Aging is caused by a gradual re-alignment of the crystalline structure of the ceramic and produces an exponential loss in capacitance and decrease in dissipation factor versus time. A typical curve of aging rate for semistable ceramics is shown in Figure 9 and a table is given showing the aging rates of various dielectrics.

If a ceramic capacitor that has been sitting on the shelf for a period of time, is heated above its curie point, (125°C for 4 hours or 150°C for ½ hour will suffice) the part will de-age and return to its initial capacitance and dissipation factor readings. Because the capacitance changes rapidly, immediately after de-aging, the basic capacitance measurements are normally referred to a time period sometime after the de-aging process. Various manufacturers use different time bases but the most popular one is one day or twenty-four hours after "last heat." Change in the aging curve can be caused by the application of voltage and other stresses. The possible changes in capacitance due to de-aging by heating the unit explain why capacitance changes are allowed after test, such as temperature cycling, moisture resistance, etc., in MIL specs. The application of high voltages such as dielectric withstanding voltages also tends to de-age capacitors and is why re-reading of capacitance after 12 or 24 hours is allowed in military specifications after dielectric strength tests have been performed.

**Impedance vs. Frequency  
Effect of Capacitance – AVX SpinGuards**



**Impedance vs. Frequency  
Effect of Dielectric – AVX DIPGuards**



**Impedance vs. Frequency  
Effect of Lead Length – Military CKR05 .01mF**

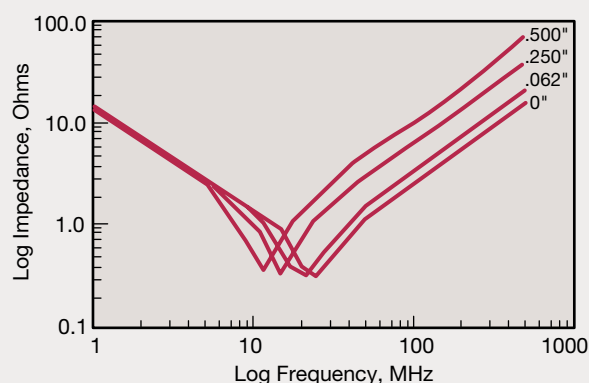
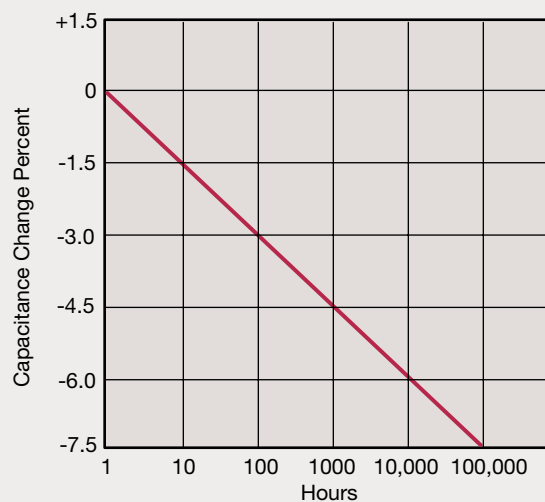


**Figure 8**

**Typical Curve of Aging Rate  
X7R Dielectric**



| Characteristic | Max. Aging Rate %/Decade |
|----------------|--------------------------|
| C0G (NP0)      | None                     |
| X7R            | 2                        |
| Z5U            | 3                        |
| Y5V            | 5                        |

**Figure 9**

**Effects of Mechanical Stress** – High “K” dielectric ceramic capacitors exhibit some low level piezoelectric reactions under mechanical stress. As a general statement, the piezoelectric output is higher, the higher the dielectric constant of the ceramic. It is desirable to investigate this effect before using high “K” dielectrics as coupling capacitors in extremely low level applications.

**Reliability** – Historically ceramic capacitors have been one of the most reliable types of capacitors in use today. The approximate formula for the reliability of a ceramic capacitor is:

$$\frac{L_o}{L_t} = \left(\frac{V_t}{V_o}\right)^x \times \left(\frac{T_t}{T_o}\right)^y$$

where

$L_o$  = operating life       $T_t$  = test temperature and  
 $L_t$  = test life       $T_o$  = operating temperature in °C  
 $V_t$  = test voltage  
 $V_o$  = operating voltage X,Y = see text

Historically for ceramic capacitors exponent X has been considered as 3. The exponent Y for temperature effects typically tends to run about 8.

## GENERAL ELECTRICAL AND ENVIRONMENTAL SPECIFICATIONS

Many AVX ceramic capacitors are purchased in accordance with Military Specifications, MIL-C-39014, MIL-C-11015, MIL-C-20, MIL-C-55681, and MIL-C-123 or according to individual customer specification. When ordered to these specifications, the parts will meet the requirements set forth in these documents. The General Electrical and Environmental Specifications listed below detail test conditions which are common to the foregoing and to most ceramic capacitor specifications. If additional information is needed, AVX Application Engineers are ready to assist you.

**Capacitance** – Capacitance shall be tested in accordance with Method 305 of MIL-STD-202.

**Class 1** dielectric to 1000 pF measured at 1 MHz,  $\pm 100$  KHz, > 1000 pF measured at 1 KHz  $\pm 100$  Hz both at  $1.0 \pm 0.2$  VAC.

**Class 2** dielectrics (except High K) to 100 pF shall be measured at 1 MHz  $\pm 100$  KHz, > 100 pF measured at 1 KHz  $\pm 100$  Hz both at  $1.0 \pm 0.2$  VAC.

**High K** dielectrics measured at 1 KHz  $\pm 100$  Hz with less than 0.5 VAC or less applied.

**Dissipation Factor** – D.F. shall be measured at the same frequency and voltage as specified for capacitance.

**Dielectric Strength** – The dielectric strength shall be measured in accordance with Method 301 of MIL-STD-202 with a suitable resistor in series with the power supply to limit the charging current to 50 ma. max.

**Insulation Resistance** – Insulation Resistance shall be measured in accordance with Method 302 of MIL-STD-202 with rated voltage or 200 VDC whichever is less applied. The current shall be limited to 50 ma. max. and the charging time shall be 2.0 minutes maximum.

**Burn-In** – (Where specified,) 100% of the parts shall be subjected to 5 cycles of Thermal Shock per Method 107 Test Condition A of MIL-STD-202 followed by voltage conditioning at twice rated voltage and maximum rated temperature for 100 hours or as specified. After Burn-In, parts shall meet all initial requirements.

**Barometric Pressure** – Capacitors shall be tested in accordance with Method 105 of MIL-STD-202 Test Condition D (100,000 ft.) with 100% rated voltage applied for 5 seconds with current limited to 50 ma. No evidence of flashover or damage is permitted.

**Solderability** – Capacitors shall be tested in accordance with Method 208 of MIL-STD-202 with 95% coverage of new solder.

**Vibration** – Capacitors shall be tested in accordance with Method 208 Test Condition D of MIL-STD-202 with the bodies rigidly clamped. The specimens shall be tested in 3 mutually perpendicular planes for a total of 8 hours with 125% rated DC voltage applied. No evidence of opens, intermittents or shorts is permitted.

**Shock** – Capacitors shall be tested in accordance with Method 213 Condition 1 (100 Gs) of MIL-STD-202 with the bodies rigidly clamped. No evidence of opens, intermittents or shorts is permitted.

**Thermal Shock and Immersion** – Capacitors shall be tested in accordance with Method 107 Condition A of MIL-STD-202 with high test temperature (maximum rated operating temperature) followed by Method 104 of MIL-STD-202 Test Condition B.

**Moisture Resistance** – Capacitors shall be tested in accordance with Method 106 of MIL-STD-202 with rated voltage or 100 VDC whichever is less applied for the first 10 cycles.

**Resistance to Solder Heat** – Capacitors shall be tested in accordance with Method 210 of MIL-STD-202 with immersion to .050 of body. AVX Ceralam capacitors are manufactured with solder which melts at a temperature greater than 450°F.

**General Considerations** – The application of voltage or temperature usually causes temporary changes in the capacitance of Class 2 ceramic capacitors. These changes are normally in the positive direction and may cause out-of-tolerance capacitance readings. If a capacitance reading is made immediately after a dielectric strength or insulation resistance test and parts are high capacitance, they should be re-read after a minimum wait of 12 hours.

## BASIC CAPACITOR FORMULAS

### I. Capacitance (farads)

$$\text{English: } C = \frac{.224 \text{ K A}}{T_D}$$

$$\text{Metric: } C = \frac{.0884 \text{ K A}}{T_D}$$

### II. Energy stored in capacitors (Joules, watt - sec)

$$E = \frac{1}{2} CV^2$$

### III. Linear charge of a capacitor (Amperes)

$$I = C \frac{dV}{dt}$$

### IV. Total Impedance of a capacitor (ohms)

$$Z = \sqrt{R_s^2 + (X_C - X_L)^2}$$

### V. Capacitive Reactance (ohms)

$$X_C = \frac{1}{2 \pi fC}$$

### VI. Inductive Reactance (ohms)

$$X_L = 2 \pi fL$$

### VII. Phase Angles:

Ideal Capacitors: Current leads voltage 90°

Ideal Inductors: Current lags voltage 90°

Ideal Resistors: Current in phase with voltage

### VIII. Dissipation Factor (%)

$$D.F. = \tan \delta \text{ (loss angle)} = \frac{E.S.R.}{X_C} = (2 \pi fC) (E.S.R.)$$

### IX. Power Factor (%)

P.F. = Sine  $\delta$  (loss angle) = Cos  $\phi$  (phase angle)

P.F. = (when less than 10%) = DF

### X. Quality Factor (dimensionless)

$$Q = \text{Cotan } \delta \text{ (loss angle)} = \frac{1}{D.F.}$$

### XI. Equivalent Series Resistance (ohms)

$$E.S.R. = (D.F.) (X_C) = (D.F.) / (2 \pi fC)$$

### XII. Power Loss (watts)

$$\text{Power Loss} = (2 \pi fCV^2) (D.F.)$$

### XIII. KVA (Kilowatts)

$$KVA = 2 \pi fCV^2 \times 10^{-3}$$

### XIV. Temperature Characteristic (ppm/°C)

$$T.C. = \frac{C_t - C_{25}}{C_{25} (T_t - 25)} \times 10^6$$

### XV. Cap Drift (%)

$$C.D. = \frac{C_1 - C_2}{C_1} \times 100$$

### XVI. Reliability of Ceramic Capacitors

$$\frac{L_o}{L_t} = \left( \frac{V_t}{V_o} \right)^X \left( \frac{T_t}{T_o} \right)^Y$$

### XVII. Capacitors in Series (current the same)

$$\text{Any Number: } \frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} \dots \frac{1}{C_N}$$

$$\text{Two: } C_T = \frac{C_1 C_2}{C_1 + C_2}$$

### XVIII. Capacitors in Parallel (voltage the same)

$$C_T = C_1 + C_2 \dots + C_N$$

### XIX. Aging Rate

$$A.R. = \% \Delta C / \text{decade of time}$$

### XX. Decibels

$$db = 20 \log \frac{V_1}{V_2}$$

## METRIC PREFIXES SYMBOLS

|       |                     |                |                        |                |                                        |                |                         |
|-------|---------------------|----------------|------------------------|----------------|----------------------------------------|----------------|-------------------------|
| Pico  | X 10 <sup>-12</sup> | K              | = Dielectric Constant  | f              | = frequency                            | L <sub>t</sub> | = Test life             |
| Nano  | X 10 <sup>-9</sup>  | A              | = Area                 | L              | = Inductance                           | V <sub>t</sub> | = Test voltage          |
| Micro | X 10 <sup>-6</sup>  | T <sub>D</sub> | = Dielectric thickness | δ              | = Loss angle                           | V <sub>o</sub> | = Operating voltage     |
| Milli | X 10 <sup>-3</sup>  | V              | = Voltage              | φ              | = Phase angle                          | T <sub>t</sub> | = Test temperature      |
| Deci  | X 10 <sup>-1</sup>  | t              | = time                 | X & Y          | = exponent effect of voltage and temp. | T <sub>o</sub> | = Operating temperature |
| Deca  | X 10 <sup>+1</sup>  | R <sub>s</sub> | = Series Resistance    | L <sub>o</sub> | = Operating life                       |                |                         |
| Kilo  | X 10 <sup>+3</sup>  |                |                        |                |                                        |                |                         |
| Mega  | X 10 <sup>+6</sup>  |                |                        |                |                                        |                |                         |
| Giga  | X 10 <sup>+9</sup>  |                |                        |                |                                        |                |                         |
| Tera  | X 10 <sup>+12</sup> |                |                        |                |                                        |                |                         |

## GENERAL SPECIFICATIONS

### Capacitance Range

See Individual Parts Specifications

### Capacitance Test at 25°C

Measured at 1 VRMS max. at 1 KHz (1 MHz for 1,000 pF or less)

### Capacitance Tolerances

C =  $\pm 0.25$  pF, D =  $\pm 0.50$  pF, E =  $\pm 0.5\%$ , F =  $\pm 1.0\%$ , G =  $\pm 2\%$ ,  
H =  $\pm 3\%$ , J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$   
For values less than 10 pF tightest tolerance available is  $\pm 0.25$  pF

### Operating Temperature Range

-55°C to +125°C

### Temperature Characteristic

0  $\pm$  30 ppm/°C

### Voltage Ratings

200, 100 & 50 Vdc

### Dissipation Factor

.15% max. (+25°C and +125°C) for values greater than 30 pF  
or  $Q = 20 \times C + 400$  for values of 30 pF and below.  
1.0 VRMS, 1 MHz for values  $\leq 1,000$  pF, and  
1 KHz for values  $> 1,000$  pF

### Insulation Resistance 25°C (MIL-STD-202-Method 302)

100 K megohms or 1000 megohms -  $\mu$ F minimum,  
whichever is less

### Dielectric Strength

250% of rated Vdc

### Life Test (1,000 hours)

200% rated voltage at +125°C

### Moisture Resistance (MIL-STD-202-Method 106)

### Thermal Shock (MIL-STD-202-Method 107, condition A, at rated elevated temperature)

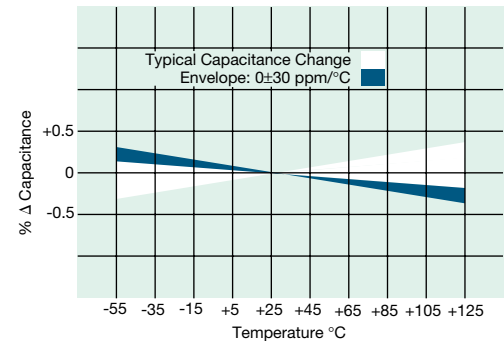
-55°C to +125°C

### Immersion Cycling (MIL-STD-202-Method 104, condition B)

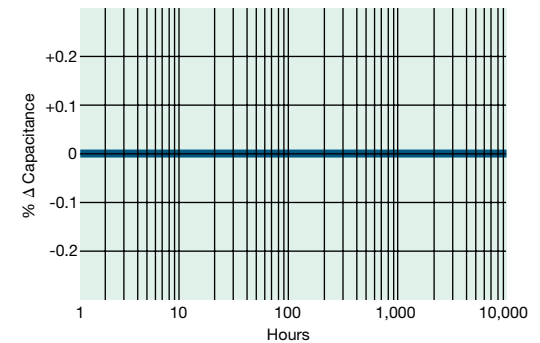
For current reliability information, consult factory.

## TYPICAL CHARACTERISTICS

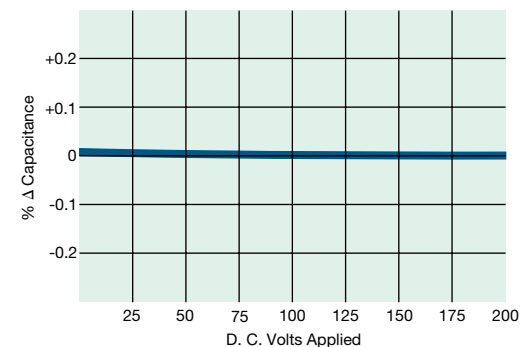
### Temperature Coefficient



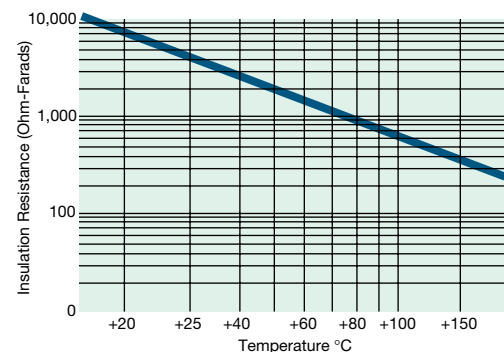
### Aging Rate



### Voltage Coefficient



### Insulation Resistance vs. Temp.



## GENERAL SPECIFICATIONS

### Capacitance Range

See Individual Parts Specifications

### Capacitance Test at 25°C

Measured at 1 VRMS max. at 1 KHz

### Capacitance Tolerances

J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

### Operating Temperature Range

-55°C to +125°C

### Temperature Characteristic

$\pm 15\%$  (0 Vdc)

### Voltage Ratings

200, 100 & 50 Vdc

### Dissipation Factor

2.5% max. at 1 KHz, 1 VRMS max.

### Insulation Resistance 25°C (MIL-STD-202-Method 302)

100 K megohms or 1000 megohms -  $\mu\text{F}$  minimum, whichever is less

### Dielectric Strength

250% of rated Vdc

### Life Test (1,000 hours)

200% rated voltage at +125°C

### Moisture Resistance (MIL-STD-202-Method 106)

### Thermal Shock (MIL-STD-202-Method 107, condition A, at rated elevated temperature)

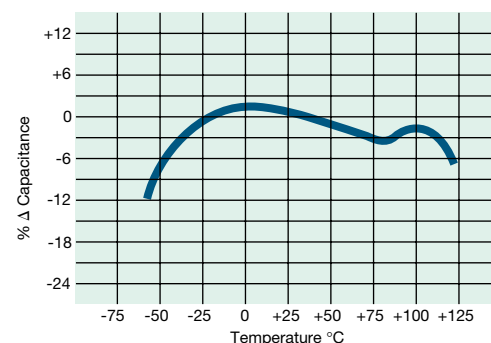
-55°C to +125°C

### Immersion Cycling (MIL-STD-202-Method 104, condition B)

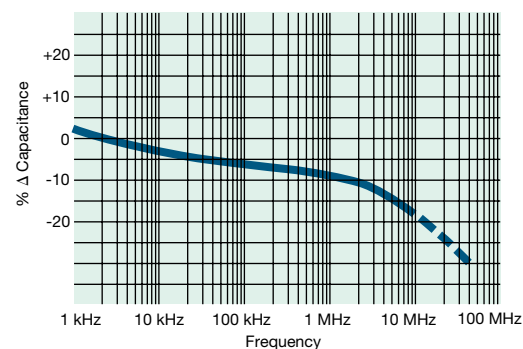
For current reliability information, consult factory.

## TYPICAL CHARACTERISTICS

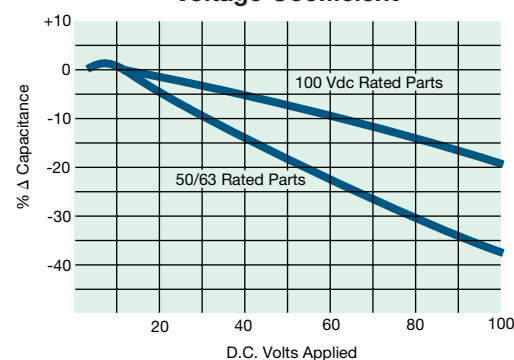
### Temperature Coefficient



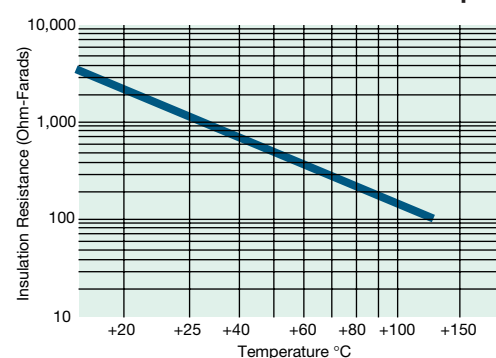
### $\Delta$ Capacitance vs. Frequency



### Voltage Coefficient



### Insulation Resistance vs. Temp.



## GENERAL SPECIFICATIONS

### Capacitance Range

See Individual Parts Specifications

### Capacitance Test at 25°C

Measured at 0.5 VRMS max. at 1 KHz

### Capacitance Tolerances

M =  $\pm 20\%$ , Z =  $+80\%$ ,  $-20\%$ , P = GMV\*

### Operating Temperature Range

$+10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

### Temperature Characteristic

$+22\%$ ,  $-56\%$

### Voltage Ratings

100 & 50 Vdc

### Dissipation Factor

4.0% max. at 1 KHz, .5 VRMS max.

### Insulation Resistance 25°C (MIL-STD-202-Method 302)

10 K megohms or 100 megohms -  $\mu\text{F}$  minimum, whichever is less

### Dielectric Strength

200% of rated Vdc

### Life Test (1,000 hours)

150% rated voltage at  $+85^{\circ}\text{C}$

### Moisture Resistance (MIL-STD-202-Method 106)

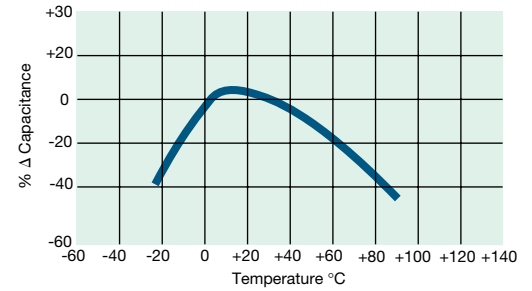
### Immersion Cycling (MIL-STD-202-Method 104, condition B)

For current reliability information, consult factory.

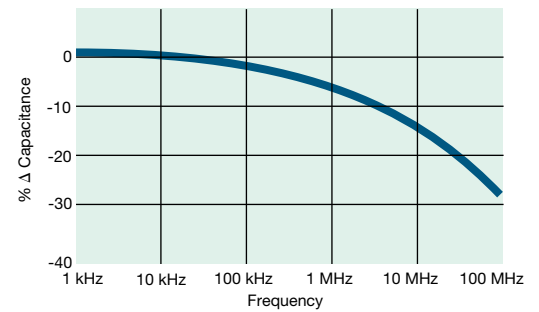
\*Guaranteed Minimum Value

## TYPICAL CHARACTERISTICS

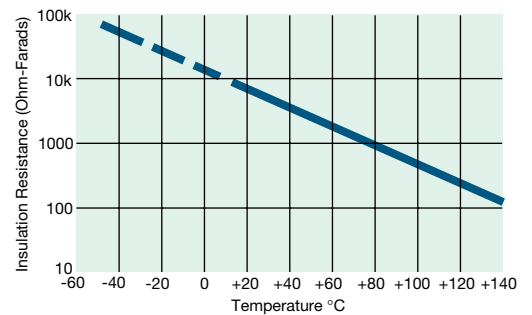
Temperature Coefficient



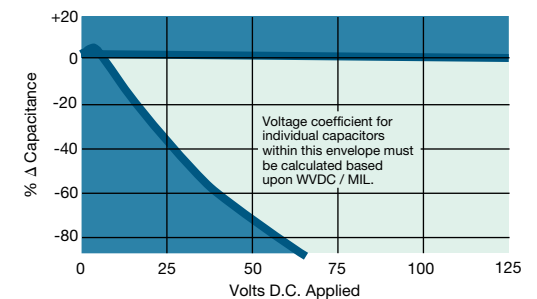
Δ Capacitance vs. Frequency



Insulation Resistance vs. Temp.



Voltage Coefficient



## Y5V (Dielectric “G”)

### GENERAL SPECIFICATIONS

**Capacitance Range**

Contact AVX

**Capacitance Test at 25°C**

Measured at 1.0 VRMS max. at 1 KHz

**Capacitance Tolerances**

+80%, -20%

**Operating Temperature Range**

-30°C to +85°C

**Temperature Characteristic**

+22%, -82%

**Voltage Ratings**

100 & 50 Vdc

**Dissipation Factor**

7% max. (<25 volts)

5% max. (≥25 volts)

at 1 KHz, 1.0 VRMS max.

**Insulation Resistance 25°C (MIL-STD-202-Method 302)**

10 K megohms or 100 megohms -  $\mu$ F minimum,  
whichever is less

**Dielectric Strength**

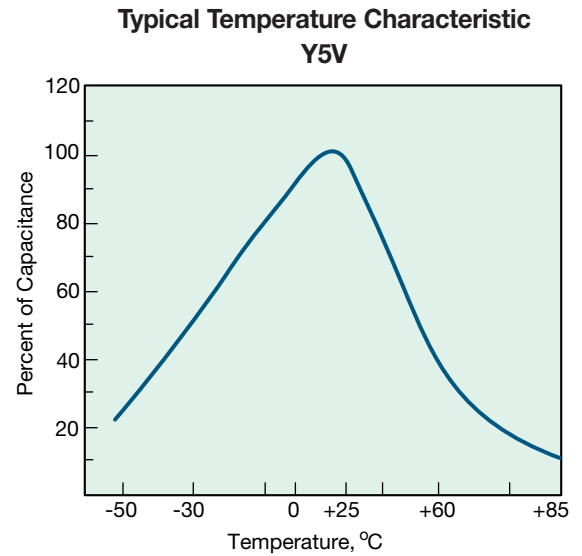
200% of rated Vdc

**Life Test (1,000 hours)**

150% rated voltage at +85°C

**Moisture Resistance (MIL-STD-202-Method 106)****Immersion Cycling (MIL-STD-202-Method 104, condition B)**

### TYPICAL CHARACTERISTICS



## GENERAL INFORMATION

### AVX SR Series

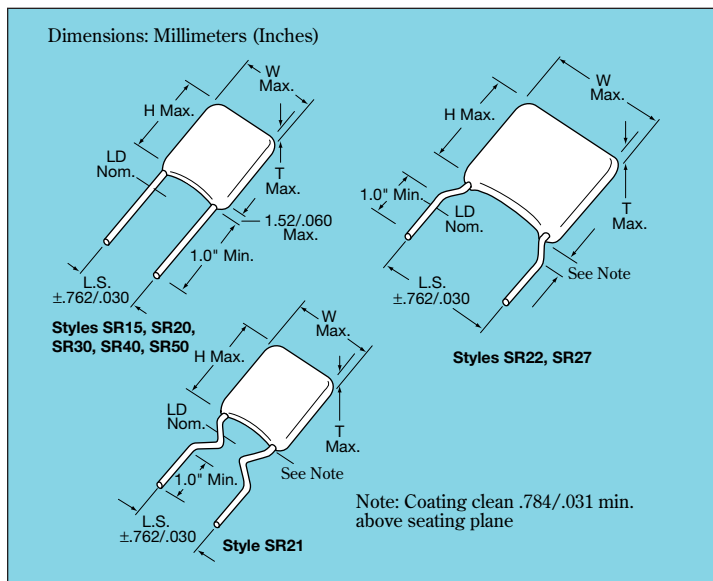
#### Conformally Coated Radial Leaded MLC

Temperature Coefficients: C0G (NP0), X7R, Z5U

200, 100, 50 Volts (300V, 400V & 500V also available)

Case Material: Epoxy

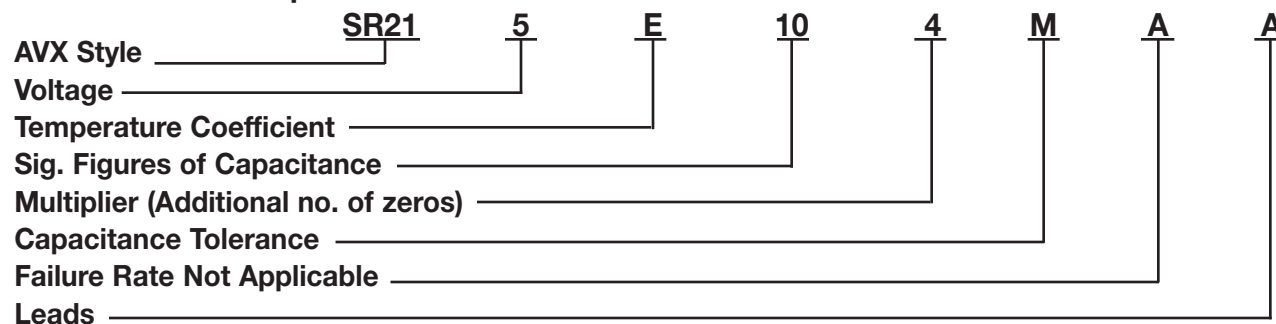
Lead Material: Solderable



## HOW TO ORDER

### AVX Styles: SR15, SR20, SR21, SR22, SR27, SR30, SR40, SR50

#### Part Number Example



#### Part Number Codes

Voltages: 50V = 5, 100V = 1, 200V = 2,  
300V = 9, 400V = 8, 500V = 7

Temp. Coefficient: C0G (NP0) = A, X7R = C, Z5U = E

#### Sig. Figures of Capacitance and Multiplier:

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10pF, use "R" in place of decimal point, e.g., 1R4 = 1.4 pF).

#### Capacitance Tolerances:

C0G (NP0): C =  $\pm 0.25$ pF, D =  $\pm 0.5$ pF, F =  $\pm 1.0\%$  (>50 pF only)  
G =  $\pm 2.0\%$  (>25 pF only), J =  $\pm 5\%$ , K =  $\pm 10\%$   
X7R: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$   
Z5U: M =  $\pm 20\%$ , Z =  $+80\%$ ,  $-20\%$

Failure Rate: A = Not Applicable

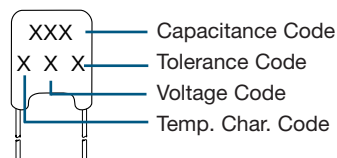
Leads: T = Trimmed Leads,  $.230" \pm .030"$

A = Long Leads, 1.0" minimum

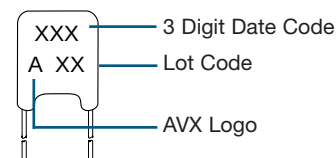
(Other lead lengths are available, contact AVX)

## MARKING

### FRONT



### BACK



## PACKAGING REQUIREMENTS

|                          | Quantity per Bag |
|--------------------------|------------------|
| SR15, 20, 21, 22, 27, 30 | 1000 Pieces      |
| SR40, 50                 | 500 Pieces       |

Note: SR15, SR20, SR21, SR30, and SR40 available on tape and reel per EIA specifications RS-468. See Pages 24 and 25.

## C0G (NP0) Dielectric

### SIZE AND CAPACITANCE SPECIFICATIONS

EIA Characteristic

Dimensions: Millimeters (Inches)

| AVX Style                                   |                                                 | SR15               |  |  | SR20               |  |  | SR21               |  |  | SR22               |  |  | SR27               |  |  | SR30           |  |  | SR40            |  |  | SR50            |  |  |
|---------------------------------------------|-------------------------------------------------|--------------------|--|--|--------------------|--|--|--------------------|--|--|--------------------|--|--|--------------------|--|--|----------------|--|--|-----------------|--|--|-----------------|--|--|
| AVX “Insertable”                            |                                                 | SR07               |  |  | SR29               |  |  | SR59               |  |  | N/A                |  |  | N/A                |  |  | SR65           |  |  | SR75            |  |  | N/A             |  |  |
| Width (W)                                   |                                                 | 3.81<br>(.150)     |  |  | 5.08<br>(.200)     |  |  | 5.08<br>(.200)     |  |  | 5.08<br>(.200)     |  |  | 6.604<br>(.260)    |  |  | 7.62<br>(.300) |  |  | 10.16<br>(.400) |  |  | 12.70<br>(.500) |  |  |
| Height (H)                                  |                                                 | 3.81<br>(.150)     |  |  | 5.08<br>(.200)     |  |  | 5.08<br>(.200)     |  |  | 5.08<br>(.200)     |  |  | 6.35<br>(.250)     |  |  | 7.62<br>(.300) |  |  | 10.16<br>(.400) |  |  | 12.70<br>(.500) |  |  |
| Thickness (T)                               |                                                 | 2.54<br>(.100)     |  |  | 3.175<br>(.125)    |  |  | 3.175<br>(.125)    |  |  | 3.175<br>(.125)    |  |  | 4.06<br>(.160)     |  |  | 3.81<br>(.150) |  |  | 3.81<br>(.150)  |  |  | 5.08<br>(.200)  |  |  |
| Lead Spacing (L.S.)                         |                                                 | 2.54<br>(.100)     |  |  | 2.54<br>(.100)     |  |  | 5.08<br>(.200)     |  |  | 6.35<br>(.250)     |  |  | 7.62<br>(.300)     |  |  | 5.08<br>(.200) |  |  | 5.08<br>(.200)  |  |  | 10.16<br>(.400) |  |  |
| Lead Diameter (L.D.)                        |                                                 | .508<br>(.020)     |  |  | .508<br>(.020)     |  |  | .508<br>(.020)     |  |  | .508<br>(.020)     |  |  | .508<br>(.020)     |  |  | .508<br>(.020) |  |  | .508<br>(.020)  |  |  | .635<br>(.025)  |  |  |
| Cap. in.* Industry Preferred Values in Blue |                                                 | WVDC<br>200 100 50 |  |  | WVDC<br>200 100 50 |  |  | WVDC<br>200 100 50 |  |  | WVDC<br>200 100 50 |  |  | WVDC<br>200 100 50 |  |  | WVDC<br>100 50 |  |  | WVDC<br>100 50  |  |  | WVDC<br>100 50  |  |  |
| 1.0-9.9<br>10<br>15                         | SR151A1R0DAA<br>SR151A100KAA<br>SR____A150KAA   |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 22<br>33<br>39                              | SR____A220KAA<br>SR____A330KAA<br>SR____A390KAA |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 47<br>68<br>100                             | SR____A470KAA<br>SR____A680KAA<br>SR151A101KAA  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 150<br>220<br>330                           | SR____A151KAA<br>SR____A221KAA<br>SR____A331KAA |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 390<br>470<br>680                           | SR____A391KAA<br>SR____A471KAA<br>SR____A681KAA |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 1000<br>1500<br>2200                        | SR211A102KAA<br>SR____A152KAA<br>SR____A222KAA  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 3900<br>4700<br>6800                        | SR____A392KAA<br>SR____A472KAA<br>SR____A682KAA |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 8200<br>10,000<br>15,000                    | SR____A822KAA<br>SR305A103KAA<br>SR____A153KAA  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 22,000<br>33,000<br>39,000                  | SR____A223KAA<br>SR____A333KAA<br>SR____A393KAA |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |
| 47,000<br>68,000<br>100,000                 | SR____A473KAA<br>SR____A683KAA<br>SR____A104KAA |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                    |  |  |                |  |  |                 |  |  |                 |  |  |

For other styles, voltages, tolerances and lead lengths see Part No. Codes or contact factory.

\*Other capacitance values available upon special request.

 = Industry preferred values  
 = SR20 only

**NOTE:** Capacitance Ranges available for SR12 same as SR15  
SR62 same as SR21  
SR64 same as SR30  
SR89 same as SR21

## X7R Dielectric

### SIZE AND CAPACITANCE SPECIFICATIONS

EIA Characteristic

Dimensions: Millimeters (Inches)

| AVX Style            |                                      | SR15           |     |    | SR20            |     |    | SR21            |    | SR22            |    | SR27            |    | SR30           |     |    | SR40            |     |    | SR50            |     |    |
|----------------------|--------------------------------------|----------------|-----|----|-----------------|-----|----|-----------------|----|-----------------|----|-----------------|----|----------------|-----|----|-----------------|-----|----|-----------------|-----|----|
| AVX “Insertable”     |                                      | SR07           |     |    | SR29            |     |    | SR59            |    | N/A             |    | N/A             |    | SR65           |     |    | SR75            |     |    | N/A             |     |    |
| Width (W)            |                                      | 3.81<br>(.150) |     |    | 5.08<br>(.200)  |     |    | 5.08<br>(.200)  |    | 5.08<br>(.200)  |    | 6.604<br>(.260) |    | 7.62<br>(.300) |     |    | 10.16<br>(.400) |     |    | 12.70<br>(.500) |     |    |
| Height (H)           |                                      | 3.81<br>(.150) |     |    | 5.08<br>(.200)  |     |    | 5.08<br>(.200)  |    | 5.08<br>(.200)  |    | 6.35<br>(.250)  |    | 7.62<br>(.300) |     |    | 10.16<br>(.400) |     |    | 12.70<br>(.500) |     |    |
| Thickness (T)        |                                      | 2.54<br>(.100) |     |    | 3.175<br>(.125) |     |    | 3.175<br>(.125) |    | 3.175<br>(.125) |    | 4.06<br>(.160)  |    | 3.81<br>(.150) |     |    | 3.81<br>(.150)  |     |    | 5.08<br>(.200)  |     |    |
| Lead Spacing (L.S.)  |                                      | 2.54<br>(.100) |     |    | 2.54<br>(.100)  |     |    | 5.08<br>(.200)  |    | 6.35<br>(.250)  |    | 7.62<br>(.300)  |    | 5.08<br>(.200) |     |    | 5.08<br>(.200)  |     |    | 10.16<br>(.400) |     |    |
| Lead Diameter (L.D.) |                                      | .508<br>(.020) |     |    | .508<br>(.020)  |     |    | .508<br>(.020)  |    | .508<br>(.020)  |    | .508<br>(.020)  |    | .508<br>(.020) |     |    | .508<br>(.020)  |     |    | .635<br>(.025)  |     |    |
| Cap. in.*<br>pF      | Industry Preferred<br>Values in Blue | WVDC           |     |    | WVDC            |     |    | WVDC            |    | WVDC            |    | WVDC            |    | WVDC           |     |    | WVDC            |     |    | WVDC            |     |    |
|                      |                                      | 200            | 100 | 50 | 200             | 100 | 50 | 100             | 50 | 100             | 50 | 100             | 50 | 200            | 100 | 50 | 200             | 100 | 50 | 200             | 100 | 50 |
| 470                  | SR____C471KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 1000                 | SR155C102KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 1500                 | SR____C152KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 2200                 | SR____C222KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 3300                 | SR____C332KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 4700                 | SR____C472KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 6800                 | SR____C682KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 10,000               | SR215C103KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 15,000               | SR____C153KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 22,000               | SR____C223KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 33,000               | SR____C333KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 47,000               | SR____C473KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 68,000               | SR____C683KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 100,000              | SR215C104KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 150,000              | SR____C154KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 220,000              | SR215C224KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 330,000              | SR____C334KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 390,000              | SR____C394KAA                        |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 470,000              | SR305C474KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 1.0 µF               | SR305C105KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 2.2 µF               | SR405C225KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 2.7 µF               | SR505C275KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |
| 4.7 µF               | SR505C475KAA                         |                |     |    |                 |     |    |                 |    |                 |    |                 |    |                |     |    |                 |     |    |                 |     |    |

For other styles, voltages, tolerances and lead lengths see Part No. Codes or contact factory.

\*Other capacitance values available upon special request.

 = Industry preferred values

 = SR20 only

**NOTE:** Capacitance Ranges available for SR12 same as SR15  
 SR62 same as SR21  
 SR64 same as SR30  
 SR89 same as SR21

## Z5U Dielectric

## SIZE AND CAPACITANCE SPECIFICATIONS

EIA Characteristic

Dimensions: Millimeters (Inches)

| AVX Style                                         | SR15           | SR20            | SR21            | SR22            | SR27            | SR30           | SR40            | SR50            |
|---------------------------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|
| AVX "Insertable"                                  | SR07           | SR29            | SR59            | N/A             | N/A             | SR65           | SR75            | N/A             |
| Width (W)                                         | 3.81<br>(.150) | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.604<br>(.260) | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |
| Height (H)                                        | 3.81<br>(.150) | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |
| Thickness (T)                                     | 2.54<br>(.100) | 3.175<br>(.125) | 3.175<br>(.125) | 3.175<br>(.125) | 4.06<br>(.160)  | 3.81<br>(.150) | 3.81<br>(.150)  | 5.08<br>(.200)  |
| Lead Spacing (L.S.)                               | 2.54<br>(.100) | 2.54<br>(.100)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300)  | 5.08<br>(.200) | 5.08<br>(.200)  | 10.16<br>(.400) |
| Lead Diameter (L.D.)                              | .508<br>(.020) | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020) | .508<br>(.020)  | .635<br>(.025)  |
| Cap. in.* Industry Preferred<br>pF Values in Blue | WVDC<br>100 50 | WVDC<br>100 50  | WVDC<br>100 50  | WVDC<br>100 50  | WVDC<br>100 50  | WVDC<br>100 50 | WVDC<br>100 50  | WVDC<br>100 50  |
| 10,000 SR155E103ZAA                               |                |                 |                 |                 |                 |                |                 |                 |
| 47,000 SR____E473ZAA                              |                |                 |                 |                 |                 |                |                 |                 |
| 100,000 SR215E104ZAA                              |                |                 |                 |                 |                 |                |                 |                 |
| 150,000 SR____E154ZAA                             |                |                 |                 |                 |                 |                |                 |                 |
| 220,000 SR215E224ZAA                              |                |                 |                 |                 |                 |                |                 |                 |
| 330,000 SR215E334ZAA                              |                |                 |                 |                 |                 |                |                 |                 |
| 470,000 SR215E474ZAA                              |                |                 |                 |                 |                 |                |                 |                 |
| 680,000 SR____E684ZAA                             |                |                 |                 |                 |                 |                |                 |                 |
| 1.0 µF SR____105ZAA                               |                |                 |                 |                 |                 |                |                 |                 |
| 1.5 µF SR30E155ZAA                                |                |                 |                 |                 |                 |                |                 |                 |
| 2.2 µF SR30E225ZAA                                |                |                 |                 |                 |                 |                |                 |                 |
| 3.3 µF SR30E335ZAA                                |                |                 |                 |                 |                 |                |                 |                 |
| 4.7 µF SR30E475ZAA                                |                |                 |                 |                 |                 |                |                 |                 |

For other styles, voltages, tolerances and lead lengths see Part No. Codes or contact factory.

\*Other capacitance values available upon special request.

 = Industry preferred values

 = SR20 only

## AVX 500 VOLT SKYCAPS\*\*

| STYLE* | MAXIMUM CAPACITANCE VALUE |         |
|--------|---------------------------|---------|
|        | C0G (NP0)                 | X7R     |
| SR29   | 900 pF                    | .015 µF |
| SR20   | 1800 pF                   | .033 µF |
| SR28   | 900 pF                    | .015 µF |
| SR59   | 900 pF                    | .015 µF |
| SR13   | 1800 pF                   | .033 µF |
| SR21   | 1800 pF                   | .033 µF |
| SR30   | 7200 pF                   | .12 µF  |
| SR61   | 7200 pF                   | .12 µF  |
| SR65   | 7200 pF                   | .12 µF  |
| SR40   | .015 µF                   | .27 µF  |
| SR75   | .015 µF                   | .27 µF  |
| SR22   | 1800 pF                   | .033 µF |
| SR27   | 1800 pF                   | .033 µF |
| SR76   | .015 µF                   | .27 µF  |
| SR50   | .036 µF                   | .59 µF  |

\*Consult pages 18 and 19 for style sizes.

\*\*Voltage rating based on DWV of 150% of rated voltage.

# Configurations by Lead Spacing

## LEAD SPACING .100 ±.030

Dimensions: Inches (Millimeters)

|                              |                                                    |                                                       |                              |
|------------------------------|----------------------------------------------------|-------------------------------------------------------|------------------------------|
| <b>SR07*</b><br>(T=.100)<br> | <b>SR14</b><br>(T=.100)<br>                        | <b>SR15*</b><br>(T=.100)<br>                          | <b>SR20*</b><br>(T=.125)<br> |
| <b>SR29*</b><br>(T=.125)<br> | <b>SR62*</b><br>(T=.125)<br><p>Leads = #22 AWG</p> | <b>SR62-LP*</b><br>(T=.100)<br><p>Leads = #22 AWG</p> |                              |

## LEAD SPACING .200 ±.030

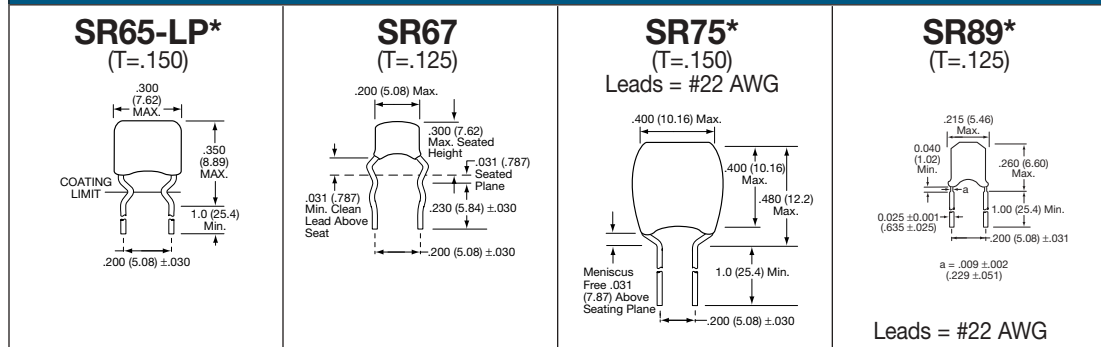
Dimensions: Inches (Millimeters)

|                              |                                 |                                                    |                                                       |                              |
|------------------------------|---------------------------------|----------------------------------------------------|-------------------------------------------------------|------------------------------|
| <b>SR12*</b><br>(T=.100)<br> | <b>SR13*</b><br>(T=.125)<br>    | <b>SR21*</b><br>(T=.125)<br>                       | <b>SR21-85*</b><br>(T=.125)<br>                       | <b>SR28*</b><br>(T=.125)<br> |
| <b>SR30*</b><br>(T=.150)<br> | <b>SR30-LP*</b><br>(T=.150)<br> | <b>SR32*</b><br>(T=.150)<br>                       | <b>SR40*</b><br>(T=.150)<br>                          | <b>SR59*</b><br>(T=.125)<br> |
| <b>SR61</b><br>(T=.150)<br>  | <b>SR63*</b><br>(T=.150)<br>    | <b>SR64*</b><br>(T=.150)<br><p>Leads = #22 AWG</p> | <b>SR64-LP*</b><br>(T=.150)<br><p>Leads = #22 AWG</p> | <b>SR65*</b><br>(T=.150)<br> |

# Configurations by Lead Spacing

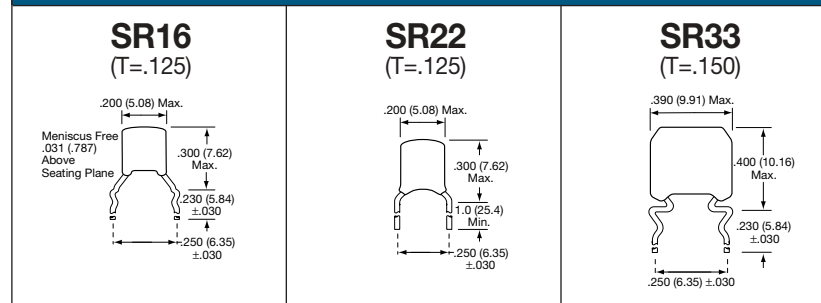
## LEAD SPACING .200 ±.030 continued

Dimensions: Inches (Millimeters)

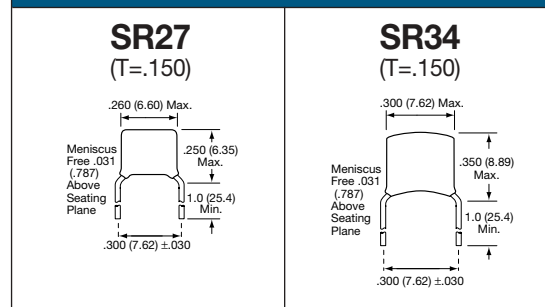


## LEAD SPACING .250 ±.030

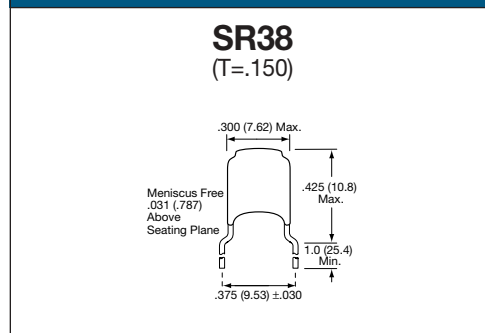
Dimensions: Inches (Millimeters)



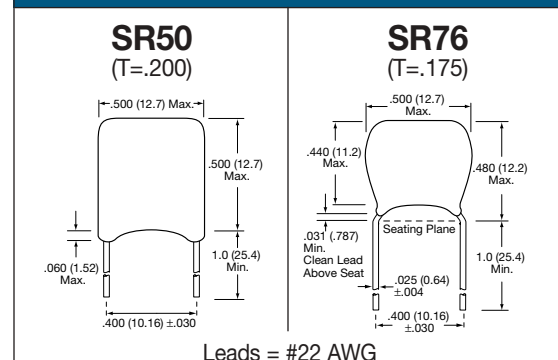
## LEAD SPACING .300 ±.030



## LEAD SPACING .375 ±.030



## LEAD SPACING .400 ±.030



- NOTES:**
1. All leads are #24 AWG unless otherwise noted.
  2. Available in tape and reel packaging(\*).
  3. Other styles are also available, contact factory.
  4. (T = XXX) under type designation is maximum thickness in inches.

## GENERAL INFORMATION

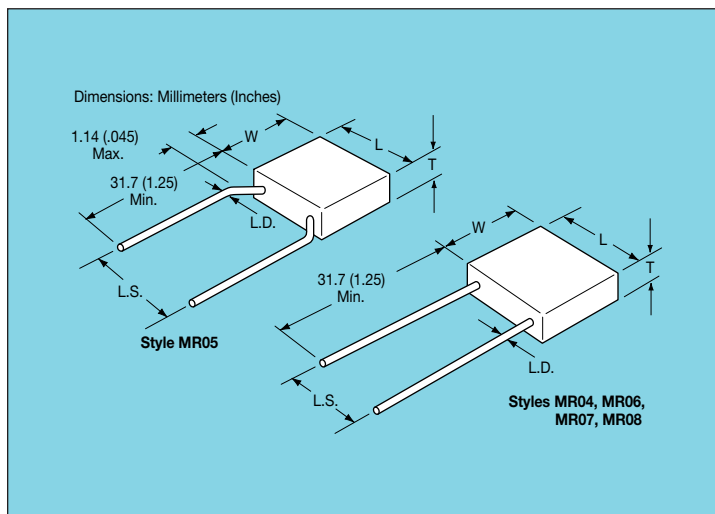
### AVX MR Series

#### Molded Radial Leaded MLC

**Temperature Coefficients:** C0G (NP0), X7R, Z5U  
50, 100, 200 Volts

**Case Material:** Molded Epoxy

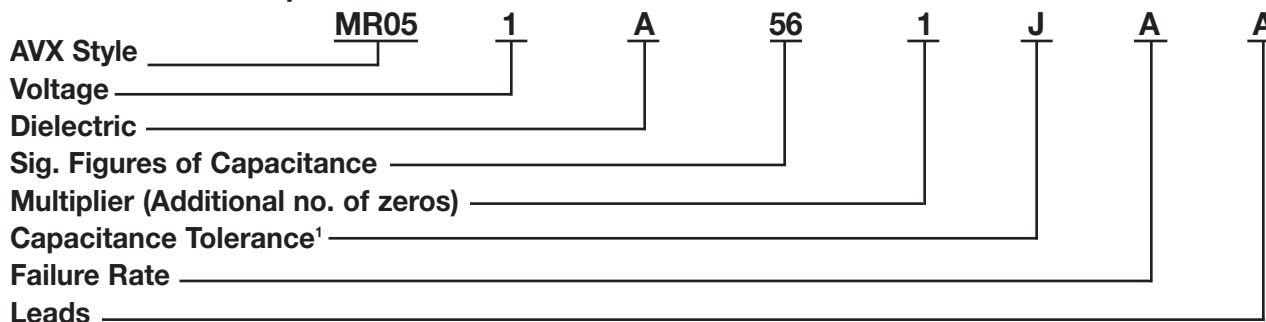
**Lead Material:** Solderable



## HOW TO ORDER

### AVX Styles: MR04, MR05, MR06, MR07, MR08

#### Part Number Example:



#### Part Number Codes

**Voltages:** 50V = 5, 100V = 1, 200V = 2

**Dielectric:** C0G (NP0) = A, X7R = C, Z5U = E

#### Sig. Figures of Capacitance and Multiplier:

First two digits are the significant figures of capacitance.  
Third digit indicates the additional number of zeros.  
For example, order 560 pF as 561. (For values below 10pF, use "R" in place of decimal point, e.g., 1R4 = 1.4 pF).

#### Capacitance Tolerances:

C0G (NP0): D =  $\pm 5\text{pF}$  (<10 pF only), F =  $\pm 1.0\%$  (>50 pF only),  
G =  $\pm 2.0\%$  (>25 pF only), J =  $\pm 5\%$ , K =  $\pm 10\%$   
X7R: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$   
Z5U: M =  $\pm 20\%$ , Z =  $+80\%$ ,  $-20\%$

**Failure Rate:** Not Applicable

**Leads:** A = Standard Solderable

T = Trimmed Leads, .230"  $\pm$  .030"

<sup>1</sup>Trimmed lead length for the MR05 style will be measured from the bend in the lead (seating plane).

## MARKING

Marking is as size permits.

(For code identification, see HOW TO ORDER section.)

- AVX
- Capacitance Tolerance
- Voltage Rating
- Temperature Coefficient
- Date Code
- Lot Code

## PACKAGING REQUIREMENTS

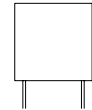
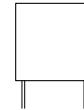
**Bulk Packaging:** 1000 pcs. per sealed package except MR07/MR08 (300 pcs.).

**Tape and Reel:** Available on MR04, MR05, and MR06 only (2500 pcs./reel).

**Ammo Packaging:** Available on special request.

## C0G (NP0)

## SIZE AND CAPACITANCE SPECIFICATIONS



Dimensions: Millimeters (Inches)

| AVX Style          |                                                    | MR04         |     |    | MR05         |     |    | MR06         |     |    | MR07          |     |    | MR08          |     |    |
|--------------------|----------------------------------------------------|--------------|-----|----|--------------|-----|----|--------------|-----|----|---------------|-----|----|---------------|-----|----|
| Length*            |                                                    | 4.83 (.190") |     |    | 4.83 (.190") |     |    | 7.36 (.290") |     |    | 12.44 (.490") |     |    | 12.44 (.490") |     |    |
| Width*             |                                                    | 4.83 (.190") |     |    | 4.83 (.190") |     |    | 7.36 (.290") |     |    | 12.44 (.490") |     |    | 12.44 (.490") |     |    |
| Thickness*         |                                                    | 2.28 (.090") |     |    | 2.28 (.090") |     |    | 2.28 (.090") |     |    | 3.55 (.140")  |     |    | 6.09 (.240")  |     |    |
| Lead Spacing*      |                                                    | 2.54 (.100") |     |    | 5.08 (.200") |     |    | 5.08 (.200") |     |    | 10.16 (.400") |     |    | 10.16 (.400") |     |    |
| Lead Diameter*     |                                                    | .635 (.025") |     |    | .635 (.025") |     |    | .635 (.025") |     |    | .635 (.025")  |     |    | .635 (.025")  |     |    |
| Cap. in pF         | Typical AVX Part Nos.                              | WVDC         |     |    | WVDC         |     |    | WVDC         |     |    | WVDC          |     |    | WVDC          |     |    |
|                    |                                                    | 200          | 100 | 50 | 200          | 100 | 50 | 200          | 100 | 50 | 200           | 100 | 50 | 200           | 100 | 50 |
| 1.0 to 9.1         | MR____5A1R0DAA<br>MR____5A9R1DAA                   |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 10 to 15           | MR____5A100KAA<br>MR____5A120KAA<br>MR____5A150KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 18 to 27           | MR____5A180KAA<br>MR____5A220KAA<br>MR____5A270KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 33 to 47           | MR____5A330KAA<br>MR____5A390KAA<br>MR____5A470KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 56 to 82           | MR____5A560KAA<br>MR____5A680KAA<br>MR____5A820KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 100 to 150         | MR____5A101KAA<br>MR____5A121KAA<br>MR____5A151KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 180 to 270         | MR____5A181KAA<br>MR____5A221KAA<br>MR____5A271KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 330 to 470         | MR____5A331KAA<br>MR____5A391KAA<br>MR____5A471KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 560 to 820         | MR____5A561KAA<br>MR____5A681KAA<br>MR____5A821KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1000 to 1500       | MR____5A102KAA<br>MR____5A122KAA<br>MR____5A152KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1800 to 2700       | MR____5A182KAA<br>MR____5A222KAA<br>MR____5A272KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 3300 to 4700       | MR____5A332KAA<br>MR____5A392KAA<br>MR____5A472KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 5600 to 8200       | MR____5A562KAA<br>MR____5A682KAA<br>MR____5A822KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 10,000 to 15,000   | MR____5A103KAA<br>MR____5A123KAA<br>MR____5A153KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 18,000 to 27,000   | MR____5A183KAA<br>MR____5A223KAA<br>MR____5A273KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 33,000 to 47,000   | MR____5A333KAA<br>MR____5A393KAA<br>MR____5A473KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 56,000 to 82,000   | MR____5A563KAA<br>MR____5A683KAA<br>MR____5A823KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 100,000 to 150,000 | MR____5A104KAA<br>MR____5A124KAA<br>MR____5A154KAA |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |

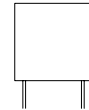
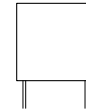
For trimmed leads see "How To Order".  
For other tolerances see "How To Order".  
For other voltages see "How To Order".

= Industry preferred values

\*Length, width and thickness dimensions are  $\pm 0.254$  mm ( $\pm 0.010$ "). Lead diameter is  $\pm 0.05$  mm ( $\pm 0.002$ "). Lead spacing is  $\pm 0.381$  mm ( $\pm 0.015$ ").

## X7R

## SIZE AND CAPACITANCE SPECIFICATIONS



Dimensions: Millimeters (Inches)

| AVX Style      |                          | MR04         |     |    | MR05         |     |    | MR06         |     |    | MR07          |     |    | MR08          |     |    |
|----------------|--------------------------|--------------|-----|----|--------------|-----|----|--------------|-----|----|---------------|-----|----|---------------|-----|----|
| Length*        |                          | 4.83 (.190") |     |    | 4.83 (.190") |     |    | 7.36 (.290") |     |    | 12.44 (.490") |     |    | 12.44 (.490") |     |    |
| Width*         |                          | 4.83 (.190") |     |    | 4.83 (.190") |     |    | 7.36 (.290") |     |    | 12.44 (.490") |     |    | 12.44 (.490") |     |    |
| Thickness*     |                          | 2.28 (.090") |     |    | 2.28 (.090") |     |    | 2.28 (.090") |     |    | 3.55 (.140")  |     |    | 6.09 (.240")  |     |    |
| Lead Spacing*  |                          | 2.54 (.100") |     |    | 5.08 (.200") |     |    | 5.08 (.200") |     |    | 10.16 (.400") |     |    | 10.16 (.400") |     |    |
| Lead Diameter* |                          | .635 (.025") |     |    | .635 (.025") |     |    | .635 (.025") |     |    | .635 (.025")  |     |    | .635 (.025")  |     |    |
| Cap. in<br>pF  | Typical AVX<br>Part Nos. | WVDC         |     |    | WVDC         |     |    | WVDC         |     |    | WVDC          |     |    | WVDC          |     |    |
|                |                          | 200          | 100 | 50 | 200          | 100 | 50 | 200          | 100 | 50 | 200           | 100 | 50 | 200           | 100 | 50 |
| 100            | MR____5C101KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 120            | MR____5C121KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 150            | MR____5C151KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 180            | MR____5C181KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 220            | MR____5C221KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 270            | MR____5C271KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 330            | MR____5C331KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 390            | MR____5C391KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 470            | MR____5C471KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 560            | MR____5C561KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 680            | MR____5C681KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 820            | MR____5C821KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1000           | MR____5C102KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1200           | MR____5C122KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1500           | MR____5C152KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1800           | MR____5C182KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 2200           | MR____5C222KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 2700           | MR____5C272KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 3300           | MR____5C332KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 3900           | MR____5C392KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 4700           | MR____5C472KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 5600           | MR____5C562KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 6800           | MR____5C682KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 8200           | MR____5C822KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 10,000         | MR____5C103KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 12,000         | MR____5C123KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 15,000         | MR____5C153KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 18,000         | MR____5C183KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 22,000         | MR____5C223KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 27,000         | MR____5C273KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 33,000         | MR____5C333KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 39,000         | MR____5C393KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 47,000         | MR____5C473KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 56,000         | MR____5C563KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 68,000         | MR____5C683KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 82,000         | MR____5C823KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 100,000        | MR____5C104KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 120,000        | MR____5C124KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 150,000        | MR____5C154KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 180,000        | MR____5C184KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 220,000        | MR____5C224KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 270,000        | MR____5C274KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 330,000        | MR____5C334KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 390,000        | MR____5C394KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 470,000        | MR____5C474KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 560,000        | MR____5C564KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 680,000        | MR____5C684KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 820,000        | MR____5C824KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1.0 µF         | MR____5C105KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1.2 µF         | MR____5C125KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1.5 µF         | MR____5C155KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 1.8 µF         | MR____5C185KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 2.0 µF         | MR____5C205KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 2.2 µF         | MR____5C225KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 2.7 µF         | MR____5C275KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 3.3 µF         | MR____5C335KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 3.9 µF         | MR____5C395KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |
| 4.7 µF         | MR____5C475KAA           |              |     |    |              |     |    |              |     |    |               |     |    |               |     |    |

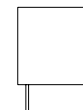
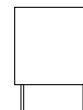
For trimmed leads see "How To Order".  
For other tolerances see "How To Order".  
For other voltages see "How To Order".

 = Industry preferred values

\*Length, width and thickness dimensions are  $\pm 0.254$  mm ( $\pm 0.010$ "). Lead diameter is  $\pm 0.05$  mm ( $\pm 0.002$ "). Lead spacing is  $\pm 0.381$  mm ( $\pm 0.015$ ").

## Z5U Dielectric

### SIZE AND CAPACITANCE SPECIFICATIONS



Dimensions: Millimeters (Inches)

| AVX Style         |                          | MR04            |    | MR05            |    | MR06            |    | MR07             |    | MR08             |    |
|-------------------|--------------------------|-----------------|----|-----------------|----|-----------------|----|------------------|----|------------------|----|
| Length*           |                          | 4.83<br>(.190") |    | 4.83<br>(.190") |    | 7.36<br>(.290") |    | 12.44<br>(.490") |    | 12.44<br>(.490") |    |
| Width*            |                          | 4.83<br>(.190") |    | 4.83<br>(.190") |    | 7.36<br>(.290") |    | 12.44<br>(.490") |    | 12.44<br>(.490") |    |
| Thickness*        |                          | 2.28<br>(.090") |    | 2.28<br>(.090") |    | 2.28<br>(.090") |    | 3.55<br>(.140")  |    | 6.09<br>(.240")  |    |
| Lead*<br>Spacing  |                          | 2.54<br>(.100") |    | 5.08<br>(.200") |    | 5.08<br>(.200") |    | 10.16<br>(.400") |    | 10.16<br>(.400") |    |
| Lead*<br>Diameter |                          | .635<br>(.025") |    | .635<br>(.025") |    | .635<br>(.025") |    | .635<br>(.025")  |    | .635<br>(.025")  |    |
| Cap. in<br>pF     | Typical AVX<br>Part Nos. | WVDC            |    | WVDC            |    | WVDC            |    | WVDC             |    | WVDC             |    |
|                   |                          | 100             | 50 | 100             | 50 | 100             | 50 | 100              | 50 | 100              | 50 |
| 10,000            | MR_____5E103ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 12,000            | MR_____5E123ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 15,000            | MR_____5E153ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 18,000            | MR_____5E183ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 22,000            | MR_____5E223ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 27,000            | MR_____5E273ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 33,000            | MR_____5E333ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 39,000            | MR_____5E393ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 47,000            | MR_____5E473ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 56,000            | MR_____5E563ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 68,000            | MR_____5E683ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 82,000            | MR_____5E823ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 100,000           | MR_____5E104ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 120,000           | MR_____5E124ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 150,000           | MR_____5E154ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 180,000           | MR_____5E184ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 220,000           | MR_____5E224ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 270,000           | MR_____5E274ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 330,000           | MR_____5E334ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 390,000           | MR_____5E394ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 470,000           | MR_____5E474ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 560,000           | MR_____5E564ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 680,000           | MR_____5E684ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 820,000           | MR_____5E824ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 1.0 µF            | MR_____5E105ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 1.2 µF            | MR_____5E125ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 1.5 µF            | MR_____5E155ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 1.8 µF            | MR_____5E185ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 2.2 µF            | MR_____5E225ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 2.7 µF            | MR_____5E275ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 3.3 µF            | MR_____5E335ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 3.9 µF            | MR_____5E395ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 4.7 µF            | MR_____5E475ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 5.6 µF            | MR_____5E565ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 6.8 µF            | MR_____5E685ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 8.2 µF            | MR_____5E825ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |
| 10.0 µF           | MR_____5E106ZAA          |                 |    |                 |    |                 |    |                  |    |                  |    |

For trimmed leads see "How To Order".  
For other tolerances see "How To Order".  
For other voltages see "How To Order".

 = Industry preferred values

\*Length, width and thickness dimensions are  $\pm 0.254$  mm ( $\pm 0.010$ "). Lead diameter is  $\pm 0.05$  mm ( $\pm 0.002$ "). Lead spacing is  $\pm 0.381$  mm ( $\pm 0.015$ ").

## Tape and Reel

### GENERAL INFORMATION

1. Standard reel diameter is 355 millimeters (14 inches) maximum.
2. Reeling standard (#1 or #2) should be specified when ordering.

### HOW TO ORDER

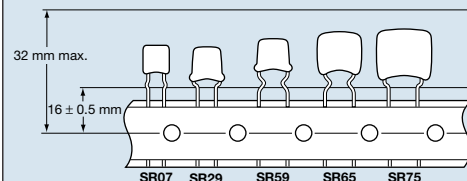
To specify tape and reel packaging, add TR1, TR2 or TRX to the end of the AVX 12 digit part number.

Examples:

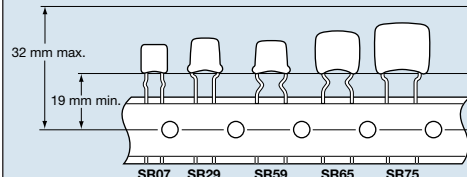
SR215C104KAATR1  
SR305E105MAATR2  
SR215C103JAATTRX

## The Insertables

### STANDARD 1

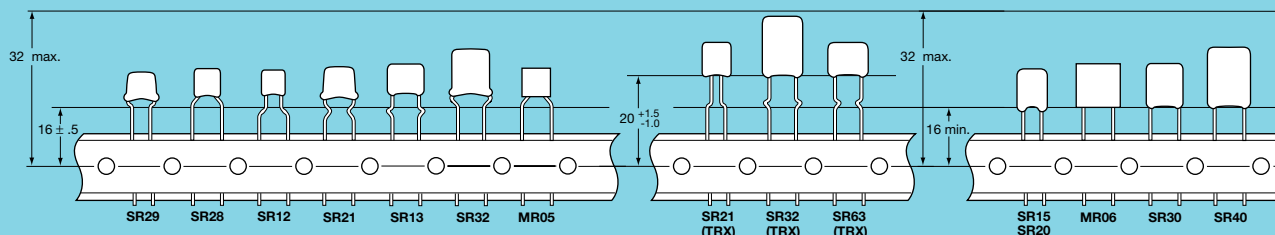


### STANDARD 2



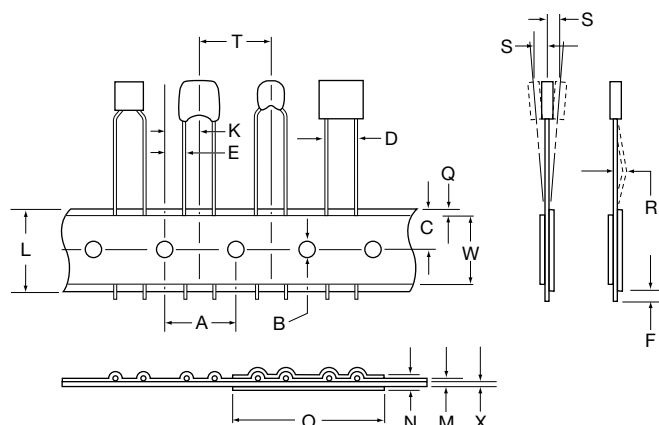
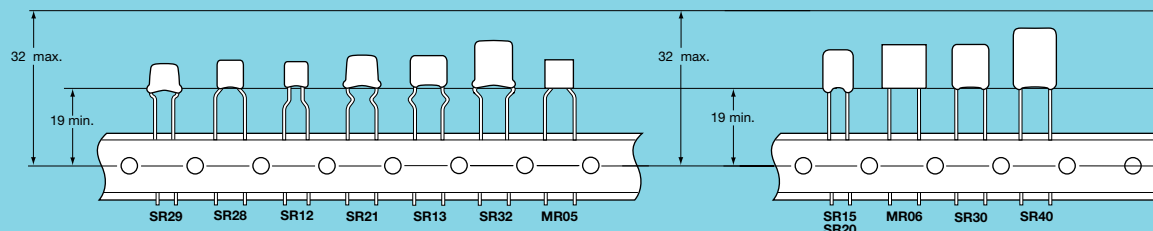
### STANDARD 1

Dimensions in Millimeters



### STANDARD 2

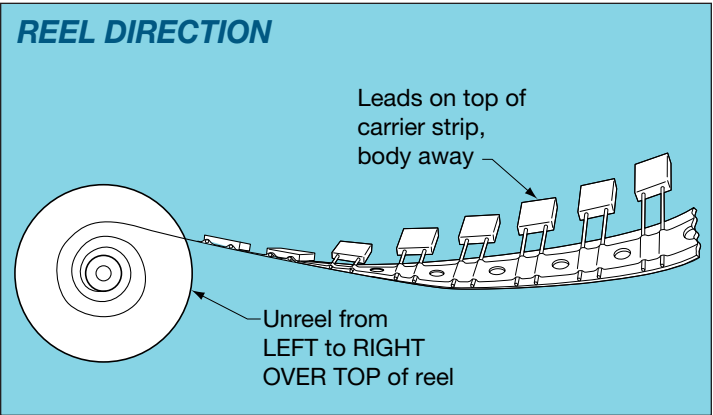
Dimensions in Millimeters



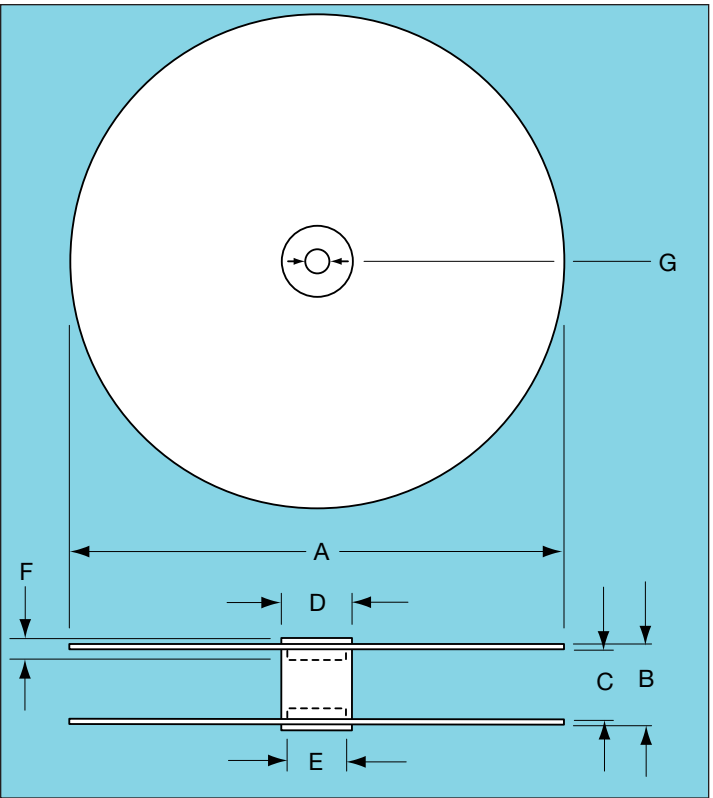
### DESCRIPTION

### DIMENSIONS (MM)

|                                                                      |                                                                                |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------|
| A. Feed Hole Pitch                                                   | 12.70 ± .20                                                                    |
| B. Feed Hole Diameter                                                | 3.99 ± .20                                                                     |
| C. Feed Hole Location                                                | 9.02 ± .51                                                                     |
| D. Component Lead Spacing                                            | 5.00 <sup>+1.79</sup> <sub>-.20</sub> or 2.54 <sup>+1.79</sup> <sub>-.20</sub> |
| E. Component Lead Location                                           | 3.81 ± .51 or 5.00 ± .51<br>for 2.54 lead spacing                              |
| F. Component Lead Protrusion<br>(edge of carrier to cut end of lead) | 2.00 maximum                                                                   |
| K. Component Body Location                                           | 6.35 ± .41                                                                     |
| L. Carrier Tape Width                                                | 18.01 <sup>+1.02</sup> <sub>-.51</sub>                                         |
| M. Carrier Tape Assembly Thickness                                   | .71 ± .20                                                                      |
| N. Carrier Tape Spliced Thickness                                    | 1.42 maximum                                                                   |
| O. Carrier Tape Spliced Length                                       | 50.80 - 88.90                                                                  |
| Q. Adhesive Tape Border                                              | 3.00 maximum                                                                   |
| R. Component Bent Leads (either direction)                           | .79 maximum                                                                    |
| S. Component Misalignment                                            | .99 maximum                                                                    |
| T. Component Pitch                                                   | 12.70 ± .99                                                                    |
| W. Adhesive Tape Width                                               | 5.00 minimum                                                                   |
| X. Carrier Tape Thickness                                            | .51 ± .10                                                                      |
| Y. Cumulative Pitch over 20 Pitches                                  | 254 ± 2.00                                                                     |



| QUANTITY PER REEL                      |      |
|----------------------------------------|------|
| PART                                   | PCS  |
| SR15, 07, 12                           | 3500 |
| SR20, 21, 23, 28<br>13, 29, 59, 62, 89 | 3000 |
| SR30, 32, 40, 63, 64<br>65, 75         | 2000 |
| MR05, 06                               | 2500 |



| DESCRIPTION              | DIMENSIONS (MM) |
|--------------------------|-----------------|
| A – Reel Diameter        | 304.80 - 355    |
| B – Reel Outside Width   | 50.80 maximum   |
| C – Reel Inside Width    | 38.10 - 46.02   |
| D – Core Diameter (O.D.) | 102.01 maximum  |
| E – Hub Recess Diameter  | 86.36 maximum   |
| F – Hub Recess Depth     | 9.50 minimum    |
| G – Arbor Hole Diameter  | 25.40 - 30.48   |

| CONVERSION TABLE |      |      |      |      |      |       |       |        |        |
|------------------|------|------|------|------|------|-------|-------|--------|--------|
| MM               | IN   | MM   | IN   | MM   | IN   | MM    | IN    | MM     | IN     |
| .10              | .004 | 1.52 | .060 | 5.00 | .197 | 9.91  | .390  | 32.00  | 1.260  |
| .20              | .007 | 2.00 | .079 | 5.08 | .200 | 10.03 | .395  | 38.10  | 1.500  |
| .38              | .015 | 2.54 | .100 | 6.22 | .245 | 10.16 | .400  | 46.02  | 1.812  |
| .41              | .016 | 3.00 | .118 | 6.35 | .250 | 11.68 | .460  | 50.80  | 2.000  |
| .51              | .020 | 3.18 | .125 | 6.60 | .260 | 12.50 | .492  | 86.36  | 3.400  |
| .71              | .028 | 3.48 | .137 | 6.99 | .275 | 12.70 | .500  | 88.90  | 3.500  |
| .79              | .031 | 3.81 | .150 | 7.62 | .300 | 16.00 | .630  | 102.01 | 4.016  |
| .99              | .039 | 3.99 | .157 | 8.89 | .350 | 18.01 | .709  | 254.00 | 10.000 |
| 1.02             | .040 | 4.45 | .175 | 9.02 | .355 | 25.40 | 1.000 | 304.80 | 12.000 |
| 1.42             | .056 | 4.98 | .196 | 9.50 | .374 | 30.48 | 1.200 | 355.00 | 14.000 |

## GENERAL INFORMATION

### AVX MD Series

Temperature Coefficients: C0G (NP0), X7R, Z5U, Y5V  
50, 100 Volts

For established reliability DIPGuards see MIL-C-39014 section on pages 47 to 52.

## HOW TO ORDER

AVX Styles: MD01, CKR22\*, CKS22\*\*, MD02, CKR23\*, CKS23\*\*, MD03, CKR24\*, CKS24\*\*

### Part Number Example

|                                      |             |          |          |           |          |          |          |          |
|--------------------------------------|-------------|----------|----------|-----------|----------|----------|----------|----------|
|                                      | <b>MD01</b> | <b>5</b> | <b>E</b> | <b>10</b> | <b>4</b> | <b>M</b> | <b>A</b> | <b>B</b> |
| AVX Style                            | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Voltage                              | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Temperature Coefficient              | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Sig. Figures of Capacitance          | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Multiplier (Additional no. of zeros) | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Capacitance Tolerance                | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Failure Rate Not Applicable          | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |
| Assembly Method                      | _____       | _____    | _____    | _____     | _____    | _____    | _____    | _____    |

### Part Number Codes

Voltages: 16V = Y, 50V = 5, 100V = 1

Temp. Coefficient: C0G (NP0) = A, X7R = C,  
Z5U = E, Y5V = G

### Sig. Figures Capacitance and Multiplier:

First two digits are the significant figures of capacitance.  
Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104.

### Capacitance Tolerances:

C0G (NP0): F =  $\pm 1\%$ , J =  $\pm 5\%$ , K =  $\pm 10\%$   
X7R: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$   
Z5U: M =  $\pm 20\%$ , Z = +80%, -20%  
Y5V: M =  $\pm 20\%$ , Z = +80%, -20%

Failure Rate: A = Not Applicable

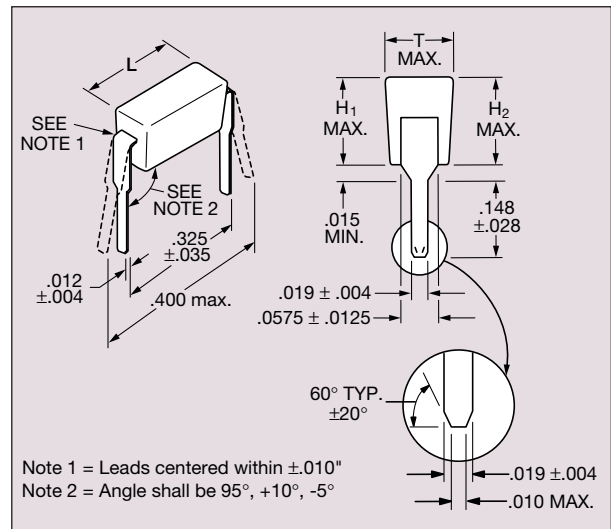
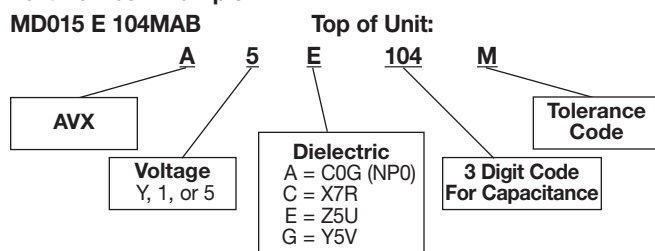
Assembly Method: A = Hand Assembled,  
B = Automated Assembly

\* Reference pages 47 to 52.

\*\* Reference page 67.

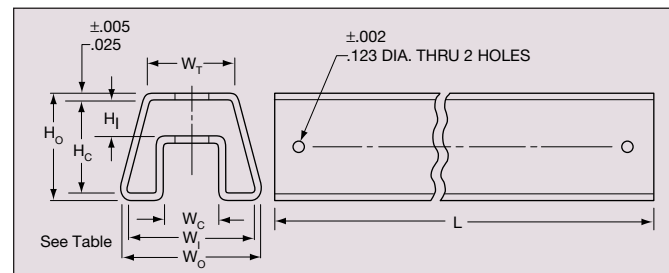
## MARKING

### Part Number Example



## PACKAGING REQUIREMENTS

Standard Packaging: 200 pieces per slide pack.



### Slide Package Dimensions

|                                  | MD01             | MD02             | MD03             |
|----------------------------------|------------------|------------------|------------------|
| (H <sub>o</sub> ) Overall Height | .400 ref.        | .430 ref.        | .545 ref.        |
| (H <sub>c</sub> ) Channel Height | .141 $\pm$ .006  | .171 $\pm$ .006  | .295 $\pm$ .010  |
| (H <sub>i</sub> ) Inside Height  | .350             | .380             | .495             |
| (W <sub>o</sub> ) Overall Width  | .540 ref.        | .540 ref.        | .600 ref.        |
| (W <sub>i</sub> ) Inside Width   | .490             | .490             | .550             |
| (W <sub>c</sub> ) Channel Width  | .210             | .210             | .170             |
| (W <sub>t</sub> ) Top Width      | .350             | .310             | .300             |
| (L) Length                       | 20.073 $\pm$ .06 | 20.073 $\pm$ .06 | 20.073 $\pm$ .06 |

## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| AVX Style | Length (L)            | Height (H <sub>1</sub> ) | Height (H <sub>2</sub> ) | Thickness           |
|-----------|-----------------------|--------------------------|--------------------------|---------------------|
| MD01      | 6.60<br>(.260 ± .020) | 3.43<br>(.135 max.)      | 4.19<br>(.165 max.)      | 2.54<br>(.098 max.) |
| MD02      | 6.60<br>(.260 ± .020) | 4.19<br>(.162 max.)      | 5.08<br>(.195 max.)      | 2.54<br>(.098 max.) |
| MD03      | 6.60<br>(.260 ± .020) | 7.37<br>(.290 max.)      | 8.13<br>(.320 max.)      | 2.54<br>(.098 max.) |

## MILITARY CROSS REFERENCE GUIDE

Note: For CKR22/23/24, see MIL-C-39014 section in the Military Section pages 47 thru 52.

Dimensions: Millimeters (Inches)

| AVX Style | MIL-C-39014 | Length (L)            | Height (H <sub>1</sub> ) | Height (H <sub>2</sub> ) | Thickness             |
|-----------|-------------|-----------------------|--------------------------|--------------------------|-----------------------|
| MD01      | CKR22       | 6.60<br>(.260 ± .020) | 3.43<br>(.135 max.)      | 4.19<br>(.165 max.)      | 2.54<br>(.092 ± .006) |
| MD02      | CKR23       | 6.60<br>(.260 ± .020) | 4.19<br>(.162 max.)      | 5.08<br>(.195 max.)      | 2.54<br>(.092 ± .006) |
| MD03      | CKR24       | 6.60<br>(.260 ± .020) | 7.37<br>(.290 max.)      | 8.13<br>(.320 max.)      | 2.54<br>(.092 ± .006) |

## CAPACITANCE SPECIFICATIONS

### C0G (NP0)

| EIA Characteristic |              | C0G (NP0)      |  |
|--------------------|--------------|----------------|--|
| AVX Style          |              | MD01           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 10                 | MD015A100KAB |                |  |
| 15                 | MD015A150KAB |                |  |
| 22                 | MD015A220KAB |                |  |
| 33                 | MD015A330KAB |                |  |
| 47                 | MD015A470KAB |                |  |
| 68                 | MD015A680KAB |                |  |
| 100                | MD015A101KAB |                |  |
| 150                | MD015A151KAB |                |  |
| 220                | MD015A221KAB |                |  |
| 330                | MD015A331KAB |                |  |
| 470                | MD015A471KAB |                |  |
| 680                | MD015A681KAB |                |  |
| 1000               | MD015A102KAB |                |  |
| 1500               | MD015A152KAB |                |  |
| 2200               | MD015A222KAB |                |  |
| 3300               | MD015A332KAB |                |  |
| AVX Style          |              | MD02           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 4700               | MD025A472KAB |                |  |
| 6800               | MD025A682KAB |                |  |
| 10000              | MD025A103KAB |                |  |

For other voltages and tolerances see Part No. Codes.

### X7R

| EIA Characteristic |              | X7R            |  |
|--------------------|--------------|----------------|--|
| AVX Style          |              | MD01           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 220                | MD015C221KAB |                |  |
| 330                | MD015C331KAB |                |  |
| 470                | MD015C471KAB |                |  |
| 680                | MD015C681KAB |                |  |
| 1000               | MD015C102KAB |                |  |
| 1500               | MD015C152KAB |                |  |
| 2200               | MD015C222KAB |                |  |
| 3300               | MD015C332KAB |                |  |
| 4700               | MD015C472KAB |                |  |
| 6800               | MD015C682KAB |                |  |
| 10,000             | MD011C103KAB |                |  |
| 15,000             | MD015C153KAB |                |  |
| 22,000             | MD015C223KAB |                |  |
| 33,000             | MD015C333KAB |                |  |
| 47,000             | MD015C473KAB |                |  |
| 68,000             | MD015C683KAB |                |  |
| 100,000            | MD015C104KAB |                |  |
| AVX Style          |              | MD02           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 150,000            | MD025C154KAB |                |  |
| 220,000            | MD025C224KAB |                |  |
| AVX Style          |              | MD03           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 330,000            | MD035C334KAA |                |  |
| 470,000            | MD035C474KAA |                |  |
| 680,000            | MD035C684KAA |                |  |
| 1,000,000          | MD035C105KAA |                |  |

For other voltages and tolerances see Part No. Codes.

### Z5U

| EIA Characteristic |              | Z5U            |  |
|--------------------|--------------|----------------|--|
| AVX Style          |              | MD01           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 10,000             | MD015E103ZAB |                |  |
| 15,000             | MD015E153ZAB |                |  |
| 22,000             | MD015E223ZAB |                |  |
| 33,000             | MD015E333ZAB |                |  |
| 47,000             | MD015E473ZAB |                |  |
| 68,000             | MD015E683ZAB |                |  |
| 100,000            | MD015E104ZAB |                |  |
| 150,000            | MD015E154ZAB |                |  |
| 220,000            | MD015E224ZAB |                |  |
| 330,000            | MD015E334ZAB |                |  |
| AVX Style          |              | MD02           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 470,000            | MD025E474ZAB |                |  |
| AVX Style          |              | MD03           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 680,000            | MD035E684ZAA |                |  |
| 1,000,000          | MD035E105ZAA |                |  |

### Y5V

| EIA Characteristic |              | Y5V            |  |
|--------------------|--------------|----------------|--|
| AVX Style          |              | MD01           |  |
| Cap. in pF*        |              | WVDC<br>16     |  |
| 1,000,000          | MD01YG105ZAB |                |  |
| 2,200,000          | MD01YG225ZAB |                |  |
| 3,300,000          | MD01YG335ZAB |                |  |
| AVX Style          |              | MD02           |  |
| Cap. in pF*        |              | WVDC<br>100 50 |  |
| 1,000,000          | MD025G105ZAB |                |  |

For other voltages and tolerances see Part No. Codes.

\*Other capacitance values available upon special request.

■ = Industry preferred values

## GENERAL DESCRIPTION

**AVX SA Series**

**Conformally Coated Axial Leaded MLC**

**Temperature Coefficients:** C0G (NP0), X7R, Z5U

50, 100, 200 Volts

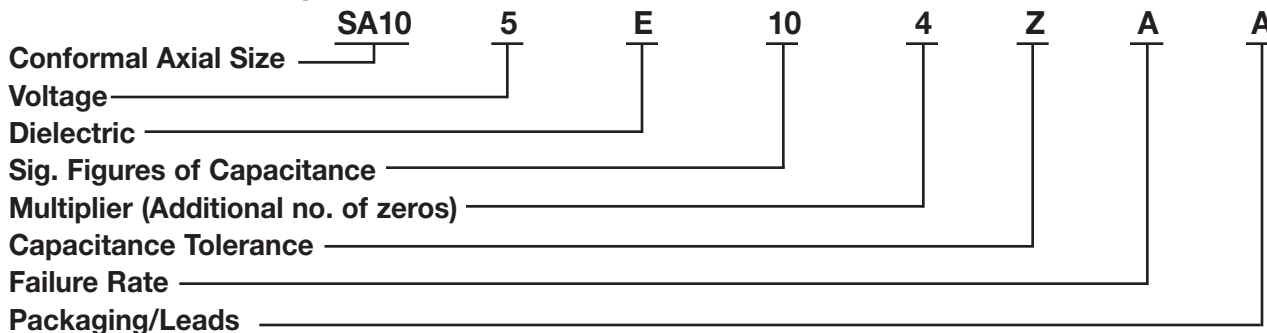
**Case Material:** Epoxy (Flame Retardant to UL Bulletin 492, Par. 280)

**Lead Material:** Solderable

## HOW TO ORDER

**AVX Styles: SA05, SA10, SA11, SA20, SA30, SA40**

### Part Number Example



### Part Number Codes

**Voltages:** 50V = 5, 100V = 1, 200V = 2

**Dielectric:** C0G (NP0) = A, X7R = C, Z5U = E

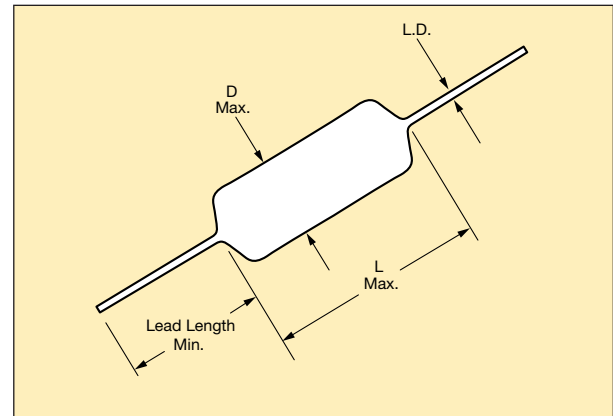
**Sig. Figures of Capacitance and Multiplier:** First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10 pF, use "R" in place of decimal point, e.g., 1R4 = 1.4 pF).

### Capacitance Tolerances:

C0G (NP0): C =  $\pm 0.25$  pF, D =  $\pm 0.5$  pF, F =  $\pm 1\%$ ,  
 G =  $\pm 2\%$ , J =  $\pm 5\%$ , K =  $\pm 10\%$   
 X7R: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$   
 Z5U: M =  $\pm 20\%$ , Z =  $\pm 80\%$ , -20%

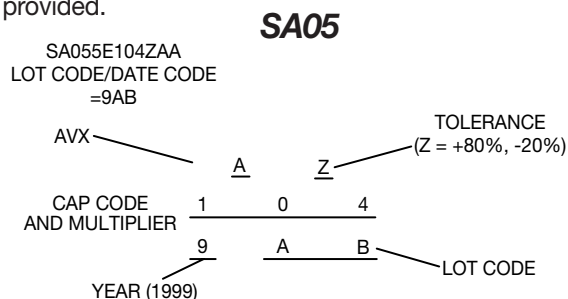
**Failure Rate:** Not Applicable

**Leads:** Standard (Solderable)

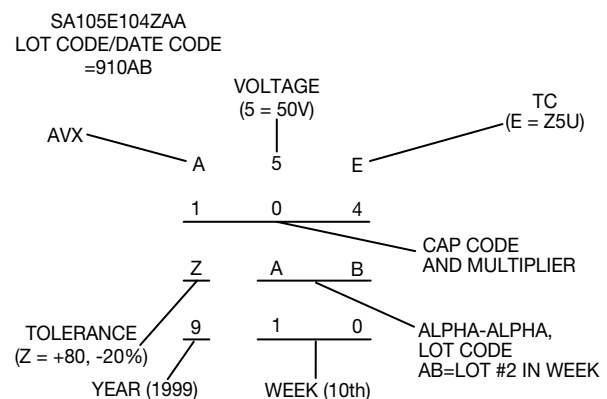


## MARKING (Example)

SpinGuard marking includes full date code/lot code identification. A first in the industry, this format provides complete traceability to all manufacturing processes involving the basic chip and final assembly. Total Shipment traceability is also provided.



## SA10, 11, 20, 30, 40



## PACKAGING REQUIREMENTS

A = Standard Reels (see Page 38)  
 B = 1000 piece reels (distributors only, tight tolerance only)  
 C = Ammo Pack (see Page 38)  
 D thru J = See Special Lead Configurations (Page 32)

L = Twin Coat Leads (95/5 Flash Tin/Lead)  
 M = 26mm tape and reel  
 N = 26mm ammo pack

### SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| AVX Style            |                                              | SA05            |     | SA10            |     |    | SA11            |    | SA20            |    | SA30            |    | SA40             |    |
|----------------------|----------------------------------------------|-----------------|-----|-----------------|-----|----|-----------------|----|-----------------|----|-----------------|----|------------------|----|
| Length<br>(L)        |                                              | 3.00<br>(.118") |     | 4.32<br>(.170") |     |    | 4.32<br>(.170") |    | 6.60<br>(.260") |    | 7.37<br>(.290") |    | 10.16<br>(.400") |    |
| Diameter<br>(D)      |                                              | 2.30<br>(.090") |     | 2.54<br>(.100") |     |    | 3.05<br>(.120") |    | 2.54<br>(.100") |    | 3.81<br>(.150") |    | 3.81<br>(.150")  |    |
| Lead<br>Diameter     |                                              | .407<br>(.016") |     | .483<br>(.019") |     |    | .483<br>(.019") |    | .483<br>(.019") |    | .483<br>(.019") |    | .483<br>(.019")  |    |
| Lead<br>Length       |                                              | 25.4<br>(1.00") |     | 25.4<br>(1.00") |     |    | 25.4<br>(1.00") |    | 25.4<br>(1.00") |    | 25.4<br>(1.00") |    | 25.4<br>(1.00")  |    |
| Cap. in<br>pF        | Typical AVX<br>Part Nos.                     | WVDC            |     | WVDC            |     |    | WVDC            |    | WVDC            |    | WVDC            |    | WVDC             |    |
|                      |                                              | 200             | 100 | 200             | 100 | 50 | 100             | 50 | 100             | 50 | 100             | 50 | 100              | 50 |
| 1.0*<br>↓<br>9.1*    | SA102A1R0DAA<br>↓<br>SA102A9R1DAA            |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 10<br>12<br>15       | SA102A100JAA<br>SA102A120JAA<br>SA102A150JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 18<br>22<br>27       | SA102A180JAA<br>SA102A220JAA<br>SA102A270JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 33<br>39<br>47       | SA102A330JAA<br>SA102A390JAA<br>SA102A470JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 56<br>68<br>82       | SA102A560JAA<br>SA102A680JAA<br>SA102A820JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 100<br>120<br>150    | SA102A101JAA<br>SA102A121JAA<br>SA101A151JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 180<br>220<br>270    | SA101A181JAA<br>SA101A221JAA<br>SA101A271JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 330<br>390<br>470    | SA101A331JAA<br>SA101A391JAA<br>SA101A471JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 560<br>680<br>820    | SA101A561JAA<br>SA101A681JAA<br>SA101A821JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 1000<br>1200<br>1500 | SA105A102JAA<br>SA201A122JAA<br>SA201A152JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 1800<br>2200<br>2700 | SA205A182JAA<br>SA301A222JAA<br>SA301A272JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 3300<br>3900<br>4700 | SA301A332JAA<br>SA301A392JAA<br>SA305A472JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 5600<br>6800<br>8200 | SA401A562JAA<br>SA401A682JAA<br>SA405A822JAA |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |
| 10,000<br>12,000     | SA405A103JAA<br>SA405A123JAA                 |                 |     |                 |     |    |                 |    |                 |    |                 |    |                  |    |

For other tolerances see Part No. Codes  
For other voltages see Part No. Codes  
AVX Style

**■ = Industry preferred values**

\*"C&D" Tolerance Only

### SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| AVX Style     |                       | SA05               |  |  | SA10               |  |  | SA11            |  |  | SA20            |  |  | SA30            |  |  | SA40             |  |  |
|---------------|-----------------------|--------------------|--|--|--------------------|--|--|-----------------|--|--|-----------------|--|--|-----------------|--|--|------------------|--|--|
| Length (L)    |                       | 3.00<br>(.118")    |  |  | 4.32<br>(.170")    |  |  | 4.32<br>(.170") |  |  | 6.60<br>(.260") |  |  | 7.37<br>(.290") |  |  | 10.16<br>(.400") |  |  |
| Diameter (D)  |                       | 2.30<br>(.090")    |  |  | 2.54<br>(.100")    |  |  | 3.05<br>(.120") |  |  | 2.54<br>(.100") |  |  | 3.81<br>(.150") |  |  | 3.81<br>(.150")  |  |  |
| Lead Diameter |                       | .407<br>(.016")    |  |  | .483<br>(.019")    |  |  | .483<br>(.019") |  |  | .483<br>(.019") |  |  | .483<br>(.019") |  |  | .483<br>(.019")  |  |  |
| Lead Length   |                       | 25.4<br>(1.00")    |  |  | 25.4<br>(1.00")    |  |  | 25.4<br>(1.00") |  |  | 25.4<br>(1.00") |  |  | 25.4<br>(1.00") |  |  | 25.4<br>(1.00")  |  |  |
| Cap. in pF    | Typical AVX Part Nos. | WVDC<br>200 100 50 |  |  | WVDC<br>200 100 50 |  |  | WVDC<br>100 50  |  |  | WVDC<br>100 50  |  |  | WVDC<br>100 50  |  |  | WVDC<br>100 50   |  |  |
| 220           | SA102C221KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 270           | SA102C271KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 330           | SA102C331KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 390           | SA102C391KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 470           | SA102C471KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 560           | SA101C561KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 680           | SA101C681KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 820           | SA101C821KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 1000          | SA101C102KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 1200          | SA101C122KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 1500          | SA101C152KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 1800          | SA101C182KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 2200          | SA101C222KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 2700          | SA101C272KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 3300          | SA101C332KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 3900          | SA101C392KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 4700          | SA101C472KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 5600          | SA101C562KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 6800          | SA101C682KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 8200          | SA105C822KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 10,000        | SA105C103KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 12,000        | SA105C123KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 15,000        | SA105C153KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 18,000        | SA105C183KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 22,000        | SA105C223KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 27,000        | SA105C273KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 33,000        | SA105C333KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 39,000        | SA105C393KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 47,000        | SA105C473KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 56,000        | SA115C563KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 68,000        | SA115C683KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 82,000        | SA115C823KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 100,000       | SA115C104KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 120,000       | SA305C124KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 150,000       | SA305C154KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 180,000       | SA305C184KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 220,000       | SA305C224KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 270,000       | SA305C274KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 330,000       | SA305C334KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |
| 470,000       | SA405C474KAA          |                    |  |  |                    |  |  |                 |  |  |                 |  |  |                 |  |  |                  |  |  |

For other tolerances see Part No. Codes  
For other voltages see Part No. Codes  
AVX Style

= Industry preferred values

### SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| AVX Style                      | SA05                                         | SA10              | SA11                  | SA20                  | SA30                  | SA40                  |
|--------------------------------|----------------------------------------------|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <b>Length (L)</b>              | 3.00<br>(.118")                              | 4.32<br>(.170")   | 4.32<br>(.170")       | 6.60<br>(.260")       | 7.37<br>(.290")       | 10.16<br>(.400")      |
| <b>Diameter (D)</b>            | 2.30<br>(.090")                              | 2.54<br>(.100")   | 3.05<br>(.120")       | 2.54<br>(.100")       | 3.81<br>(.150")       | 3.81<br>(.150")       |
| <b>Lead Diameter</b>           | .407<br>(.016")                              | .483<br>(.019")   | .483<br>(.019")       | .483<br>(.019")       | .483<br>(.019")       | .483<br>(.019")       |
| <b>Lead Length</b>             | 25.4<br>(1.00")                              | 25.4<br>(1.00")   | 25.4<br>(1.00")       | 25.4<br>(1.00")       | 25.4<br>(1.00")       | 25.4<br>(1.00")       |
| <b>Cap. in pF</b>              | <b>Typical AVX Part Nos.</b>                 | <b>WVDC</b><br>50 | <b>WVDC</b><br>100 50 | <b>WVDC</b><br>100 50 | <b>WVDC</b><br>100 50 | <b>WVDC</b><br>100 50 |
| 10,000<br>15,000<br>22,000     | SA105E103ZAA<br>SA105E153ZAA<br>SA105E223ZAA |                   |                       |                       |                       |                       |
| 33,000<br>47,000<br>68,000     | SA105E333ZAA<br>SA105E473ZAA<br>SA105E683ZAA |                   |                       |                       |                       |                       |
| *100,000<br>150,000<br>220,000 | SA105E104ZAA<br>SA105E154ZAA<br>SA105E224ZAA |                   |                       |                       |                       |                       |
| 330,000<br>470,000<br>680,000  | SA115E334ZAA<br>SA305E474ZAA<br>SA305E684ZAA |                   |                       |                       |                       |                       |
| 820,000<br>1,000,000           | SA305E824ZAA<br>SA305E105ZAA                 |                   |                       |                       |                       |                       |

For other tolerances see Part No. Codes  
For other voltages see Part No. Codes  
AVX Style

 = Industry preferred values

\*Preferred Industry Decoupling Capacitor — Insertable on .300" centers.

SA105E104ZAA

## Extended Range SpinGuards

### GENERAL SPECIFICATIONS

#### Capacitance Range

220,000 pF, 330,000 pF, 1,000,000 pF

#### Capacitance Tolerances

±20%, [+80 -20]%

#### Operating Temperature Range

Z5U = +10°C to +85°C

#### Temperature Characteristics

E = Z5U

#### Voltage Ratings

50 Vdc

#### Dissipation Factor 25°C

Z5U = 4.0% max. at 1 KHz, .3 VRMS

#### Insulation Resistance 25°C (MIL-STD-202-Method 302)

Z5U = 10 K megohms or 100 megohms -  $\mu$ F minimum, whichever is less

#### Dielectric Strength

Z5U = 200% of rated voltage

#### Moisture Resistance (MIL-STD-202-Method 106)

#### Immersion Cycling (MIL-STD-202-Method 104, condition B)

For current reliability information, consult factory.

### SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: Millimeters (Inches)

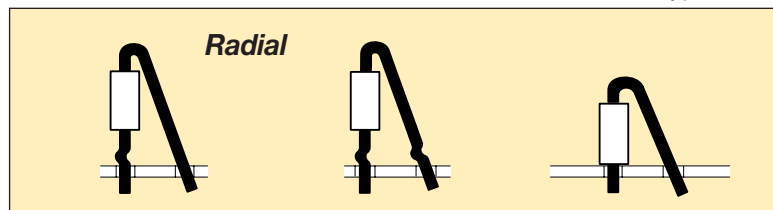
| AVX Style                   | SA11*           | SA30            |
|-----------------------------|-----------------|-----------------|
| Length (L)                  | 4.32<br>(.170") | 7.37<br>(.290") |
| Diameter (D)                | 3.05<br>(.120") | 3.81<br>(.150") |
| 0.22 $\mu$ F SA115E224ZAA   |                 |                 |
| 0.33 $\mu$ F **SA115E334ZAA |                 |                 |
| 1.0 $\mu$ F SA305E105ZAA    |                 |                 |

\* Automatically insertable on 0.300" centers (see page 38 for reel packing details)

\*\* RAMGuard: the 0.33  $\mu$ F value capacitance is recommended for decoupling 256K and 1 Meg Dynamic RAMs.

### Special Lead Configurations

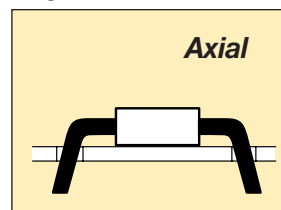
Dimensions — Body dimensions Per Standard SpinGuard Configurations.  
Formed dimensions as shown for types D, E, F, G, H, I, & J configurations.



D  
Single Crimp

E  
Dual Crimp

F  
No Crimp

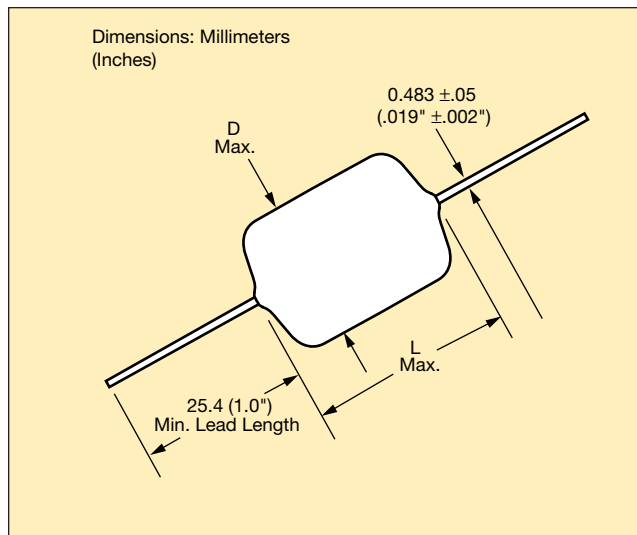


G = .300" L.S. I = .500" L.S.  
H = .400" L.S. J = .600" L.S.

Formed Dimensions:

|      | LEAD SPACING* | SEATED HEIGHT (Max.) |       |             |
|------|---------------|----------------------|-------|-------------|
|      | Nom.          | D & E                | F     | G, H, I & J |
| SA10 | .2"           | .525"                | .300" | .100"       |
| SA20 | .2"           | .570"                | .375" | .100"       |
| SA30 | .2"           | .580"                | .425" | .150"       |
| SA40 | .2"           | .650"                | .460" | .150"       |

\*Lead spacing can be varied by user to cover .1"- .3" spacing requirements for F, D, and E styles.



### ELECTRICAL PERFORMANCE CHARACTERISTICS AT TYPICAL 256K DRAM OPERATING CONDITIONS

| Parameter            | Test Conditions          | Mi. | Typ. | Max. | Unit     |
|----------------------|--------------------------|-----|------|------|----------|
| $V_L$                | di/dt = 200 ma/10 ns     | —   | 80   | 90   | mv       |
| Inductance, L        |                          | —   | 4.0  | 4.5  | nh       |
| dv/dt                | 20 ns after pulse        |     |      |      |          |
| Capacitance, C       | di/dt = 200 ma/10 ns     | —   | 0.53 | —    | mv/ns    |
| ESR                  | Resonance Freq., 4-5 MHz | .24 | .33  | —    | $\mu$ F  |
| Impedance (Total)    | 100 MHz (HP- 4192A)      | —   | .03  | .08  | $\Omega$ |
| Recovery Time, $t_R$ |                          | —   | 4.4  | 5.0  | $\Omega$ |
|                      |                          | —   | 20   | —    | ns       |



## GENERAL DESCRIPTION

AVX MA Series

Molded Axial Leaded MLC

Temperature Coefficient: C0G (NP0), X7R, Z5U  
50V, 100V and 200V

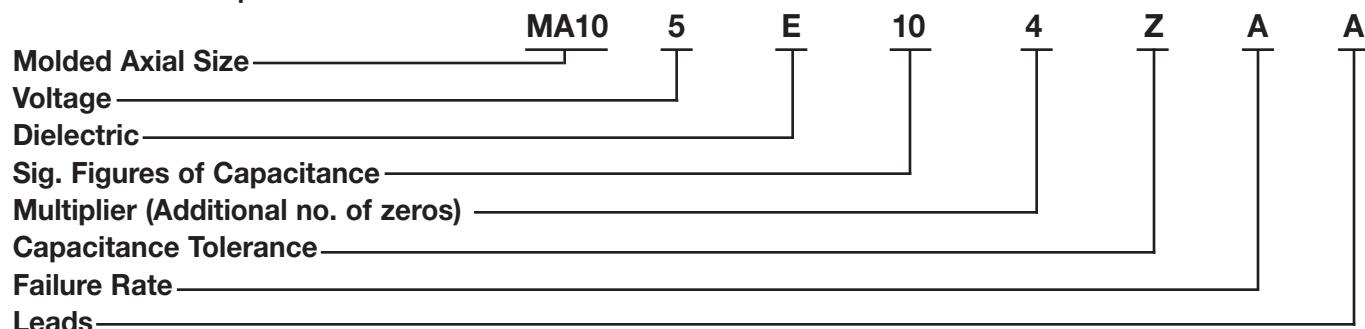
Case Material: Molded Epoxy

Lead Material: Solderable

## HOW TO ORDER

AVX Styles: MA10, MA20, MA30, MA40, MA50, MA60

Part Number Example



### Part Number Codes

Voltages: 50V = 5, 100V = 1, 200V = 2

Dielectric: C0G (NP0) = A, X7R = C, Z5U = E

**Sig. Figures of Capacitance and Multiplier:** First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10 pF, use "R" in place of decimal point, e.g., 1R4 = 1.4 pF).

### Capacitance Tolerances:

C0G (NP0): F =  $\pm 1.0\%$ , J =  $\pm 5\%$ , K =  $\pm 10\%$ ,  
M =  $\pm 20\%$ , D =  $\pm 5\text{pF}$  <10 pF only

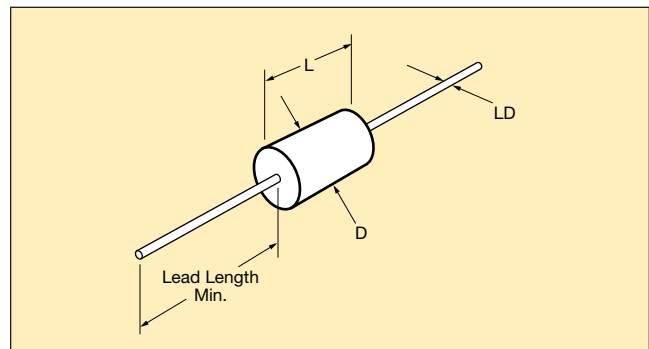
X7R: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

Z5U: M =  $\pm 20\%$ , Z =  $+80\%$ ,  $-20\%$

**Failure Rate:** Not Applicable

**Leads:** Standard

‡ C tolerance available C0G (NP0) from 1.0 to 9.1 pF only. Minimum tolerance for values 10 pF - 100 pF is D or F whichever is greater.



## MARKING (Example)

Line 1, A (for AVX), 5 = 50 Volts (V is optional), E = TC

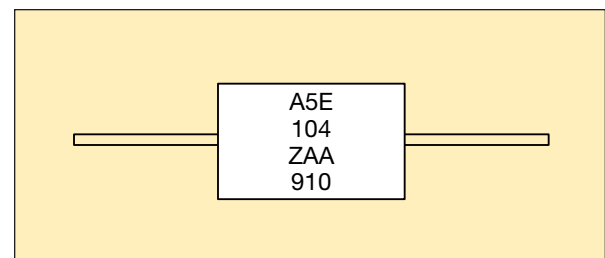
Line 2, 104Z = Capacitance Code

Line 3, Tolerance, 2 digit Lot Code

Date Code: 9 = 1999

10 = Week

Four Digit Date Code Optional



## MILITARY CROSS REFERENCE AND DIMENSIONS GUIDE

| Per MIL-Spec |             |             |            | Case Size                      |                               |                              |
|--------------|-------------|-------------|------------|--------------------------------|-------------------------------|------------------------------|
| AVX Style    | MIL-C-11015 | MIL-C-39014 | MIL-C-20   | Length (L)                     | Diameter (D)                  | Lead Diameter (LD)           |
| MA10         | CK12        | CKR11       | CCR75/CC75 | 4.07 ± .25<br>(.160" ± .010")  | 2.29 ± .25<br>(.090" ± .010") | .48 ± .05<br>(.019" ± .002") |
| MA20         | CK13        | CKR12       | CCR76/CC76 | 6.35 ± .25<br>(.250" ± .010")  | 2.29 ± .25<br>(.090" ± .010") | .48 ± .05<br>(.019" ± .002") |
| MA40         | CK14        | CKR14       | CCR77/CC77 | 9.91 ± .25<br>(.390" ± .010")  | 3.56 ± .25<br>(.140" ± .010") | .63 ± .05<br>(.025" ± .002") |
| MA50         | CK15        | CKR15       | CCR78/CC78 | 12.7 ± .51<br>(.500" ± .020")  | 6.35 ± .38<br>(.250" ± .015") | .63 ± .05<br>(.025" ± .002") |
| MA60         | CK16        | CKR16       | CCR79/CC79 | 17.53 ± .51<br>(.690" ± .020") | 8.89 ± .51<br>(.350" ± .015") | .63 ± .05<br>(.025" ± .002") |

For Military/Established Reliability Molded/Axial Lead see MIL-C-11015, MIL-C-39014, MIL-C-20 Section.

Dimensions: Millimeters (Inches)

## C0G (NP0) Dielectric SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: Millimeters (Inches)



| AVX Style          |                                                    | MA10                          |     |    | MA20                          |     |    | MA30                          |     |    | MA40                          |     |    | MA50                          |     |    | MA60                           |     |    |
|--------------------|----------------------------------------------------|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|--------------------------------|-----|----|
| Length             |                                                    | 4.07 ± .25<br>(.160" ± .010") |     |    | 6.35 ± .25<br>(.250" ± .010") |     |    | 6.09 ± .25<br>(.240" ± .010") |     |    | 9.91 ± .25<br>(.390" ± .010") |     |    | 12.7 ± .51<br>(.500" ± .020") |     |    | 17.53 ± .51<br>(.690" ± .020") |     |    |
| Diameter           |                                                    | 2.29 ± .25<br>(.090" ± .010") |     |    | 2.29 ± .25<br>(.090" ± .010") |     |    | 3.30 ± .25<br>(.130" ± .010") |     |    | 3.56 ± .25<br>(.140" ± .010") |     |    | 6.35 ± .38<br>(.250" ± .015") |     |    | 8.89 ± .51<br>(.350" ± .015")  |     |    |
| Lead Diameter      |                                                    | .48 ± .05<br>(.019" ± .002")  |     |    | .48 ± .05<br>(.019" ± .002")  |     |    | .48 ± .05<br>(.019" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")   |     |    |
| Lead Length        |                                                    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")                |     |    |
| Cap. in pF         | Typical AVX Part Nos.                              | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                           |     |    |
|                    |                                                    | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                            | 100 | 50 |
| 1.0 to 9.1         | MA____5A1R0DAA<br>MA____5A9R1DAA                   |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 10 to 15           | MA____5A100KAA<br>MA____5A120KAA<br>MA____5A150KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 18 to 27           | MA____5A180KAA<br>MA____5A220KAA<br>MA____5A270KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 33 to 47           | MA----5A330KAA<br>MA----5A390KAA<br>MA----5A470KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 56 to 82           | MA____5A560KAA<br>MA____5A680KAA<br>MA____5A820KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 100 to 150         | MA____5A101KAA<br>MA____5A121KAA<br>MA____5A151KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 180 to 270         | MA____5A181KAA<br>MA____5A221KAA<br>MA____5A271KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 330 to 470         | MA____5A331KAA<br>MA____5A391KAA<br>MA____5A471KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 560 to 820         | MA____5A561KAA<br>MA____5A681KAA<br>MA____5A821KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1000 to 1500       | MA____5A102KAA<br>MA____5A122KAA<br>MA____5A152KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1800 to 2700       | MA____5A182KAA<br>MA____5A222KAA<br>MA____5A272KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3300 to 4700       | MA____5A332KAA<br>MA____5A392KAA<br>MA____5A472KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 5600 to 8200       | MA____5A562KAA<br>MA____5A682KAA<br>MA____5A822KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 10,000 to 15,000   | MA____5A103KAA<br>MA____5A123KAA<br>MA____5A153KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 18,000 to 27,000   | MA____5A183KAA<br>MA____5A223KAA<br>MA____5A273KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 33,000 to 47,000   | MA____5A333KAA<br>MA____5A393KAA<br>MA____5A473KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 56,000 to 82,000   | MA____5A563KAA<br>MA____5A683KAA<br>MA____5A823KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 100,000 to 150,000 | MA____5A104KAA<br>MA____5A124KAA<br>MA____5A154KAA |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |

For other tolerances see Part No. Codes  
 For other voltages see Part No. Codes.  
 AVX Style

## X7R Dielectric

## SIZE AND CAPACITANCE SPECIFICATIONS



Dimensions: Millimeters (Inches)

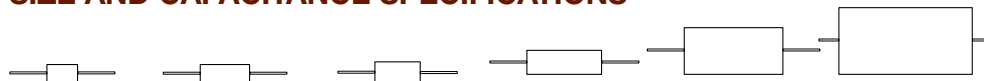
| AVX Style     |                          | MA10                          |     |    | MA20                          |     |    | MA30                          |     |    | MA40                          |     |    | MA50                          |     |    | MA60                           |     |    |
|---------------|--------------------------|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|--------------------------------|-----|----|
| Length        |                          | 4.07 ± .25<br>(.160" ± .010") |     |    | 6.35 ± .25<br>(.250" ± .010") |     |    | 6.09 ± .25<br>(.240" ± .010") |     |    | 9.91 ± .25<br>(.390" ± .010") |     |    | 12.7 ± .51<br>(.500" ± .020") |     |    | 17.53 ± .51<br>(.690" ± .020") |     |    |
| Diameter      |                          | 2.29 ± .25<br>(.090" ± .010") |     |    | 2.29 ± .25<br>(.090" ± .010") |     |    | 3.30 ± .25<br>(.130" ± .010") |     |    | 3.56 ± .25<br>(.140" ± .010") |     |    | 6.35 ± .38<br>(.250" ± .015") |     |    | 8.89 ± .51<br>(.350" ± .015")  |     |    |
| Lead Diameter |                          | .48 ± .05<br>(.019" ± .002")  |     |    | .48 ± .05<br>(.019" ± .002")  |     |    | .48 ± .05<br>(.019" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")   |     |    |
| Lead Length   |                          | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")                |     |    |
| Cap. in<br>pF | Typical AVX<br>Part Nos. | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                           |     |    |
|               |                          | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                            | 100 | 50 |
| 220           | MA____5C221KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 270           | MA____5C271KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 330           | MA____5C331KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 390           | MA____5C391KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 470           | MA____5C471KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 560           | MA____5C561KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 680           | MA____5C681KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 820           | MA____5C821KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1000          | MA____5C102KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1200          | MA____5C122KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1500          | MA____5C152KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1800          | MA____5C182KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2200          | MA____5C222KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2700          | MA____5C272KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3300          | MA____5C332KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3900          | MA____5C392KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 4700          | MA____5C472KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 5600          | MA____5C562KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 6800          | MA____5C682KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 8200          | MA____5C822KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 10,000        | MA____5C103KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 12,000        | MA____5C123KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 15,000        | MA____5C153KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 18,000        | MA____5C183KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 22,000        | MA____5C223KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 27,000        | MA____5C273KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 33,000        | MA____5C333KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 39,000        | MA____5C393KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 47,000        | MA____5C473KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 56,000        | MA____5C563KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 68,000        | MA____5C683KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 82,000        | MA____5C823KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 100,000       | MA____5C104KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 120,000       | MA____5C124KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 150,000       | MA____5C154KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 180,000       | MA____5C184KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 220,000       | MA____5C224KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 270,000       | MA____5C274KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 330,000       | MA____5C334KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 390,000       | MA____5C394KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 470,000       | MA____5C474KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 560,000       | MA____5C564KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 680,000       | MA____5C684KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 820,000       | MA____5C824KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.0 µF        | MA____5C105KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.2 µF        | MA____5C125KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.5 µF        | MA____5C155KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.8 µF        | MA____5C185KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2.2 µF        | MA____5C225KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2.7 µF        | MA____5C275KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3.3 µF        | MA____5C335KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3.9 µF        | MA____5C395KAA           |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |

For other tolerances see Part No. Codes  
 For other voltages see Part No. Codes.  
 AVX Style

## Z5U Dielectric

## SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: Millimeters (Inches)

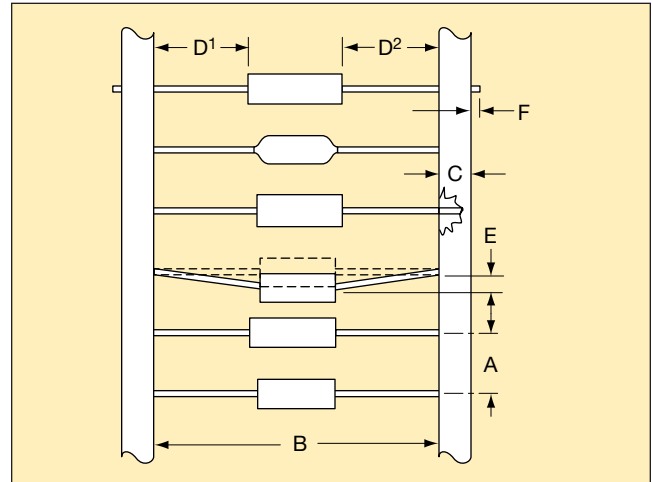


| AVX Style     |                       | MA10                          |     |    | MA20                          |     |    | MA30                          |     |    | MA40                          |     |    | MA50                          |     |    | MA60                           |     |    |
|---------------|-----------------------|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|-------------------------------|-----|----|--------------------------------|-----|----|
| Length        |                       | 4.07 ± .25<br>(.160" ± .010") |     |    | 6.35 ± .25<br>(.250" ± .010") |     |    | 6.09 ± .25<br>(.240" ± .010") |     |    | 9.91 ± .25<br>(.390" ± .010") |     |    | 12.7 ± .51<br>(.500" ± .020") |     |    | 17.53 ± .51<br>(.690" ± .020") |     |    |
| Diameter      |                       | 2.29 ± .25<br>(.090" ± .010") |     |    | 2.29 ± .25<br>(.090" ± .010") |     |    | 3.30 ± .25<br>(.130" ± .010") |     |    | 3.56 ± .25<br>(.140" ± .010") |     |    | 6.35 ± .38<br>(.250" ± .015") |     |    | 8.89 ± .51<br>(.350" ± .015")  |     |    |
| Lead Diameter |                       | .48 ± .05<br>(.019" ± .002")  |     |    | .48 ± .05<br>(.019" ± .002")  |     |    | .48 ± .05<br>(.019" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")  |     |    | .63 ± .05<br>(.025" ± .002")   |     |    |
| Lead Length   |                       | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")               |     |    | 25.4<br>(1.00")                |     |    |
| Cap. in pF    | Typical AVX Part Nos. | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                          |     |    | WVDC                           |     |    |
|               |                       | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                           | 100 | 50 | 200                            | 100 | 50 |
| 1000          | MA____5E102ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1200          | MA____5E122ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1500          | MA____5E152ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1800          | MA____5E182ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2200          | MA____5E222ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2700          | MA____5E272ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3300          | MA____5E332ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3900          | MA____5E392ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 4700          | MA____5E472ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 5600          | MA____5E562ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 6800          | MA____5E682ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 8200          | MA____5E822ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 10,000        | MA____5E103ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 12,000        | MA____5E123ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 15,000        | MA____5E153ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 18,000        | MA____5E183ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 22,000        | MA____5E223ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 27,000        | MA____5E273ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 33,000        | MA____5E333ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 39,000        | MA____5E393ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 47,000        | MA____5E473ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 56,000        | MA____5E563ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 68,000        | MA____5E683ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 82,000        | MA____5E823ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 100,000       | MA____5E104ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 120,000       | MA____5E124ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 150,000       | MA____5E154ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 180,000       | MA____5E184ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 220,000       | MA____5E224ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 270,000       | MA____5E274ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 330,000       | MA____5E334ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 390,000       | MA____5E394ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 470,000       | MA____5E474ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 560,000       | MA____5E564ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 680,000       | MA____5E684ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 820,000       | MA____5E824ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.0 µF        | MA____5E105ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.2 µF        | MA____5E125ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.5 µF        | MA____5E155ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 1.8 µF        | MA____5E185ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2.2 µF        | MA____5E225ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 2.7 µF        | MA____5E275ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3.3 µF        | MA____5E335ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 3.9 µF        | MA____5E395ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 4.7 µF        | MA____5E475ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 5.6 µF        | MA____5E565ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 6.8 µF        | MA____5E685ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |
| 8.2 µF        | MA____5E825ZAA        |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                               |     |    |                                |     |    |

For other tolerances see Part No. Codes  
For other voltages see Part No. Codes.  
AVX Style

## TAPE AND REEL

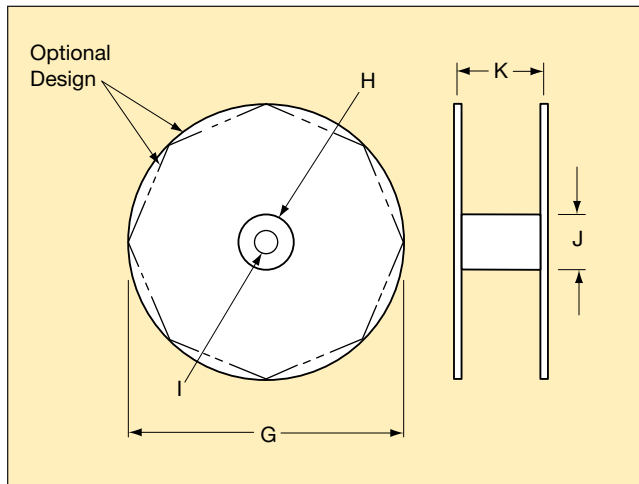
| CLASS I / RS-296 |                                     |
|------------------|-------------------------------------|
| A.               | 5mm ± 0.5mm<br>(.200" ± 0.020")     |
| B*.              | 52.4mm ± 1.5mm<br>(2.063" ± 0.059") |
| C.               | 6.35mm ± 0.4mm<br>(0.250" ± 0.016") |
| D'-D².           | 1.4mm<br>(0.055" MAX.)              |
| E.               | 1.2mm<br>(0.047" MAX.)              |
| F.               | 1.6mm<br>(0.063" MAX.)              |
| G.               | 356mm<br>(14.00")                   |
| H.               | 76mm<br>(3.000")                    |
| I.               | 25.4mm<br>(1.000")                  |
| J.               | 84mm<br>(3.300")                    |
| K.               | 70mm<br>(2.750")                    |



**Leader Tape:** 300mm min. (12")

**Splicing:** Tape Only

**Missing Parts:** 0.25% of component count max.-  
No consecutive missing parts



## REEL QUANTITIES (Max.) ‡

|      |            |      |            |
|------|------------|------|------------|
| SA05 | 7,500 pcs. | MA10 | 5,000 pcs. |
| SA10 | 7,500 pcs. | MA20 | 5,000 pcs. |
| SA11 | 5,000 pcs. | MA30 | 3,000 pcs. |
| SA20 | 5,000 pcs. | MA40 | 3,000 pcs. |
| SA30 | 5,000 pcs. | MA50 | 950 pcs.   |
| SA40 | 5,000 pcs. | MA60 | 650 pcs.   |

‡ 1000 pc. reels available for distribution pack only in ±1% and ±2% tolerance.

\* Standard Tape Spacing Shown. Also available in 26.0mm + 1.5mm, - 0mm, (1.023 in. + .059 in. - 0 in. ) for SpinGuards only. EIA Class I, II and III tape spacings are available for molded axials. Tape spacing for Class II is 63.5mm ± 1.5mm (2.50 in ± .059 in), and for Class III 73mm ± 1.5mm (2.87 in ± .059 in)

## ADDITIONAL PACKAGING AVAILABLE

### AMMO PACK

| Tape Spacing                                  | MA10, SA05, SA10<br>MA20, SA20 | SA11<br>SA30 | MA30<br>MA40, SA40 | BOX SIZES (Nominal) |                  |                   |
|-----------------------------------------------|--------------------------------|--------------|--------------------|---------------------|------------------|-------------------|
|                                               |                                |              |                    | L                   | W                | H                 |
| 52.4mm ± 1.5mm<br>(2.062" ± .059")            | 4,000 pcs.                     | 2000         | 2,000 pcs.         | 255mm<br>(10.039")  | 73mm<br>(2.874") | 93mm<br>(3.661")  |
| 26.0mm + 1.5mm - 0mm<br>(1.023" + .059" - 0") | 4,000 pcs.*                    | 2000         | 2,000 pcs.*        | 255mm<br>(10.039")  | 48mm<br>(1.889") | 113mm<br>(4.448") |

\*SpinGuard only

## BULK PACK (Molded Axials Only)

|                              |                |
|------------------------------|----------------|
| MA10<br>MA20<br>MA30<br>MA40 | 100 pcs. (bag) |
| MA50<br>MA60                 | 50 pcs. (bag)  |

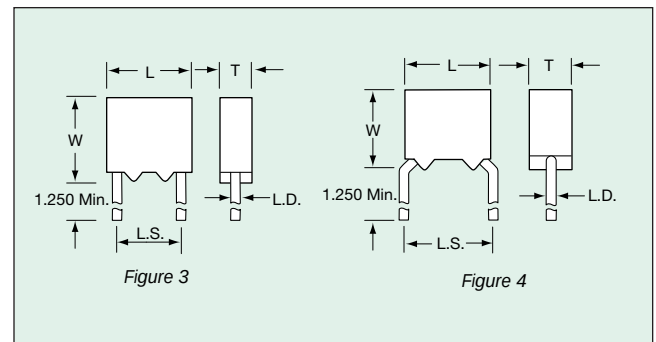
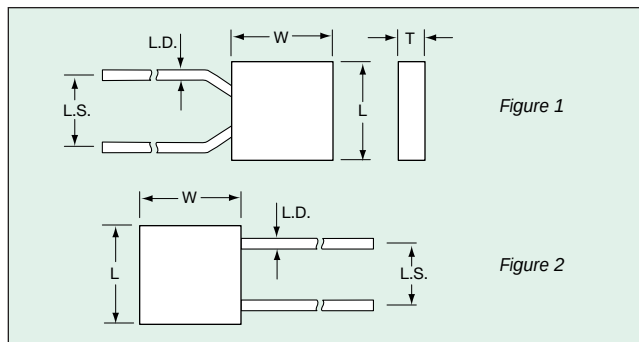
## HOW TO ORDER

**Military Type Designation:** Styles CKR04, CKR05, CKR06, CKR08

**Dash Number Option:** MIL-C-39014/01 (Appropriate Dash Number)

**Part Number Example**

Style CKR05 BX 104 K S (V)  
 Voltage-Temperature Limits \_\_\_\_\_  
 Capacitance Code \_\_\_\_\_  
 Capacitance Tolerance \_\_\_\_\_  
 Military Failure Rate \_\_\_\_\_  
 Standoff Option \_\_\_\_\_



### MIL Part No. Codes

**Style:** **CK** = General purpose, ceramic dielectric, fixed capacitors.

**R** = Established Reliability parts.

**05** = Remaining two numbers identify shape and dimension.

**Voltage-Temperature Limits:** First letter identifies temperature range. B = -55°C to +125°C

Second letter identifies voltage-temperature coefficient.

| Capacitance Change with Reference to 25°C |            |               |
|-------------------------------------------|------------|---------------|
| Second Letter                             | No Voltage | Rated Voltage |
| X                                         | +15, -15%  | +15, -25%     |

### Sig. Fig. Capacitance and Multiplier:

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10 pF, use "R" in place of decimal point, e.g., 1R4 = 1.4 pF).

**Capacitance Tolerances:** K = ±10%, M = ±20%

**Military Failure Rate:** M = 1% per 1000 hours; P = 0.1% per 1000 hours; R = 0.01% per 1000 hours; S = 0.001% per 1000 hours

Note: AVX reserves the right to substitute a lower failure rate part per MIL-C-39014. Substitutability for failure rate levels shall be as follows:

| Failure Rate Level | Will Replace Failure Rate Level |
|--------------------|---------------------------------|
| S (STD) (X-ray)    | R, P, M, L                      |
| R (STD) (No X-ray) | P, M, L                         |
| P                  | M, L                            |
| M                  | L                               |

To order standoff option, place "V" at the end of the part number. For example: CKR05BX104KSV.

## PACKAGING REQUIREMENTS

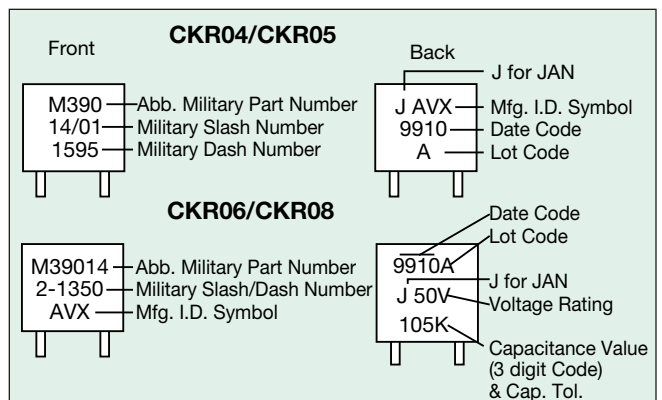
Packaging: 100 Pcs/bag; Radial Tape and Reel Packaging available upon request (2500 pcs./reel).

## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| Per Mil Spec         | Case Size               |                         |                         |                         |                        |
|----------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
| MIL-C-39014          | Length (L)              | Width (W)               | Thickness (T)           | Lead Spacing (L.S.)     | Lead Diameter (L.D.)   |
| CKR04<br>(Fig. 2)    | 4.83±.25<br>(.190±.010) | 4.83±.25<br>(.190±.010) | 2.29±.25<br>(.090±.010) | 2.54±.38<br>(.100±.015) | .64±.05<br>(.025±.002) |
| CKR05<br>(Fig. 1, 4) | 4.83±.25<br>(.190±.010) | 4.83±.25<br>(.190±.010) | 2.29±.25<br>(.090±.010) | 5.08±.38<br>(.200±.015) | .64±.05<br>(.025±.002) |
| CKR06<br>(Fig. 2, 3) | 7.37±.25<br>(.290±.010) | 7.37±.25<br>(.290±.010) | 2.29±.25<br>(.090±.010) | 5.08±.38<br>(.200±.015) | .64±.05<br>(.025±.002) |
| CKR08<br>(Fig. 2)    | 7.37±.25<br>(.290±.010) | 7.37±.25<br>(.290±.010) | 3.68±.38<br>(.145±.015) | 5.08±.38<br>(.200±.015) | .64±.05<br>(.025±.002) |

## MARKING Radial Lead



# MIL-C-39014/Radial Leads



## MILITARY DASH NUMBER IDENTIFICATION CKR04 to MIL-C-39014/23 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------|----------|-----------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                                      |      |
|                                 | CKR04 (BX)                         |         |          |           |                     |                                      |      |
| CKR04BX100K_                    | 0001                               | 0101    | 0201     | 0301      | 10                  | 10                                   | 200  |
| CKR04BX100M_                    | 0002                               | 0102    | 0202     | 0302      | 10                  | 20                                   | 200  |
| CKR04BX120K_                    | 0003                               | 0103    | 0203     | 0303      | 12                  | 10                                   | 200  |
| CKR04BX150K_                    | 0004                               | 0104    | 0204     | 0304      | 15                  | 10                                   | 200  |
| CKR04BX150M_                    | 0005                               | 0105    | 0205     | 0305      | 15                  | 20                                   | 200  |
| CKR04BX180K_                    | 0006                               | 0106    | 0206     | 0306      | 18                  | 10                                   | 200  |
| CKR04BX220K_                    | 0007                               | 0107    | 0207     | 0307      | 22                  | 10                                   | 200  |
| CKR04BX220M_                    | 0008                               | 0108    | 0208     | 0308      | 22                  | 20                                   | 200  |
| CKR04BX270K_                    | 0009                               | 0109    | 0209     | 0309      | 27                  | 10                                   | 200  |
| CKR04BX330K_                    | 0010                               | 0110    | 0210     | 0310      | 33                  | 10                                   | 200  |
| CKR04BX330M_                    | 0011                               | 0111    | 0211     | 0311      | 33                  | 20                                   | 200  |
| CKR04BX390K_                    | 0012                               | 0112    | 0212     | 0312      | 39                  | 10                                   | 200  |
| CKR04BX470K_                    | 0013                               | 0113    | 0213     | 0313      | 47                  | 10                                   | 200  |
| CKR04BX470M_                    | 0014                               | 0114    | 0214     | 0314      | 47                  | 20                                   | 200  |
| CKR04BX560K_                    | 0015                               | 0115    | 0215     | 0315      | 56                  | 10                                   | 200  |
| CKR04BX680K_                    | 0016                               | 0116    | 0216     | 0316      | 68                  | 10                                   | 200  |
| CKR04BX680M_                    | 0017                               | 0117    | 0217     | 0317      | 68                  | 20                                   | 200  |
| CKR04BX820K_                    | 0018                               | 0118    | 0218     | 0318      | 82                  | 10                                   | 200  |
| CKR04BX101K_                    | 0019                               | 0119    | 0219     | 0319      | 100                 | 10                                   | 200  |
| CKR04BX101M_                    | 0020                               | 0120    | 0220     | 0320      | 100                 | 20                                   | 200  |
| CKR04BX121K_                    | 0021                               | 0121    | 0221     | 0321      | 120                 | 10                                   | 200  |
| CKR04BX151K_                    | 0022                               | 0122    | 0222     | 0322      | 150                 | 10                                   | 200  |
| CKR04BX151M_                    | 0023                               | 0123    | 0223     | 0323      | 150                 | 20                                   | 200  |
| CKR04BX181K_                    | 0024                               | 0124    | 0224     | 0324      | 180                 | 10                                   | 200  |
| CKR04BX221K_                    | 0025                               | 0125    | 0225     | 0325      | 220                 | 10                                   | 200  |
| CKR04BX221M_                    | 0026                               | 0126    | 0226     | 0326      | 220                 | 20                                   | 200  |
| CKR04BX271K_                    | 0027                               | 0127    | 0227     | 0327      | 270                 | 10                                   | 200  |
| CKR04BX331K_                    | 0028                               | 0128    | 0228     | 0328      | 330                 | 10                                   | 200  |
| CKR04BX331M_                    | 0029                               | 0129    | 0229     | 0329      | 330                 | 20                                   | 200  |
| CKR04BX391K_                    | 0030                               | 0130    | 0230     | 0330      | 390                 | 10                                   | 200  |
| CKR04BX471K_                    | 0031                               | 0131    | 0231     | 0331      | 470                 | 10                                   | 200  |
| CKR04BX471M_                    | 0032                               | 0132    | 0232     | 0332      | 470                 | 20                                   | 200  |
| CKR04BX561K_                    | 0033                               | 0133    | 0233     | 0333      | 560                 | 10                                   | 200  |
| CKR04BX681K_                    | 0034                               | 0134    | 0234     | 0334      | 680                 | 10                                   | 200  |
| CKR04BX681M_                    | 0035                               | 0135    | 0235     | 0335      | 680                 | 20                                   | 200  |
| CKR04BX821K_                    | 0036                               | 0136    | 0236     | 0336      | 820                 | 10                                   | 200  |
| CKR04BX102K_                    | 0037                               | 0137    | 0237     | 0337      | 1,000               | 10                                   | 200  |
| CKR04BX102M_                    | 0038                               | 0138    | 0238     | 0338      | 1,000               | 20                                   | 200  |
| CKR04BX122K_                    | 0039                               | 0139    | 0239     | 0339      | 1,200               | 10                                   | 100  |
| CKR04BX152K_                    | 0040                               | 0140    | 0240     | 0340      | 1,500               | 10                                   | 100  |
| CKR04BX152M_                    | 0041                               | 0141    | 0241     | 0341      | 1,500               | 20                                   | 100  |
| CKR04BX182K_                    | 0042                               | 0142    | 0242     | 0342      | 1,800               | 10                                   | 100  |
| CKR04BX222K_                    | 0043                               | 0143    | 0243     | 0343      | 2,200               | 10                                   | 100  |
| CKR04BX222M_                    | 0044                               | 0144    | 0244     | 0344      | 2,200               | 20                                   | 100  |
| CKR04BX272K_                    | 0045                               | 0145    | 0245     | 0345      | 2,700               | 10                                   | 100  |
| CKR04BX332K_                    | 0046                               | 0146    | 0246     | 0346      | 3,300               | 10                                   | 100  |
| CKR04BX332M_                    | 0047                               | 0147    | 0247     | 0347      | 3,300               | 20                                   | 100  |
| CKR04BX392K_                    | 0048                               | 0148    | 0248     | 0348      | 3,900               | 10                                   | 100  |
| CKR04BX472K_                    | 0049                               | 0149    | 0249     | 0349      | 4,700               | 10                                   | 100  |
| CKR04BX472M_                    | 0050                               | 0150    | 0250     | 0350      | 4,700               | 20                                   | 100  |
| CKR04BX562K_                    | 0051                               | 0151    | 0251     | 0351      | 5,600               | 10                                   | 100  |
| CKR04BX682K_                    | 0052                               | 0152    | 0252     | 0352      | 6,800               | 10                                   | 100  |
| CKR04BX682M_                    | 0053                               | 0153    | 0253     | 0353      | 6,800               | 20                                   | 100  |
| CKR04BX822K_                    | 0054                               | 0154    | 0254     | 0354      | 8,200               | 10                                   | 100  |
| CKR04BX103K_                    | 0055                               | 0155    | 0255     | 0355      | 10,000              | 10                                   | 100  |
| CKR04BX103M_                    | 0056                               | 0156    | 0256     | 0356      | 10,000              | 20                                   | 100  |
| CKR04BX123K_                    | 0057                               | 0157    | 0257     | 0357      | 12,000              | 10                                   | 50   |
| CKR04BX153K_                    | 0058                               | 0158    | 0258     | 0358      | 15,000              | 10                                   | 50   |
| CKR04BX153M_                    | 0059                               | 0159    | 0259     | 0359      | 15,000              | 20                                   | 50   |
| CKR04BX183K_                    | 0060                               | 0160    | 0260     | 0360      | 18,000              | 10                                   | 50   |
| CKR04BX223K_                    | 0061                               | 0161    | 0261     | 0361      | 22,000              | 10                                   | 50   |
| CKR04BX223M_                    | 0062                               | 0162    | 0262     | 0362      | 22,000              | 20                                   | 50   |
| CKR04BX273K_                    | 0063                               | 0163    | 0263     | 0363      | 27,000              | 10                                   | 50   |
| CKR04BX333K_                    | 0064                               | 0164    | 0264     | 0364      | 33,000              | 10                                   | 50   |
| CKR04BX333M_                    | 0065                               | 0165    | 0265     | 0365      | 33,000              | 20                                   | 50   |
| CKR04BX393K_                    | 0066                               | 0166    | 0266     | 0366      | 39,000              | 10                                   | 50   |
| CKR04BX473K_                    | 0067                               | 0167    | 0267     | 0367      | 47,000              | 10                                   | 50   |
| CKR04BX473M_                    | 0068                               | 0168    | 0268     | 0368      | 47,000              | 20                                   | 50   |
| CKR04BX563K_                    | 0069                               | 0169    | 0269     | 0369      | 56,000              | 10                                   | 50   |
| CKR04BX683K_                    | 0070                               | 0170    | 0270     | 0370      | 68,000              | 10                                   | 50   |
| CKR04BX683M_                    | 0071                               | 0171    | 0271     | 0371      | 68,000              | 20                                   | 50   |
| CKR04BX823K_                    | 0072                               | 0172    | 0272     | 0372      | 82,000              | 10                                   | 50   |
| CKR04BX104K_                    | 0073                               | 0173    | 0273     | 0373      | 100,000             | 10                                   | 50   |
| CKR04BX104M_                    | 0074                               | 0174    | 0274     | 0374      | 100,000             | 20                                   | 50   |

— Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/Radial Leads



## MILITARY DASH NUMBER IDENTIFICATION CKR05 to MIL-C-39014/01 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------|----------|-----------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                                      |      |
|                                 | CKR05 (BX)                         |         |          |           |                     |                                      |      |
| CKR05BX100K_                    | 1201                               | 1241    | 1281     | 1321      | 10                  | 10                                   | 200  |
| CKR05BX100M_                    | 1202                               | 1242    | 1282     | 1322      | 10                  | 20                                   | 200  |
| CKR05BX120K_                    | 1203                               | 1243    | 1283     | 1323      | 12                  | 10                                   | 200  |
| CKR05BX150K_                    | 1204                               | 1244    | 1284     | 1324      | 15                  | 10                                   | 200  |
| CKR05BX150M_                    | 1205                               | 1245    | 1285     | 1325      | 15                  | 20                                   | 200  |
| CKR05BX180K_                    | 1206                               | 1246    | 1286     | 1326      | 18                  | 10                                   | 200  |
| CKR05BX220K_                    | 1207                               | 1247    | 1287     | 1327      | 22                  | 10                                   | 200  |
| CKR05BX220M_                    | 1208                               | 1248    | 1288     | 1328      | 22                  | 20                                   | 200  |
| CKR05BX270K_                    | 1209                               | 1249    | 1289     | 1329      | 27                  | 10                                   | 200  |
| CKR05BX330K_                    | 1210                               | 1250    | 1290     | 1330      | 33                  | 10                                   | 200  |
| CKR05BX330M_                    | 1211                               | 1251    | 1291     | 1331      | 33                  | 20                                   | 200  |
| CKR05BX390K_                    | 1212                               | 1252    | 1292     | 1332      | 39                  | 10                                   | 200  |
| CKR05BX470K_                    | 1213                               | 1253    | 1293     | 1333      | 47                  | 10                                   | 200  |
| CKR05BX470M_                    | 1214                               | 1254    | 1294     | 1334      | 47                  | 20                                   | 200  |
| CKR05BX560K_                    | 1215                               | 1255    | 1295     | 1335      | 56                  | 10                                   | 200  |
| CKR05BX680K_                    | 1216                               | 1256    | 1296     | 1336      | 68                  | 10                                   | 200  |
| CKR05BX680M_                    | 1217                               | 1257    | 1297     | 1337      | 68                  | 20                                   | 200  |
| CKR05BX820K_                    | 1218                               | 1258    | 1298     | 1338      | 82                  | 10                                   | 200  |
| CKR05BX101K_                    | 1219                               | 1259    | 1299     | 1339      | 100                 | 10                                   | 200  |
| CKR05BX101M_                    | 1220                               | 1260    | 1300     | 1340      | 100                 | 20                                   | 200  |
| CKR05BX121K_                    | 1221                               | 1261    | 1301     | 1341      | 120                 | 10                                   | 200  |
| CKR05BX151K_                    | 1222                               | 1262    | 1302     | 1342      | 150                 | 10                                   | 200  |
| CKR05BX151M_                    | 1223                               | 1263    | 1303     | 1343      | 150                 | 20                                   | 200  |
| CKR05BX181K_                    | 1224                               | 1264    | 1304     | 1344      | 180                 | 10                                   | 200  |
| CKR05BX221K_                    | 1225                               | 1265    | 1305     | 1345      | 220                 | 10                                   | 200  |
| CKR05BX221M_                    | 1226                               | 1266    | 1306     | 1346      | 220                 | 20                                   | 200  |
| CKR05BX271K_                    | 1227                               | 1267    | 1307     | 1347      | 270                 | 10                                   | 200  |
| CKR05BX331K_                    | 1228                               | 1268    | 1308     | 1348      | 330                 | 10                                   | 200  |
| CKR05BX331M_                    | 1229                               | 1269    | 1309     | 1349      | 330                 | 20                                   | 200  |
| CKR05BX391K_                    | 1230                               | 1270    | 1310     | 1350      | 390                 | 10                                   | 200  |
| CKR05BX471K_                    | 1231                               | 1271    | 1311     | 1351      | 470                 | 10                                   | 200  |
| CKR05BX471M_                    | 1232                               | 1272    | 1312     | 1352      | 470                 | 20                                   | 200  |
| CKR05BX561K_                    | 1233                               | 1273    | 1313     | 1353      | 560                 | 10                                   | 200  |
| CKR05BX681K_                    | 1234                               | 1274    | 1314     | 1354      | 680                 | 10                                   | 200  |
| CKR05BX681M_                    | 1235                               | 1275    | 1315     | 1355      | 680                 | 20                                   | 200  |
| CKR05BX821K_                    | 1236                               | 1276    | 1316     | 1356      | 820                 | 10                                   | 200  |
| CKR05BX102K_                    | 1237                               | 1277    | 1317     | 1357      | 1,000               | 10                                   | 200  |
| CKR05BX102M_                    | 1238                               | 1278    | 1318     | 1358      | 1,000               | 20                                   | 200  |
| CKR05BX122K_                    | 1239                               | 1279    | 1319     | 1359      | 1,200               | 10                                   | 100  |
| CKR05BX152K_                    | 1240                               | 1280    | 1320     | 1360      | 1,500               | 10                                   | 100  |
| CKR05BX152M_                    | 1441                               | 1481    | 1521     | 1561      | 1,500               | 20                                   | 100  |
| CKR05BX182K_                    | 1442                               | 1482    | 1522     | 1562      | 1,800               | 10                                   | 100  |
| CKR05BX222K_                    | 1443                               | 1483    | 1523     | 1563      | 2,200               | 10                                   | 100  |
| CKR05BX222M_                    | 1444                               | 1484    | 1524     | 1564      | 2,200               | 20                                   | 100  |
| CKR05BX272K_                    | 1445                               | 1485    | 1525     | 1565      | 2,700               | 10                                   | 100  |
| CKR05BX332K_                    | 1446                               | 1486    | 1526     | 1566      | 3,300               | 10                                   | 100  |
| CKR05BX332M_                    | 1447                               | 1487    | 1527     | 1567      | 3,300               | 20                                   | 100  |
| CKR05BX392K_                    | 1448                               | 1488    | 1528     | 1568      | 3,900               | 10                                   | 100  |
| CKR05BX472K_                    | 1449                               | 1489    | 1529     | 1569      | 4,700               | 10                                   | 100  |
| CKR05BX472M_                    | 1450                               | 1490    | 1530     | 1570      | 4,700               | 20                                   | 100  |
| CKR05BX562K_                    | 1451                               | 1491    | 1531     | 1571      | 5,600               | 10                                   | 100  |
| CKR05BX682K_                    | 1452                               | 1492    | 1532     | 1572      | 6,800               | 10                                   | 100  |
| CKR05BX682M_                    | 1453                               | 1493    | 1533     | 1573      | 6,800               | 20                                   | 100  |
| CKR05BX822K_                    | 1454                               | 1494    | 1534     | 1574      | 8,200               | 10                                   | 100  |
| CKR05BX103K_                    | 1455                               | 1495    | 1535     | 1575      | 10,000              | 10                                   | 100  |
| CKR05BX103M_                    | 1456                               | 1496    | 1536     | 1576      | 10,000              | 20                                   | 100  |
| CKR05BX123K_                    | 1457                               | 1497    | 1537     | 1577      | 12,000              | 10                                   | 50   |
| CKR05BX153K_                    | 1458                               | 1498    | 1538     | 1578      | 15,000              | 10                                   | 50   |
| CKR05BX153M_                    | 1459                               | 1499    | 1539     | 1579      | 15,000              | 20                                   | 50   |
| CKR05BX183K_                    | 1460                               | 1500    | 1540     | 1580      | 18,000              | 10                                   | 50   |
| CKR05BX223K_                    | 1461                               | 1501    | 1541     | 1581      | 22,000              | 10                                   | 50   |
| CKR05BX223M_                    | 1462                               | 1502    | 1542     | 1582      | 22,000              | 20                                   | 50   |
| CKR05BX273K_                    | 1463                               | 1503    | 1543     | 1583      | 27,000              | 10                                   | 50   |
| CKR05BX333K_                    | 1464                               | 1504    | 1544     | 1584      | 33,000              | 10                                   | 50   |
| CKR05BX333M_                    | 1465                               | 1505    | 1545     | 1585      | 33,000              | 20                                   | 50   |
| CKR05BX393K_                    | 1466                               | 1506    | 1546     | 1586      | 39,000              | 10                                   | 50   |
| CKR05BX473K_                    | 1467                               | 1507    | 1547     | 1587      | 47,000              | 10                                   | 50   |
| CKR05BX473M_                    | 1468                               | 1508    | 1548     | 1588      | 47,000              | 20                                   | 50   |
| CKR05BX563K_                    | 1469                               | 1509    | 1549     | 1589      | 56,000              | 10                                   | 50   |
| CKR05BX683K_                    | 1470                               | 1510    | 1550     | 1590      | 68,000              | 10                                   | 50   |
| CKR05BX683M_                    | 1471                               | 1511    | 1551     | 1591      | 68,000              | 20                                   | 50   |
| CKR05BX823K_                    | 1472                               | 1512    | 1552     | 1592      | 82,000              | 10                                   | 50   |
| CKR05BX104K_                    | 1473                               | 1513    | 1553     | 1593      | 100,000             | 10                                   | 50   |
| CKR05BX104M_                    | 1474                               | 1514    | 1554     | 1594      | 100,000             | 20                                   | 50   |

\_\_\_\_\_ Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/Radial Leads



## MILITARY DASH NUMBER IDENTIFICATION CKR06 to MIL-C-39014/02 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------|----------|-----------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                                      |      |
|                                 | CKR06 (BX)                         |         |          |           |                     |                                      |      |
| CKR06BX122K_                    | 1201                               | 1241    | 1281     | 1321      | 1200                | 10                                   | 200  |
| CKR06BX152K_                    | 1202                               | 1242    | 1282     | 1322      | 1500                | 10                                   | 200  |
| CKR06BX152M_                    | 1203                               | 1243    | 1283     | 1323      | 1500                | 20                                   | 200  |
| CKR06BX182K_                    | 1204                               | 1244    | 1284     | 1324      | 1800                | 10                                   | 200  |
| CKR06BX222K_                    | 1206                               | 1246    | 1286     | 1326      | 2200                | 10                                   | 200  |
| CKR06BX222M_                    | 1207                               | 1247    | 1287     | 1327      | 2200                | 20                                   | 200  |
| CKR06BX272K_                    | 1208                               | 1248    | 1288     | 1328      | 2700                | 10                                   | 200  |
| CKR06BX332K_                    | 1209                               | 1249    | 1289     | 1329      | 3300                | 10                                   | 200  |
| CKR06BX332M_                    | 1210                               | 1250    | 1290     | 1330      | 3300                | 20                                   | 200  |
| CKR06BX392K_                    | 1211                               | 1251    | 1291     | 1331      | 3900                | 10                                   | 200  |
| CKR06BX472K_                    | 1212                               | 1252    | 1292     | 1332      | 4700                | 10                                   | 200  |
| CKR06BX472M_                    | 1213                               | 1253    | 1293     | 1333      | 4700                | 20                                   | 200  |
| CKR06BX562K_                    | 1214                               | 1254    | 1294     | 1334      | 5600                | 10                                   | 200  |
| CKR06BX682K_                    | 1215                               | 1255    | 1295     | 1335      | 6800                | 10                                   | 200  |
| CKR06BX682M_                    | 1216                               | 1256    | 1296     | 1336      | 6800                | 20                                   | 200  |
| CKR06BX822K_                    | 1217                               | 1257    | 1297     | 1337      | 8200                | 10                                   | 200  |
| CKR06BX103K_                    | 1218                               | 1258    | 1298     | 1338      | 10,000              | 10                                   | 200  |
| CKR06BX103M_                    | 1219                               | 1259    | 1299     | 1339      | 10,000              | 20                                   | 200  |
| CKR06BX123K_                    | 1231                               | 1271    | 1311     | 1351      | 12,000              | 10                                   | 100  |
| CKR06BX153K_                    | 1220                               | 1260    | 1300     | 1340      | 15,000              | 10                                   | 100  |
| CKR06BX183K_                    | 1221                               | 1261    | 1301     | 1341      | 18,000              | 10                                   | 100  |
| CKR06BX223K_                    | 1222                               | 1262    | 1302     | 1342      | 22,000              | 10                                   | 100  |
| CKR06BX273K_                    | 1232                               | 1272    | 1312     | 1352      | 27,000              | 10                                   | 100  |
| CKR06BX333K_                    | 1223                               | 1263    | 1303     | 1343      | 33,000              | 10                                   | 100  |
| CKR06BX393K_                    | 1224                               | 1264    | 1304     | 1344      | 39,000              | 10                                   | 100  |
| CKR06BX473K_                    | 1225                               | 1265    | 1305     | 1345      | 47,000              | 10                                   | 100  |
| CKR06BX563K_                    | 1226                               | 1266    | 1306     | 1346      | 56,000              | 10                                   | 100  |
| CKR06BX683K_                    | 1227                               | 1267    | 1307     | 1347      | 68,000              | 10                                   | 100  |
| CKR06BX823K_                    | 1229                               | 1269    | 1309     | 1349      | 82,000              | 10                                   | 100  |
| CKR06BX104K_                    | 1230                               | 1270    | 1310     | 1350      | 100,000             | 10                                   | 100  |
| CKR06BX124K_                    | 1233                               | 1273    | 1313     | 1353      | 120,000             | 10                                   | 50   |
| CKR06BX154K_                    | 1234                               | 1274    | 1314     | 1354      | 150,000             | 10                                   | 50   |
| CKR06BX184K_                    | 1235                               | 1275    | 1315     | 1355      | 180,000             | 10                                   | 50   |
| CKR06BX224K_                    | 1236                               | 1276    | 1316     | 1356      | 220,000             | 10                                   | 50   |
| CKR06BX274K_                    | 1237                               | 1277    | 1317     | 1357      | 270,000             | 10                                   | 50   |
| CKR06BX334K_                    | 1238                               | 1278    | 1318     | 1358      | 330,000             | 10                                   | 50   |
| CKR06BX394K_                    | 1239                               | 1279    | 1319     | 1359      | 390,000             | 10                                   | 50   |
| CKR06BX474K_                    | 1240                               | 1280    | 1320     | 1360      | 470,000             | 10                                   | 50   |
| CKR06BX564K_                    | 1404                               | 1408    | 1412     | 1416      | 560,000             | 10                                   | 50   |
| CKR06BX684K_                    | 1405                               | 1409    | 1413     | 1417      | 680,000             | 10                                   | 50   |
| CKR06BX824K_                    | 1406                               | 1410    | 1414     | 1418      | 820,000             | 10                                   | 50   |
| CKR06BX105K_                    | 1407                               | 1411    | 1415     | 1419      | 1,000,000           | 10                                   | 50   |

— Add appropriate failure rate level letter (M, P, R or S)

## CKR08 to MIL-C-39014/20 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            |                     |                                      |      |
|                                 | CKR08 (BX)                         |                     |                                      |      |
| CKR08BX125K_                    | 0104                               | 1,200,000           | 10                                   | 50   |
| CKR08BX155K_                    | 0105                               | 1,500,000           | 10                                   | 50   |
| CKR08BX205K_                    | 0106                               | 2,000,000           | 10                                   | 50   |

— Add appropriate failure rate level letter (M)

## CROSS REFERENCE CHART - AVX MILITARY FOR MOLDED RADIAL LEAD

|        |           | Per Mil-Spec |             |            | Case Size             |                       |                      |                       |                     |
|--------|-----------|--------------|-------------|------------|-----------------------|-----------------------|----------------------|-----------------------|---------------------|
| Figure | AVX Style | MIL-C-11015  | MIL-C-39014 | MIL-C-20   | Length(L)             | Width (W)             | Thickness (T)        | Lead Spacing (LS)     | Lead Diameter (LD)  |
| 1      | MR05      | CK05         | CKR05       | CCR05/CC05 | 4.83±.25 (.190±.010)  | 4.83±.25 (.190±.010)  | 2.29±.25 (.090±.010) | 5.08±.38 (.200±.015)  | .64±.05 (.025±.002) |
| 2      | MR04      | —            | CKR04       | CCR09/CC09 | 4.83±.25 (.190±.010)  | 4.83±.25 (.190±.010)  | 2.29±.25 (.090±.010) | 2.54±.38 (.100±.015)  | .64±.05 (.025±.002) |
| 2      | MR06      | CK06         | CKR06       | CCR06/CC06 | 7.37±.25 (.290±.010)  | 7.37±.25 (.290±.010)  | 2.29±.25 (.090±.010) | 5.08±.38 (.200±.015)  | .64±.05 (.025±.002) |
| 2      | MR68      | —            | CKR08       | —          | 7.37±.25 (.290±.010)  | 7.37±.25 (.290±.010)  | 3.68±.38 (.145±.015) | 5.08±.38 (.200±.015)  | .64±.05 (.025±.002) |
| 2      | MR07      | —            | —           | CCR07/CC07 | 12.19±.51 (.480±.020) | 12.19±.51 (.480±.020) | 3.56±.25 (.140±.010) | 10.16±.51 (.400±.020) | .64±.05 (.025±.002) |
| 2      | MR08      | —            | —           | CCR08/CC08 | 12.19±.51 (.480±.020) | 12.19±.51 (.480±.020) | 6.1±.25 (.240±.010)  | 10.16±.51 (.400±.020) | .64±.05 (.025±.002) |

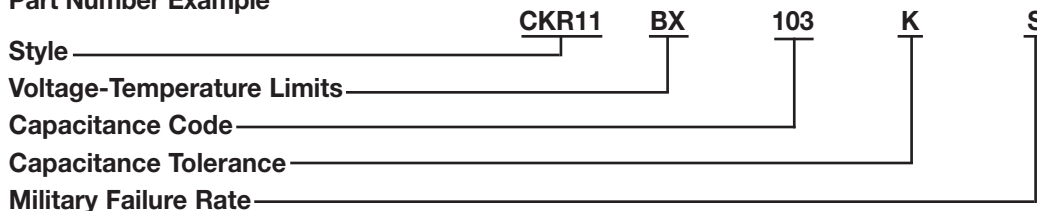
Dimensions: Millimeters (Inches)

## HOW TO ORDER

**Military Type Designation: Styles CKR11, CKR12, CKR14, CKR15, CKR16**

**Dash Number Option: MIL-C-39014/05 (Add Appropriate Dash Number)**

**Part Number Example**



### MIL Part No. Codes

**Style: CK** = General purpose, ceramic dielectric, fixed capacitors.

**R** = Established Reliability parts.

**11** = Remaining two numbers identify shape and dimension.

### Voltage-Temperature Limits:

First letter identifies temperature range.

B = -55°C to +125°C

Second letter identifies voltage-temperature coefficient.

| Capacitance Change with Reference to 25°C |            |               |
|-------------------------------------------|------------|---------------|
| Second Letter                             | No Voltage | Rated Voltage |
| R                                         | +15, -15%  | +15, -40%     |
| X                                         | +15, -15%  | +15, -25%     |

### Sig. Fig. Capacitance and Multiplier:

First two digits are the significant figures of capacitance.

Third digit indicates the additional number of zeros. For example, order 10,000 pF as 103.

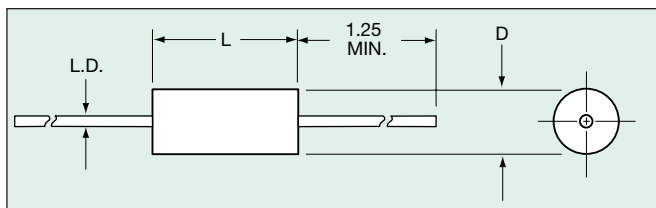
**Capacitance Tolerances:** K =  $\pm 10\%$ , M =  $\pm 20\%$

**Military Failure Rate:** M = 1% per 1000 hours

P = 0.1% per 1000 hours

R = 0.01% per 1000 hours

S = 0.001% per 1000 hours



Note: AVX reserves the right to substitute a lower failure rate part per MIL-C-39014/5E. Substitutability for failure rate levels shall be as follows:

| Failure Rate Level | Will Replace Failure Rate Level |
|--------------------|---------------------------------|
| S (STD) (X-ray)    | R, P, M, L                      |
| R (STD) (No X-ray) | P, M, L                         |
| P                  | M, L                            |
| M                  | L                               |

## PACKAGING REQUIREMENTS

### Packaging: Bulk

CKR11, 12, & 14 100 pcs per bag

CKR15 & 16 50 pcs per bag

### Tape & Reel

CKR11, 12 5000 pcs per reel

CKR14 3000 pcs per reel

CKR15 950 pcs per reel

CKR16 650 pcs per reel

## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| Per Mil Spec | Case Size                            |                                     |                                     |
|--------------|--------------------------------------|-------------------------------------|-------------------------------------|
|              | Length (L)                           | Diameter (D)                        | Lead Diameter (L.D.)                |
| MIL-C-39014  |                                      |                                     |                                     |
| CKR11        | 4.07 $\pm$ .25<br>(.160 $\pm$ .010)  | 2.29 $\pm$ .25<br>(.090 $\pm$ .010) | .48 $\pm$ .05<br>(.019 $\pm$ .002)  |
| CKR12        | 6.35 $\pm$ .25<br>(.250 $\pm$ .010)  | 2.29 $\pm$ .25<br>(.090 $\pm$ .010) | .48 $\pm$ .05<br>(.019 $\pm$ .002)  |
| CKR14        | 9.91 $\pm$ .25<br>(.390 $\pm$ .010)  | 3.56 $\pm$ .25<br>(.140 $\pm$ .010) | .63 $\pm$ .025<br>(.025 $\pm$ .002) |
| CKR15        | 12.7 $\pm$ .51<br>(.500 $\pm$ .020)  | 6.35 $\pm$ .38<br>(.250 $\pm$ .015) | .63 $\pm$ .05<br>(.025 $\pm$ .002)  |
| CKR16        | 17.53 $\pm$ .51<br>(.690 $\pm$ .020) | 8.89 $\pm$ .51<br>(.350 $\pm$ .020) | .63 $\pm$ .05<br>(.025 $\pm$ .002)  |

# MIL-C-39014/Axial Leads



## MILITARY DASH NUMBER IDENTIFICATION CKR11 to MIL-C-39014/05 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------|----------|-----------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                                      |      |
|                                 | CKR11 (BX)                         |         |          |           |                     |                                      |      |
| CKR11BX100K_                    | 2601                               | 2801    | 2001     | 2201      | 10                  | 10                                   | 100  |
| CKR11BX100M_                    | 2602                               | 2802    | 2002     | 2202      | 10                  | 20                                   | 100  |
| CKR11BX120K_                    | 2603                               | 2803    | 2003     | 2203      | 12                  | 10                                   | 100  |
| CKR11BX150K_                    | 2604                               | 2804    | 2004     | 2204      | 15                  | 10                                   | 100  |
| CKR11BX150M_                    | 2605                               | 2805    | 2005     | 2205      | 15                  | 20                                   | 100  |
| CKR11BX180K_                    | 2606                               | 2806    | 2006     | 2206      | 18                  | 10                                   | 100  |
| CKR11BX220K_                    | 2607                               | 2807    | 2007     | 2207      | 22                  | 10                                   | 100  |
| CKR11BX220M_                    | 2608                               | 2808    | 2008     | 2208      | 22                  | 20                                   | 100  |
| CKR11BX270K_                    | 2609                               | 2809    | 2009     | 2209      | 27                  | 10                                   | 100  |
| CKR11BX330K_                    | 2610                               | 2810    | 2010     | 2210      | 33                  | 10                                   | 100  |
| CKR11BX330M_                    | 2611                               | 2811    | 2011     | 2211      | 33                  | 20                                   | 100  |
| CKR11BX390K_                    | 2612                               | 2812    | 2012     | 2212      | 39                  | 10                                   | 100  |
| CKR11BX470K_                    | 2613                               | 2813    | 2013     | 2213      | 47                  | 10                                   | 100  |
| CKR11BX470M_                    | 2614                               | 2814    | 2014     | 2214      | 47                  | 20                                   | 100  |
| CKR11BX560K_                    | 2615                               | 2815    | 2015     | 2215      | 56                  | 10                                   | 100  |
| CKR11BX680K_                    | 2616                               | 2816    | 2016     | 2216      | 68                  | 10                                   | 100  |
| CKR11BX680M_                    | 2617                               | 2817    | 2017     | 2217      | 68                  | 20                                   | 100  |
| CKR11BX820K_                    | 2618                               | 2818    | 2018     | 2218      | 82                  | 10                                   | 100  |
| CKR11BX101K_                    | 2619                               | 2819    | 2019     | 2219      | 100                 | 10                                   | 100  |
| CKR11BX101M_                    | 2620                               | 2820    | 2020     | 2220      | 100                 | 20                                   | 100  |
| CKR11BX121K_                    | 2621                               | 2821    | 2021     | 2221      | 120                 | 10                                   | 100  |
| CKR11BX151K_                    | 2622                               | 2822    | 2022     | 2222      | 150                 | 10                                   | 100  |
| CKR11BX151M_                    | 2623                               | 2823    | 2023     | 2223      | 150                 | 20                                   | 100  |
| CKR11BX181K_                    | 2624                               | 2824    | 2024     | 2224      | 180                 | 10                                   | 100  |
| CKR11BX221K_                    | 2625                               | 2825    | 2025     | 2225      | 220                 | 10                                   | 100  |
| CKR11BX221M_                    | 2626                               | 2826    | 2026     | 2226      | 220                 | 20                                   | 100  |
| CKR11BX271K_                    | 2627                               | 2827    | 2027     | 2227      | 270                 | 10                                   | 100  |
| CKR11BX331K_                    | 2628                               | 2828    | 2028     | 2228      | 330                 | 10                                   | 100  |
| CKR11BX331M_                    | 2629                               | 2829    | 2029     | 2229      | 330                 | 20                                   | 100  |
| CKR11BX391K_                    | 2630                               | 2830    | 2030     | 2230      | 390                 | 10                                   | 100  |
| CKR11BX471K_                    | 2631                               | 2831    | 2031     | 2231      | 470                 | 10                                   | 100  |
| CKR11BX471M_                    | 2632                               | 2832    | 2032     | 2232      | 470                 | 20                                   | 100  |
| CKR11BX561K_                    | 2633                               | 2833    | 2033     | 2233      | 560                 | 10                                   | 100  |
| CKR11BX681K_                    | 2634                               | 2834    | 2034     | 2234      | 680                 | 10                                   | 100  |
| CKR11BX681M_                    | 2635                               | 2835    | 2035     | 2235      | 680                 | 20                                   | 100  |
| CKR11BX821K_                    | 2636                               | 2836    | 2036     | 2236      | 820                 | 10                                   | 100  |
| CKR11BX102K_                    | 2637                               | 2837    | 2037     | 2237      | 1000                | 10                                   | 100  |
| CKR11BX102M_                    | 2638                               | 2838    | 2038     | 2238      | 1000                | 20                                   | 100  |
| CKR11BX122K_                    | 2639                               | 2839    | 2039     | 2239      | 1200                | 10                                   | 100  |
| CKR11BX152K_                    | 2640                               | 2840    | 2040     | 2240      | 1500                | 10                                   | 100  |
| CKR11BX152M_                    | 2641                               | 2841    | 2041     | 2241      | 1500                | 20                                   | 100  |
| CKR11BX182K_                    | 2642                               | 2842    | 2042     | 2242      | 1800                | 10                                   | 100  |
| CKR11BX222K_                    | 2643                               | 2843    | 2043     | 2243      | 2200                | 10                                   | 100  |
| CKR11BX222M_                    | 2644                               | 2844    | 2044     | 2244      | 2200                | 20                                   | 100  |
| CKR11BX272K_                    | 2645                               | 2845    | 2045     | 2245      | 2700                | 10                                   | 100  |
| CKR11BX332K_                    | 2646                               | 2846    | 2046     | 2246      | 3300                | 10                                   | 100  |
| CKR11BX332M_                    | 2647                               | 2847    | 2047     | 2247      | 3300                | 20                                   | 100  |
| CKR11BX392K_                    | 2648                               | 2848    | 2048     | 2248      | 3900                | 10                                   | 100  |
| CKR11BX472K_                    | 2649                               | 2849    | 2049     | 2249      | 4700                | 10                                   | 100  |
| CKR11BX472M_                    | 2650                               | 2850    | 2050     | 2250      | 4700                | 20                                   | 100  |
| CKR11BX562K_                    | 2651                               | 2851    | 2051     | 2251      | 5600                | 10                                   | 50   |
| CKR11BX682K_                    | 2652                               | 2852    | 2052     | 2252      | 6800                | 10                                   | 50   |
| CKR11BX682M_                    | 2653                               | 2853    | 2053     | 2253      | 6800                | 20                                   | 50   |
| CKR11BX822K_                    | 2654                               | 2854    | 2054     | 2254      | 8200                | 10                                   | 50   |
| CKR11BX103K_                    | 2655                               | 2855    | 2055     | 2255      | 10,000              | 10                                   | 50   |
| CKR11BX103M_                    | 2656                               | 2856    | 2056     | 2256      | 10,000              | 20                                   | 50   |

— Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/Axial Leads



## MILITARY DASH NUMBER IDENTIFICATION CKR12/14/15 to MIL-C-39014/05 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------|----------|-----------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                                      |      |
|                                 | CKR12 (BX)                         |         |          |           |                     |                                      |      |
| CKR12BX562K_                    | 2657                               | 2857    | 2057     | 2257      | 5600                | 10                                   | 100  |
| CKR12BX682K_                    | 2658                               | 2858    | 2058     | 2258      | 6800                | 10                                   | 100  |
| CKR12BX682M_                    | 2659                               | 2859    | 2059     | 2259      | 6800                | 20                                   | 100  |
| CKR12BX822K_                    | 2660                               | 2860    | 2060     | 2260      | 8200                | 10                                   | 100  |
| CKR12BX103K_                    | 2661                               | 2861    | 2061     | 2261      | 10,000              | 10                                   | 100  |
| CKR12BX103M_                    | 2662                               | 2862    | 2062     | 2262      | 10,000              | 20                                   | 100  |
| CKR12BX123K_                    | 2663                               | 2863    | 2063     | 2263      | 12,000              | 10                                   | 50   |
| CKR12BX153K_                    | 2664                               | 2864    | 2064     | 2264      | 15,000              | 10                                   | 50   |
| CKR12BX153M_                    | 2665                               | 2865    | 2065     | 2265      | 15,000              | 20                                   | 50   |
| CKR12BX183K_                    | 2666                               | 2866    | 2066     | 2266      | 18,000              | 10                                   | 50   |
| CKR12BX223K_                    | 2667                               | 2867    | 2067     | 2267      | 22,000              | 10                                   | 50   |
| CKR12BX223M_                    | 2668                               | 2868    | 2068     | 2268      | 22,000              | 20                                   | 50   |
| CKR12BX273K_                    | 2669                               | 2869    | 2069     | 2269      | 27,000              | 10                                   | 50   |
| CKR12BX333K_                    | 2670                               | 2870    | 2070     | 2270      | 33,000              | 10                                   | 50   |
| CKR12BX333M_                    | 2671                               | 2871    | 2071     | 2271      | 33,000              | 20                                   | 50   |
| CKR12BX393K_                    | 2672                               | 2872    | 2072     | 2272      | 39,000              | 10                                   | 50   |
| CKR12BX473K_                    | 2673                               | 2873    | 2073     | 2273      | 47,000              | 10                                   | 50   |
| CKR12BX473M_                    | 2674                               | 2874    | 2074     | 2274      | 47,000              | 20                                   | 50   |
|                                 | CKR14 (BX)                         |         |          |           |                     |                                      |      |
| CKR14BX123K_                    | 2675                               | 2875    | 2075     | 2275      | 12,000              | 10                                   | 100  |
| CKR14BX153K_                    | 2676                               | 2876    | 2076     | 2276      | 15,000              | 10                                   | 100  |
| CKR14BX153M_                    | 2677                               | 2877    | 2077     | 2277      | 15,000              | 20                                   | 100  |
| CKR14BX183K_                    | 2678                               | 2878    | 2078     | 2278      | 18,000              | 10                                   | 100  |
| CKR14BX223K_                    | 2679                               | 2879    | 2079     | 2279      | 22,000              | 10                                   | 100  |
| CKR14BX223M_                    | 2680                               | 2880    | 2080     | 2280      | 22,000              | 20                                   | 100  |
| CKR14BX273K_                    | 2681                               | 2881    | 2081     | 2281      | 27,000              | 10                                   | 100  |
| CKR14BX333K_                    | 2682                               | 2882    | 2082     | 2282      | 33,000              | 10                                   | 100  |
| CKR14BX333M_                    | 2683                               | 2883    | 2083     | 2283      | 33,000              | 20                                   | 100  |
| CKR14BX393K_                    | 2684                               | 2884    | 2084     | 2284      | 39,000              | 10                                   | 100  |
| CKR14BX473K_                    | 2685                               | 2885    | 2085     | 2285      | 47,000              | 10                                   | 100  |
| CKR14BX473M_                    | 2686                               | 2886    | 2086     | 2286      | 47,000              | 20                                   | 100  |
| CKR14BX563K_                    | 2687                               | 2887    | 2087     | 2287      | 56,000              | 10                                   | 50   |
| CKR14BX683K_                    | 2688                               | 2888    | 2088     | 2288      | 68,000              | 10                                   | 50   |
| CKR14BX683M_                    | 2689                               | 2889    | 2089     | 2289      | 68,000              | 20                                   | 50   |
| CKR14BX823K_                    | 2690                               | 2890    | 2090     | 2290      | 82,000              | 10                                   | 50   |
| CKR14BX104K_                    | 2691                               | 2891    | 2091     | 2291      | 100,000             | 10                                   | 50   |
| CKR14BX104M_                    | 2692                               | 2892    | 2092     | 2292      | 100,000             | 20                                   | 50   |
|                                 | CKR14 (BR)                         |         |          |           |                     |                                      |      |
| CKR14BR563K_                    | 2693                               | 2893    | 2093     | 2293      | 56,000              | 10                                   | 100  |
| CKR14BR683K_                    | 2694                               | 2894    | 2094     | 2294      | 68,000              | 10                                   | 100  |
| CKR14BR683M_                    | 2695                               | 2895    | 2095     | 2295      | 68,000              | 20                                   | 100  |
| CKR14BR823K_                    | 2696                               | 2896    | 2096     | 2296      | 82,000              | 10                                   | 100  |
| CKR14BR104K_                    | 2697                               | 2897    | 2097     | 2297      | 100,000             | 10                                   | 100  |
| CKR14BR104M_                    | 2698                               | 2898    | 2098     | 2298      | 100,000             | 20                                   | 100  |
| CKR14BR124K_                    | 2699                               | 2899    | 2099     | 2299      | 120,000             | 10                                   | 50   |
| CKR14BR154K_                    | 2700                               | 2900    | 2100     | 2300      | 150,000             | 10                                   | 50   |
| CKR14BR154M_                    | 2701                               | 2901    | 2101     | 2301      | 150,000             | 20                                   | 50   |
| CKR14BR184K_                    | 2702                               | 2902    | 2102     | 2302      | 180,000             | 10                                   | 50   |
| CKR14BR224K_                    | 2703                               | 2903    | 2103     | 2303      | 220,000             | 10                                   | 50   |
| CKR14BR224M_                    | 2704                               | 2904    | 2104     | 2304      | 220,000             | 20                                   | 50   |
| CKR14BR274K_                    | 2705                               | 2905    | 2105     | 2305      | 270,000             | 10                                   | 50   |
|                                 | CKR15 (BX)                         |         |          |           |                     |                                      |      |
| CKR15BX563K_                    | 2706                               | 2906    | 2106     | 2306      | 56,000              | 10                                   | 100  |
| CKR15BX683K_                    | 2707                               | 2907    | 2107     | 2307      | 68,000              | 10                                   | 100  |
| CKR15BX683M_                    | 2708                               | 2908    | 2108     | 2308      | 68,000              | 20                                   | 100  |
| CKR15BX823K_                    | 2709                               | 2909    | 2109     | 2309      | 82,000              | 10                                   | 100  |
| CKR15BX104K_                    | 2710                               | 2910    | 2110     | 2310      | 100,000             | 10                                   | 100  |
| CKR15BX104M_                    | 2711                               | 2911    | 2111     | 2311      | 100,000             | 20                                   | 100  |

— Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/Axial Leads

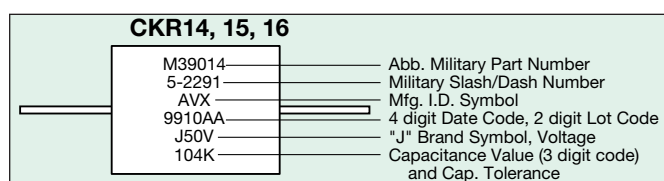
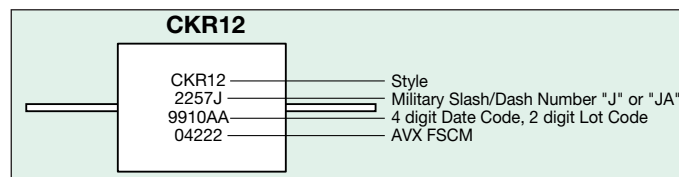
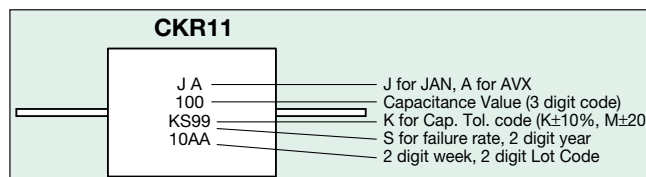


## MILITARY DASH NUMBER IDENTIFICATION CKR15/16 to MIL-C-39014/05 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours) |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance<br>±Percent | WVDC |
|---------------------------------|------------------------------------|---------|----------|-----------|---------------------|--------------------------------------|------|
|                                 | 1.0 (M)                            | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                                      |      |
|                                 | CKR15 (BR)                         |         |          |           |                     |                                      |      |
| CKR15BR124K_                    | 2712                               | 2912    | 2112     | 2312      | 120,000             | 10                                   | 100  |
| CKR15BR154K_                    | 2713                               | 2913    | 2113     | 2313      | 150,000             | 10                                   | 100  |
| CKR15BR154M_                    | 2714                               | 2914    | 2114     | 2314      | 150,000             | 20                                   | 100  |
| CKR15BR184K_                    | 2715                               | 2915    | 2115     | 2315      | 180,000             | 10                                   | 100  |
| CKR15BR224K_                    | 2716                               | 2916    | 2116     | 2316      | 220,000             | 10                                   | 100  |
| CKR15BR224M_                    | 2717                               | 2917    | 2117     | 2317      | 220,000             | 20                                   | 100  |
| CKR15BR274K_                    | 2718                               | 2918    | 2118     | 2318      | 270,000             | 10                                   | 100  |
| CKR15BR334K_                    | 2719                               | 2919    | 2119     | 2319      | 330,000             | 10                                   | 100  |
| CKR15BR334M_                    | 2720                               | 2920    | 2120     | 2320      | 330,000             | 20                                   | 100  |
| CKR15BR474K_                    | 2721                               | 2921    | 2121     | 2321      | 470,000             | 10                                   | 50   |
| CKR15BR474M_                    | 2722                               | 2922    | 2122     | 2322      | 470,000             | 20                                   | 50   |
| CKR15BR684K_                    | 2723                               | 2923    | 2123     | 2323      | 680,000             | 10                                   | 50   |
| CKR15BR684M_                    | 2724                               | 2924    | 2124     | 2324      | 680,000             | 20                                   | 50   |
| CKR15BR105K_                    | 2725                               | 2925    | 2125     | 2325      | 1,000,000           | 10                                   | 50   |
| CKR15BR105M_                    | 2726                               | 2926    | 2126     | 2326      | 1,000,000           | 20                                   | 50   |
|                                 | CKR16 (BR)                         |         |          |           |                     |                                      |      |
| CKR16BR474K_                    | 2727                               | 2927    | 2127     | 2327      | 470,000             | 10                                   | 100  |
| CKR16BR474M_                    | 2728                               | 2928    | 2128     | 2328      | 470,000             | 20                                   | 100  |
| CKR16BR684K_                    | 2729                               | 2929    | 2129     | 2329      | 680,000             | 10                                   | 100  |
| CKR16BR684M_                    | 2730                               | 2930    | 2130     | 2330      | 680,000             | 20                                   | 100  |
| CKR16BR105K_                    | 2731                               | 2931    | 2131     | 2331      | 1,000,000           | 10                                   | 100  |
| CKR16BR105M_                    | 2732                               | 2932    | 2132     | 2332      | 1,000,000           | 20                                   | 100  |
| CKR16BR225K_                    | 2733                               | 2933    | 2133     | 2333      | 2,200,000           | 10                                   | 50   |
| CKR16BR225M_                    | 2734                               | 2934    | 2134     | 2334      | 2,200,000           | 20                                   | 50   |
| CKR16BR335K_                    | 2735                               | 2935    | 2135     | 2335      | 3,300,000           | 10                                   | 50   |
| CKR16BR335M_                    | 2736                               | 2936    | 2136     | 2336      | 3,300,000           | 20                                   | 50   |

— Add appropriate failure rate level letter (M, P, R or S)

## MARKING



## CROSS REFERENCE CHART - AVX MILITARY FOR MOLDED AXIAL LEAD

| AVX Style | Per Mil-Spec |             |            | Case Size                 |                         |                        |
|-----------|--------------|-------------|------------|---------------------------|-------------------------|------------------------|
|           | MIL-C-11015  | MIL-C-39014 | MIL-C-20   | Length (L)                | Diameter (D)            | Lead Diameter (L.D.)   |
| MA10      | CK12         | CKR11       | CCR75/CC75 | 4.07 ±.25<br>(.160±.010)  | 2.29±.25<br>(.090±.010) | .48±.05<br>(.019±.002) |
| MA20      | CK13         | CKR12       | CCR76/CC76 | 6.35 ±.25<br>(.250 ±.010) | 2.29±.25<br>(.090±.010) | .48±.05<br>(.019±.002) |
| MA30      | —            | —           | —          | 6.10 ±.25<br>(.240±.010)  | 3.30±.25<br>(.130±.010) | .48±.05<br>(.019±.002) |
| MA40      | CK14         | CKR14       | CCR77/CC77 | 9.91±.25<br>(.390±.010)   | 3.56±.25<br>(.140±.010) | .63±.05<br>(.025±.002) |
| MA50      | CK15         | CKR15       | CCR78/CC78 | 12.7±.51<br>(.500±.020)   | 6.35±.38<br>(.250±.015) | .63±.05<br>(.025±.002) |
| MA60      | CK16         | CKR16       | CCR79/CC79 | 17.53±.51<br>(.690±.020)  | 8.89±.51<br>(.350±.015) | .63±.05<br>(.025±.002) |

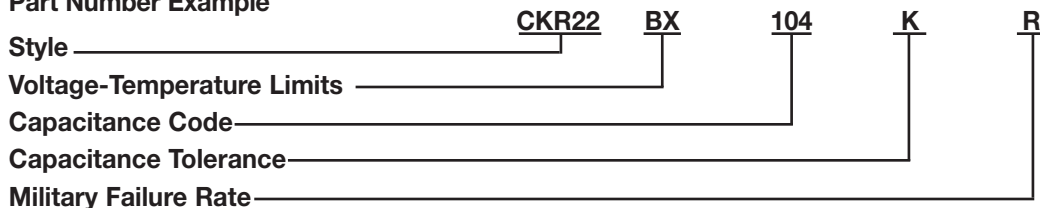
Dimensions: Millimeters (Inches)

## HOW TO ORDER

**Military Type Designation: Styles CKR22, CKR23, CKR24**

**Dash Number Option: MIL-C-39014/22 (Add Appropriate Dash Number)**

**Part Number Example**



## MIL Part No. Codes

**Style: CK** = General purpose, ceramic dielectric, fixed capacitors.

**R** = Established Reliability parts.

**22** = Remaining two numbers identify shape and dimension.

## Voltage-Temperature Limits:

First letter identifies temperature range.

B = -55°C to +125°C

C = -55°C to +150°C

Second letter identifies voltage-temperature coefficient.

| Capacitance Change with Reference to 25°C |             |               |
|-------------------------------------------|-------------|---------------|
| Second Letter                             | No Voltage  | Rated Voltage |
| G                                         | +30, -30ppm | +30, -30ppm   |
| H                                         | +60, -60ppm | +60, -60ppm   |
| R                                         | +15, -15%   | +15, -40%     |
| X                                         | +15, -15%   | +15, -25%     |

## Sig. Fig. Capacitance and Multiplier:

First two digits are the significant figures of capacitance.

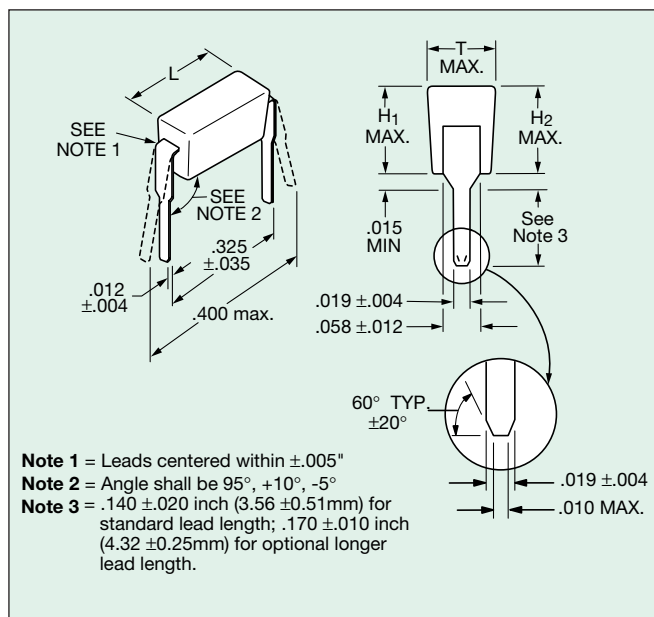
Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10 pF, use "R" in place of decimal point, e.g., 1R5 = 1.5 pF).

**Capacitance Tolerances:** D =  $\pm 5\text{pF}$ , F =  $\pm 1\%$ , J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

**Military Failure Rate:** M = 1% per 1000 hours  
P = 0.1% per 1000 hours  
R = 0.01% per 1000 hours  
S = 0.001% per 1000 hours

Note: AVX reserves the right to substitute a lower failure rate part per MIL-C-39014. Substitutability for failure rate levels shall be as follows:

| Failure Rate Level | Will Replace Failure Rate Level |
|--------------------|---------------------------------|
| S (STD) (X-ray)    | R, P, M, L                      |
| R (STD) (No X-ray) | P, M, L                         |
| P                  | M, L                            |
| M                  | L                               |



## PACKAGING REQUIREMENTS

**Packaging:** 200 pcs/slide pack. See page 26.

## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| MIL-C-39014 | Length (L)                | Height (H <sub>1</sub> )  | Height (H <sub>2</sub> ) | Thickness                 |
|-------------|---------------------------|---------------------------|--------------------------|---------------------------|
| CKR22       | 6.60<br>(.260 $\pm$ .020) | 3.25<br>(.128 $\pm$ .007) | 4.45 max.<br>(.175)      | 2.34<br>(.092 $\pm$ .006) |
| CKR23       | 6.60<br>(.260 $\pm$ .020) | 3.94<br>(.155 $\pm$ .007) | 4.45 max.<br>(.175)      | 2.34<br>(.092 $\pm$ .006) |
| CKR24       | 6.60<br>(.260 $\pm$ .020) | 7.19<br>(.283 $\pm$ .007) | 8.13 max.<br>(.320)      | 2.34<br>(.092 $\pm$ .006) |

## MILITARY DASH NUMBER IDENTIFICATION CKR22 to MIL-C-39014/22 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours)                        |         |          |           |                             |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance | WVDC |
|---------------------------------|-----------------------------------------------------------|---------|----------|-----------|-----------------------------|---------|----------|-----------|---------------------|--------------------------|------|
|                                 | Standard Lead Length                                      |         |          |           | Optional Longer Lead Length |         |          |           |                     |                          |      |
|                                 | 1.0 (M)                                                   | 0.1 (P) | 0.01 (R) | 0.001 (S) | 1.0 (M)                     | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                          |      |
|                                 | Style CKR22, Voltage-temperature limits of 0 ± 60 ppm/°C. |         |          |           |                             |         |          |           |                     |                          |      |
| CKR22CH1R0D_                    | 0001                                                      | 0301    | 0601     | 0901      | 3001                        | 3301    | 3601     | 3901      | 1.0                 | D                        | 200  |
| CKR22CH1R2D_                    | 0004                                                      | 0304    | 0604     | 0904      | 3004                        | 3304    | 3604     | 3904      | 1.2                 | D                        |      |
| CKR22CH1R5D_                    | 0007                                                      | 0307    | 0607     | 0907      | 3007                        | 3307    | 3607     | 3907      | 1.5                 | D                        |      |
| CKR22CH1R8D_                    | 0010                                                      | 0310    | 0610     | 0910      | 3010                        | 3310    | 3610     | 3910      | 1.8                 | D                        |      |
| CKR22CH2R2D_                    | 0013                                                      | 0313    | 0613     | 0913      | 3013                        | 3313    | 3613     | 3913      | 2.2                 | D                        |      |
| CKR22CH2R7D_                    | 0016                                                      | 0316    | 0616     | 0916      | 3016                        | 3316    | 3616     | 3916      | 2.7                 | D                        |      |
| CKR22CH3R3D_                    | 0019                                                      | 0319    | 0619     | 0919      | 3019                        | 3319    | 3619     | 3919      | 3.3                 | D                        |      |
| CKR22CH3R9D_                    | 0022                                                      | 0322    | 0622     | 0922      | 3022                        | 3322    | 3622     | 3922      | 3.9                 | D                        |      |
| CKR22CH4R7D_                    | 0025                                                      | 0325    | 0625     | 0925      | 3025                        | 3325    | 3625     | 3925      | 4.7                 | D                        |      |
| CKR22CH5R6D_                    | 0028                                                      | 0328    | 0628     | 0928      | 3028                        | 3328    | 3628     | 3928      | 5.6                 | D                        |      |
| CKR22CH6R8D_                    | 0031                                                      | 0331    | 0631     | 0931      | 3031                        | 3331    | 3631     | 3931      | 6.8                 | D                        |      |
| CKR22CH8R2D_                    | 0034                                                      | 0334    | 0634     | 0934      | 3034                        | 3334    | 3634     | 3934      | 8.2                 | D                        |      |
| CKR22CH100D_                    | 0037                                                      | 0337    | 0637     | 0937      | 3037                        | 3337    | 3637     | 3937      | 10                  | D                        |      |
| CKR22CH100J_                    | 0038                                                      | 0338    | 0638     | 0938      | 3038                        | 3338    | 3638     | 3938      | 10                  | J                        |      |
| CKR22CH100K_                    | 0039                                                      | 0339    | 0639     | 0939      | 3039                        | 3339    | 3639     | 3939      | 10                  | K                        |      |
| CKR22CH120D_                    | 0040                                                      | 0340    | 0640     | 0940      | 3040                        | 3340    | 3640     | 3940      | 12                  | D                        |      |
| CKR22CH120J_                    | 0041                                                      | 0341    | 0641     | 0941      | 3041                        | 3341    | 3641     | 3941      | 12                  | J                        |      |
| CKR22CH120K_                    | 0042                                                      | 0342    | 0642     | 0942      | 3042                        | 3342    | 3642     | 3942      | 12                  | K                        |      |
| CKR22CH150D_                    | 0043                                                      | 0343    | 0643     | 0943      | 3043                        | 3343    | 3643     | 3943      | 15                  | D                        |      |
| CKR22CH150J_                    | 0044                                                      | 0344    | 0644     | 0944      | 3044                        | 3344    | 3644     | 3944      | 15                  | J                        |      |
| CKR22CH150K_                    | 0045                                                      | 0345    | 0645     | 0945      | 3045                        | 3345    | 3645     | 3945      | 15                  | K                        |      |
| CKR22CH180D_                    | 0046                                                      | 0346    | 0646     | 0946      | 3046                        | 3346    | 3646     | 3946      | 18                  | D                        |      |
| CKR22CH180J_                    | 0047                                                      | 0347    | 0647     | 0947      | 3047                        | 3347    | 3647     | 3947      | 18                  | J                        |      |
| CKR22CH180K_                    | 0048                                                      | 0348    | 0648     | 0948      | 3048                        | 3348    | 3648     | 3948      | 18                  | K                        |      |
|                                 | Style CKR22, Voltage-temperature limits of ±30 ppm/°C.    |         |          |           |                             |         |          |           |                     |                          |      |
| CKR22CG220D_                    | 0049                                                      | 0349    | 0649     | 0949      | 3049                        | 3349    | 3649     | 3949      | 22                  | D                        | 200  |
| CKR22CG220J_                    | 0050                                                      | 0350    | 0650     | 0950      | 3050                        | 3350    | 3650     | 3950      | 22                  | J                        |      |
| CKR22CG220K_                    | 0051                                                      | 0351    | 0651     | 0951      | 3051                        | 3351    | 3651     | 3951      | 22                  | K                        |      |
| CKR22CG270D_                    | 0052                                                      | 0352    | 0652     | 0952      | 3052                        | 3352    | 3652     | 3952      | 27                  | D                        |      |
| CKR22CG270J_                    | 0053                                                      | 0353    | 0653     | 0953      | 3053                        | 3353    | 3653     | 3953      | 27                  | J                        |      |
| CKR22CG270K_                    | 0054                                                      | 0354    | 0654     | 0954      | 3054                        | 3354    | 3654     | 3954      | 27                  | K                        |      |
| CKR22CG330D_                    | 0055                                                      | 0355    | 0655     | 0955      | 3055                        | 3355    | 3655     | 3955      | 33                  | D                        |      |
| CKR22CG330J_                    | 0056                                                      | 0356    | 0656     | 0956      | 3056                        | 3356    | 3656     | 3956      | 33                  | J                        |      |
| CKR22CG330K_                    | 0057                                                      | 0357    | 0657     | 0957      | 3057                        | 3357    | 3657     | 3957      | 33                  | K                        |      |
| CKR22CG390D_                    | 0058                                                      | 0358    | 0658     | 0958      | 3058                        | 3358    | 3658     | 3958      | 39                  | D                        |      |
| CKR22CG390J_                    | 0059                                                      | 0359    | 0659     | 0959      | 3059                        | 3359    | 3659     | 3959      | 39                  | J                        |      |
| CKR22CG390K_                    | 0060                                                      | 0360    | 0660     | 0960      | 3060                        | 3360    | 3660     | 3960      | 39                  | K                        |      |
| CKR22CG470D_                    | 0061                                                      | 0361    | 0661     | 0961      | 3061                        | 3361    | 3661     | 3961      | 47                  | D                        |      |
| CKR22CG470J_                    | 0062                                                      | 0362    | 0662     | 0962      | 3062                        | 3362    | 3662     | 3962      | 47                  | J                        |      |
| CKR22CG470K_                    | 0063                                                      | 0363    | 0663     | 0963      | 3063                        | 3363    | 3663     | 3963      | 47                  | K                        |      |
| CKR22CG560D_                    | 0064                                                      | 0364    | 0664     | 0964      | 3064                        | 3364    | 3664     | 3964      | 56                  | D                        |      |
| CKR22CG560J_                    | 0065                                                      | 0365    | 0665     | 0965      | 3065                        | 3365    | 3665     | 3965      | 56                  | J                        |      |
| CKR22CG560K_                    | 0066                                                      | 0366    | 0666     | 0966      | 3066                        | 3366    | 3666     | 3966      | 56                  | K                        |      |
| CKR22CG680F_                    | 0067                                                      | 0367    | 0667     | 0967      | 3067                        | 3367    | 3667     | 3967      | 68                  | F                        |      |
| CKR22CG680J_                    | 0068                                                      | 0368    | 0668     | 0968      | 3068                        | 3368    | 3668     | 3968      | 68                  | J                        |      |
| CKR22CG680K_                    | 0069                                                      | 0369    | 0669     | 0969      | 3069                        | 3369    | 3669     | 3969      | 68                  | K                        |      |
| CKR22CG820F_                    | 0070                                                      | 0370    | 0670     | 0970      | 3070                        | 3370    | 3670     | 3970      | 82                  | F                        |      |
| CKR22CG820J_                    | 0071                                                      | 0371    | 0671     | 0971      | 3071                        | 3371    | 3671     | 3971      | 82                  | J                        |      |
| CKR22CG820K_                    | 0072                                                      | 0372    | 0672     | 0972      | 3072                        | 3372    | 3672     | 3972      | 82                  | K                        |      |
| CKR22CG101F_                    | 0073                                                      | 0373    | 0673     | 0973      | 3073                        | 3373    | 3673     | 3973      | 100                 | F                        |      |
| CKR22CG101J_                    | 0074                                                      | 0374    | 0674     | 0974      | 3074                        | 3374    | 3674     | 3974      | 100                 | J                        |      |
| CKR22CG101K_                    | 0075                                                      | 0375    | 0675     | 0975      | 3075                        | 3375    | 3675     | 3975      | 100                 | K                        |      |
| CKR22CG121F_                    | 0076                                                      | 0376    | 0676     | 0976      | 3076                        | 3376    | 3676     | 3976      | 120                 | F                        |      |
| CKR22CG121J_                    | 0077                                                      | 0377    | 0677     | 0977      | 3077                        | 3377    | 3677     | 3977      | 120                 | J                        |      |
| CKR22CG121K_                    | 0078                                                      | 0378    | 0678     | 0978      | 3078                        | 3378    | 3678     | 3978      | 120                 | K                        |      |
| CKR22CG151F_                    | 0079                                                      | 0379    | 0679     | 0979      | 3079                        | 3379    | 3679     | 3979      | 150                 | F                        |      |
| CKR22CG151J_                    | 0080                                                      | 0380    | 0680     | 0980      | 3080                        | 3380    | 3680     | 3980      | 150                 | J                        |      |
| CKR22CG151K_                    | 0081                                                      | 0381    | 0681     | 0981      | 3081                        | 3381    | 3681     | 3981      | 150                 | K                        |      |
| CKR22CG181F_                    | 0082                                                      | 0382    | 0682     | 0982      | 3082                        | 3382    | 3682     | 3982      | 180                 | F                        |      |
| CKR22CG181J_                    | 0083                                                      | 0383    | 0683     | 0983      | 3083                        | 3383    | 3683     | 3983      | 180                 | J                        |      |
| CKR22CG181K_                    | 0084                                                      | 0384    | 0684     | 0984      | 3084                        | 3384    | 3684     | 3984      | 180                 | K                        |      |
| CKR22CG221F_                    | 0085                                                      | 0385    | 0685     | 0985      | 3085                        | 3385    | 3685     | 3985      | 220                 | F                        |      |
| CKR22CG221J_                    | 0086                                                      | 0386    | 0686     | 0986      | 3086                        | 3386    | 3686     | 3986      | 220                 | J                        |      |
| CKR22CG221K_                    | 0087                                                      | 0387    | 0687     | 0987      | 3087                        | 3387    | 3687     | 3987      | 220                 | K                        |      |
| CKR22CG271F_                    | 0088                                                      | 0388    | 0688     | 0988      | 3088                        | 3388    | 3688     | 3988      | 270                 | F                        |      |
| CKR22CG271J_                    | 0089                                                      | 0389    | 0689     | 0989      | 3089                        | 3389    | 3689     | 3989      | 270                 | J                        |      |

— Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/2Pin DIP



## MILITARY DASH NUMBER IDENTIFICATION CKR22 to MIL-C-39014/22

(Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours)                                 |         |          |           |                             |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance | WVDC |     |
|---------------------------------|--------------------------------------------------------------------|---------|----------|-----------|-----------------------------|---------|----------|-----------|---------------------|--------------------------|------|-----|
|                                 | Standard Lead Length                                               |         |          |           | Optional Longer Lead Length |         |          |           |                     |                          |      |     |
|                                 | 1.0 (M)                                                            | 0.1 (P) | 0.01 (R) | 0.001 (S) | 1.0 (M)                     | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                          |      |     |
|                                 | Style CKR22, Voltage-temperature limits of ±30 ppm/°C, (continued) |         |          |           |                             |         |          |           |                     |                          |      |     |
| CKR22CG271K                     | 0090                                                               | 0390    | 0690     | 0990      | 3090                        | 3390    | 3690     | 3990      | 270                 | K                        | 200  |     |
| CKR22CG331F                     | 0091                                                               | 0391    | 0691     | 0991      | 3091                        | 3391    | 3691     | 3991      | 330                 | F                        |      |     |
| CKR22CG331J                     | 0092                                                               | 0392    | 0692     | 0992      | 3092                        | 3392    | 3692     | 3992      | 330                 | J                        |      |     |
| CKR22CG331K                     | 0093                                                               | 0393    | 0693     | 0993      | 3093                        | 3393    | 3693     | 3993      | 330                 | K                        |      |     |
| CKR22CG391F                     | 0094                                                               | 0394    | 0694     | 0994      | 3094                        | 3394    | 3694     | 3994      | 390                 | F                        | 200  |     |
| CKR22CG391J                     | 0095                                                               | 0395    | 0695     | 0995      | 3095                        | 3395    | 3695     | 3995      | 390                 | J                        |      |     |
| CKR22CG391K                     | 0096                                                               | 0396    | 0696     | 0996      | 3096                        | 3396    | 3696     | 3996      | 390                 | K                        |      |     |
| CKR22CG471F                     | 0097                                                               | 0397    | 0697     | 0997      | 3097                        | 3397    | 3697     | 3997      | 470                 | F                        |      |     |
| CKR22CG471J                     | 0098                                                               | 0398    | 0698     | 0998      | 3098                        | 3398    | 3698     | 3998      | 470                 | J                        | 200  |     |
| CKR22CG471K                     | 0099                                                               | 0399    | 0699     | 0999      | 3099                        | 3399    | 3699     | 3999      | 470                 | K                        |      |     |
| CKR22CG561F                     | 0100                                                               | 0400    | 0700     | 1000      | 3100                        | 3400    | 3700     | 4000      | 560                 | F                        |      | 100 |
| CKR22CG561J                     | 0101                                                               | 0401    | 0701     | 1001      | 3101                        | 3401    | 3701     | 4001      | 560                 | J                        |      |     |
| CKR22CG561K                     | 0102                                                               | 0402    | 0702     | 1002      | 3102                        | 3402    | 3702     | 4002      | 560                 | K                        |      |     |
| CKR22CG681F                     | 0103                                                               | 0403    | 0703     | 1003      | 3103                        | 3403    | 3703     | 4003      | 680                 | F                        |      |     |
| CKR22CG681J                     | 0104                                                               | 0404    | 0704     | 1004      | 3104                        | 3404    | 3704     | 4004      | 680                 | J                        | 100  |     |
| CKR22CG681K                     | 0105                                                               | 0405    | 0705     | 1005      | 3105                        | 3405    | 3705     | 4005      | 680                 | K                        |      |     |
| CKR22CG821F                     | 0106                                                               | 0406    | 0706     | 1006      | 3106                        | 3406    | 3706     | 4006      | 820                 | F                        |      |     |
| CKR22CG821J                     | 0107                                                               | 0407    | 0707     | 1007      | 3107                        | 3407    | 3707     | 4007      | 820                 | J                        |      |     |
| CKR22CG821K                     | 0108                                                               | 0408    | 0708     | 1008      | 3108                        | 3408    | 3708     | 4008      | 820                 | K                        | 100  |     |
| CKR22CG102F                     | 0109                                                               | 0409    | 0709     | 1009      | 3109                        | 3409    | 3709     | 4009      | 1000                | F                        |      |     |
| CKR22CG102J                     | 0110                                                               | 0410    | 0710     | 1010      | 3110                        | 3410    | 3710     | 4010      | 1000                | J                        |      |     |
| CKR22CG102K                     | 0111                                                               | 0411    | 0711     | 1011      | 3111                        | 3411    | 3711     | 4011      | 1000                | K                        |      |     |
| CKR22CG122F                     | 0112                                                               | 0412    | 0712     | 1012      | 3112                        | 3412    | 3712     | 4012      | 1200                | F                        | 100  |     |
| CKR22CG122J                     | 0113                                                               | 0413    | 0713     | 1013      | 3113                        | 3413    | 3713     | 4013      | 1200                | J                        |      |     |
| CKR22CG122K                     | 0114                                                               | 0414    | 0714     | 1014      | 3114                        | 3414    | 3714     | 4014      | 1200                | K                        |      |     |
| CKR22CG152F                     | 0115                                                               | 0415    | 0715     | 1015      | 3115                        | 3415    | 3715     | 4015      | 1500                | F                        |      |     |
| CKR22CG152J                     | 0116                                                               | 0416    | 0716     | 1016      | 3116                        | 3416    | 3716     | 4016      | 1500                | J                        | 50   |     |
| CKR22CG152K                     | 0117                                                               | 0417    | 0717     | 1017      | 3117                        | 3417    | 3717     | 4017      | 1500                | K                        |      |     |
| CKR22CG182F                     | 0118                                                               | 0418    | 0718     | 1018      | 3118                        | 3418    | 3718     | 4018      | 1800                | F                        |      |     |
| CKR22CG182J                     | 0119                                                               | 0419    | 0719     | 1019      | 3119                        | 3419    | 3719     | 4019      | 1800                | J                        |      |     |
| CKR22CG182K                     | 0120                                                               | 0420    | 0720     | 1020      | 3120                        | 3420    | 3720     | 4020      | 1800                | K                        | 50   |     |
| CKR22CG222F                     | 0121                                                               | 0421    | 0721     | 1021      | 3121                        | 3421    | 3721     | 4021      | 2200                | F                        |      |     |
| CKR22CG222J                     | 0122                                                               | 0422    | 0722     | 1022      | 3122                        | 3422    | 3722     | 4022      | 2200                | J                        |      |     |
| CKR22CG222K                     | 0123                                                               | 0423    | 0723     | 1023      | 3123                        | 3423    | 3723     | 4023      | 2200                | K                        |      |     |
| CKR22CG272F                     | 0124                                                               | 0424    | 0724     | 1024      | 3124                        | 3424    | 3724     | 4024      | 2700                | F                        | 50   |     |
| CKR22CG272J                     | 0125                                                               | 0425    | 0725     | 1025      | 3125                        | 3425    | 3725     | 4025      | 2700                | J                        |      |     |
| CKR22CG272K                     | 0126                                                               | 0426    | 0726     | 1026      | 3126                        | 3426    | 3726     | 4026      | 2700                | K                        |      |     |
| CKR22CG332F                     | 0127                                                               | 0427    | 0727     | 1027      | 3127                        | 3427    | 3727     | 4027      | 3300                | F                        |      |     |
| CKR22CG332J                     | 0128                                                               | 0428    | 0728     | 1028      | 3128                        | 3428    | 3728     | 4028      | 3300                | J                        | 50   |     |
| CKR22CG332K                     | 0129                                                               | 0429    | 0729     | 1029      | 3129                        | 3429    | 3729     | 4029      | 3300                | K                        |      |     |
| CKR22CG392F                     | 0130                                                               | 0430    | 0730     | 1030      | 3130                        | 3430    | 3730     | 4030      | 3900                | F                        |      |     |
| CKR22CG392J                     | 0131                                                               | 0431    | 0731     | 1031      | 3131                        | 3431    | 3731     | 4031      | 3900                | J                        |      |     |
| CKR22CG392K                     | 0132                                                               | 0432    | 0732     | 1032      | 3132                        | 3432    | 3732     | 4032      | 3900                | K                        | 50   |     |
| CKR22CG472F                     | 0133                                                               | 0433    | 0733     | 1033      | 3133                        | 3433    | 3733     | 4033      | 4700                | F                        |      |     |
| CKR22CG472J                     | 0134                                                               | 0434    | 0734     | 1034      | 3134                        | 3434    | 3734     | 4034      | 4700                | J                        |      |     |
| CKR22CG472K                     | 0135                                                               | 0435    | 0735     | 1035      | 3135                        | 3435    | 3735     | 4035      | 4700                | K                        |      |     |
| CKR22CG562F                     | 0136                                                               | 0436    | 0736     | 1036      | 3136                        | 3436    | 3736     | 4036      | 5600                | F                        | 50   |     |
| CKR22CG562J                     | 0137                                                               | 0437    | 0737     | 1037      | 3137                        | 3437    | 3737     | 4037      | 5600                | J                        |      |     |
| CKR22CG562K                     | 0138                                                               | 0438    | 0738     | 1038      | 3138                        | 3438    | 3738     | 4038      | 5600                | K                        |      |     |
| CKR22CG682F                     | 0139                                                               | 0439    | 0739     | 1039      | 3139                        | 3439    | 3739     | 4039      | 6800                | F                        |      |     |
| CKR22CG682J                     | 0140                                                               | 0440    | 0740     | 1040      | 3140                        | 3440    | 3740     | 4040      | 6800                | J                        | 50   |     |
| CKR22CG682K                     | 0141                                                               | 0441    | 0741     | 1041      | 3141                        | 3441    | 3741     | 4041      | 6800                | K                        |      |     |
| CKR22CG822F                     | 0142                                                               | 0442    | 0742     | 1042      | 3142                        | 3442    | 3742     | 4042      | 8200                | F                        |      |     |
| CKR22CG822J                     | 0143                                                               | 0443    | 0743     | 1043      | 3143                        | 3443    | 3743     | 4043      | 8200                | J                        |      |     |
| CKR22CG822K                     | 0144                                                               | 0444    | 0744     | 1044      | 3144                        | 3444    | 3744     | 4044      | 8200                | K                        | 50   |     |
| CKR22CG103F                     | 0145                                                               | 0445    | 0745     | 1045      | 3145                        | 3445    | 3745     | 4045      | 10,000              | F                        |      |     |
| CKR22CG103J                     | 0146                                                               | 0446    | 0746     | 1046      | 3146                        | 3446    | 3746     | 4046      | 10,000              | J                        |      |     |
| CKR22CG103K                     | 0147                                                               | 0447    | 0747     | 1047      | 3147                        | 3447    | 3747     | 4047      | 10,000              | K                        |      |     |

— Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/2Pin DIP



## MILITARY DASH NUMBER IDENTIFICATION CKR22 to MIL-C-39014/22

(Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours)                                             |         |          |           |                             |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance | WVDC |
|---------------------------------|--------------------------------------------------------------------------------|---------|----------|-----------|-----------------------------|---------|----------|-----------|---------------------|--------------------------|------|
|                                 | Standard Lead Length                                                           |         |          |           | Optional Longer Lead Length |         |          |           |                     |                          |      |
|                                 | 1.0 (M)                                                                        | 0.1 (P) | 0.01 (R) | 0.001 (S) | 1.0 (M)                     | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                          |      |
|                                 | Style CKR22, Voltage-temperature limits of ±15% (+15%, -25% for Rated Voltage) |         |          |           |                             |         |          |           |                     |                          |      |
| CKR22BX271K                     | 0148                                                                           | 0448    | 0748     | 1048      | 3148                        | 3448    | 3748     | 4048      | 270                 | K                        | 200  |
| CKR22BX331K                     | 0149                                                                           | 0449    | 0749     | 1049      | 3149                        | 3449    | 3749     | 4049      | 330                 | K                        |      |
| CKR22BX331M                     | 0150                                                                           | 0450    | 0750     | 1050      | 3150                        | 3450    | 3750     | 4050      | 330                 | M                        |      |
| CKR22BX391K                     | 0151                                                                           | 0451    | 0751     | 1051      | 3151                        | 3451    | 3751     | 4051      | 390                 | K                        |      |
| CKR22BX471K                     | 0152                                                                           | 0452    | 0752     | 1052      | 3152                        | 3452    | 3752     | 4052      | 470                 | K                        |      |
| CKR22BX471M                     | 0153                                                                           | 0453    | 0753     | 1053      | 3153                        | 3453    | 3753     | 4053      | 470                 | M                        | 200  |
| CKR22BX561K                     | 0154                                                                           | 0454    | 0754     | 1054      | 3154                        | 3454    | 3754     | 4054      | 560                 | K                        |      |
| CKR22BX681K                     | 0155                                                                           | 0455    | 0755     | 1055      | 3155                        | 3455    | 3755     | 4055      | 680                 | K                        |      |
| CKR22BX681M                     | 0156                                                                           | 0456    | 0756     | 1056      | 3156                        | 3456    | 3756     | 4056      | 680                 | M                        |      |
| CKR22BX821K                     | 0157                                                                           | 0457    | 0757     | 1057      | 3157                        | 3457    | 3757     | 4057      | 820                 | K                        |      |
| CKR22BX102K                     | 0158                                                                           | 0458    | 0758     | 1058      | 3158                        | 3458    | 3758     | 4058      | 1,000               | K                        | 100  |
| CKR22BX102M                     | 0159                                                                           | 0459    | 0759     | 1059      | 3159                        | 3459    | 3759     | 4059      | 1,000               | M                        |      |
| CKR22BX122K                     | 0160                                                                           | 0460    | 0760     | 1060      | 3160                        | 3460    | 3760     | 4060      | 1,200               | K                        |      |
| CKR22BX152K                     | 0161                                                                           | 0461    | 0761     | 1061      | 3161                        | 3461    | 3761     | 4061      | 1,500               | K                        |      |
| CKR22BX152M                     | 0162                                                                           | 0462    | 0762     | 1062      | 3162                        | 3462    | 3762     | 4062      | 1,500               | M                        |      |
| CKR22BX182K                     | 0163                                                                           | 0463    | 0763     | 1063      | 3163                        | 3463    | 3763     | 4063      | 1,800               | K                        | 100  |
| CKR22BX222K                     | 0164                                                                           | 0464    | 0764     | 1064      | 3164                        | 3464    | 3764     | 4064      | 2,200               | K                        |      |
| CKR22BX222M                     | 0165                                                                           | 0465    | 0765     | 1065      | 3165                        | 3465    | 3765     | 4065      | 2,200               | M                        |      |
| CKR22BX272K                     | 0166                                                                           | 0466    | 0766     | 1066      | 3166                        | 3466    | 3766     | 4066      | 2,700               | K                        |      |
| CKR22BX332K                     | 0167                                                                           | 0467    | 0767     | 1067      | 3167                        | 3467    | 3767     | 4067      | 3,300               | K                        |      |
| CKR22BX332M                     | 0168                                                                           | 0468    | 0768     | 1068      | 3168                        | 3468    | 3768     | 4068      | 3,300               | M                        | 100  |
| CKR22BX392K                     | 0169                                                                           | 0469    | 0769     | 1069      | 3169                        | 3469    | 3769     | 4069      | 3,900               | K                        |      |
| CKR22BX472K                     | 0170                                                                           | 0470    | 0770     | 1070      | 3170                        | 3470    | 3770     | 4070      | 4,700               | K                        |      |
| CKR22BX472M                     | 0171                                                                           | 0471    | 0771     | 1071      | 3171                        | 3471    | 3771     | 4071      | 4,700               | M                        |      |
| CKR22BX562K                     | 0172                                                                           | 0472    | 0772     | 1072      | 3172                        | 3472    | 3772     | 4072      | 5,600               | K                        |      |
| CKR22BX682K                     | 0173                                                                           | 0473    | 0773     | 1073      | 3173                        | 3473    | 3773     | 4073      | 6,800               | K                        | 100  |
| CKR22BX682M                     | 0174                                                                           | 0474    | 0774     | 1074      | 3174                        | 3474    | 3774     | 4074      | 6,800               | M                        |      |
| CKR22BX822K                     | 0175                                                                           | 0475    | 0775     | 1075      | 3175                        | 3475    | 3775     | 4075      | 8,200               | K                        |      |
| CKR22BX103K                     | 0176                                                                           | 0476    | 0776     | 1076      | 3176                        | 3476    | 3776     | 4076      | 10,000              | K                        |      |
| CKR22BX103M                     | 0177                                                                           | 0477    | 0777     | 1077      | 3177                        | 3477    | 3777     | 4077      | 10,000              | M                        |      |
| CKR22BX123K                     | 0178                                                                           | 0478    | 0778     | 1078      | 3178                        | 3478    | 3778     | 4078      | 12,000              | K                        | 50   |
| CKR22BX153K                     | 0179                                                                           | 0479    | 0779     | 1079      | 3179                        | 3479    | 3779     | 4079      | 15,000              | K                        |      |
| CKR22BX153M                     | 0180                                                                           | 0480    | 0780     | 1080      | 3180                        | 3480    | 3780     | 4080      | 15,000              | M                        |      |
| CKR22BX183K                     | 0181                                                                           | 0481    | 0781     | 1081      | 3181                        | 3481    | 3781     | 4081      | 18,000              | K                        |      |
| CKR22BX223K                     | 0182                                                                           | 0482    | 0782     | 1082      | 3182                        | 3482    | 3782     | 4082      | 22,000              | K                        |      |
| CKR22BX223M                     | 0183                                                                           | 0483    | 0783     | 1083      | 3183                        | 3483    | 3783     | 4083      | 22,000              | M                        | 50   |
| CKR22BX273K                     | 0184                                                                           | 0484    | 0784     | 1084      | 3184                        | 3484    | 3784     | 4084      | 27,000              | K                        |      |
| CKR22BX333K                     | 0185                                                                           | 0485    | 0785     | 1085      | 3185                        | 3485    | 3785     | 4085      | 33,000              | K                        |      |
| CKR22BX333M                     | 0186                                                                           | 0486    | 0786     | 1086      | 3186                        | 3486    | 3786     | 4086      | 33,000              | M                        |      |
| CKR22BX393K                     | 0187                                                                           | 0487    | 0787     | 1087      | 3187                        | 3487    | 3787     | 4087      | 39,000              | K                        |      |
| CKR22BX473K                     | 0188                                                                           | 0488    | 0788     | 1088      | 3188                        | 3488    | 3788     | 4088      | 47,000              | K                        | 50   |
| CKR22BX473M                     | 0189                                                                           | 0489    | 0789     | 1089      | 3189                        | 3489    | 3789     | 4089      | 47,000              | M                        |      |
| CKR22BX563K                     | 0190                                                                           | 0490    | 0790     | 1090      | 3190                        | 3490    | 3790     | 4090      | 56,000              | K                        |      |
| CKR22BX683K                     | 0191                                                                           | 0491    | 0791     | 1091      | 3191                        | 3491    | 3791     | 4091      | 68,000              | K                        |      |
| CKR22BX683M                     | 0192                                                                           | 0492    | 0792     | 1092      | 3192                        | 3492    | 3792     | 4092      | 68,000              | M                        |      |
| CKR22BX823K                     | 0193                                                                           | 0493    | 0793     | 1093      | 3193                        | 3493    | 3793     | 4093      | 82,000              | K                        | 50   |
| CKR22BX104K                     | 0194                                                                           | 0494    | 0794     | 1094      | 3194                        | 3494    | 3794     | 4094      | 100,000             | K                        |      |
| CKR22BX104M                     | 0195                                                                           | 0495    | 0795     | 1095      | 3195                        | 3495    | 3795     | 4095      | 100,000             | M                        |      |

— Add appropriate failure rate level letter (M, P, R or S)

# MIL-C-39014/2Pin DIP



## MILITARY DASH NUMBER IDENTIFICATION CKR23 to MIL-C-39014/22 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours)                                             |         |          |           |                             |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance | WVDC |
|---------------------------------|--------------------------------------------------------------------------------|---------|----------|-----------|-----------------------------|---------|----------|-----------|---------------------|--------------------------|------|
|                                 | Standard Lead Length                                                           |         |          |           | Optional Longer Lead Length |         |          |           |                     |                          |      |
|                                 | 1.0 (M)                                                                        | 0.1 (P) | 0.01 (R) | 0.001 (S) | 1.0 (M)                     | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                          |      |
|                                 | Style CKR23, Voltage-temperature limits of 0 ± 60 ppm/°C                       |         |          |           |                             |         |          |           |                     |                          |      |
| CKR23CG561F                     | 0258                                                                           | 0558    | 0858     | 1158      | 3258                        | 3558    | 3858     | 4158      | 560                 | F                        | 200  |
| CKR23CG561J                     | 0259                                                                           | 0559    | 0859     | 1159      | 3259                        | 3559    | 3859     | 4159      | 560                 | J                        |      |
| CKR23CG561K                     | 0260                                                                           | 0560    | 0860     | 1160      | 3260                        | 3560    | 3860     | 4160      | 560                 | K                        |      |
| CKR23CG681F                     | 0261                                                                           | 0561    | 0861     | 1161      | 3261                        | 3561    | 3861     | 4161      | 680                 | F                        |      |
| CKR23CG681J                     | 0262                                                                           | 0562    | 0862     | 1162      | 3262                        | 3562    | 3862     | 4162      | 680                 | J                        | 200  |
| CKR23CG681K                     | 0263                                                                           | 0563    | 0863     | 1163      | 3263                        | 3563    | 3863     | 4163      | 680                 | K                        |      |
| CKR23CG821F                     | 0264                                                                           | 0564    | 0864     | 1164      | 3264                        | 3564    | 3864     | 4164      | 820                 | F                        |      |
| CKR23CG821J                     | 0265                                                                           | 0565    | 0865     | 1165      | 3265                        | 3565    | 3865     | 4165      | 820                 | J                        |      |
| CKR23CG821K                     | 0266                                                                           | 0566    | 0866     | 1166      | 3266                        | 3566    | 3866     | 4166      | 820                 | K                        | 200  |
| CKR23CG102F                     | 0267                                                                           | 0567    | 0867     | 1167      | 3267                        | 3567    | 3867     | 4167      | 1,000               | F                        |      |
| CKR23CG102J                     | 0268                                                                           | 0568    | 0868     | 1168      | 3268                        | 3568    | 3868     | 4168      | 1,000               | J                        |      |
| CKR23CG102K                     | 0269                                                                           | 0569    | 0869     | 1169      | 3269                        | 3569    | 3869     | 4169      | 1,000               | K                        |      |
| CKR23CG122F                     | 0270                                                                           | 0570    | 0870     | 1170      | 3270                        | 3570    | 3870     | 4170      | 1,200               | F                        | 100  |
| CKR23CG122J                     | 0271                                                                           | 0571    | 0871     | 1171      | 3271                        | 3571    | 3871     | 4171      | 1,200               | J                        |      |
| CKR23CG122K                     | 0272                                                                           | 0572    | 0872     | 1172      | 3272                        | 3572    | 3872     | 4172      | 1,200               | K                        |      |
| CKR23CG272F                     | 0273                                                                           | 0573    | 0873     | 1173      | 3273                        | 3573    | 3873     | 4173      | 2,700               | F                        |      |
| CKR23CG272J                     | 0274                                                                           | 0574    | 0874     | 1174      | 3274                        | 3574    | 3874     | 4174      | 2,700               | J                        | 100  |
| CKR23CG272K                     | 0275                                                                           | 0575    | 0875     | 1175      | 3275                        | 3575    | 3875     | 4175      | 2,700               | K                        |      |
| CKR23CG332F                     | 0276                                                                           | 0576    | 0876     | 1176      | 3276                        | 3576    | 3876     | 4176      | 3,300               | F                        |      |
| CKR23CG332J                     | 0277                                                                           | 0577    | 0877     | 1177      | 3277                        | 3577    | 3877     | 4177      | 3,300               | J                        |      |
| CKR23CG332K                     | 0278                                                                           | 0578    | 0878     | 1178      | 3278                        | 3578    | 3878     | 4178      | 3,300               | K                        | 50   |
| CKR23CG472F                     | 0279                                                                           | 0579    | 0879     | 1179      | 3279                        | 3579    | 3879     | 4179      | 4,700               | F                        |      |
| CKR23CG472J                     | 0280                                                                           | 0580    | 0880     | 1180      | 3280                        | 3580    | 3880     | 4180      | 4,700               | J                        |      |
| CKR23CG472K                     | 0281                                                                           | 0581    | 0881     | 1181      | 3281                        | 3581    | 3881     | 4181      | 4,700               | K                        |      |
| CKR23CG562F                     | 0282                                                                           | 0582    | 0882     | 1182      | 3282                        | 3582    | 3882     | 4182      | 5,600               | F                        | 50   |
| CKR23CG562J                     | 0283                                                                           | 0583    | 0883     | 1183      | 3283                        | 3583    | 3883     | 4183      | 5,600               | J                        |      |
| CKR23CG562K                     | 0284                                                                           | 0584    | 0884     | 1184      | 3284                        | 3584    | 3884     | 4184      | 5,600               | K                        |      |
| CKR23CG682F                     | 0285                                                                           | 0585    | 0885     | 1185      | 3285                        | 3585    | 3885     | 4185      | 6,800               | F                        |      |
| CKR23CG682J                     | 0286                                                                           | 0586    | 0886     | 1186      | 3286                        | 3586    | 3886     | 4186      | 6,800               | J                        | 50   |
| CKR23CG682K                     | 0287                                                                           | 0587    | 0887     | 1187      | 3287                        | 3587    | 3887     | 4187      | 6,800               | K                        |      |
| CKR23CG822F                     | 0288                                                                           | 0588    | 0888     | 1188      | 3288                        | 3588    | 3888     | 4188      | 8,200               | F                        |      |
| CKR23CG822J                     | 0289                                                                           | 0589    | 0889     | 1189      | 3289                        | 3589    | 3889     | 4189      | 8,200               | J                        |      |
| CKR23CG822K                     | 0290                                                                           | 0590    | 0890     | 1190      | 3290                        | 3590    | 3890     | 4190      | 8,200               | K                        | 50   |
| CKR23CG103F                     | 0291                                                                           | 0591    | 0891     | 1191      | 3291                        | 3591    | 3891     | 4191      | 10,000              | F                        |      |
| CKR23CG103J                     | 0292                                                                           | 0592    | 0892     | 1192      | 3292                        | 3592    | 3892     | 4192      | 10,000              | J                        |      |
| CKR23CG103K                     | 0293                                                                           | 0593    | 0893     | 1193      | 3293                        | 3593    | 3893     | 4193      | 10,000              | K                        |      |
|                                 | Style CKR23, voltage-temperature limits of ±15% (+15%, -25% for Rated Voltage) |         |          |           |                             |         |          |           |                     |                          |      |
| CKR23BX102K                     | 0196                                                                           | 0496    | 0796     | 1096      | 3196                        | 3496    | 3796     | 4096      | 1,000               | K                        | 200  |
| CKR23BX102M                     | 0197                                                                           | 0497    | 0797     | 1097      | 3197                        | 3497    | 3797     | 4097      | 1,000               | M                        |      |
| CKR23BX122K                     | 0198                                                                           | 0498    | 0798     | 1098      | 3198                        | 3498    | 3798     | 4098      | 1,200               | K                        |      |
| CKR23BX152K                     | 0199                                                                           | 0499    | 0799     | 1099      | 3199                        | 3499    | 3799     | 4099      | 1,500               | K                        |      |
| CKR23BX152M                     | 0200                                                                           | 0500    | 0800     | 1100      | 3200                        | 3500    | 3800     | 4100      | 1,500               | M                        | 200  |
| CKR23BX182K                     | 0201                                                                           | 0501    | 0801     | 1101      | 3201                        | 3501    | 3801     | 4101      | 1,800               | K                        |      |
| CKR23BX222K                     | 0202                                                                           | 0502    | 0802     | 1102      | 3202                        | 3502    | 3802     | 4102      | 2,200               | K                        |      |
| CKR23BX222M                     | 0203                                                                           | 0503    | 0803     | 1103      | 3203                        | 3503    | 3803     | 4103      | 2,200               | M                        |      |
| CKR23BX272K                     | 0204                                                                           | 0504    | 0804     | 1104      | 3204                        | 3504    | 3804     | 4104      | 2,700               | K                        | 200  |
| CKR23BX332K                     | 0205                                                                           | 0505    | 0805     | 1105      | 3205                        | 3505    | 3805     | 4105      | 3,300               | K                        |      |
| CKR23BX332M                     | 0206                                                                           | 0506    | 0806     | 1106      | 3206                        | 3506    | 3806     | 4106      | 3,300               | M                        |      |
| CKR23BX392K                     | 0207                                                                           | 0507    | 0807     | 1107      | 3207                        | 3507    | 3807     | 4107      | 3,900               | K                        |      |
| CKR23BX472K                     | 0208                                                                           | 0508    | 0808     | 1108      | 3208                        | 3508    | 3808     | 4108      | 4,700               | K                        | 100  |
| CKR23BX472M                     | 0209                                                                           | 0509    | 0809     | 1109      | 3209                        | 3509    | 3809     | 4109      | 4,700               | M                        |      |
| CKR23BX562K                     | 0210                                                                           | 0510    | 0810     | 1110      | 3210                        | 3510    | 3810     | 4110      | 5,600               | K                        |      |
| CKR23BX682K                     | 0211                                                                           | 0511    | 0811     | 1111      | 3211                        | 3511    | 3811     | 4111      | 6,800               | K                        |      |
| CKR23BX682M                     | 0212                                                                           | 0512    | 0812     | 1112      | 3212                        | 3512    | 3812     | 4112      | 6,800               | M                        | 100  |
| CKR23BX822K                     | 0213                                                                           | 0513    | 0813     | 1113      | 3213                        | 3513    | 3813     | 4113      | 8,200               | K                        |      |
| CKR23BX103K                     | 0214                                                                           | 0514    | 0814     | 1114      | 3214                        | 3514    | 3814     | 4114      | 10,000              | K                        |      |
| CKR23BX103M                     | 0215                                                                           | 0515    | 0815     | 1115      | 3215                        | 3515    | 3815     | 4115      | 10,000              | M                        |      |
| CKR23BX123K                     | 0216                                                                           | 0516    | 0816     | 1116      | 3216                        | 3516    | 3816     | 4116      | 12,000              | K                        | 50   |
| CKR23BX153K                     | 0217                                                                           | 0517    | 0817     | 1117      | 3217                        | 3517    | 3817     | 4117      | 15,000              | K                        |      |
| CKR23BX153M                     | 0218                                                                           | 0518    | 0818     | 1118      | 3218                        | 3518    | 3818     | 4118      | 15,000              | M                        |      |
| CKR23BX183K                     | 0219                                                                           | 0519    | 0819     | 1119      | 3219                        | 3519    | 3819     | 4119      | 18,000              | K                        |      |
| CKR23BX223K                     | 0220                                                                           | 0520    | 0820     | 1120      | 3220                        | 3520    | 3820     | 4120      | 22,000              | K                        | 50   |
| CKR23BX223M                     | 0221                                                                           | 0521    | 0821     | 1121      | 3221                        | 3521    | 3821     | 4121      | 22,000              | M                        |      |
| CKR23BX273K                     | 0222                                                                           | 0522    | 0822     | 1122      | 3222                        | 3522    | 3822     | 4122      | 27,000              | K                        |      |
| CKR23BX333K                     | 0223                                                                           | 0523    | 0823     | 1123      | 3223                        | 3523    | 3823     | 4123      | 33,000              | K                        |      |
| CKR23BX333M                     | 0224                                                                           | 0524    | 0824     | 1124      | 3224                        | 3524    | 3824     | 4124      | 33,000              | M                        | 50   |
| CKR23BX393K                     | 0225                                                                           | 0525    | 0825     | 1125      | 3225                        | 3525    | 3825     | 4125      | 39,000              | K                        |      |
| CKR23BX473K                     | 0226                                                                           | 0526    | 0826     | 1126      | 3226                        | 3526    | 3826     | 4126      | 47,000              | K                        |      |
| CKR23BX473M                     | 0227                                                                           | 0527    | 0827     | 1127      | 3227                        | 3527    | 3827     | 4127      | 47,000              | M                        |      |
| CKR23BX563K                     | 0228                                                                           | 0528    | 0828     | 1128      | 3228                        | 3528    | 3828     | 4128      | 56,000              | K                        | 50   |
| CKR23BX683K                     | 0229                                                                           | 0529    | 0829     | 1129      | 3229                        | 3529    | 3829     | 4129      | 68,000              | K                        |      |
| CKR23BX683M                     | 0230                                                                           | 0530    | 0830     | 1130      | 3230                        | 3530    | 3830     | 4130      | 68,000              | M                        |      |
| CKR23BX823K                     | 0231                                                                           | 0531    | 0831     | 1131      | 3231                        | 3531    | 3831     | 4131      | 82,000              | K                        |      |
| CKR23BX104K                     | 0232                                                                           | 0532    | 0832     | 1132      | 3232                        | 3532    | 3832     | 4132      | 100,000             | K                        | 50   |
| CKR23BX104M                     | 0233                                                                           | 0533    | 0833     | 1133      | 3233                        | 3533    | 3833     | 4133      | 100,000             | M                        |      |
| CKR23BX124K                     | 0234                                                                           | 0534    | 0834     | 1134      | 3234                        | 3534    | 3834     | 4134      | 120,000             | K                        |      |
| CKR23BX154K                     | 0235                                                                           | 0535    | 0835     | 1135      | 3235                        | 3535    | 3835     | 4135      | 150,000             | K                        |      |
| CKR23BX154M                     | 0236                                                                           | 0536    | 0836     | 1136      | 3236                        | 3536    | 3836     | 4136      | 150,000             | M                        | 50   |
| CKR23BX184K                     | 0237                                                                           | 0537    | 0837     | 1137      | 3237                        | 3537    | 3837     | 4137      | 180,000             | K                        |      |
| CKR23BX224K                     | 0238                                                                           | 0538    | 0838     | 1138      | 3238                        | 3538    | 3838     | 4138      | 220,000             | K                        |      |
| CKR23BX224M                     | 0239                                                                           | 0539    | 0839     | 1139      | 3239                        | 3539    | 3839     | 4139      | 220,000             | M                        |      |

— Add appropriate failure rate level letter (M, P, R or S)

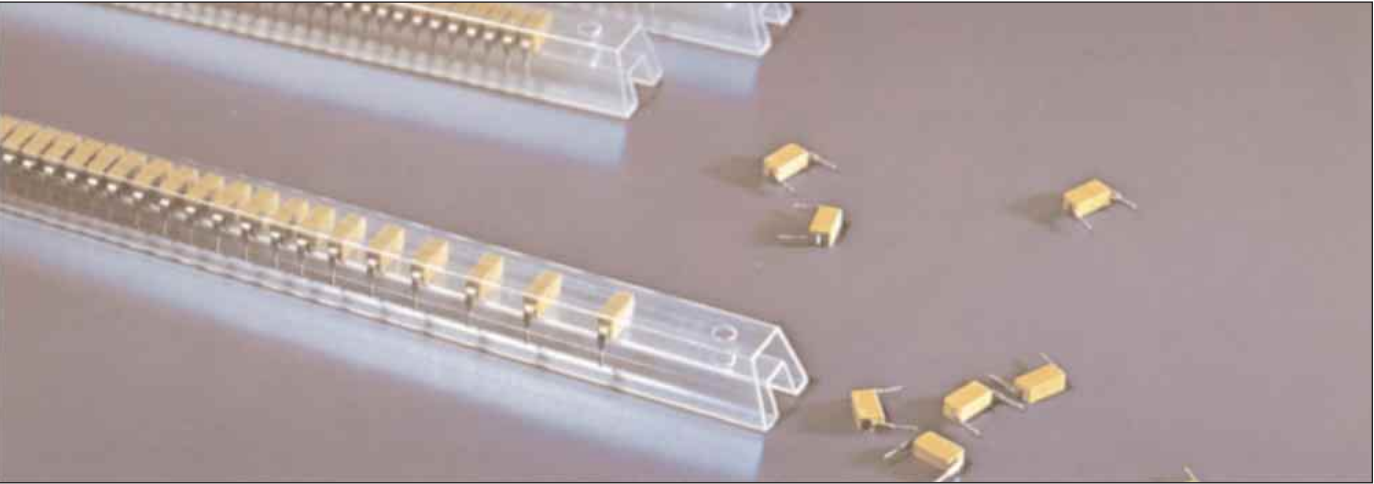
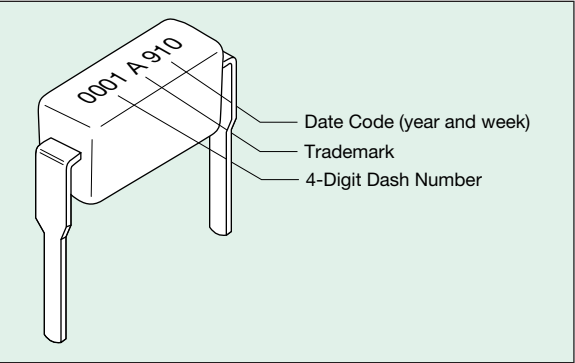
# MIL-C-39014/2Pin DIP

## MILITARY DASH NUMBER IDENTIFICATION CKR24 to MIL-C-39014/22 (Dash Number From Table)

| Military<br>Type<br>Designation | Failure Rate Level (%/1,000 Hours)                                             |         |          |           |                             |         |          |           | Capacitance<br>(pF) | Capacitance<br>Tolerance | WVDC |
|---------------------------------|--------------------------------------------------------------------------------|---------|----------|-----------|-----------------------------|---------|----------|-----------|---------------------|--------------------------|------|
|                                 | Standard Lead Length                                                           |         |          |           | Optional Longer Lead Length |         |          |           |                     |                          |      |
|                                 | 1.0 (M)                                                                        | 0.1 (P) | 0.01 (R) | 0.001 (S) | 1.0 (M)                     | 0.1 (P) | 0.01 (R) | 0.001 (S) |                     |                          |      |
|                                 | Style CKR24, Voltage-temperature limits of ±15% (+15%, -40% for Rated Voltage) |         |          |           |                             |         |          |           |                     |                          |      |
| CKR24BR124K                     | 0240                                                                           | 0540    | 0840     | 1140      | 3240                        | 3540    | 3840     | 4140      | 120,000             | K                        | 100  |
| CKR24BR154K                     | 0241                                                                           | 0541    | 0841     | 1141      | 3241                        | 3541    | 3841     | 4141      | 150,000             | K                        | 100  |
| CKR24BR154M                     | 0242                                                                           | 0542    | 0842     | 1142      | 3242                        | 3542    | 3842     | 4142      | 150,000             | M                        | 100  |
| CKR24BR184K                     | 0243                                                                           | 0543    | 0843     | 1143      | 3243                        | 3543    | 3843     | 4143      | 180,000             | K                        | 50   |
| CKR24BR224K                     | 0244                                                                           | 0544    | 0844     | 1144      | 3244                        | 3544    | 3844     | 4144      | 220,000             | K                        | 50   |
| CKR24BR224M                     | 0245                                                                           | 0545    | 0845     | 1145      | 3245                        | 3545    | 3845     | 4145      | 220,000             | M                        |      |
| CKR24BR274K                     | 0246                                                                           | 0546    | 0846     | 1146      | 3246                        | 3546    | 3846     | 4146      | 270,000             | K                        |      |
| CKR24BR334K                     | 0247                                                                           | 0547    | 0847     | 1147      | 3247                        | 3547    | 3847     | 4147      | 330,000             | K                        |      |
| CKR24BR334M                     | 0248                                                                           | 0548    | 0848     | 1148      | 3248                        | 3548    | 3848     | 4148      | 330,000             | M                        |      |
| CKR24BR394K                     | 0249                                                                           | 0549    | 0849     | 1149      | 3249                        | 3549    | 3849     | 4149      | 390,000             | K                        |      |
| CKR24BR474K                     | 0250                                                                           | 0550    | 0850     | 1150      | 3250                        | 3550    | 3850     | 4150      | 470,000             | K                        |      |
| CKR24BR474M                     | 0251                                                                           | 0551    | 0851     | 1151      | 3251                        | 3551    | 3851     | 4151      | 470,000             | M                        |      |
| CKR24BR564K                     | 0252                                                                           | 0552    | 0852     | 1152      | 3252                        | 3552    | 3852     | 4152      | 560,000             | K                        |      |
| CKR24BR684K                     | 0253                                                                           | 0553    | 0853     | 1153      | 3253                        | 3553    | 3853     | 4153      | 680,000             | K                        |      |
| CKR24BR684M                     | 0254                                                                           | 0554    | 0854     | 1154      | 3254                        | 3554    | 3854     | 4154      | 680,000             | M                        |      |
| CKR24BR824K                     | 0255                                                                           | 0555    | 0855     | 1155      | 3255                        | 3555    | 3855     | 4155      | 820,000             | K                        |      |
| CKR24BR105K                     | 0256                                                                           | 0556    | 0856     | 1156      | 3256                        | 3556    | 3856     | 4156      | 1,000,000           | K                        |      |
| CKR24BR105M                     | 0257                                                                           | 0557    | 0857     | 1157      | 3257                        | 3557    | 3857     | 4157      | 1,000,000           | M                        |      |

— Add appropriate failure rate level letter (M, P, R or S)

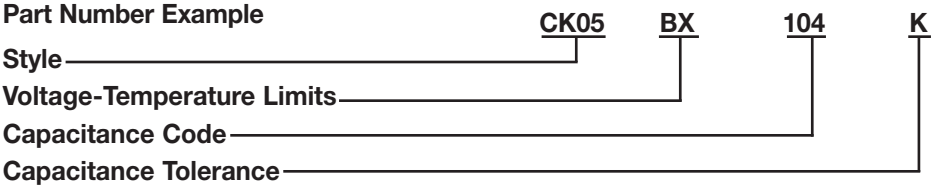
## MARKING



## HOW TO ORDER

**Military Type Designation: Styles CK05, CK06**

For values, tolerances, voltages, sizes, configurations and dielectrics not shown, contact AVX facilities directly for information.



## MIL Part No. Codes

**Style: CK** = General purpose, ceramic dielectric, fixed capacitors.  
**05** = Remaining two numbers identify shape and dimension.

### Voltage-Temperature Limits:

First letter identifies temperature range.  
 B = -55°C to +125°C

Second letter identifies voltage-temperature coefficient.

| Capacitance Change with Reference to 25°C |            |               |
|-------------------------------------------|------------|---------------|
| Second Letter                             | No Voltage | Rated Voltage |
| X                                         | +15, -15%  | +15, -25%     |

### Sig. Fig. Capacitance and Multiplier:

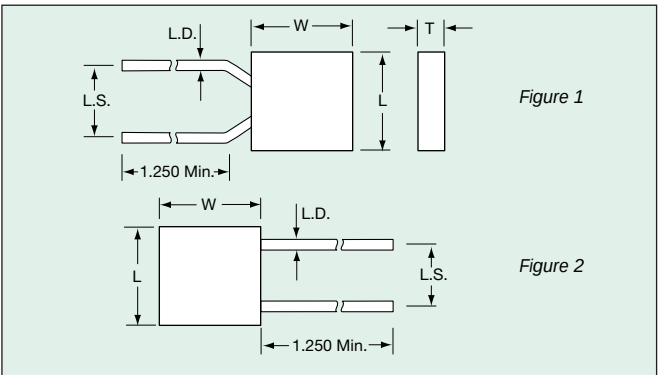
First two digits are the significant figures of capacitance.  
 Third digit indicates the additional number of zeros.  
 For example, order 100,000 pF as 104.

**Capacitance Tolerances:** K =  $\pm 10\%$ , M =  $\pm 20\%$

**Packaging:** CK05 1000 per bag

CK06 1000 per bag

Radial tape and reel packaging available upon request (2500 pcs./reel).



## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| Case Size            | Per MIL Spec                        |                                     |
|----------------------|-------------------------------------|-------------------------------------|
| MIL-C-11015          | CK05 (Fig. 1)                       | CK06 (Fig. 2)                       |
| Length (L)           | 4.83 $\pm$ .25<br>(.190 $\pm$ .010) | 7.37 $\pm$ .25<br>(.290 $\pm$ .010) |
| Width (W)            | 4.83 $\pm$ .25<br>(.190 $\pm$ .010) | 7.37 $\pm$ .25<br>(.290 $\pm$ .010) |
| Thickness (T)        | 2.29 $\pm$ .25<br>(.090 $\pm$ .010) | 2.29 $\pm$ .25<br>(.090 $\pm$ .010) |
| Lead Spacing (L.S.)  | 5.08 $\pm$ .38<br>(.200 $\pm$ .015) | 5.08 $\pm$ .38<br>(.200 $\pm$ .015) |
| Lead Diameter (L.D.) | .64 $\pm$ .05<br>(.025 $\pm$ .002)  | .64 $\pm$ .05<br>(.025 $\pm$ .002)  |

## Military Part Number Identification CK05 and CK06

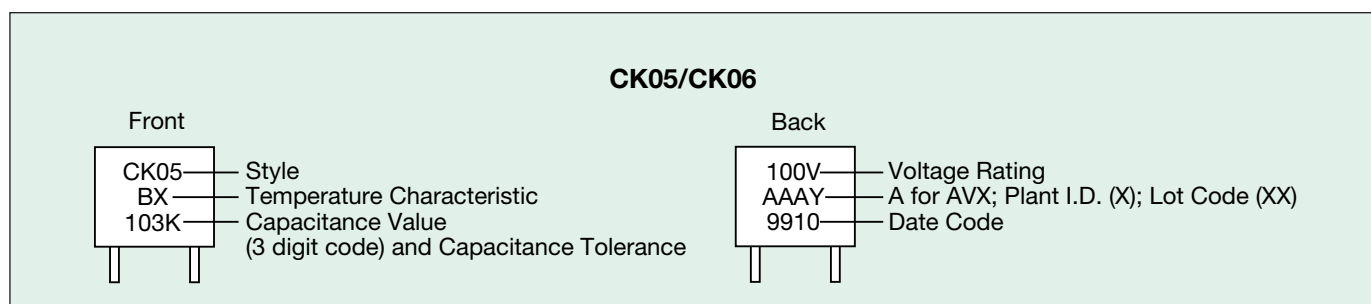
| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CK05 (BX)</b>          |                  |                       |      |
| CK05BX100                 | 10               | K, M                  | 200  |
| CK05BX120K                | 12               | K                     | 200  |
| CK05BX150                 | 15               | K, M                  | 200  |
| CK05BX180K                | 18               | K                     | 200  |
| CK05BX220                 | 22               | K, M                  | 200  |
| CK05BX270K                | 27               | K                     | 200  |
| CK05BX330                 | 33               | K, M                  | 200  |
| CK05BX390K                | 39               | K                     | 200  |
| CK05BX470                 | 47               | K, M                  | 200  |
| CK05BX560K                | 56               | K                     | 200  |
| CK05BX680                 | 68               | K, M                  | 200  |
| CK05BX820K                | 82               | K                     | 200  |
| CK05BX101                 | 100              | K, M                  | 200  |
| CK05BX121K                | 120              | K                     | 200  |
| CK05BX151                 | 150              | K, M                  | 200  |
| CK05BX181K                | 180              | K                     | 200  |
| CK05BX221                 | 220              | K, M                  | 200  |
| CK05BX271K                | 270              | K                     | 200  |
| CK05BX331                 | 330              | K, M                  | 200  |
| CK05BX391K                | 390              | K                     | 200  |
| CK05BX471                 | 470              | K, M                  | 200  |
| CK05BX561K                | 560              | K                     | 200  |
| CK05BX681                 | 680              | K, M                  | 200  |
| CK05BX821K                | 820              | K                     | 200  |
| CK05BX102                 | 1,000            | K, M                  | 200  |
| CK05BX122                 | 1,200            | K                     | 100  |
| CK05BX152                 | 1,500            | K, M                  | 100  |
| CK05BX182K                | 1,800            | K                     | 100  |
| CK05BX222                 | 2,200            | K, M                  | 100  |
| CK05BX272K                | 2,700            | K                     | 100  |
| CK05BX332                 | 3,300            | K, M                  | 100  |
| CK05BX392K                | 3,900            | K                     | 100  |
| CK05BX472                 | 4,700            | K, M                  | 100  |
| CK05BX562K                | 5,600            | K                     | 100  |
| CK05BX682                 | 6,800            | K, M                  | 100  |
| CK05BX822K                | 8,200            | K                     | 100  |
| CK05BX103                 | 10,000           | K, M                  | 100  |
| CK05BX123K                | 12,000           | K                     | 50   |
| CK05BX153                 | 15,000           | K, M                  | 50   |
| CK05BX183K                | 18,000           | K                     | 50   |
| CK05BX223                 | 22,000           | K, M                  | 50   |
| CK05BX273K                | 27,000           | K                     | 50   |
| CK05BX333                 | 33,000           | K, M                  | 50   |
| CK05BX393K                | 39,000           | K                     | 50   |
| CK05BX473                 | 47,000           | K, M                  | 50   |
| CK05BX563K                | 56,000           | K                     | 50   |
| CK05BX683                 | 68,000           | K, M                  | 50   |
| CK05BX823K                | 82,000           | K                     | 50   |
| CK05BX104                 | 100,000          | K, M                  | 50   |

Add Capacitance Tolerance Letter K =  $\pm 10\%$  or M =  $\pm 20\%$

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CK06 (BX)</b>          |                  |                       |      |
| CK06BX122K                | 1,200            | K                     | 200  |
| CK06BX152                 | 1,500            | K, M                  | 200  |
| CK06BX182K                | 1,800            | K                     | 200  |
| CK06BX222                 | 2,200            | K, M                  | 200  |
| CK06BX272K                | 2,700            | K                     | 200  |
| CK06BX332                 | 3,300            | K, M                  | 200  |
| CK06BX392K                | 3,900            | K                     | 200  |
| CK06BX472                 | 4,700            | K, M                  | 200  |
| CK06BX562K                | 5,600            | K                     | 200  |
| CK06BX682                 | 6,800            | K, M                  | 200  |
| CK06BX822K                | 8,200            | K                     | 200  |
| CK06BX103                 | 10,000           | K, M                  | 200  |
| CK06BX123K                | 12,000           | K                     | 100  |
| CK06BX153                 | 15,000           | K, M                  | 100  |
| CK06BX183K                | 18,000           | K                     | 100  |
| CK06BX223                 | 22,000           | K, M                  | 100  |
| CK06BX273K                | 27,000           | K                     | 100  |
| CK06BX333                 | 33,000           | K, M                  | 100  |
| CK06BX393K                | 39,000           | K                     | 100  |
| CK06BX473                 | 47,000           | K, M                  | 100  |
| CK06BX563K                | 56,000           | K                     | 100  |
| CK06BX683                 | 68,000           | K, M                  | 100  |
| CK06BX823K                | 82,000           | K                     | 100  |
| CK06BX104                 | 100,000          | K, M                  | 100  |
| CK06BX124K                | 120,000          | K                     | 50   |
| CK06BX154                 | 150,000          | K, M                  | 50   |
| CK06BX184K                | 180,000          | K                     | 50   |
| CK06BX224                 | 220,000          | K, M                  | 50   |
| CK06BX274K                | 270,000          | K                     | 50   |
| CK06BX334                 | 330,000          | K, M                  | 50   |
| CK06BX394K                | 390,000          | K                     | 50   |
| CK06BX474                 | 470,000          | K, M                  | 50   |
| CK06BX564K                | 560,000          | K                     | 50   |
| CK06BX684                 | 680,000          | K, M                  | 50   |
| CK06BX824K                | 820,000          | K                     | 50   |
| CK06BX105                 | 1.0 mfd          | K, M                  | 50   |

Add Capacitance Tolerance Letter K =  $\pm 10\%$  or M =  $\pm 20\%$

## MARKING



## HOW TO ORDER

Military Type Designation: Styles CK12, CK13, CK14, CK15, CK16

Part Number Example

Style CK12 BX 103 K

Voltage-Temperature Limits \_\_\_\_\_

Capacitance Code \_\_\_\_\_

Capacitance Tolerance \_\_\_\_\_

### MIL Part No. Codes

**Style:** **CK** = general purpose, ceramic dielectric, fixed capacitors.  
**12** = Remaining two numbers identify shape and dimension.

### Voltage-Temperature Limits:

First letter identifies temperature range.  
**B** = -55°C to +125°C

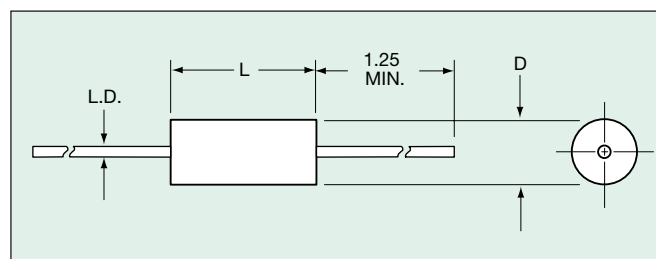
Second letter identifies voltage-temperature coefficient.

| Capacitance Change with Reference to 25°C |            |               |
|-------------------------------------------|------------|---------------|
| Second Letter                             | No Voltage | Rated Voltage |
| R                                         | +15, -15%  | +15, -40%     |
| X                                         | +15, -15%  | +15, -25%     |

### Sig. Fig. Capacitance and Multiplier:

First two digits are the significant figures of capacitance.  
 Third digit indicates the additional number of zeros. For example, order 10,000 pF as 103.

**Capacitance Tolerances:** K =  $\pm 10\%$ , M =  $\pm 20\%$



## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| Case Size                   | Per MIL Spec            |                         |                         |                         |                          |
|-----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|
| MIL-C-11015                 | CK12                    | CK13                    | CK14                    | CK15                    | CK16                     |
| <b>Length (L)</b>           | 4.07±.25<br>(.160±.010) | 6.35±.25<br>(.250±.010) | 9.91±.25<br>(.390±.010) | 12.7±.51<br>(.500±.020) | 17.53±.51<br>(.690±.020) |
| <b>Diameter (D)</b>         | 2.29±.25<br>(.090±.010) | 2.29±.25<br>(.090±.010) | 3.56±.25<br>(.140±.010) | 6.35±.38<br>(.250±.015) | 8.89±.51<br>(.350±.020)  |
| <b>Lead Diameter (L.D.)</b> | .48±.05<br>(.019±.002)  | .48±.05<br>(.019±.002)  | .63±.05<br>(.025±.002)  | .63±.05<br>(.025±.002)  | .63±.05<br>(.025±.002)   |

## PACKAGING REQUIREMENTS

### Packaging: Bulk

CK12, 13 & 14 100 pcs per bag  
 CK15 & 16 50 pcs per bag

### Tape & Reel

CK12, 13 5000 pcs per reel  
 CK14 3000 pcs per reel  
 CK15 950 pcs per reel  
 CK16 650 pcs per reel

## Military Part Number Identification CK12 thru CK16

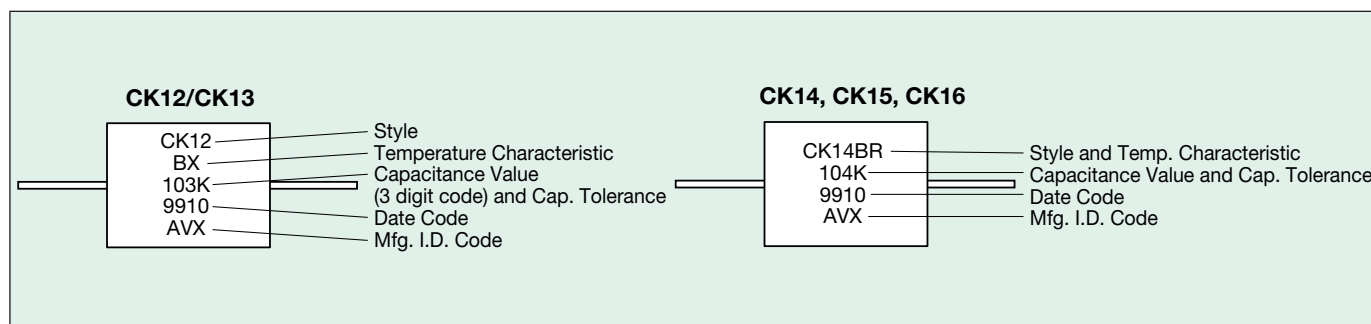
| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CK12 (BX)</b>          |                  |                       |      |
| CK12BX100_                | 10               | K, M                  | 100  |
| CK12BX120K                | 12               | K                     | 100  |
| CK12BX150_                | 15               | K, M                  | 100  |
| CK12BX180K                | 18               | K                     | 100  |
| CK12BX220_                | 22               | K, M                  | 100  |
| CK12BX270K                | 27               | K                     | 100  |
| CK12BX330_                | 33               | K, M                  | 100  |
| CK12BX390K                | 39               | K                     | 100  |
| CK12BX470_                | 47               | K, M                  | 100  |
| CK12BX560K                | 56               | K                     | 100  |
| CK12BX680_                | 68               | K, M                  | 100  |
| CK12BX820K                | 82               | K                     | 100  |
| CK12BX101_                | 100              | K, M                  | 100  |
| CK12BX121K                | 120              | K                     | 100  |
| CK12BX151_                | 150              | K, M                  | 100  |
| CK12BX181K                | 180              | K                     | 100  |
| CK12BX221_                | 220              | K, M                  | 100  |
| CK12BX271K                | 270              | K                     | 100  |
| CK12BX331_                | 330              | K, M                  | 100  |
| CK12BX391K                | 390              | K                     | 100  |
| CK12BX471_                | 470              | K, M                  | 100  |
| CK12BX561K                | 560              | K                     | 100  |
| CK12BX681_                | 680              | K, M                  | 100  |
| CK12BX821K                | 820              | K                     | 100  |
| CK12BX102_                | 1,000            | K, M                  | 100  |
| CK12BX122K                | 1,200            | K                     | 100  |
| CK12BX152_                | 1,500            | K, M                  | 100  |
| CK12BX182K                | 1,800            | K                     | 100  |
| CK12BX222_                | 2,200            | K, M                  | 100  |
| CK12BX272K                | 2,700            | K                     | 100  |
| CK12BX332_                | 3,300            | K, M                  | 100  |
| CK12BX392K                | 3,900            | K                     | 100  |
| CK12BX472_                | 4,700            | K, M                  | 100  |
| CK12BX562K                | 5,600            | K                     | 50   |
| CK12BX682_                | 6,800            | K, M                  | 50   |
| CK12BX822K                | 8,200            | K                     | 50   |
| CK12BX103_                | 10,000           | K, M                  | 50   |
| <b>CK13 (BX)</b>          |                  |                       |      |
| CK13BX562K                | 5,600            | K                     | 100  |
| CK13BX682_                | 6,800            | K, M                  | 100  |
| CK13BX822K                | 8,200            | K                     | 100  |
| CK13BX103_                | 10,000           | K, M                  | 100  |
| CK13BX123K                | 12,000           | K                     | 50   |
| CK13BX153_                | 15,000           | K, M                  | 50   |
| CK13BX183K                | 18,000           | K                     | 50   |
| CK13BX223_                | 22,000           | K, M                  | 50   |
| <b>CK13 (BR)</b>          |                  |                       |      |
| CK13BR273K                | 27,000           | K                     | 50   |
| CK13BR333_                | 33,000           | K, M                  | 50   |
| CK13BR393K                | 39,000           | K                     | 50   |
| CK13BR473_                | 47,000           | K, M                  | 50   |

— Add Capacitance Tolerance Letter K =  $\pm 10\%$  or M =  $\pm 20\%$

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CK14 (BX)</b>          |                  |                       |      |
| CK14BX123K                | 12,000           | K                     | 100  |
| CK14BX153_                | 15,000           | K, M                  | 100  |
| CK14BX183K                | 18,000           | K                     | 100  |
| CK14BX223_                | 22,000           | K, M                  | 100  |
| CK14BX273K                | 27,000           | K                     | 100  |
| CK14BX333_                | 33,000           | K, M                  | 100  |
| CK14BX393K                | 39,000           | K                     | 100  |
| CK14BX473_                | 47,000           | K, M                  | 100  |
| <b>CK14 (BR)</b>          |                  |                       |      |
| CK14BR563K                | 56,000           | K                     | 100  |
| CK14BR683_                | 68,000           | K, M                  | 100  |
| CK14BR823K                | 82,000           | K                     | 100  |
| CK14BR104_                | 100,000          | K, M                  | 100  |
| CK14BR124K                | 120,000          | K                     | 50   |
| CK14BR154_                | 150,000          | K, M                  | 50   |
| CK14BR184K                | 180,000          | K                     | 50   |
| CK14BR224_                | 220,000          | K, M                  | 50   |
| CK14BR274K                | 270,000          | K                     | 50   |
| <b>CK15 (BX)</b>          |                  |                       |      |
| CK15BX104K                | 100,000          | K, M                  | 100  |
| <b>CK15 (BR)</b>          |                  |                       |      |
| CK15BR124K                | 120,000          | K                     | 100  |
| CK15BR154_                | 150,000          | K, M                  | 100  |
| CK15BR184K                | 180,000          | K                     | 100  |
| CK15BR224_                | 220,000          | K, M                  | 100  |
| CK15BR274K                | 270,000          | K                     | 100  |
| CK15BR334_                | 330,000          | K, M                  | 100  |
| CK15BR474K                | 470,000          | K, M                  | 50   |
| CK15BR105_                | 1,000,000        | K, M                  | 50   |
| <b>CK16 (BR)</b>          |                  |                       |      |
| CK16BR474K                | 470,000          | K, M                  | 100  |
| CK16BR105_                | 1,000,000        | K, M                  | 100  |
| CK16BR225_                | 2,200,000        | K, M                  | 50   |
| CK16BR335_                | 3,300,000        | K, M                  | 50   |

— Add Capacitance Tolerance Letter K =  $\pm 10\%$  or M =  $\pm 20\%$

## MARKING



## HOW TO ORDER

**Military Type Designation:**

**Established Reliability = CCR05, CCR06, CCR07, CCR08, CCR09**

**Non-Established Reliability = CC05, CC06, CC07, CC08, CC09**

Part Number Example **CCR06** **CG** **183** **J** **R** **(V)**

Style \_\_\_\_\_

Temperature Characteristic \_\_\_\_\_

Capacitance Code \_\_\_\_\_

Capacitance Tolerance \_\_\_\_\_

Military Failure Rate \_\_\_\_\_

Stand-off Option \_\_\_\_\_

MIL Part No. Codes

**Style:** **CC** = Identifies temperature compensating, ceramic dielectric, fixed capacitors.  
**R** = Identifies Established Reliability parts.  
**06** = Numbers identify shape and dimension.

**Temperature Characteristic:**

| Permissible capacitance change from capacitance at +25°C in ppm/°C |                |                    |                    |                  |                  |
|--------------------------------------------------------------------|----------------|--------------------|--------------------|------------------|------------------|
| Temp.                                                              | Characteristic |                    |                    |                  |                  |
|                                                                    | CX             | CK                 | CJ                 | CH               | CG               |
| +125°C                                                             | 1/             | ±250 ppm/°C        | ±120 ppm/°C        | ±60 ppm/°C       | ±30 ppm/°C       |
| -55°C 2/                                                           | 1/             | +246.25<br>-326.25 | +116.25<br>-166.25 | +55.00<br>-91.25 | +27.50<br>-53.75 |

1/ Not practically measurable.

2/ The ppm/°C values for -55°C were calculated by dividing ppm by negative 80°C.

**Capacitance Code:**

First two digits are the significant figures of capacitance.  
 Third digit indicates the additional number of zeros. For example, order 18,000 pF as 183. (For values below 10 pF, use "R" in place of decimal point, e.g., 1R4 = 1.4pF).

**Capacitance Tolerance:**

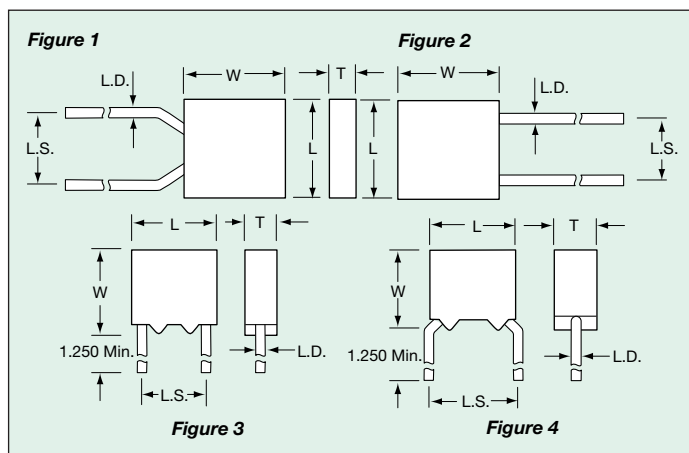
C = ±0.25 pF, D = ±0.5 pF, F = ±1%, G = ±2%,  
 J = ±5%, K = ±10%

**Military Failure Rate:**

M = 1% per 1000 hours, P = 0.1% per 1000 hours,  
 R = 0.01% per 1000 hours, S = 0.001% per 1000 hours.

## PACKAGING REQUIREMENTS

**Packaging:** CCR0X: 100 pcs/bag; CC0X: 1000 pcs/bag



To order stand-off option, place "V" at the end of the part number.  
 For example: CCR05CG332FSV.

## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| Per MIL Spec               | Case Size                |                          |                         |                          |                        |
|----------------------------|--------------------------|--------------------------|-------------------------|--------------------------|------------------------|
| MIL-C-20                   | Length (L)               | Width (W)                | Thickness (T)           | Lead Spacing (L.S.)      | Lead Diameter (L.D.)   |
| CCR05/CC05<br>Figures 1, 4 | 4.83±.25<br>(.190±.010)  | 4.83±.25<br>(.190±.010)  | 2.29±.25<br>(.090±.010) | 5.08±.38<br>(.200±.015)  | .64±.05<br>(.025±.002) |
| CCR06/CC06<br>Figures 2, 3 | 7.37±.25<br>(.290±.010)  | 7.37±.25<br>(.290±.010)  | 2.29±.25<br>(.090±.010) | 5.08±.38<br>(.200±.015)  | .64±.05<br>(.025±.002) |
| CCR07/CC07<br>Figure 2     | 12.19±.51<br>(.480±.020) | 12.19±.51<br>(.480±.020) | 3.56±.25<br>(.140±.010) | 10.16±.51<br>(.400±.020) | .64±.05<br>(.025±.002) |
| CCR08/CC08<br>Figure 2     | 12.19±.51<br>(.480±.020) | 12.19±.51<br>(.480±.020) | 6.1±.25<br>(.240±.010)  | 10.16±.51<br>(.400±.020) | .64±.05<br>(.025±.002) |
| CCR09/CC09<br>Figure 2     | 4.83±.25<br>(.190±.010)  | 4.83±.25<br>(.190±.010)  | 2.29±.25<br>(.090±.010) | 2.54±.38<br>(.100±.015)  | .64±.05<br>(.025±.002) |

## MILITARY PART NUMBER IDENTIFICATION

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| CC05-CCR05, CC09-CCR09    |                  |                       |      |
| CCR05CX1R0_               | 1.0              | C                     | 200  |
| CCR05CX1R1_               | 1.1              | C                     | 200  |
| CCR05CX1R2_               | 1.2              | C                     | 200  |
| CCR05CX1R3_               | 1.3              | C                     | 200  |
| CCR05CX1R5_               | 1.5              | C                     | 200  |
| CCR05CX1R6_               | 1.6              | C                     | 200  |
| CCR05CX1R8_               | 1.8              | C                     | 200  |
| CCR05CX2R0_               | 2.0              | C                     | 200  |
| CCR05CK2R2_               | 2.2              | C                     | 200  |
| CCR05CK2R4_               | 2.4              | C                     | 200  |
| CCR05CK2R7_               | 2.7              | C, D                  | 200  |
| CCR05CK3R0_               | 3.0              | C, D                  | 200  |
| CCR05CK3R3_               | 3.3              | C, D                  | 200  |
| CCR05CK3R6_               | 3.6              | C, D                  | 200  |
| CCR05CK3R9_               | 3.9              | C, D                  | 200  |

— Add appropriate failure rate level (M, P, R, or S), add V for Stand-off  
 — Add appropriate cap. tolerance letter

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| CC05-CCR05, CC09-CCR09    |                  |                       |      |
| CCR05CJ4R3_               | 4.3              | C, D                  | 200  |
| CCR05CJ4R7_               | 4.7              | C, D                  | 200  |
| CCR05CJ5R1_               | 5.1              | C, D                  | 200  |
| CCR05CJ5R6_               | 5.6              | C, D                  | 200  |
| CCR05CJ6R2_               | 6.2              | C, D                  | 200  |
| CCR05CJ6R8_               | 6.8              | C, D                  | 200  |
| CCR05CJ7R5_               | 7.5              | C, D                  | 200  |
| CCR05CH8R2_               | 8.2              | C, D                  | 200  |
| CCR05CH9R1_               | 9.1              | C, D                  | 200  |
| CCR05CH100_               | 10               | G, J                  | 200  |
| CCR05CH110_               | 11               | G, J                  | 200  |
| CCR05CH120_               | 12               | G, J                  | 200  |
| CCR05CH130_               | 13               | G, J                  | 200  |
| CCR05CH150_               | 15               | G, J                  | 200  |
| CCR05CH160_               | 16               | G, J                  | 200  |

— Add appropriate failure rate level (M, P, R, or S), add V for Stand-off  
 — Add appropriate cap. tolerance letter

## Military Part Number Identification

| Military Type Designation     | Capacitance (pF) | Capacitance Tolerance | WVDC |
|-------------------------------|------------------|-----------------------|------|
| <b>CC05-CCR05, CC09-CCR09</b> |                  |                       |      |
| CCR05CH180                    | 18               | G, J                  | 200  |
| CCR05CG200                    | 20               | G, J                  | 200  |
| CCR05CG220                    | 22               | G, J                  | 200  |
| CCR05CG240                    | 24               | G, J                  | 200  |
| CCR05CG270                    | 27               | F, G, J               | 200  |
| CCR05CG300                    | 30               | F, G, J               | 200  |
| CCR05CG330                    | 33               | F, G, J               | 200  |
| CCR05CG360                    | 36               | F, G, J               | 200  |
| CCR05CG390                    | 39               | F, G, J               | 200  |
| CCR05CG430                    | 43               | F, G, J               | 200  |
| CCR05CG470                    | 47               | F, G, J               | 200  |
| CCR05CG510                    | 51               | F, G, J               | 200  |
| CCR05CG560                    | 56               | F, G, J               | 200  |
| CCR05CG620                    | 62               | F, G, J               | 200  |
| CCR05CG680                    | 68               | F, G, J               | 200  |
| CCR05CG750                    | 75               | F, G, J               | 200  |
| CCR05CG820                    | 82               | F, G, J               | 200  |
| CCR05CG910                    | 91               | F, G, J               | 200  |
| CCR05CG101                    | 100              | F, G, J               | 200  |
| CCR05CG111                    | 110              | F, G, J               | 200  |
| CCR05CG121                    | 120              | F, G, J               | 200  |
| CCR05CG131                    | 130              | F, G, J               | 200  |
| CCR05CG151                    | 150              | F, G, J               | 200  |
| CCR05CG161                    | 160              | F, G, J               | 200  |
| CCR05CG181                    | 180              | F, G, J               | 200  |
| CCR05CG201                    | 200              | F, G, J               | 200  |
| CCR05CG221                    | 220              | F, G, J               | 200  |
| CCR05CG241                    | 240              | F, G, J               | 200  |
| CCR05CG271                    | 270              | F, G, J               | 200  |
| CCR05CG301                    | 300              | F, G, J               | 200  |
| CCR05CG331                    | 330              | F, G, J               | 200  |
| CCR05CG361                    | 360              | F, G, J               | 100  |
| CCR05CG391                    | 390              | F, G, J               | 100  |
| CCR05CG431                    | 430              | F, G, J               | 100  |
| CCR05CG471                    | 470              | F, G, J               | 100  |
| CCR05CG511                    | 510              | F, G, J               | 100  |
| CCR05CG561                    | 560              | F, G, J               | 100  |
| CCR05CG621                    | 620              | F, G, J               | 100  |
| CCR05CG681                    | 680              | F, G, J               | 100  |
| CCR05CG751                    | 750              | F, G, J               | 100  |
| CCR05CG821                    | 820              | F, G, J               | 100  |
| CCR05CG911                    | 910              | F, G, J               | 100  |
| CCR05CG102                    | 1,000            | F, G, J               | 100  |
| CCR05CG112                    | 1,100            | F, G, J               | 100  |
| CCR05CG122                    | 1,200            | F, G, J               | 100  |
| CCR05CG132                    | 1,300            | F, G, J               | 100  |
| CCR05CG152                    | 1,500            | F, G, J               | 100  |
| CCR05CG162                    | 1,600            | F, G, J               | 100  |
| CCR05CG182                    | 1,800            | F, G, J               | 100  |
| CCR05CG202                    | 2,000            | F, G, J               | 50   |
| CCR05CG222                    | 2,200            | F, G, J               | 50   |
| CCR05CG242                    | 2,400            | F, G, J               | 50   |
| CCR05CG272                    | 2,700            | F, G, J               | 50   |
| CCR05CG302                    | 3,000            | F, G, J               | 50   |
| CCR05CG332                    | 3,300            | F, G, J               | 50   |
| <b>CC06, CCR06</b>            |                  |                       |      |
| CCR06CG361                    | 360              | F, G, J               | 200  |
| CCR06CG391                    | 390              | F, G, J               | 200  |
| CCR06CG431                    | 430              | F, G, J               | 200  |
| CCR06CG471                    | 470              | F, G, J               | 200  |
| CCR06CG511                    | 510              | F, G, J               | 200  |
| CCR06CG561                    | 560              | F, G, J               | 200  |
| CCR06CG621                    | 620              | F, G, J               | 200  |
| CCR06CG681                    | 680              | F, G, J               | 200  |
| CCR06CG751                    | 750              | F, G, J               | 200  |
| CCR06CG821                    | 820              | F, G, J               | 200  |

— Add appropriate failure rate level (M, P, R or S)  
— Add appropriate cap. tolerance letter

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CC06, CCR06 (cont)</b> |                  |                       |      |
| CCR06CG911                | 910              | F, G, J               | 200  |
| CCR06CG102                | 1,000            | F, G, J               | 200  |
| CCR06CG112                | 1,100            | F, G, J               | 200  |
| CCR06CG122                | 1,200            | F, G, J               | 200  |
| CCR06CG132                | 1,300            | F, G, J               | 200  |
| CCR06CG152                | 1,500            | F, G, J               | 200  |
| CCR06CG162                | 1,600            | F, G, J               | 200  |
| CCR06CG182                | 1,800            | F, G, J               | 200  |
| CCR06CG202                | 2,000            | F, G, J               | 100  |
| CCR06CG222                | 2,200            | F, G, J               | 100  |
| CCR06CG242                | 2,400            | F, G, J               | 100  |
| CCR06CG272                | 2,700            | F, G, J               | 100  |
| CCR06CG302                | 3,000            | F, G, J               | 100  |
| CCR06CG332                | 3,300            | F, G, J               | 100  |
| CCR06CG362                | 3,600            | F, G, J               | 100  |
| CCR06CG392                | 3,900            | F, G, J               | 100  |
| CCR06CG432                | 4,300            | F, G, J               | 100  |
| CCR06CG472                | 4,700            | F, G, J               | 100  |
| CCR06CG512                | 5,100            | F, G, J, K            | 50   |
| CCR06CG562                | 5,600            | F, G, J, K            | 50   |
| CCR06CG622                | 6,200            | F, G, J, K            | 50   |
| CCR06CG682                | 6,800            | F, G, J, K            | 50   |
| CCR06CG752                | 7,500            | F, G, J, K            | 50   |
| CCR06CG822                | 8,200            | F, G, J, K            | 50   |
| CCR06CG912                | 9,100            | F, G, J, K            | 50   |
| CCR06CG103                | 10,000           | F, G, J, K            | 50   |
| CCR06CG123                | 12,000           | F, G, J, K            | 50   |
| CCR06CG153                | 15,000           | F, G, J, K            | 50   |
| CCR06CG183                | 18,000           | F, G, J, K            | 50   |
| <b>CC07, CCR07</b>        |                  |                       |      |
| CCR07CG222                | 2,200            | F, G, J, K            | 200  |
| CCR07CG272                | 2,700            | F, G, J, K            | 200  |
| CCR07CG332                | 3,300            | F, G, J, K            | 200  |
| CCR07CG392                | 3,900            | F, G, J, K            | 200  |
| CCR07CG472                | 4,700            | F, G, J, K            | 200  |
| CCR07CG562                | 5,600            | F, G, J, K            | 100  |
| CCR07CG682                | 6,800            | F, G, J, K            | 100  |
| CCR07CG822                | 8,200            | F, G, J, K            | 100  |
| CCR07CG103                | 10,000           | F, G, J, K            | 100  |
| CCR07CG123                | 12,000           | F, G, J, K            | 100  |
| CCR07CG153                | 15,000           | F, G, J, K            | 50   |
| CCR07CG183                | 18,000           | F, G, J, K            | 50   |
| CCR07CG223                | 22,000           | F, G, J, K            | 50   |
| CCR07CG273                | 27,000           | F, G, J, K            | 50   |
| CCR07CG333                | 33,000           | F, G, J, K            | 50   |
| CCR07CG393                | 39,000           | F, G, J, K            | 50   |
| CCR07CG473                | 47,000           | F, G, J, K            | 50   |
| CCR07CG563                | 56,000           | F, G, J, K            | 50   |
| CCR07CG683                | 68,000           | F, G, J, K            | 50   |
| CCR07CG823                | 82,000           | F, G, J, K            | 50   |
| CCR07CG104                | 100,000          | F, G, J, K            | 50   |
| <b>CC08, CCR08</b>        |                  |                       |      |
| CCR08CG392                | 3,900            | G, J, K               | 200  |
| CCR08CG472                | 4,700            | G, J, K               | 200  |
| CCR08CG153                | 15,000           | G, J, K               | 100  |
| CCR08CG183                | 18,000           | G, J, K               | 100  |
| CCR08CG563                | 56,000           | G, J, K               | 50   |
| CCR08CG683                | 68,000           | G, J, K               | 50   |

— Add appropriate failure rate level (M, P, R or S)  
— Add appropriate cap. tolerance letter

**Note:** For marking information, see page 63.

## HOW TO ORDER

### Military Type Designation:

Established Reliability = CCR75, CCR76, CCR77, CCR78, CCR79

Non-Established Reliability = CC75, CC76, CC77, CC78, CC79

|                            |       |    |     |   |   |
|----------------------------|-------|----|-----|---|---|
| Part Number Example        | CCR76 | CG | 102 | J | R |
| Style                      |       |    |     |   |   |
| Temperature Characteristic |       |    |     |   |   |
| Capacitance Code           |       |    |     |   |   |
| Capacitance Tolerance      |       |    |     |   |   |
| Military Failure Rate      |       |    |     |   |   |

### MIL Part No. Codes

**Style:** **CC** = Identifies temperature compensating, ceramic dielectric, fixed capacitors.  
**R** = Identifies Established Reliability parts.  
**76** = Numbers identify shape and dimension.

### Temperature Characteristic:

| Permissible capacitance change from capacitance at +25°C in ppm/°C |                |                    |                    |                  |                  |
|--------------------------------------------------------------------|----------------|--------------------|--------------------|------------------|------------------|
| Temp.                                                              | Characteristic |                    |                    |                  |                  |
|                                                                    | CX             | CK                 | CJ                 | CH               | CG               |
| +125°C                                                             | 1/             | ±250 ppm/°C        | ±120 ppm/°C        | ±60 ppm/°C       | ±30 ppm/°C       |
| -55°C 2/                                                           | 1/             | +246.25<br>-326.25 | +116.25<br>-166.25 | +55.00<br>-91.25 | +27.50<br>-53.75 |

1/ Not practically measurable.

### Capacitance Code:

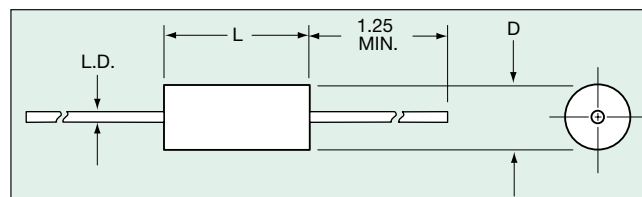
First two digits are the significant figures of capacitance.  
 Third digit indicates the additional number of zeros. For example, order 1,000 pF as 102. (For values below 10 pF, use "R" in place of decimal point, e.g., 1R8 - 1.8pF).

### Capacitance Tolerance:

C = ±0.25 pF, D = ±0.5 pF, F = ±1%,  
 G = ±2%, J = ±5%, K = ±10%

### Military Failure Rate:

M = 1% per 1000 hours, P = 0.1% per 1000 hours,  
 R = 0.01% per 1000 hours, S = 0.001% per 1000 hours.



## SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

| Per MIL Spec  | Case Size                |                         |                        |
|---------------|--------------------------|-------------------------|------------------------|
| MIL-C-20      | Length (L)               | Diameter (D)            | Lead Diameter (L.D.)   |
| CCR75<br>CC75 | 4.07±.25<br>(.160±.010)  | 2.29±.25<br>(.090±.010) | .48±.05<br>(.019±.002) |
| CCR76<br>CC76 | 6.35±.25<br>(.250±.010)  | 2.29±.25<br>(.090±.010) | .48±.05<br>(.019±.002) |
| CCR77<br>CC77 | 9.91±.25<br>(.390±.010)  | 3.56±.25<br>(.140±.010) | .63±.05<br>(.025±.002) |
| CCR78<br>CC78 | 12.7±.51<br>(.500±.020)  | 6.35±.38<br>(.250±.015) | .63±.05<br>(.025±.002) |
| CCR79<br>CC79 | 17.53±.51<br>(.690±.020) | 8.89±.51<br>(.350±.020) | .63±.05<br>(.025±.002) |

## PACKAGING REQUIREMENTS

### Packaging:

#### Bulk

CCR75/CC75, CCR76/CC76, CCR77/CC77, 100 pcs/bag  
 CCR78/CC78, CCR79/CC79 50 pcs/bag

### Tape & Reel

CCR75/CC75, CCR76/CC76 5000 pcs/reel  
 CCR77/CC77 3000 pcs/reel  
 CCR78/CC78 950 pcs/reel  
 CCR79/CC79 650 pcs/reel

## Military Part Number Identification CC75 thru CC79 and CCR75 thru CCR79

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| CC75-CCR75                |                  |                       |      |
| CCR75CX1R0_               | 1.0              | C                     | 200  |
| CCR75CX1R1_               | 1.1              | C                     | 200  |
| CCR75CX1R2_               | 1.2              | C                     | 200  |
| CCR75CX1R3_               | 1.3              | C                     | 200  |
| CCR75CX1R5_               | 1.5              | C                     | 200  |
| CCR75CX1R6_               | 1.6              | C                     | 200  |
| CCR75CX1R8_               | 1.8              | C                     | 200  |
| CCR75CX2R0_               | 2.0              | C                     | 200  |
| CCR75CK2R2_               | 2.2              | C                     | 200  |
| CCR75CK2R4_               | 2.4              | C                     | 200  |
| CCR75CK2R7_               | 2.7              | C, D                  | 200  |
| CCR75CK3R0_               | 3.0              | C, D                  | 200  |
| CCR75CK3R3_               | 3.3              | C, D                  | 200  |
| CCR75CK3R6_               | 3.6              | C, D                  | 200  |
| CCR75CK3R9_               | 3.9              | C, D                  | 200  |
| CCR75CJ4R3_               | 4.3              | C, D                  | 200  |
| CCR75CJ4R7_               | 4.7              | C, D                  | 200  |
| CCR75CJ5R1_               | 5.1              | C, D                  | 200  |
| CCR75CJ5R6_               | 5.6              | C, D                  | 200  |
| CCR75CJ6R2_               | 6.2              | C, D                  | 200  |
| CCR75CJ6R8_               | 6.8              | C, D                  | 200  |
| CCR75CJ7R5_               | 7.5              | C, D                  | 200  |
| CCR75CH8R2_               | 8.2              | C, D                  | 200  |
| CCR75CH9R1_               | 9.1              | C, D                  | 200  |
| CCR75CH100_               | 10               | G, J                  | 200  |
| CCR75CH110_               | 11               | G, J                  | 200  |
| CCR75CH120_               | 12               | G, J                  | 200  |
| CCR75CH130_               | 13               | G, J                  | 200  |
| CCR75CH150_               | 15               | G, J                  | 200  |
| CCR75CH160_               | 16               | G, J                  | 200  |
| CCR75CH180_               | 18               | G, J                  | 200  |
| CCR75CG200_               | 20               | F, G, J               | 200  |
| CCR75CG220_               | 22               | F, G, J               | 200  |
| CCR75CG240_               | 24               | F, G, J               | 200  |
| CCR75CG270_               | 27               | F, G, J               | 200  |
| CCR75CG300_               | 30               | F, G, J               | 200  |

Add appropriate failure rate level (M, P, R or S)  
 Add appropriate cap. tolerance letter

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| CC75-CCR75                |                  |                       |      |
| CCR75CG330_               | 33               | F, G, J               | 200  |
| CCR75CG360_               | 36               | F, G, J               | 200  |
| CCR75CG390_               | 39               | F, G, J               | 200  |
| CCR75CG430_               | 43               | F, G, J               | 200  |
| CCR75CG470_               | 47               | F, G, J               | 200  |
| CCR75CG510_               | 51               | F, G, J               | 200  |
| CCR75CG560_               | 56               | F, G, J               | 200  |
| CCR75CG620_               | 62               | F, G, J               | 200  |
| CCR75CG680_               | 68               | F, G, J               | 200  |
| CCR75CG750_               | 75               | F, G, J               | 200  |
| CCR75CG820_               | 82               | F, G, J               | 100  |
| CCR75CG910_               | 91               | F, G, J               | 100  |
| CCR75CG101_               | 100              | F, G, J               | 100  |
| CCR75CG111_               | 110              | F, G, J               | 100  |
| CCR75CG121_               | 120              | F, G, J               | 100  |
| CCR75CG131_               | 130              | F, G, J               | 100  |
| CCR75CG151_               | 150              | F, G, J               | 100  |
| CCR75CG161_               | 160              | F, G, J               | 100  |
| CCR75CG181_               | 180              | F, G, J               | 100  |
| CCR75CG201_               | 200              | F, G, J               | 100  |
| CCR75CG221_               | 220              | F, G, J               | 100  |
| CCR75CG241_               | 240              | F, G, J               | 100  |
| CCR75CG271_               | 270              | F, G, J               | 50   |
| CCR75CG301_               | 300              | F, G, J               | 50   |
| CCR75CG331_               | 330              | F, G, J               | 50   |
| CCR75CG361_               | 360              | F, G, J               | 50   |
| CCR75CG391_               | 390              | F, G, J               | 50   |
| CCR75CG431_               | 430              | F, G, J               | 50   |
| CCR75CG471_               | 470              | F, G, J               | 50   |
| CCR75CG511_               | 510              | F, G, J               | 50   |
| CCR75CG561_               | 560              | F, G, J               | 50   |
| CCR75CG621_               | 620              | F, G, J               | 50   |
| CCR75CG681_               | 680              | F, G, J               | 50   |

Add appropriate failure rate level (M, P, R or S)  
 Add appropriate cap. tolerance letter

**Note:** For marking information, see page 63.

## Military Part Number Identification CC75 thru CC79 and CCR75 thru CCR79

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CC76, CCR76</b>        |                  |                       |      |
| CCR76CG820                | 82               | F, G, J               | 200  |
| CCR76CG910                | 91               | F, G, J               | 200  |
| CCR76CG101                | 100              | F, G, J               | 200  |
| CCR76CG111                | 110              | F, G, J               | 200  |
| CCR76CG121                | 120              | F, G, J               | 200  |
| CCR76CG131                | 130              | F, G, J               | 200  |
| CCR76CG271                | 270              | F, G, J               | 100  |
| CCR76CG301                | 300              | F, G, J               | 100  |
| CCR76CG331                | 330              | F, G, J               | 100  |
| CCR76CG361                | 360              | F, G, J               | 100  |
| CCR76CG391                | 390              | F, G, J               | 100  |
| CCR76CG431                | 430              | F, G, J               | 100  |
| CCR76CG471                | 470              | F, G, J               | 100  |
| CCR76CG511                | 510              | F, G, J               | 100  |
| CCR76CG561                | 560              | F, G, J               | 100  |
| CCR76CG621                | 620              | F, G, J               | 100  |
| CCR76CG681                | 680              | F, G, J               | 100  |
| CCR76CG751                | 750              | F, G, J               | 50   |
| CCR76CG821                | 820              | F, G, J               | 50   |
| CCR76CG911                | 910              | F, G, J               | 50   |
| CCR76CG102                | 1,000            | F, G, J               | 50   |
| <b>CC77, CCR77</b>        |                  |                       |      |
| CCR77CG151                | 150              | F, G, J               | 200  |
| CCR77CG161                | 160              | F, G, J               | 200  |
| CCR77CG181                | 180              | F, G, J               | 200  |
| CCR77CG201                | 200              | F, G, J               | 200  |
| CCR77CG221                | 220              | F, G, J               | 200  |
| CCR77CG241                | 240              | F, G, J               | 200  |
| CCR77CG271                | 270              | F, G, J               | 200  |
| CCR77CG301                | 300              | F, G, J               | 200  |
| CCR77CG331                | 330              | F, G, J               | 200  |
| CCR77CG361                | 360              | F, G, J               | 200  |
| CCR77CG391                | 390              | F, G, J               | 200  |
| CCR77CG431                | 430              | F, G, J               | 200  |
| CCR77CG471                | 470              | F, G, J               | 200  |
| CCR77CG511                | 510              | F, G, J               | 200  |
| CCR77CG561                | 560              | F, G, J               | 200  |
| CCR77CG621                | 620              | F, G, J               | 200  |
| CCR77CG681                | 680              | F, G, J               | 200  |
| CCR77CG751                | 750              | F, G, J               | 100  |
| CCR77CG821                | 820              | F, G, J               | 100  |
| CCR77CG911                | 910              | F, G, J               | 100  |
| CCR77CG102                | 1,000            | F, G, J               | 100  |
| CCR77CG112                | 1,100            | F, G, J               | 100  |
| CCR77CG122                | 1,200            | F, G, J               | 100  |
| CCR77CG132                | 1,300            | F, G, J               | 100  |
| CCR77CG152                | 1,500            | F, G, J               | 100  |
| CCR77CG162                | 1,600            | F, G, J               | 100  |
| CCR77CG182                | 1,800            | F, G, J               | 100  |
| CCR77CG202                | 2,000            | F, G, J               | 100  |
| CCR77CG222                | 2,200            | F, G, J               | 100  |
| CCR77CG242                | 2,400            | F, G, J               | 50   |
| CCR77CG272                | 2,700            | F, G, J               | 50   |

Add appropriate failure rate level (M, P, R or S)  
 Add appropriate cap. tolerance letter

| Military Type Designation | Capacitance (pF) | Capacitance Tolerance | WVDC |
|---------------------------|------------------|-----------------------|------|
| <b>CC77, CCR77 (cont)</b> |                  |                       |      |
| CCR77CG302                | 3,000            | F, G, J               | 50   |
| CCR77CG332                | 3,300            | F, G, J               | 50   |
| CCR77CG362                | 3,600            | F, G, J               | 50   |
| CCR77CG392                | 3,900            | F, G, J               | 50   |
| CCR77CG432                | 4,300            | F, G, J               | 50   |
| CCR77CG472                | 4,700            | F, G, J               | 50   |
| CCR77CG512                | 5,100            | F, G, J, K            | 50   |
| CCR77CG562                | 5,600            | F, G, J, K            | 50   |
| <b>CC78, CCR78</b>        |                  |                       |      |
| CCR78CG821                | 820              | F, G, J, K            | 200  |
| CCR78CG102                | 1,000            | F, G, J, K            | 200  |
| CCR78CG122                | 1,200            | F, G, J, K            | 200  |
| CCR78CG152                | 1,500            | F, G, J, K            | 200  |
| CCR78CG182                | 1,800            | F, G, J, K            | 200  |
| CCR78CG222                | 2,200            | F, G, J, K            | 200  |
| CCR78CG272                | 2,700            | F, G, J, K            | 200  |
| CCR78CG332                | 3,300            | F, G, J, K            | 200  |
| CCR78CG392                | 3,900            | F, G, J, K            | 100  |
| CCR78CG472                | 4,700            | F, G, J, K            | 100  |
| CCR78CG562                | 5,600            | F, G, J, K            | 100  |
| CCR78CG682                | 6,800            | F, G, J, K            | 100  |
| CCR78CG822                | 8,200            | F, G, J, K            | 100  |
| CCR78CG103                | 10,000           | F, G, J, K            | 100  |
| CCR78CG123                | 12,000           | F, G, J, K            | 100  |
| CCR78CG153                | 15,000           | F, G, J, K            | 50   |
| CCR78CG183                | 18,000           | F, G, J, K            | 50   |
| CCR78CG223                | 22,000           | F, G, J, K            | 50   |
| CCR78CG273                | 27,000           | F, G, J, K            | 50   |
| <b>CC79, CCR79</b>        |                  |                       |      |
| CCR79CG392                | 3,900            | F, G, J, K            | 200  |
| CCR79CG472                | 4,700            | F, G, J, K            | 200  |
| CCR79CG562                | 5,600            | F, G, J, K            | 200  |
| CCR79CG682                | 6,800            | F, G, J, K            | 200  |
| CCR79CG822                | 8,200            | F, G, J, K            | 200  |
| CCR79CG103                | 10,000           | F, G, J, K            | 200  |
| CCR79CG153                | 15,000           | F, G, J, K            | 100  |
| CCR79CG183                | 18,000           | F, G, J, K            | 100  |
| CCR79CG223                | 22,000           | F, G, J, K            | 100  |
| CCR79CG273                | 27,000           | F, G, J, K            | 100  |
| CCR79CG333                | 33,000           | F, G, J, K            | 100  |
| CCR79CG393                | 39,000           | F, G, J, K            | 100  |
| CCR79CG473                | 47,000           | F, G, J, K            | 50   |
| CCR79CG563                | 56,000           | F, G, J, K            | 50   |
| CCR79CG683                | 68,000           | F, G, J, K            | 50   |
| CCR79CG823                | 82,000           | F, G, J, K            | 50   |

Add appropriate failure rate level (M, P, R or S)  
 Add appropriate cap. tolerance letter

**Note:** Complete type designation will include the appropriate capacitance tolerance in the 11th digit. For CC styles, delete 3rd and 12th digits.

**Note:** For marking information, see page 62.

## MARKING

Radials**CC05 & CC09**

|                    |                    |
|--------------------|--------------------|
| CC05<br>CH<br>100G | 9910<br>A0<br>4222 |
| FRONT              | BACK               |

Date Code  
A=Lot Letter  
0=1st Digit of AVX FSCM #  
4222=Last four digits of  
AVX FSCM #

**CCR05 & CCR09**

|                      |                     |
|----------------------|---------------------|
| CCR0<br>5CH1<br>00GM | 9910<br>AJ0<br>4222 |
| FRONT                | BACK                |

Date Code  
A=Lot Letter  
J="J" or "JAN" Brand  
0=1st Digit of AVX FSCM #  
4222=Last four digits of  
AVX FSCM #

**CC06**

|                    |                        |
|--------------------|------------------------|
| CC06<br>CG<br>102F | 9910A<br>200V<br>04222 |
| FRONT              | BACK                   |

Date Code & Lot Letter  
200V=Rated Voltage  
04222=AVX FSCM #

**CCR06**

|                      |                         |
|----------------------|-------------------------|
| CCR06<br>CG102<br>FM | 9910A<br>J200V<br>04222 |
| FRONT                | BACK                    |

Date Code & Lot Letter  
J="J" or "JAN" Brand  
200V=Rated Voltage  
04222=AVX FSCM #

**CC07**

|                         |
|-------------------------|
| CG<br>103<br>G9<br>AAVX |
|-------------------------|

Characteristic  
Capacitance Value  
Cap. Tolerance & Year Code (9 for 1999)  
Lot Code & Trademark

**CCR07**

|                           |
|---------------------------|
| JCG<br>103<br>GM9<br>AAVX |
|---------------------------|

"J" Brand (J) and Characteristic (CG)  
Capacitance Value  
Cap. Tolerance (G) FR Level (M), & Year Code (9 for 1999)  
Lot Code (A); and Trademark (AVX)

**CC08**

|                                              |
|----------------------------------------------|
| CC08CG<br>392K<br>AVX<br>96095<br>200V 9910A |
|----------------------------------------------|

Trademark or Manufacturer's Name  
Source Code (FSCM)  
Voltage, Date Code and Lot Symbol

**CCR08**

|                                                    |
|----------------------------------------------------|
| CCR08CG<br>392KM<br>JAN AVX<br>96095<br>200V 9910A |
|----------------------------------------------------|

"JAN" Brand & Trademark or Manufacturer's Name  
Source Code (FSCM)  
Voltage, Date Code and Lot Symbol

Axials**CC75, CC76**

|                           |
|---------------------------|
| CG<br>101<br>G99<br>10AAA |
|---------------------------|

Characteristic  
Capacitance Value  
Cap. Tolerance & 2 digit Year Code  
2 digit Week, 2 digit Lot Code, A for AVX

**CCR75, CCR76**

|                             |
|-----------------------------|
| JCG<br>101<br>GM99<br>10AAA |
|-----------------------------|

"J" Brand (J) and Characteristic (CG)  
Capacitance Value  
Cap. Tolerance (G) FR Level (M), & 2 digit Year Code  
2 digit Week, A for AVX

**CC77**

|                                   |
|-----------------------------------|
| CC77C<br>G151F<br>04222<br>9910AA |
|-----------------------------------|

Type Designation  
FSCM  
4 digit Date Code, 2 digit Lot Code

**CCR77**

|                                      |
|--------------------------------------|
| CCR77C<br>G151FM<br>JO4222<br>9910AA |
|--------------------------------------|

Type Designation  
"J" Brand and FSCM  
4 digit Date Code, 2 digit Lot Code

**CC78, CC79**

|                                                  |
|--------------------------------------------------|
| CC78CG<br>821K<br>AVX<br>04222<br>200V<br>9910AA |
|--------------------------------------------------|

Type Designation  
Trademark or Manufacturer's Name  
Source Code (FSCM)  
Voltage  
4 digit Date Code

**CCR78, CCR79**

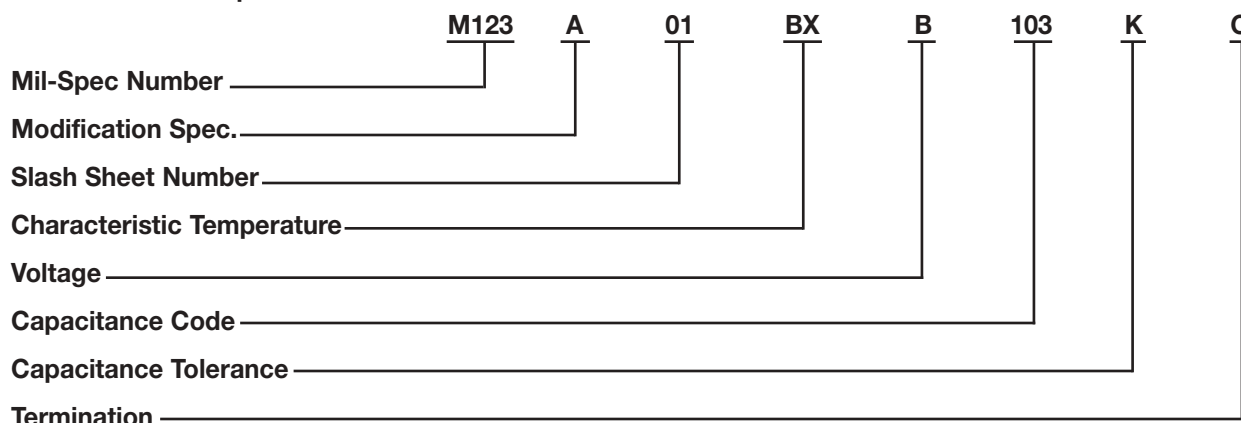
|                                                          |
|----------------------------------------------------------|
| CCR78<br>CG<br>821KM<br>JAN A<br>04222<br>200V<br>9910AA |
|----------------------------------------------------------|

Type Designation  
TC  
Capacitance Tolerance, Failure Rate  
"JAN" Brand, A for AVX  
FSCM  
Voltage  
4 digit Date Code, 2 digit Lot Code

## HOW TO ORDER

**Military Type Designation: Capacitors, Fixed, Ceramic Dielectric, (Temperature Stable and General Purpose), High Reliability**

### Part Number Example



## Part Number Codes

### Voltage-Temperature Limits:

| Symbol | Capacitance change with reference to 25°C over temperature range -55°C to +125°C |                       |
|--------|----------------------------------------------------------------------------------|-----------------------|
|        | Without Voltage                                                                  | With Rated DC Voltage |
| BP     | 0 ± 30 ppm/°C                                                                    | 0 ± 30 ppm/°C         |
| BX     | +15, -15 percent                                                                 | +15, -25 percent      |

### Rated Voltage:

| Symbol | Rated Voltage Volts, DC |
|--------|-------------------------|
| B      | 50                      |
| C      | 100                     |

### Capacitance Tolerance:

| Symbol | Cap. Tolerance ± |
|--------|------------------|
| C      | 0.25pF           |
| D      | 0.5 pF           |
| F      | 1%               |
| J      | 5%               |
| K      | 10%              |

### Termination:

| Lead Capacitors |                                                            |
|-----------------|------------------------------------------------------------|
| Symbol          | Termination Style                                          |
| C               | Copper, solder coated (type C-4 or C-5 of MIL-STD-1276)    |
| W               | Copper clad steel, solder coated, 60 micro inches minimum. |

## CROSS REFERENCE MIL-SPEC TEST REQUIREMENTS

| TEST DESCRIPTION                                        | MIL-C-123                                                 | MIL-C-39014 | MIL-C-20 | MIL-C-55681 |
|---------------------------------------------------------|-----------------------------------------------------------|-------------|----------|-------------|
| NDT (Non-Destructive Test)                              | 100% Ultrasonic Scan or Neutron-Radiography               | No          | No       | No          |
| Pre-Cap Visual (Pre-Encapsulation Visual Examination)   | 100%                                                      | No          | No       | No          |
| D.P.A. (Destructive Physical Analysis)                  | Lot by Lot—Pre-Termination<br>Lot by Lot—Finished Product | No          | No       | No          |
| Pre-Cap Terminal Strength (Pre-Encapsulation Pull Test) | Lot by Lot                                                | No          | No       | No          |
| Life Test (Lot by Lot)                                  | Lot by Lot—1000 Hours                                     | No          | No       | No          |
| Low Voltage Humidity                                    | Lot by Lot                                                | No          | No       | No          |
| Thermal Shock 100 Cycles                                | Lot by Lot                                                | No          | No       | No          |



## CKS05

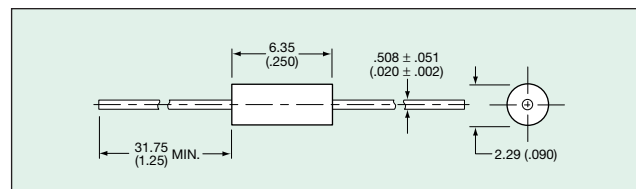
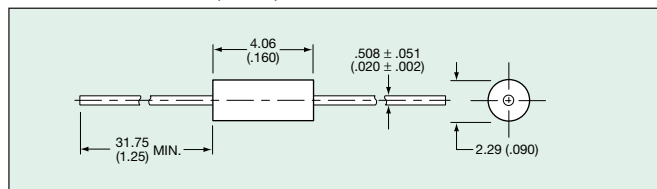
CKS06

| Part Number 1/  | Capacitance<br>pF | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|-----------------|-------------------|--------------------------|-----------------------------------|------------------|
| M123A02BPC271_C | 270               | F, J, K                  | BP                                | 100              |
| M123A02BPC301_C | 300               |                          |                                   |                  |
| M123A02BPC331_C | 330               |                          |                                   |                  |
| M123A02BPC361_C | 360               |                          |                                   |                  |
| M123A02BPC391_C | 390               |                          |                                   |                  |
| M123A02BPC431_C | 430               |                          |                                   |                  |
| M123A02BPC471_C | 470               |                          |                                   |                  |
| M123A02BPC511_C | 510               |                          |                                   |                  |
| M123A02BPC561_C | 560               |                          |                                   |                  |
| M123A02BPC621_C | 620               |                          |                                   |                  |
| M123A02BPC681_C | 680               |                          |                                   |                  |
| M123A02BPC751_C | 750               |                          |                                   |                  |
| M123A02BPC821_C | 820               |                          |                                   |                  |
| M123A02BPC911_C | 910               |                          |                                   |                  |
| M123A02BPC102_C | 1,000             |                          |                                   |                  |
| M123A02BPC112_C | 1,100             |                          |                                   |                  |
| M123A02BPC122_C | 1,200             |                          |                                   |                  |
| M123A02BPC132_C | 1,300             |                          |                                   |                  |
| M123A02BPC152_C | 1,500             |                          |                                   |                  |
| M123A02BPC162_C | 1,600             |                          |                                   |                  |
| M123A02BPC182_C | 1,800             | F, J, K                  | BP                                | 100              |
| M123A02BPC202_C | 2,000             |                          |                                   |                  |
| M123A02BPC222_C | 2,200             |                          |                                   |                  |
| M123A02BPC242_C | 2,400             |                          |                                   |                  |
| M123A02BPB272_C | 2,700             | F, J, K                  | BP                                | 50               |
| M123A02BPB302_C | 3,000             | ↓                        | ↓                                 | ↓                |
| M123A02BPB332_C | 3,300             |                          |                                   |                  |
| M123A02BPB362_C | 3,600             |                          |                                   |                  |
| M123A02BPB392_C | 3,900             |                          |                                   |                  |
| M123A02BPB432_C | 4,300             | F, J, K                  | BP                                | 50               |
| M123A02BPB472_C | 4,700             |                          |                                   |                  |
| M123A02BXC562KC | 5,600             | K                        | BX                                | 100              |
| M123A02BXC682KC | 6,800             |                          |                                   |                  |
| M123A02BXC822KC | 8,200             |                          |                                   |                  |
| M123A02BXC103KC | 10,000            |                          |                                   |                  |
| M123A02BXC123KC | 12,000            |                          |                                   |                  |
| M123A02BXC153KC | 15,000            |                          |                                   |                  |
| M123A02BXC183KC | 18,000            |                          |                                   |                  |
| M123A02BXC223KC | 22,000            |                          |                                   |                  |
| M123A02BXC273KC | 27,000            |                          |                                   |                  |
| M123A02BXC333KC | 33,000            |                          |                                   |                  |
| M123A02BXC393KC | 39,000            | ↓                        | ↓                                 | ↓                |
| M123A02BXC473KC | 47,000            |                          |                                   |                  |
| M123A02BXC563KC | 56,000            |                          |                                   |                  |
| M123A02BXC683KC | 68,000            |                          |                                   |                  |
| M123A02BXC823KC | 82,000            |                          |                                   |                  |
| M123A02BXC104KC | 100,000           | K                        | BX                                | 100              |
| M123A02BXB563KC | 56,000            | K                        | BX                                | 50               |
| M123A02BXB683KC | 68,000            |                          |                                   |                  |
| M123A02BXB823KC | 82,000            |                          |                                   |                  |
| M123A02BXB104KC | 100,000           |                          |                                   |                  |
| M123A02BXB124KC | 120,000           |                          |                                   |                  |
| M123A02BXB154KC | 150,000           |                          |                                   |                  |
| M123A02BXB184KC | 180,000           |                          |                                   |                  |
| M123A02BXB224KC | 220,000           |                          |                                   |                  |
| M123A02BXB274KC | 270,000           |                          |                                   |                  |
| M123A02BXB334KC | 330,000           |                          |                                   |                  |
| M123A02BXB394KC | 390,000           | ↓                        | ↓                                 | ↓                |
| M123A02BXB474KC | 470,000           |                          |                                   |                  |
|                 |                   | K                        | BX                                | 50               |

# MIL-C-123/Axial Leads



Dimensions: Millimeters (Inches)

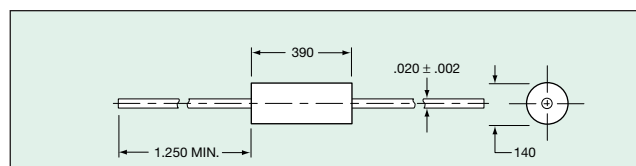


## MIL-C-123/STYLE CKS11, -/04

| Part Number 1/                                                                              | Capacitance<br>pF                         | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|---------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------|-----------------------------------|------------------|
| M123A04BPC4R7_W<br>M123A04BPC5R1_W<br>M123A04BPC6R2_W<br>M123A04BPC6R8_W<br>M123A04BPC7R5_W | 4.7<br>5.1<br>6.2<br>6.8<br>7.5           | C, D                     | BP                                | 100              |
| M123A04BPC8R2_W<br>M123A04BPC9R1_W<br>M123A04BPC100_W<br>M123A04BPC110_W<br>M123A04BPC120_W | 8.2<br>9.1<br>10<br>11<br>12              | C, J, K                  |                                   |                  |
| M123A04BPC130_W<br>M123A04BPC150_W<br>M123A04BPC160_W<br>M123A04BPC180_W<br>M123A04BPC200_W | 13<br>15<br>16<br>18<br>20                |                          |                                   |                  |
| M123A04BPC220_W<br>M123A04BPC240_W<br>M123A04BPC270_W<br>M123A04BPC300_W<br>M123A04BPC330_W | 22<br>24<br>27<br>30<br>33                |                          |                                   |                  |
| M123A04BPC360_W<br>M123A04BPC390_W<br>M123A04BPC430_W<br>M123A04BPC470_W<br>M123A04BPC510_W | 36<br>39<br>43<br>47<br>51                |                          |                                   |                  |
| M123A04BPC560_W<br>M123A04BPC620_W<br>M123A04BPC680_W<br>M123A04BPC750_W<br>M123A04BPC820_W | 56<br>62<br>68<br>75<br>82                |                          |                                   |                  |
| M123A04BPC910_W<br>M123A04BPC101_W                                                          | 91<br>100                                 | C, J, K                  | BP                                | 100              |
| M123A04BPB111_W<br>M123A04BPB121_W<br>M123A04BPB131_W<br>M123A04BPB151_W<br>M123A04BPB161_W | 110<br>120<br>130<br>150<br>160           | F, J, K                  | BP                                | 50               |
| M123A04BPB181_W<br>M123A04BPB201_W<br>M123A04BPB221_W<br>M123A04BPB241_W<br>M123A04BPB271_W | 180<br>200<br>220<br>240<br>270           |                          |                                   |                  |
| M123A04BPB301_W<br>M123A04BPB331_W<br>M123A04BPB361_W<br>M123A04BPB391_W<br>M123A04BPB431_W | 300<br>330<br>360<br>390<br>430           |                          |                                   |                  |
| M123A04BPB471_W<br>M123A04BPB511_W<br>M123A04BPB561_W                                       | 470<br>510<br>560                         | F, J, K                  | BP                                | 50               |
| M123A04BXC101KW<br>M123A04BXC121KW<br>M123A04BXC151KW<br>M123A04BXC181KW<br>M123A04BXC221KW | 100<br>120<br>150<br>180<br>220           | K                        | BX                                | 100              |
| M123A04BXC271KW<br>M123A04BXC331KW<br>M123A04BXC391KW<br>M123A04BXC471KW<br>M123A04BXC561KW | 270<br>330<br>390<br>470<br>560           |                          |                                   |                  |
| M123A04BXC681KW<br>M123A04BXC821KW<br>M123A04BXC102KW                                       | 680<br>820<br>1,000                       | K                        | BX                                | 100              |
| M123A04BXC122KW<br>M123A04BXC152KW<br>M123A04BXC182KW<br>M123A04BXC222KW<br>M123A04BXC272KW | 1,200<br>1,500<br>1,800<br>2,200<br>2,700 |                          |                                   |                  |
| M123A04BXC332KW<br>M123A04BXC392KW<br>M123A04BXC472KW                                       | 3,300<br>3,900<br>4,700                   | K                        | BX                                | 50               |

## MIL-C-123/STYLE CKS12, -/05

| Part Number 1/                                                                              | Capacitance<br>pF                         | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|---------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------|-----------------------------------|------------------|
| M123A05BPC111_W<br>M123A05BPC121_W<br>M123A05BPC131_W<br>M123A05BPC151_W<br>M123A05BPC161_W | 110<br>120<br>130<br>150<br>160           | F, J, K                  | BP                                | 100              |
| M123A05BPC181_W<br>M123A05BPC201_W<br>M123A05BPC221_W                                       | 180<br>200<br>220                         | F, J, K                  | BP                                | 100              |
| M123A05BPB241_W<br>M123A05BPB271_W<br>M123A05BPB301_W<br>M123A05BPB331_W<br>M123A05BPB361_W | 240<br>270<br>300<br>330<br>360           | F, J, K                  | BP                                | 50               |
| M123A05BPB391_W<br>M123A05BPB431_W<br>M123A05BPB471_W                                       | 390<br>430<br>470                         | F, J, K                  | BP                                | 50               |
| M123A05BXC122KW<br>M123A05BXC152KW<br>M123A05BXC182KW<br>M123A05BXC222KW<br>M123A05BXC272KW | 1,200<br>1,500<br>1,800<br>2,200<br>2,700 | K                        | BX                                | 100              |
| M123A05BXC332KW<br>M123A05BXC392KW<br>M123A05BXC472KW                                       | 3,300<br>3,900<br>4,700                   | K                        | BX                                | 100              |
| M123A05BXC562KW<br>M123A05BXC682KW<br>M123A05BXC822KW<br>M123A05BXC103KW                    | 5,600<br>6,800<br>8,200<br>10,000         | K                        | BX                                | 50               |

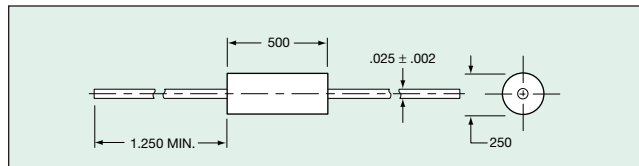


## MIL-C-123/STYLE CKS14, -/06

| Part Number 1/                                                                              | Capacitance<br>pF                         | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|---------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------|-----------------------------------|------------------|
| M123A06BPC241_W<br>M123A06BPC271_W<br>M123A06BPC301_W<br>M123A06BPC331_W<br>M123A06BPC361_W | 240<br>270<br>300<br>330<br>360           | F, J, K                  | BP                                | 100              |
| M123A06BPC391_W<br>M123A06BPC431_W<br>M123A06BPC471_W<br>M123A06BPC511_W<br>M123A06BPC561_W | 390<br>430<br>470<br>510<br>560           |                          |                                   |                  |
| M123A06BPC621_W<br>M123A06BPC681_W<br>M123A06BPC751_W<br>M123A06BPC821_W<br>M123A06BPC911_W | 620<br>680<br>750<br>820<br>910           |                          |                                   |                  |
| M123A06BPC102_W                                                                             | 1,000                                     | F, J, K                  | BP                                | 100              |
| M123A06BPB112_W<br>M123A06BPB122_W<br>M123A06BPB132_W<br>M123A06BPB152_W<br>M123A06BPB162_W | 1,100<br>1,200<br>1,300<br>1,500<br>1,600 | F, J, K                  | BP                                | 50               |
| M123A06BPB182_W<br>M123A06BPB202_W<br>M123A06BPB222_W<br>M123A06BPB242_W                    | 1,800<br>2,000<br>2,200<br>2,400          | F, J, K                  | BP                                | 50               |

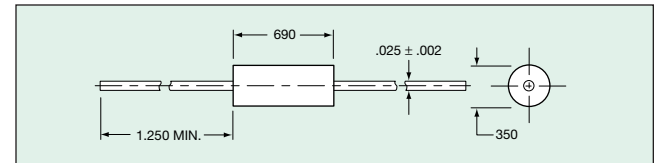
## MIL-C-123/STYLE CKS14, -/06 (continued)

| Part Number 1/                                                                              | Capacitance<br>pF                              | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|---------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------|-----------------------------------|------------------|
| M123A06BPB272_W<br>M123A06BPB302_W<br>M123A06BPB332_W<br>M123A06BPB362_W<br>M123A06BPB392_W | 2,700<br>3,000<br>3,300<br>3,600<br>3,900      | F, J, K<br>↓             | BP<br>↓                           | 50<br>↓          |
| M123A06BPB432_W<br>M123A06BPB472_W<br>M123A06BPB512_W<br>M123A06BPB562_W<br>M123A06BPB622_W | 4,300<br>4,700<br>5,100<br>5,600<br>6,200      | ↓                        | ↓                                 | ↓                |
| M123A06BPB682_W                                                                             | 6,800                                          | F, J, K                  | BP                                | 50               |
| M123A06BXC562KW<br>M123A06BXC682KW<br>M123A06BXC822KW<br>M123A06BXC103KW                    | 5,600<br>6,800<br>8,200<br>10,000              | K<br>↓<br>K              | BX<br>↓<br>BX                     | 100<br>↓<br>100  |
| M123A06BXC123KW<br>M123A06BXC153KW<br>M123A06BXC183KW<br>M123A06BXC223KW<br>M123A06BXC273KW | 12,000<br>15,000<br>18,000<br>22,000<br>27,000 | K<br>↓                   | BX<br>↓                           | 50<br>↓          |
| M123A06BXC333KW<br>M123A06BXC393KW<br>M123A06BXC473KW                                       | 33,000<br>39,000<br>47,000                     | ↓<br>K                   | ↓<br>BX                           | ↓<br>50          |



## MIL-C-123/STYLE CKS15, -/07

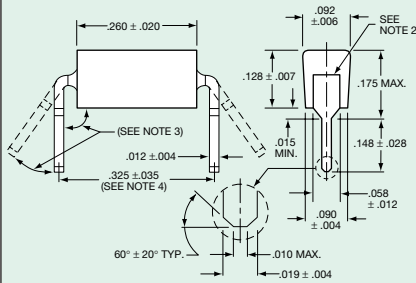
| Part Number 1/                                                                                                                    | Capacitance<br>pF                                                   | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------|-----------------------------------|------------------|
| M123A07BPC112_W<br>M123A07BPC122_W<br>M123A07BPC132_W<br>M123A07BPC152_W<br>M123A07BPC162_W                                       | 1,100<br>1,200<br>1,300<br>1,500<br>1,600                           | F, J, K<br>↓             | BP<br>↓                           | 100<br>↓         |
| M123A07BPC182_W<br>M123A07BPC202_W<br>M123A07BPC222_W                                                                             | 1,800<br>2,000<br>2,200                                             | F, J, K                  | BP                                | 100              |
| M123A07BPB242_W<br>M123A07BPB272_W<br>M123A07BPB302_W<br>M123A07BPB332_W<br>M123A07BPB362_W                                       | 2,400<br>2,700<br>3,000<br>3,300<br>3,600                           | F, J, K<br>↓             | BP<br>↓                           | 50<br>↓          |
| M123A07BPB392_W<br>M123A07BPB432_W<br>M123A07BPB472_W<br>M123A07BPB512_W<br>M123A07BPB562_W                                       | 3,900<br>4,300<br>4,700<br>5,100<br>5,600                           | ↓                        | ↓                                 | ↓                |
| M123A07BPB622_W<br>M123A07BPB682_W<br>M123A07BPB752_W<br>M123A07BPB822_W<br>M123A07BPB912_W                                       | 6,200<br>6,800<br>7,500<br>8,200<br>9,100                           | ↓                        | ↓                                 | ↓                |
| M123A07BPB103_W<br>M123A07BPB113_W<br>M123A07BPB123_W<br>M123A07BPB133_W<br>M123A07BPB153_W                                       | 10,000<br>11,000<br>12,000<br>13,000<br>15,000                      | ↓                        | ↓                                 | ↓                |
| M123A07BPB163_W<br>M123A07BPB183_W<br>M123A07BPB203_W<br>M123A07BPB223_W                                                          | 16,000<br>18,000<br>20,000<br>22,000                                | F, J, K                  | BP                                | 50               |
| M123A07BXC123KW<br>M123A07BXC153KW<br>M123A07BXC183KW<br>M123A07BXC223KW<br>M123A07BXC273KW                                       | 12,000<br>15,000<br>18,000<br>22,000<br>27,000                      | K<br>↓                   | BX<br>↓                           | 100<br>↓         |
| M123A07BXC333KW<br>M123A07BXC393KW<br>M123A07BXC473KW<br>M123A07BXC563KW<br>M123A07BXC683KW<br>M123A07BXC823KW<br>M123A07BXC104KW | 33,000<br>39,000<br>47,000<br>56,000<br>68,000<br>82,000<br>100,000 | ↓<br>K                   | ↓<br>BX                           | ↓<br>100         |
| M123A07BXC124KW<br>M123A07BXC154KW<br>M123A07BXC184KW                                                                             | 120,000<br>150,000<br>180,000                                       | K<br>↓<br>K              | BX<br>↓<br>BX                     | 50<br>↓<br>50    |



## MIL-C-123/STYLE CKS16, -/08

| Part Number 1/                                                                              | Capacitance<br>pF                                   | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------|-----------------------------------|------------------|
| M123A08BPC242_W<br>M123A08BPC272_W<br>M123A08BPC302_W<br>M123A08BPC332_W                    | 2,400<br>2,700<br>3,000<br>3,300                    | F, J, K<br>↓             | BP<br>↓                           | 100<br>↓         |
| M123A08BPC362_W<br>M123A08BPC392_W<br>M123A08BPC432_W<br>M123A08BPC472_W<br>M123A08BPC512_W | 3,600<br>3,900<br>4,300<br>4,700<br>5,100           | ↓                        | ↓                                 | ↓                |
| M123A08BPC562_W<br>M123A08BPC622_W<br>M123A08BPC682_W<br>M123A08BPC822_W<br>M123A08BPC912_W | 5,600<br>6,200<br>6,800<br>8,200<br>9,100           | ↓                        | ↓                                 | ↓                |
| M123A08BPC103_W                                                                             | 10,000                                              | F, J, K                  | BP                                | 100              |
| M123A08BPB113_W<br>M123A08BPB123_W<br>M123A08BPB133_W<br>M123A08BPB153_W<br>M123A08BPB163_W | 11,000<br>12,000<br>13,000<br>15,000<br>16,000      | F, J, K<br>↓             | BP<br>↓                           | 50<br>↓          |
| M123A08BPB183_W<br>M123A08BPB203_W<br>M123A08BPB223_W                                       | 18,000<br>20,000<br>22,000                          | F, J, K                  | BP                                | 50               |
| M123A08BXC124KW<br>M123A08BXC154KW<br>M123A08BXC184KW<br>M123A08BXC224KW<br>M123A08BXC274KW | 120,000<br>150,000<br>180,000<br>220,000<br>270,000 | K<br>↓                   | BX<br>↓                           | 100<br>↓         |
| M123A08BXC334KW<br>M123A08BXC394KW<br>M123A08BXC474KW                                       | 330,000<br>390,000<br>470,000                       | K                        | BX                                | 100              |
| M123A08BXC564KW<br>M123A08BXC684KW<br>M123A08BXC824KW<br>M123A08BXC105KW                    | 560,000<br>680,000<br>820,000<br>1,000,000          | K<br>↓<br>K              | BX<br>↓<br>BX                     | 50<br>↓<br>50    |

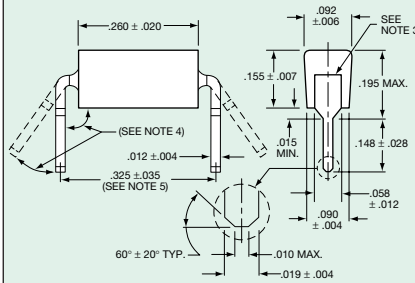
## STYLE CKS22, -/16



### NOTES:

1. Dimensions are in inches.
2. Leads shall be centered within  $\pm .005$  (0.13mm).
3. The angle shall be  $95^\circ + 10^\circ, -5^\circ$ .
4. The distance between the centers of the mounting holes will be  $.300 \pm .010$  inch (7.62  $\pm 0.25$ mm).
5. Nonconductive material shall not extend beyond .030 inch (0.76mm) from the edge of the capacitor body.

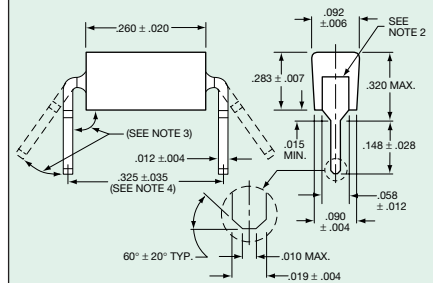
## STYLE CKS23, -/17



### NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Leads shall be centered within  $\pm .005$  (0.13mm).
4. The angle shall be  $95^\circ + 10^\circ, -5^\circ$ .
5. The distance between the centers of the mounting holes will be  $.300 \pm .010$  inch (7.62  $\pm 0.25$ mm).
6. Nonconductive materials shall not extend beyond .030 inch (0.76mm) from the edge of the capacitor body.

## STYLE CKS24, -/18



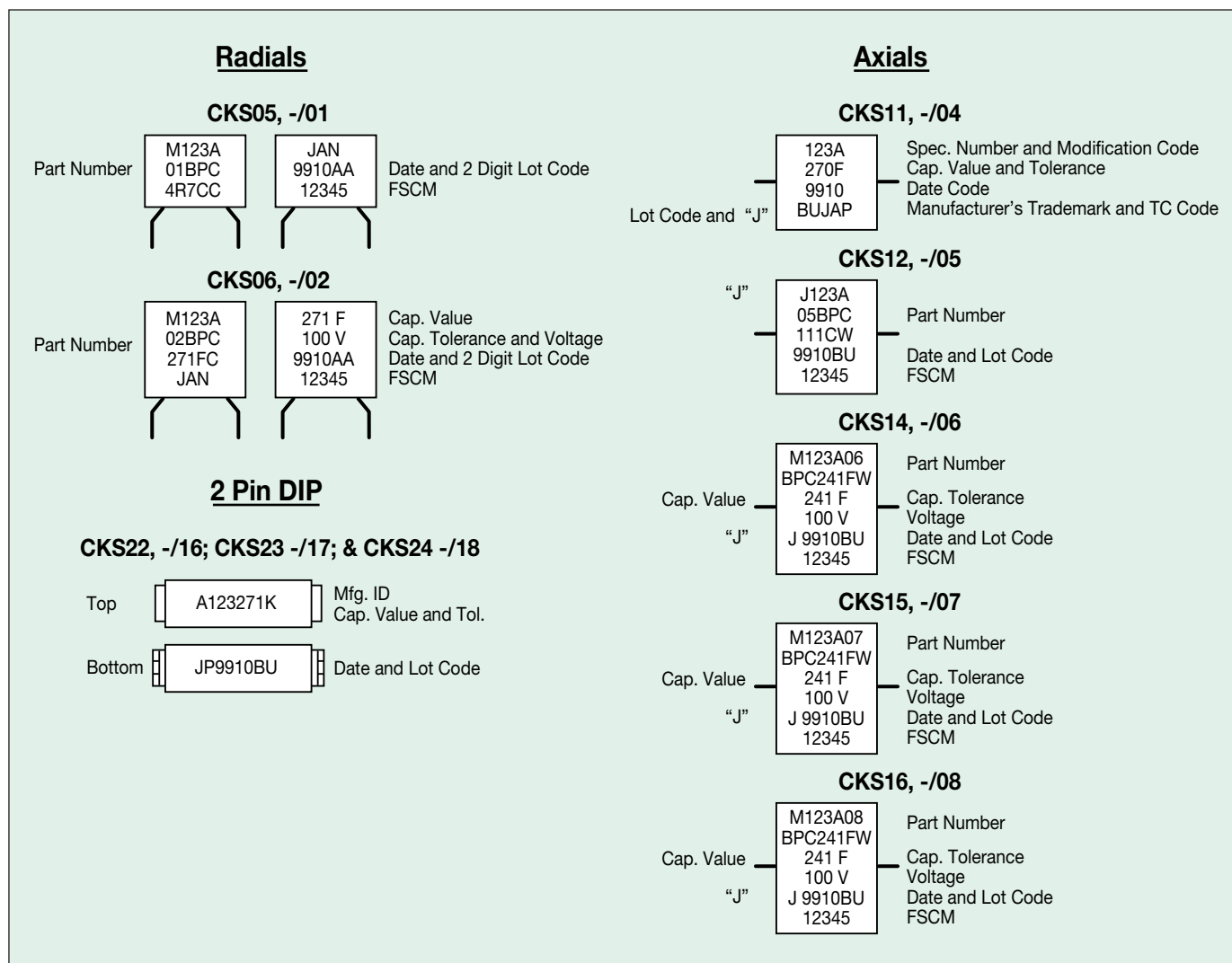
### NOTES:

1. Dimensions are in inches.
2. Leads shall be centered within  $\pm .005$  (0.13mm).
3. The angle shall be  $95^\circ + 10^\circ, -5^\circ$ .
4. The distance between the centers of the mounting holes will be  $.300 \pm .010$  inch (7.62  $\pm 0.25$ mm).
5. Nonconductive material shall not extend beyond .030 inch (0.76mm) from the edge of the capacitor body.

## MIL-C-123/STYLE CKS22, -/16

| Part Number 1/  | Capacitance<br>pf | Capacitance<br>Tolerance | Voltage-<br>Temperature<br>Limits | Rated<br>Voltage |
|-----------------|-------------------|--------------------------|-----------------------------------|------------------|
| M123A16BPD1R0DC | 1.0               | D                        | BP                                | 200              |
| M123A16BPD1R2DC | 1.2               |                          |                                   |                  |
| M123A16BPD1R5DC | 1.5               |                          |                                   |                  |
| M123A16BPD1R8DC | 1.8               |                          |                                   |                  |
| M123A16BPD2R2DC | 2.2               |                          |                                   |                  |
| M123A16BPD2R7DC | 2.7               |                          |                                   |                  |
| M123A16BPD3R3DC | 3.3               |                          |                                   |                  |
| M123A16BPD3R9DC | 3.9               |                          |                                   |                  |
| M123A16BPD4R7DC | 4.7               |                          |                                   |                  |
| M123A16BPD5R6DC | 5.6               |                          |                                   |                  |
| M123A16BPD6R8DC | 6.8               | D, J, K                  |                                   |                  |
| M123A16BPD8R2DC | 8.2               |                          |                                   |                  |
| M123A16BPD100_C | 10                |                          |                                   |                  |
| M123A16BPD120_C | 12                |                          |                                   |                  |
| M123A16BPD150_C | 15                |                          |                                   |                  |
| M123A16BPD180_C | 18                |                          |                                   |                  |
| M123A16BPD220_C | 22                |                          |                                   |                  |
| M123A16BPD270_C | 27                |                          |                                   |                  |
| M123A16BPD330_C | 33                |                          |                                   |                  |
| M123A16BPD390_C | 39                |                          |                                   |                  |
| M123A16BPD470_C | 47                | F, J, K                  |                                   |                  |
| M123A16BPD560_C | 56                |                          |                                   |                  |
| M123A16BPD680_C | 68                |                          |                                   |                  |
| M123A16BPD820_C | 82                |                          |                                   |                  |
| M123A16BPD101_C | 100               |                          |                                   |                  |
| M123A16BPD121_C | 120               |                          |                                   |                  |
| M123A16BPD151_C | 150               |                          |                                   |                  |
| M123A16BPD181_C | 180               |                          |                                   |                  |
| M123A16BPD221_C | 220               |                          |                                   |                  |
| M123A16BPD271_C | 270               |                          |                                   |                  |
| M123A16BPD331_C | 330               | F, J, K                  | BP                                | 200              |
| M123A16BPD391_C | 390               |                          |                                   |                  |
| M123A16BPD471_C | 470               |                          |                                   |                  |
| M123A16BPC561_C | 560               | F, J, K                  | BP                                | 100              |
| M123A16BPC681_C | 680               |                          |                                   |                  |
| M123A16BPC821_C | 820               |                          |                                   |                  |
| M123A16BPC102_C | 1000              |                          |                                   |                  |
| M123A16BPC122_C | 1200              |                          |                                   |                  |
| M123A16BPC152_C | 1500              |                          |                                   |                  |
| M123A16BPC182_C | 1800              | F, J, K                  | BP                                | 100              |
| M123A16BPC222_C | 2200              |                          |                                   |                  |
| M123A16BPC272_C | 2700              |                          |                                   |                  |
| M123A16BPC332_C | 3300              | F, J, K                  | BP                                | 50               |
| M123A16BPC392_C | 3900              |                          |                                   |                  |
| M123A16BPC472_C | 4700              |                          |                                   |                  |
| M123A16BXD271KC | 270               | K<br>K, M<br>K           | BX                                | 200              |
| M123A16BXD331_C | 330               |                          |                                   |                  |
| M123A16BXD391KC | 390               |                          |                                   |                  |
| M123A16BXD471_C | 470               | K, M<br>K                |                                   |                  |
| M123A16BXD561KC | 560               |                          |                                   |                  |
| M123A16BXD681_C | 680               |                          |                                   |                  |
| M123A16BXD821KC | 820               | K, M                     | BX                                | 200              |
| M123A16BXC122_C | 1000              | K, M<br>K<br>K, M        | BX                                | 100              |
| M123A16BXC122KC | 1200              |                          |                                   |                  |
| M123A16BXC152_C | 1500              |                          |                                   |                  |
| M123A16BXC182KC | 1800              | K, M                     |                                   |                  |
| M123A16BXC222_C | 2200              |                          |                                   |                  |
| M123A16BXC222_C | 2200              |                          |                                   |                  |

## MARKING



## MILITARY PART NUMBER CROSS REFERENCE MIL-C-123/

| MIL-C-123 |         | MIL-C-39014 |           | MIL-C-20 |        | MIL-C-55681 |           | AVX CATALOG |
|-----------|---------|-------------|-----------|----------|--------|-------------|-----------|-------------|
| CKS #     | M123/ - | CKR #       | M39014/ - | CCR #    | M20/ - | CDR #       | M55681/ - |             |
| CKS05     | /1      | CKR05       | /01       | CCR05    | /35    | N/A         | N/A       | MR05        |
| CKS06     | /2      | CKR06       | /02       | CCR06    | /36    | N/A         | N/A       | MR06        |
| CKS11     | /4      | CKR11       | /05       | CCR75    | /27    | N/A         | N/A       | MA10        |
| CKS12     | /5      | CKR12       | /05       | CCR76    | /28    | N/A         | N/A       | MA20        |
| CKS14     | /6      | CKR14       | /05       | CCR77    | /29    | N/A         | N/A       | MA40        |
| CKS15     | /7      | CKR15       | /05       | CCR78    | /30    | N/A         | N/A       | MA50        |
| CKS16     | /8      | CKR16       | /05       | CCR79    | /31    | N/A         | N/A       | MA60        |
| CKS51     | /10     | N/A         | N/A       | N/A      | N/A    | CDR01       | /1        | 0805        |
| CKS52     | /11     | N/A         | N/A       | N/A      | N/A    | N/A         | N/A       | 1210        |
| CKS53     | /12     | N/A         | N/A       | N/A      | N/A    | CDR03       | /1        | 1808        |
| CKS54     | /13     | N/A         | N/A       | N/A      | N/A    | CDR06       | /3        | 2225        |
| CKS22     | /16     | CKR22       | /22       | N/A      | N/A    | N/A         | N/A       | MD01        |
| CKS23     | /17     | CKR23       | /22       | N/A      | N/A    | N/A         | N/A       | MD02        |
| CKS24     | /18     | CKR24       | /22       | N/A      | N/A    | N/A         | N/A       | MD03        |

## CECC 30-601 & 30-701

SkyCap, SpinGuards and Ceralam capacitors are available to European CECC specifications covering three standard dielectric materials: 1B/C0G, 2C1/X7R and 2F4/Y5V.

To order use AVX part number with the Failure Rate code of “T” for CECC.

### SpinGuard – CECC

| 1B/A<br>BSCECC 30 601 010 Issue 1 |         |         |         | 2C1/C<br>BSCECC 30 701 014 Issue 1 |         |         | 2F4/E<br>BSCECC 30 701 015 Issue 1 |         |
|-----------------------------------|---------|---------|---------|------------------------------------|---------|---------|------------------------------------|---------|
|                                   | 50V     | 100V    | 200V    | 50V                                | 100V    | 200V    | 50V                                | 100V    |
| A/SA10                            | 1R0-102 | 1R0-102 | 1R0-681 | 221-393                            | 221-273 | 221-682 | 102-224                            | 102-154 |
| B/SA20                            | 1R0-222 | 1R0-222 | 1R0-152 | 271-823                            | 271-563 | 271-153 | 472-474                            | 472-334 |
| C/SA30                            | 3R3-562 | 3R3-472 | 3R3-392 | 561-184                            | 561-154 | 561-333 | 103-105                            | 103-824 |

### Molded Radial – CECC

| 1B/A<br>CECC 30 601 009 Issue 1 |         |         |         | 2C1/C<br>CECC 30 701 007 Issue 1 |         |         | 2F4/E<br>CECC 30 701 008 Issue 1 |         |
|---------------------------------|---------|---------|---------|----------------------------------|---------|---------|----------------------------------|---------|
|                                 | 50V     | 100V    | 200V    | 50V                              | 100V    | 200V    | 50V                              | 100V    |
| B/MR05                          | 1R0-682 | 1R0-472 | 1R0-332 | 221-224                          | 221-154 | 221-393 | 103-125                          | 103-224 |
| C/MR06                          | 1R0-223 | 1R0-153 | 1R0-123 | 122-105                          | 122-474 | 122-124 | 223-335                          | 223-684 |

### SkyCap – CECC

|           |           |           |            |            |            |            |
|-----------|-----------|-----------|------------|------------|------------|------------|
| SR15 = D2 | SR20 = D6 | SR21 = D7 | SR30 = D11 | SR40 = D15 | SR50 = D14 | SR65 = D16 |
|-----------|-----------|-----------|------------|------------|------------|------------|

| 1B/A<br>CECC 30 601 801 Issue 2 |         |         |         |         | 2C1/C<br>CECC 30 701 801 Issue 2 |         |         |         | 2F4/E<br>CECC 30 701 802 Issue 1 |         |
|---------------------------------|---------|---------|---------|---------|----------------------------------|---------|---------|---------|----------------------------------|---------|
|                                 | 50V     | 100V    | 200V    | 500V    | 50V                              | 100V    | 200V    | 500V    | 50V                              | 100V    |
| SR15                            | 1R0-122 | 1R0-681 | 1R0-471 | —       | 221-333                          | 221-273 | 221-562 | —       | 103-154                          | 103-393 |
| SR20                            | 1R0-682 | 1R0-392 | 1R0-392 | 1R0-152 | 102-184                          | 102-124 | 102-333 | 102-103 | 103-824                          | 103-224 |
| SR21                            | 1R0-682 | 1R0-392 | 1R0-392 | 1R0-152 | 102-184                          | 102-124 | 102-333 | 102-153 | 103-824                          | 103-224 |
| SR30                            | 102-273 | 102-223 | 102-223 | 101-472 | 333-105                          | 333-334 | 333-124 | 103-473 | 104-225                          | 104-684 |
| SR40                            | 103-563 | 103-393 | 103-393 | —       | 334-155                          | 334-105 | 124-274 | —       | 105-156                          | 105-335 |
| SR50                            | 103-104 | 103-823 | 103-563 | —       | 104-155                          | 104-185 | 104-564 | —       | 225-276                          | 225-685 |
| SR65                            | 102-273 | 102-223 | 102-103 | 101-472 | 333-105                          | 333-334 | 333-124 | 103-473 | 104-225                          | 104-684 |

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