

**POWER DISCRETES****Description**

**Semtech Premium Dielectric  
High Voltage Capacitors  
Monolithic Ceramic type**

Semtech's premium dielectric capacitors demonstrate minimum capacitance change over the operation voltage and temperature range, high current carrying capability and high volumetric efficiency. This X7R body has been designed into the most demanding applications: from the one extreme of satellite, missile, space shuttle, and avionics programs to the other extreme of "down hole" oil exploration equipment.

**Features**

- ◆ X7R dielectric
- ◆ 1kV to 5kV voltage range

**General Specifications**

- ◆ Operating temperature range -55°C to 125°C
- ◆ Aging rate <1.0% per decade hour
- ◆ Insulation resistance: 100k megΩ or 1000megΩ microfarads, whichever is less, at 500VDC, 25°C
- ◆ Dissipation factor: 2.5% max at 1kHz 1 VAC, 25°C
- ◆ Dielectric withstanding voltage: 1.2 x rated voltage at 25°C (Test conducted with charging current limited to 10mA and discharge current limited to 10A)
- ◆ Temperature coefficient: ± 15% over -55°C to 125°C range
- ◆ "S" size package type available

**POWER DISCRETES**
**Capability Matrix**

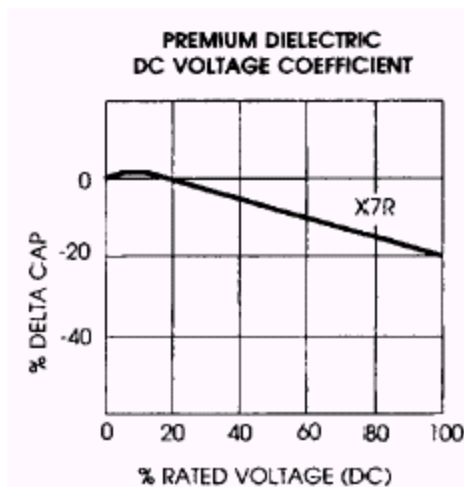
|        | 1kV |   |   |   |   | 2kV |   |   |   |   | 3kV |   |   |   |   | 4kV |   |   |   |   | 5kV |   |   |   |   | EIA CODE |
|--------|-----|---|---|---|---|-----|---|---|---|---|-----|---|---|---|---|-----|---|---|---|---|-----|---|---|---|---|----------|
| SIZE   | 2   | 3 | 4 | 5 | 6 | 2   | 3 | 4 | 5 | 6 | 2   | 3 | 4 | 5 | 6 | 2   | 3 | 4 | 5 | 6 | 2   | 3 | 4 | 5 | 6 |          |
| VALUE  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |          |
| 180pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 181      |
| 220pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 221      |
| 270pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 271      |
| 330pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 331      |
| 390pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 391      |
| 470pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 471      |
| 560pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 561      |
| 680pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 681      |
| 820pF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 821      |
| 1000pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 102      |
| 1200pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 122      |
| 1500pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 152      |
| 1800pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 182      |
| 2200pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 222      |
| 2700pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 272      |
| 3300pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 332      |
| 3900pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 392      |
| 4700pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 472      |
| 5600pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 562      |
| 6800pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 682      |
| 8200pF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 822      |
| .010uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 103      |
| .012uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 123      |
| .015uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 153      |
| .018uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 183      |
| .022uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 223      |
| .027uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 273      |
| .033uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 333      |
| .039uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 393      |
| .047uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 473      |
| .056uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 563      |
| .068uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 683      |
| .082uF |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 823      |
| .10uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 104      |
| .12uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 124      |
| .15uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 154      |
| .18uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 184      |
| .22uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 224      |
| .27uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 274      |
| .33uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 334      |
| .39uF  |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   |     |   |   |   |   | 394      |

 = Standard range K tolerance available from stock.

 = Non standard capabilities

## POWER DISCRETES

### Typical Characteristic

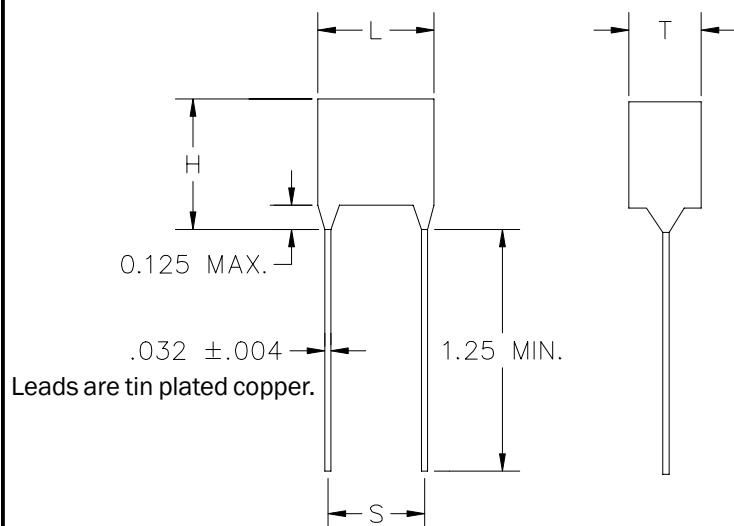


### Ordering Information

| 3              | A                                                             |                                           | X                   | 103                                                                                             | K                                                      | 2                                                   |
|----------------|---------------------------------------------------------------|-------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------|
| PART SIZE CODE | FORM                                                          |                                           | DIELECTRIC MATERIAL | CAPACITANCE (EIA CODE)                                                                          | CAPACITANCE TOLERANCE                                  | VOLTAGE RATING                                      |
| 2              | CHIP                                                          | LEADED                                    | X = X7R             | Last digit indicates number of zeroes following the first two digits<br>Example:<br>103=10000pF | K = 10%<br>M = 20%<br>V = +100% - 0%<br>Z = +80% - 20% | 1 = 1kV<br>2 = 2kV<br>3 = 3kV<br>4 = 4kV<br>5 = 5kV |
| 3              | A = Silver Termination                                        | E = Epoxy Encapsulated<br>L = Leaded only |                     |                                                                                                 |                                                        |                                                     |
| 4              | D = Palladium Silver Termination                              |                                           |                     |                                                                                                 |                                                        |                                                     |
| 5              | H = Capable of handling temperature excursions of up to 200°C |                                           |                     |                                                                                                 |                                                        |                                                     |
| 6              |                                                               |                                           |                     |                                                                                                 |                                                        |                                                     |

Note:

- For "S" size package type, please order part as "SXXXXXXXX" e.g. S3AX103K2.

**POWER DISCRETES**
**Outline Drawing - Encapsulated**

**Notes:**

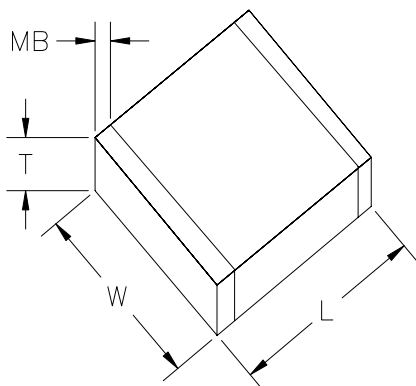
1. Maximum mounting height. Leads shall be solderable beyond this point.
2. When ordering "S" size package type please see Dimension Table "S".

| Dimensions |                    |                             |                   |                                  |
|------------|--------------------|-----------------------------|-------------------|----------------------------------|
| Size Code  | L(Max)<br>In. (mm) | S<br>In.(mm)                | T(Max)<br>In.(mm) | H(Ref) <sup>(1)</sup><br>In.(mm) |
| 2          | .400<br>(10.2)     | .300 ± .032<br>(7.62 ± .82) | .275<br>(7.00)    | .475<br>(12.1)                   |
| 3          | .500<br>(12.7)     | .400 ± .032<br>(10.2 ± .82) | .300<br>(7.62)    | .575<br>(14.6)                   |
| 4          | .600<br>(15.3)     | .500 ± .032<br>(12.7 ± .82) | .375<br>(9.53)    | .675<br>(17.1)                   |
| 5          | .700<br>(17.8)     | .600 ± .032<br>(15.3 ± .82) | .375<br>(9.53)    | .775<br>(19.7)                   |
| 6          | .800<br>(20.4)     | .700 ± .032<br>(17.8 ± .82) | .375<br>(9.53)    | .875<br>(22.2)                   |

| Dimensions for "S" Size <sup>(2)</sup> |                    |                             |                   |                                  |
|----------------------------------------|--------------------|-----------------------------|-------------------|----------------------------------|
| Size Code                              | L(Max)<br>In. (mm) | S<br>In.(mm)                | T(Max)<br>In.(mm) | H(Ref) <sup>(1)</sup><br>In.(mm) |
| S2                                     | 0.42<br>(10.7)     | .275 ± .03<br>(6.96 ± .76)  | 0.35<br>(8.89)    | 0.3<br>(8.89)                    |
| S3                                     | 0.49<br>(12.4)     | .375 ± .03<br>(9.52 ± .76)  | 0.35<br>(8.89)    | 0.4<br>(10.16)                   |
| S4                                     | 0.59<br>(14.9)     | .475 ± .03<br>(12.06 ± .76) | 0.35<br>(8.89)    | 0.5<br>(12.7)                    |
| S5                                     | 0.69<br>(17.5)     | .575 ± .03<br>(14.6 ± .76)  | 0.35<br>(8.89)    | 0.6<br>(15.24)                   |
| S6                                     | 0.79<br>(20.0)     | .675 ± .03<br>(17.14 ± .76) | 0.35<br>(8.89)    | 0.72<br>(18.28)                  |

## POWER DISCRETES

### Outline Drawing - Chip



| Dimensions |                    |                   |                   |                    |
|------------|--------------------|-------------------|-------------------|--------------------|
| Size Code  | L(Nom)<br>In. (mm) | W(Nom)<br>In.(mm) | T(Max)<br>In.(mm) | MB(Max)<br>In.(mm) |
| 2          | .270<br>(6.90)     | .250<br>(6.40)    | .250<br>(6.40)    | .040<br>(1.10)     |
| 3          | .370<br>(9.40)     | .350<br>(8.90)    | .250<br>(6.40)    | .040<br>(1.10)     |
| 4          | .470<br>(12.0)     | .450<br>(11.5)    | .300<br>(7.60)    | .040<br>(1.10)     |
| 5          | .570<br>(14.5)     | .550<br>(14.0)    | .300<br>(7.60)    | .040<br>(1.10)     |
| 6          | .670<br>(17.0)     | .650<br>(16.6)    | .300<br>(7.60)    | .040<br>(1.10)     |

Note:

1. When ordering "S" size package type please see Dimension Table "S".

| Dimensions for "S" Size <sup>(1)</sup> |                    |                   |                   |                    |
|----------------------------------------|--------------------|-------------------|-------------------|--------------------|
| Size Code                              | L(Nom)<br>In. (mm) | W(Nom)<br>In.(mm) | T(Max)<br>In.(mm) | MB(Max)<br>In.(mm) |
| S2                                     | .25<br>(6.35)      | .2<br>(5.08)      | .25<br>(6.35)     | .03<br>(0.76)      |
| S3                                     | .36<br>(9.14)      | .31<br>(7.87)     | .25<br>(6.35)     | .03<br>(0.76)      |
| S4                                     | .45<br>(11.43)     | .4<br>(10.16)     | .25<br>(6.35)     | .03<br>(0.76)      |
| S5                                     | .56<br>(14.22)     | .52<br>(13.2)     | .25<br>(6.35)     | .03<br>(0.76)      |
| S6                                     | .66<br>(16.76)     | .62<br>(15.74)    | .25<br>(6.35)     | .03<br>(0.76)      |

### Contact Information

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