## Electrical Characteristics ($T_A$=25°C unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Marking | | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ | | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximum Reverse Leakage $I_R$ @ $V_R$ (µA) | Maximum Temperature coefficient of $V_{BR}$ (%/C) | Agency Approval |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNI | BI | | MIN | MAX | | | | | | |
| P6SMB6.8A | P6SMB6.8CA | 6V8A | 6V8C | 5.80 | 6.45 | 7.14 | 10 | 10.5 | 58.1 | 1000 | 0.041 | X |
| P6SMB7.5A | P6SMB7.5CA | 7V5A | 7V5C | 6.40 | 7.13 | 7.88 | 10 | 11.3 | 54.0 | 500 | 0.054 | X |
| P6SMB8.2A | P6SMB8.2CA | 8V2A | 8V2C | 7.02 | 7.79 | 8.61 | 10 | 12.1 | 50.4 | 200 | 0.058 | X |
| P6SMB9.1A | P6SMB9.1CA | 9V1A | 9V1C | 7.78 | 8.65 | 9.55 | 1 | 13.4 | 45.5 | 50 | 0.063 | X |
| P6SMB10A | P6SMB10CA | 10A | 10C | 8.55 | 9.50 | 10.50 | 1 | 14.5 | 42.1 | 10 | 0.066 | X |
| P6SMB11A | P6SMB11CA | 11A | 11C | 9.40 | 10.50 | 11.60 | 1 | 15.6 | 39.1 | 5 | 0.069 | X |
| P6SMB12A | P6SMB12CA | 12A | 12C | 10.20 | 11.40 | 12.60 | 1 | 16.7 | 36.5 | 5 | 0.071 | X |
| P6SMB13A | P6SMB13CA | 13A | 13C | 11.10 | 12.40 | 13.70 | 1 | 18.2 | 33.5 | 1 | 0.074 | X |
| P6SMB15A | P6SMB15CA | 15A | 15C | 12.80 | 14.30 | 15.80 | 1 | 21.2 | 28.8 | 1 | 0.076 | X |
| P6SMB16A | P6SMB16CA | 16A | 16C | 13.60 | 15.20 | 16.80 | 1 | 22.5 | 27.1 | 1 | 0.080 | X |
| P6SMB18A | P6SMB18CA | 18A | 18C | 15.30 | 17.10 | 18.90 | 1 | 25.5 | 24.2 | 1 | 0.083 | X |
| P6SMB20A | P6SMB20CA | 20A | 20C | 17.10 | 19.00 | 21.00 | 1 | 27.7 | 22.0 | 1 | 0.085 | X |
| P6SMB22A | P6SMB22CA | 22A | 22C | 18.80 | 20.90 | 23.10 | 1 | 30.6 | 19.9 | 1 | 0.088 | X |
| P6SMB24A | P6SMB24CA | 24A | 24C | 20.50 | 22.80 | 25.20 | 1 | 33.2 | 18.4 | 1 | 0.091 | X |
| P6SMB27A | P6SMB27CA | 27A | 27C | 23.10 | 25.70 | 28.40 | 1 | 37.5 | 16.3 | 1 | 0.092 | X |
| P6SMB30A | P6SMB30CA | 30A | 30C | 25.60 | 28.50 | 31.50 | 1 | 41.4 | 14.7 | 1 | 0.093 | X |
| P6SMB33A | P6SMB33CA | 33A | 33C | 28.20 | 31.40 | 34.70 | 1 | 45.7 | 13.3 | 1 | 0.094 | X |
| P6SMB36A | P6SMB36CA | 36A | 36C | 30.80 | 34.20 | 37.80 | 1 | 49.9 | 12.2 | 1 | 0.096 | X |
| P6SMB39A | P6SMB39CA | 39A | 39C | 33.30 | 37.10 | 41.00 | 1 | 53.9 | 11.3 | 1 | 0.097 | X |
| P6SMB43A | P6SMB43CA | 43A | 43C | 36.80 | 40.90 | 45.20 | 1 | 59.3 | 10.3 | 1 | 0.098 | X |
| P6SMB47A | P6SMB47CA | 47A | 47C | 40.20 | 44.70 | 49.40 | 1 | 64.8 | 9.4 | 1 | 0.099 | X |
| P6SMB51A | P6SMB51CA | 51A | 51C | 43.60 | 48.50 | 53.60 | 1 | 70.1 | 8.7 | 1 | 0.100 | X |
| P6SMB56A | P6SMB56CA | 56A | 56C | 47.80 | 53.20 | 58.80 | 1 | 77.0 | 7.9 | 1 | 0.101 | X |
| P6SMB58A | P6SMB58CA | 58A | 58C | 52.78 | 55.10 | 60.90 | 1 | 79.8 | 7.7 | 1 | 0.101 | - |
| P6SMB62A | P6SMB62CA | 62A | 62C | 53.00 | 58.90 | 65.10 | 1 | 85.0 | 7.2 | 1 | 0.102 | X |
| P6SMB68A | P6SMB68CA | 68A | 68C | 58.10 | 64.60 | 71.40 | 1 | 92.0 | 6.6 | 1 | 0.103 | X |
| P6SMB75A | P6SMB75CA | 75A | 75C | 64.10 | 71.30 | 78.80 | 1 | 103.0 | 5.9 | 1 | 0.104 | X |
| P6SMB82A | P6SMB82CA | 82A | 82C | 70.10 | 77.90 | 86.10 | 1 | 113.0 | 5.4 | 1 | 0.105 | X |
| P6SMB91A | P6SMB91CA | 91A | 91C | 77.80 | 86.50 | 95.50 | 1 | 125.0 | 4.9 | 1 | 0.106 | X |
| P6SMB100A | P6SMB100CA | 100A | 100C | 85.50 | 95.00 | 105.00 | 1 | 137.0 | 4.5 | 1 | 0.106 | X |
| P6SMB110A | P6SMB110CA | 110A | 110C | 94.00 | 105.00 | 116.00 | 1 | 152.0 | 4.0 | 1 | 0.107 | X |
| P6SMB120A | P6SMB120CA | 120A | 120C | 102.00 | 114.00 | 126.00 | 1 | 165.0 | 3.7 | 1 | 0.107 | X |
| P6SMB130A | P6SMB130CA | 130A | 130C | 111.00 | 124.00 | 137.00 | 1 | 179.0 | 3.4 | 1 | 0.107 | X |
| P6SMB150A | P6SMB150CA | 150A | 150C | 128.00 | 143.00 | 158.00 | 1 | 207.0 | 2.9 | 1 | 0.108 | X |
| P6SMB160A | P6SMB160CA | 160A | 160C | 136.00 | 152.00 | 168.00 | 1 | 219.0 | 2.8 | 1 | 0.108 | X |
| P6SMB170A | P6SMB170CA | 170A | 170C | 145.00 | 162.00 | 179.00 | 1 | 234.0 | 2.6 | 1 | 0.108 | X |
| P6SMB180A | P6SMB180CA | 180A | 180C | 154.00 | 171.00 | 189.00 | 1 | 246.0 | 2.5 | 1 | 0.108 | X |
| P6SMB200A | P6SMB200CA | 200A | 200C | 171.00 | 190.00 | 210.00 | 1 | 274.0 | 2.2 | 1 | 0.108 | X |
| P6SMB220A | P6SMB220CA | 220A | 220C | 185.00 | 209.00 | 231.00 | 1 | 328.0 | 1.9 | 1 | 0.110 | X |
| P6SMB250A | P6SMB250CA | 250A | 250C | 214.00 | 237.00 | 263.00 | 1 | 344.0 | 1.8 | 1 | 0.110 | X |
| P6SMB300A | P6SMB300CA | 300A | 300C | 256.00 | 285.00 | 315.00 | 1 | 414.0 | 1.5 | 1 | 0.110 | X |
| P6SMB350A* | P6SMB350CA* | 350A | 350C | 300.00 | 332.00 | 368.00 | 1 | 482.0 | 1.7 | 1 | 0.112 | X |
| P6SMB400A* | P6SMB400CA* | 400A | 400C | 342.00 | 380.00 | 420.00 | 1 | 548.0 | 1.5 | 1 | 0.112 | X |
| P6SMB440A* | P6SMB440CA* | 440A | 440C | 376.00 | 418.00 | 462.00 | 1 | 602.0 | 1.4 | 1 | 0.112 | X |
| P6SMB480A* | P6SMB480CA* | 480A | 480C | 408.00 | 456.00 | 504.00 | 1 | 658.0 | 1.3 | 1 | 0.112 | X |
| P6SMB510A* | P6SMB510CA* | 510A | 510C | 434.00 | 485.00 | 535.00 | 1 | 698.0 | 1.2 | 1 | 0.112 | X |
| P6SMB530A* | P6SMB530CA* | 530A | 530C | 451.00 | 503.50 | 556.50 | 1 | 725.0 | 1.2 | 1 | 0.112 | X |
| P6SMB540A* | P6SMB540CA* | 540A | 540C | 460.00 | 513.00 | 567.00 | 1 | 740.0 | 1.1 | 1 | 0.112 | X |
| P6SMB550A* | P6SMB550CA* | 550A | 550C | 468.00 | 522.50 | 577.50 | 1 | 760.0 | 1.1 | 1 | 0.112 | X |
| P6SMB600A* | P6SMB600CA* | 600A | 600C | 512.00 | 570.00 | 630.00 | 1 | 828.0 | 1.0 | 1 | 0.112 | - |

For bidirectional type having $V_R$ of 10 volts and less, the $I_R$ limit is double.
For stack-die parts, use * to label the part number.

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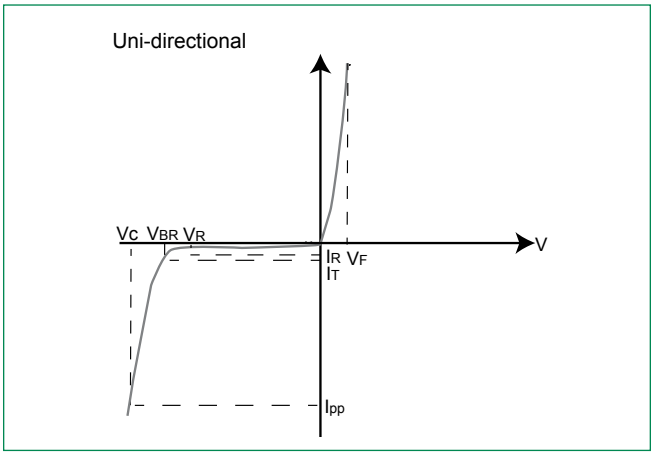
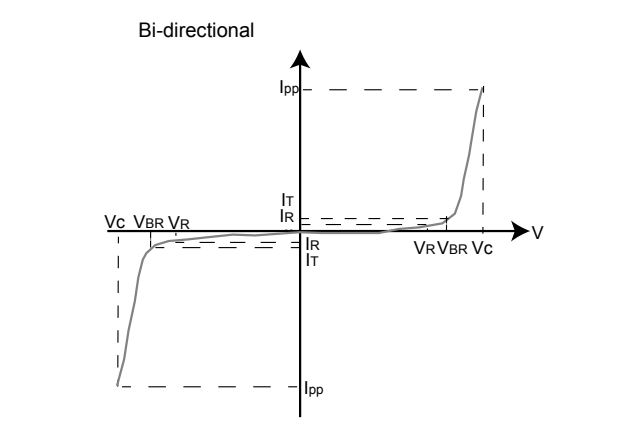
## I-V Curve Characteristics

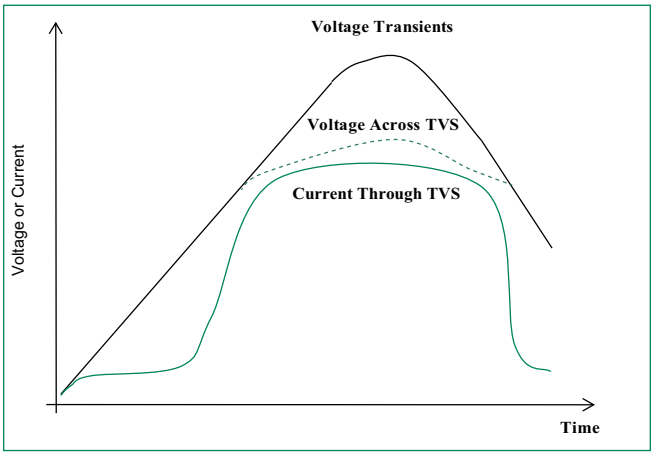


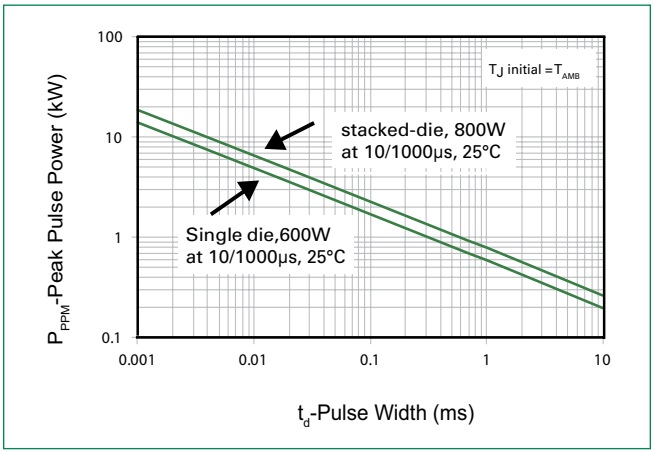

**$P_{PPM}$ Peak Pulse Power Dissipation** -- Max power dissipation ($V_C$ * $I_{PP}$)
**$V_R$ Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation
**$V_{BR}$ Breakdown Voltage** -- Maximum voltage that flows though the TVS at a specified test current ($I_T$)
**$V_C$ Clamping Voltage** -- Peak voltage measured across the TVS at a specified Ippm (peak impulse current)
**$I_R$ Reverse Leakage Current** -- Current measured at $V_R$
**$V_F$ Forward Voltage Drop for Uni-directional**

## Ratings and Characteristic Curves ($T_A$=25°C unless otherwise noted)

### Figure 1 - TVS Transients Clamping Waveform




### Figure 2 - Peak Pulse Power Rating

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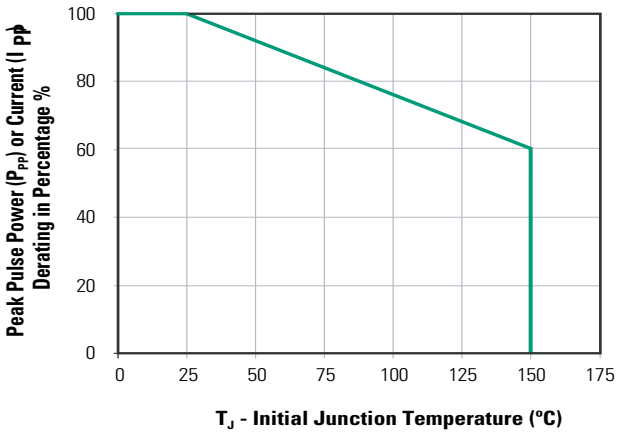
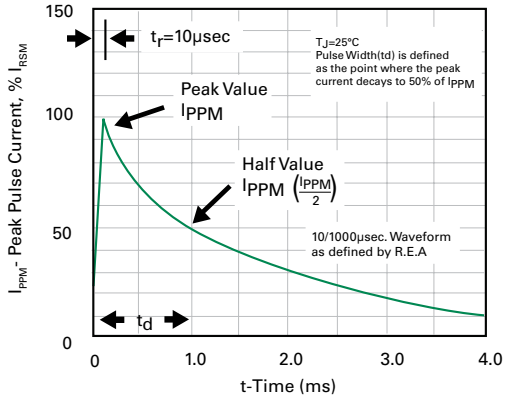
## Ratings and Characteristic Curves ($T_A$=25°C unless otherwise noted) (Continued)

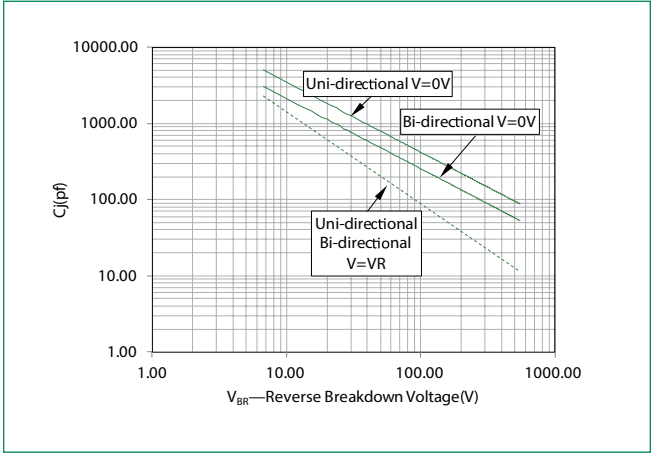
### Figure 3 - Peak Pulse Power Derating Curve



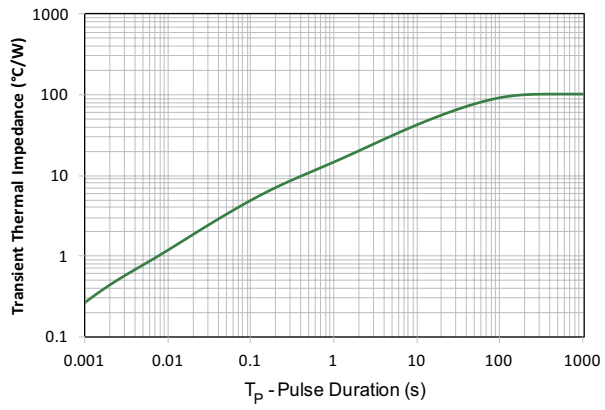

### Figure 4 - Pulse Waveform



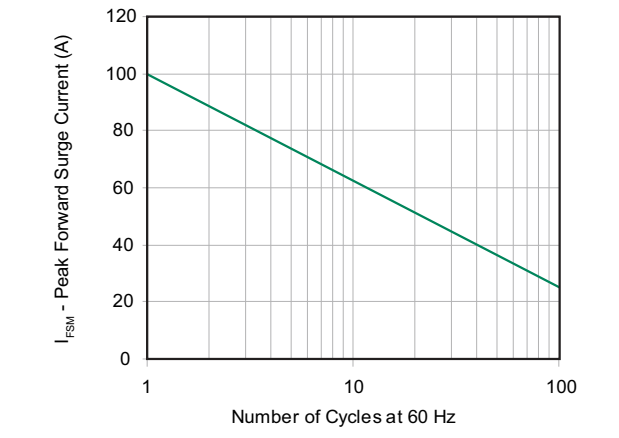

### Figure 5 - Typical Junction Capacitance



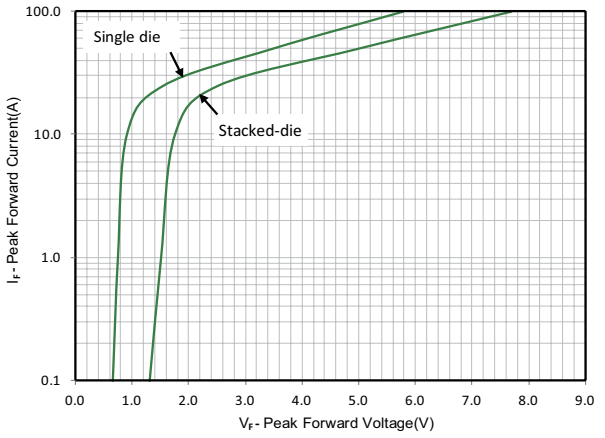

### Figure 6 - Typical Transient Thermal Impedance




### Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only




### Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)

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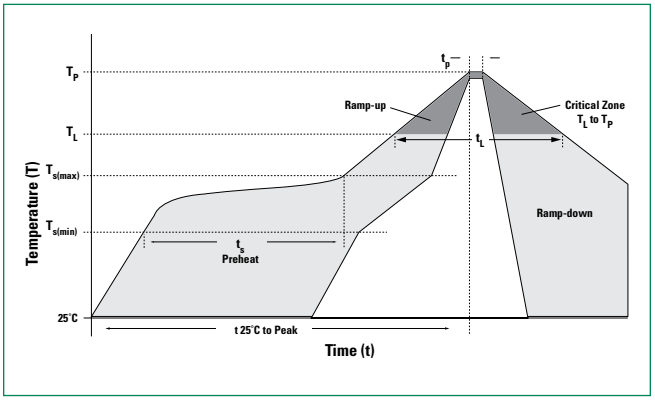
# TVS Diodes
## Surface Mount – 600W > P6SMB series

## Soldering Parameters

| | | |
|---|---|---|
| **Reflow Condition** | | Pb-Free assembly |
| **Pre Heat** | **-Temperature Min ($T_{s(min)}$)** | 150°C |
| | **-Temperature Max ($T_{s(max)}$)** | 200°C |
| | **-Time (min to max) ($t_s$)** | 60 – 120 secs |
| **Average ramp up rate (Liquidus Temp ($T_L$) to peak** | | 3°C/second max |
| **$T_{S(max)}$ to $T_L$ - Ramp-up Rate** | | 3°C/second max |
| **Reflow** | **-Temperature ($T_L$) (Liquidus)** | 217°C |
| | **-Time (min to max) ($t_L$)** | 60 – 150 seconds |
| **Peak Temperature ($T_P$)** | | $260^{+0/-5}$ °C |
| **Time within 5°C of actual peak Temperature ($t_p$)** | | 30 seconds Max |
| **Ramp-down Rate** | | 6°C/second Max |
| **Time 25°C to peak Temperature ($T_P$)** | | 8 minutes Max. |
| **Do not exceed** | | 260°C |




## Physical Specifications

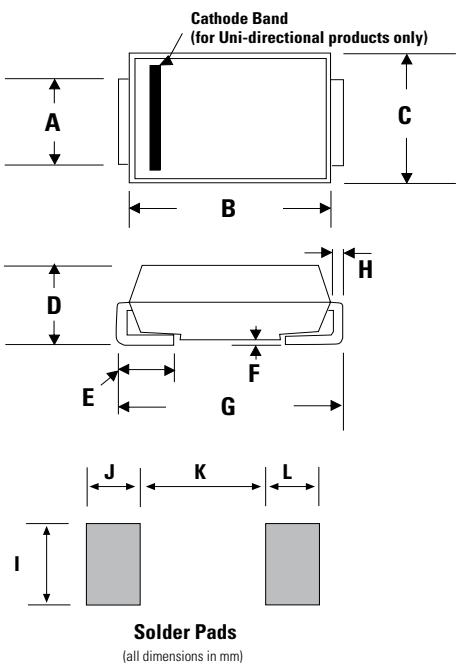
| | |
|---|---|
| **Weight** | 0.003 ounce, 0.093 grams |
| **Case** | JEDEC DO214AA. Molded plastic body over glass passivated junction |
| **Polarity** | Color band denotes cathode except for bidirectional versions |
| **Terminal** | Matte Tin-plated leads, Solderable per JESD22-B102 |

## Environmental Specifications

| | |
|---|---|
| **High Temp. Storage** | JESD22-A103 |
| **HTRB** | JESD22-A108 |
| **Temperature Cycling** | JESD22-A104 |
| **MSL** | JEDEC-J-STD-020, Level 1 |
| **H3TRB** | JESD22-A101 |
| **RSH** | JESD22-A111 |

## Dimensions

**DO-214AA (SMB J-Bend)**




**Solder Pads**
(all dimensions in mm)

| Dimensions | Inches | | Millimeters | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| **A** | 0.076 | 0.086 | 1.930 | 2.200 |
| **B** | 0.160 | 0.187 | 4.060 | 4.750 |
| **C** | 0.130 | 0.155 | 3.300 | 3.940 |
| **D** | 0.078 | 0.103 | 1.990 | 2.610 |
| **E** | 0.030 | 0.060 | 0.760 | 1.520 |
| **F** | - | 0.008 | - | 0.203 |
| **G** | 0.205 | 0.220 | 5.210 | 5.590 |
| **H** | 0.006 | 0.012 | 0.152 | 0.305 |
| **I** | 0.089 | - | 2.260 | - |
| **J** | 0.085 | - | 2.160 | - |
| **K** | - | 0.107 | - | 2.740 |
| **L** | 0.085 | - | 2.160 | - |

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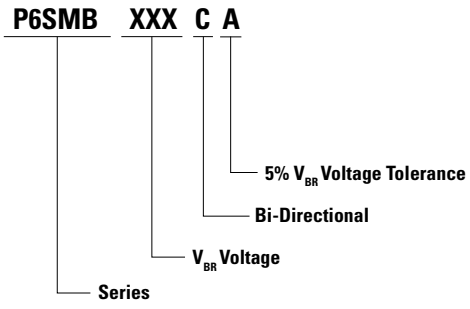
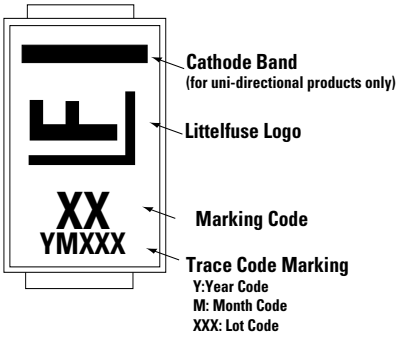
## Part Numbering System



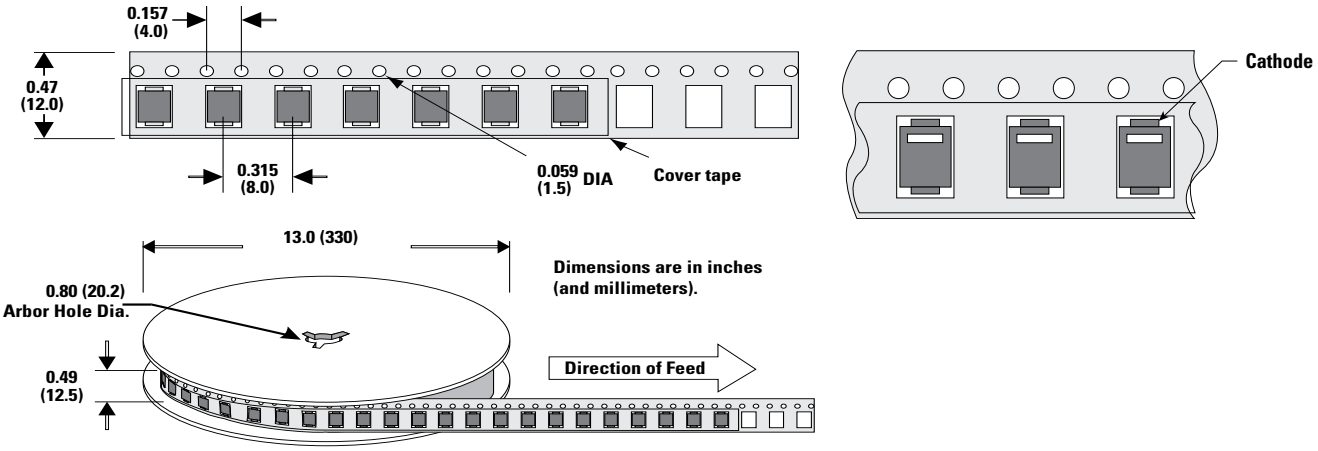

## Part Marking System




## Packaging

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|---|---|---|---|---|
| P6SMBxxxXX | DO-214AA | 3000 | Tape & Reel - 12mm tape/13" reel | EIA STD RS-481 |

## Tape and Reel Specification

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