

**»Features**

- Excellent clamping capability
- Low leakage current
- Low capacitance
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- Fast response time:  
typically less than 1.0ps from 0 Volts to  $V_{BR}$  min



SMB (DO-214AA)

**»Mechanical Characteristics**

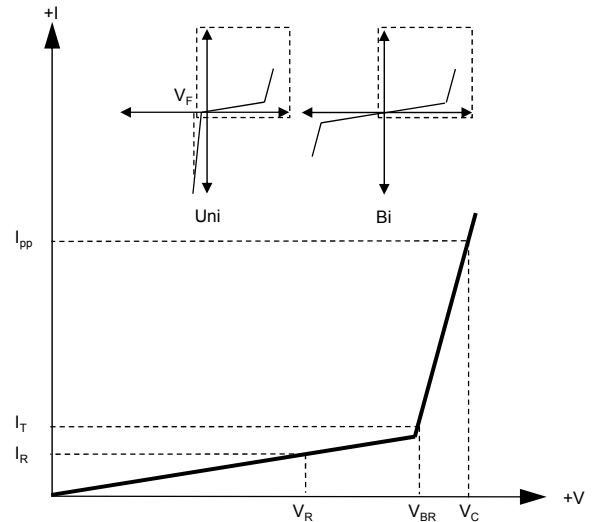
- Package: SMB plastic package.
- Lead Finish: Matte Tin
- Case Material: Epoxy Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020

**»Applications**

- Telecom
- Computer
- Industrial electronic
- Consumer electronic

**»Electrical Parameters**

| Parameter | Definition   |
|-----------|--|
| $C_J$     | Junction Capacitance - typical capacitance measured with 0V or $V_R$ bias                                      |
| $I_{PP}$  | Peak Pulse Current - maximum rated peak impulse current  |
| $V_C$     | Clamping Voltage - Peak voltage measured across the suppressor at a specified $I_{ppm}$ (peak impulse current) |
| $V_{BR}$  | Breakdown Voltage - Maximum voltage that flows though the TVS at a specified test current ( $I_T$ )            |
| $I_R$     | Leakage Current - maximum peak off-state current measured at $V_R$   |
| $V_R$     | Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state                       |


**»Summary of Packing Options**

| Package | Packing Description | Packing Quantity | Industry Standard |
|---------|---------------------|------------------|-------------------|
| SMB     | Tape/Reel, 13" reel | 3000             | EIA-481-1         |
|         | Tape/Reel, 7" reel  | 500              | EIA-481-1         |

**»Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

| Parameter                                      | Symbol          | Value      | Units                     | Remarks        |
|--|-----------------|------------|---------------------------|----------------|
| Peak Pulse Power Dissipation                   | $P_{PPM}$       | 600        | W                         | (Note1)(Note2) |
| Steady State Power Dissipation                 | $P_D$           | 5          | W                         | (Note3)        |
| Peak Forward Surge Current                     | $I_{FSM}$       | 100        | A                         | (Note4)        |
| Maximum Instantaneous Forward Voltage at 50A   | $V_{FM}$        | 3.5/5      | V                         | (Note5)        |
| Typical Thermal Resistance Junction to Lead    | $R_{\theta JL}$ | 20         | $^\circ\text{C}/\text{W}$ |                |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 100        | $^\circ\text{C}/\text{W}$ |                |
| Operating Temperature Range                    | $T_J$           | -55 to 150 | $^\circ\text{C}$          |                |
| Storage Temperature Range                      | $T_{STG}$       | -55 to 150 | $^\circ\text{C}$          |                |

Notes1: Non-repetitive current pulse , 10/1000us Waveform.

Notes2: Mounted on copper pad area of 5×5mm to each terminal.

Notes3: Infinite HeatSink at  $T_A=50^\circ\text{C}$

Notes4: Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.

Notes5: For UnidirectionalOnly,  $V_{FM}<3.5\text{V}$  for  $V_{BR} \leq 200\text{V}$  and  $V_{FM}<5.0\text{V}$  for  $V_{BR} \geq 201\text{V}$ .

**»Electrical Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

| Part Number (Uni) | Part Number (Bi) | Marking Code |      | Reverse Stand off Voltage $V_R$ (V) | Breakdown Voltage $V_{BR} @ I_T$ (V) |      | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximun Reverse Leakage $I_R @ V_R$ ( $\mu\text{A}$ ) |
|-------------------|------------------|--------------|------|-------------------------------------|--------------------------------------|------|-------------------------|---|---|---|
|                   |                  | Uni          | Bi   |                                     | Min                                  | Max  |                         |   |   |   |
| P6SMB6.8A         | P6SMB6.8CA       | 6V8A         | 6V8C | 5.8                                 | 6.45                                 | 7.14 | 10                      | 10.5  | 58.1                                    | 1000  |
| P6SMB7.5A         | P6SMB7.5CA       | 7V5A         | 7V5C | 6.4                                 | 7.13                                 | 7.88 | 10                      | 11.3  | 54                                      | 500   |
| P6SMB8.2A         | P6SMB8.2CA       | 8V2A         | 8V2C | 7.02                                | 7.79                                 | 8.61 | 10                      | 12.1  | 50.4                                    | 200   |
| P6SMB9.1A         | P6SMB9.1CA       | 9V1A         | 9V1C | 7.78                                | 8.65                                 | 9.55 | 1                       | 13.4  | 45.5                                    | 50  |
| P6SMB10A          | P6SMB10CA        | 10A          | 10C  | 8.55                                | 9.5                                  | 10.5 | 1                       | 14.5  | 42.1                                    | 10  |
| P6SMB11A          | P6SMB11CA        | 11A          | 11C  | 9.4                                 | 10.5                                 | 11.6 | 1                       | 15.6  | 39.1                                    | 5   |
| P6SMB12A          | P6SMB12CA        | 12A          | 12C  | 10.2                                | 11.4                                 | 12.6 | 1                       | 16.7  | 36.5                                    | 5   |
| P6SMB13A          | P6SMB13CA        | 13A          | 13C  | 11.1                                | 12.4                                 | 13.7 | 1                       | 18.2  | 33.5                                    | 1   |
| P6SMB15A          | P6SMB15CA        | 15A          | 15C  | 12.8                                | 14.3                                 | 15.8 | 1                       | 21.2  | 28.8                                    | 1   |
| P6SMB16A          | P6SMB16CA        | 16A          | 16C  | 13.6                                | 15.2                                 | 16.8 | 1                       | 22.5  | 27.1                                    | 1   |
| P6SMB18A          | P6SMB18CA        | 18A          | 18C  | 15.3                                | 17.1                                 | 18.9 | 1                       | 25.5  | 24.2                                    | 1   |
| P6SMB20A          | P6SMB20CA        | 20A          | 20C  | 17.1                                | 19                                   | 21   | 1                       | 27.7  | 22                                      | 1   |
| P6SMB22A          | P6SMB22CA        | 22A          | 22C  | 18.8                                | 20.9                                 | 23.1 | 1                       | 30.6  | 19.9                                    | 1   |
| P6SMB24A          | P6SMB24CA        | 24A          | 24C  | 20.5                                | 22.8                                 | 25.2 | 1                       | 33.2  | 18.4                                    | 1   |
| P6SMB27A          | P6SMB27CA        | 27A          | 27C  | 23.1                                | 25.7                                 | 28.4 | 1                       | 37.5  | 16.3                                    | 1   |
| P6SMB30A          | P6SMB30CA        | 30A          | 30C  | 25.6                                | 28.5                                 | 31.5 | 1                       | 41.4  | 14.7                                    | 1   |
| P6SMB33A          | P6SMB33CA        | 33A          | 33C  | 28.2                                | 31.4                                 | 34.7 | 1                       | 45.7  | 13.3                                    | 1   |
| P6SMB36A          | P6SMB36CA        | 36A          | 36C  | 30.8                                | 34.2                                 | 37.8 | 1                       | 49.9  | 12.2                                    | 1   |
| P6SMB39A          | P6SMB39CA        | 39A          | 39C  | 33.3                                | 37.1                                 | 41   | 1                       | 53.9  | 11.3                                    | 1   |
| P6SMB43A          | P6SMB43CA        | 43A          | 43C  | 36.8                                | 40.9                                 | 45.2 | 1                       | 59.3  | 10.3                                    | 1   |

**»Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

| Part Number (Uni) | Part Number (Bi) | Marking Code |      | Reverse Stand off Voltage $V_R$ (V) | Breakdown Voltage $V_{BR} @ I_T$ (V) |       | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximun Reverse Leakage $I_R @ V_R$ ( $\mu\text{A}$ ) |
|-------------------|------------------|--------------|------|-------------------------------------|--------------------------------------|-------|-------------------------|---|---|---|
|                   |                  | Uni          | Bi   |                                     | Min                                  | Max   |                         |   |   |   |
| P6SMB47A          | P6SMB47CA        | 47A          | 47C  | 40.2                                | 44.7                                 | 49.4  | 1                       | 64.8  | 9.4                                     | 1   |
| P6SMB51A          | P6SMB51CA        | 51A          | 51C  | 43.6                                | 48.5                                 | 53.6  | 1                       | 70.1  | 8.7                                     | 1   |
| P6SMB56A          | P6SMB56CA        | 56A          | 56C  | 47.8                                | 53.2                                 | 58.8  | 1                       | 77  | 7.9                                     | 1   |
| P6SMB58A          | P6SMB58CA        | 58A          | 58C  | 52.78                               | 55.1                                 | 60.9  | 1                       | 79.8  | 7.7                                     | 1   |
| P6SMB62A          | P6SMB62CA        | 62A          | 62C  | 53                                  | 58.9                                 | 65.1  | 1                       | 85  | 7.2                                     | 1   |
| P6SMB68A          | P6SMB68CA        | 68A          | 68C  | 58.1                                | 64.6                                 | 71.4  | 1                       | 92  | 6.6                                     | 1   |
| P6SMB75A          | P6SMB75CA        | 75A          | 75C  | 64.1                                | 71.3                                 | 78.8  | 1                       | 103   | 5.9                                     | 1   |
| P6SMB82A          | P6SMB82CA        | 82A          | 82C  | 70.1                                | 77.9                                 | 86.1  | 1                       | 113   | 5.4                                     | 1   |
| P6SMB91A          | P6SMB91CA        | 91A          | 91C  | 77.8                                | 86.5                                 | 95.5  | 1                       | 125   | 4.9                                     | 1   |
| P6SMB100A         | P6SMB100CA       | 100A         | 100C | 85.5                                | 95                                   | 105   | 1                       | 137   | 4.5                                     | 1   |
| P6SMB110A         | P6SMB110CA       | 110A         | 110C | 94                                  | 105                                  | 116   | 1                       | 152   | 4                                       | 1   |
| P6SMB120A         | P6SMB120CA       | 120A         | 120C | 102                                 | 114                                  | 126   | 1                       | 165   | 3.7                                     | 1   |
| P6SMB130A         | P6SMB130CA       | 130A         | 130C | 111                                 | 124                                  | 137   | 1                       | 179   | 3.4                                     | 1   |
| P6SMB150A         | P6SMB150CA       | 150A         | 150C | 128                                 | 143                                  | 158   | 1                       | 207   | 2.9                                     | 1   |
| P6SMB160A         | P6SMB160CA       | 160A         | 160C | 136                                 | 152                                  | 168   | 1                       | 219   | 2.8                                     | 1   |
| P6SMB170A         | P6SMB170CA       | 170A         | 170C | 145                                 | 162                                  | 179   | 1                       | 234   | 2.6                                     | 1   |
| P6SMB180A         | P6SMB180CA       | 180A         | 180C | 154                                 | 171                                  | 189   | 1                       | 246   | 2.5                                     | 1   |
| P6SMB200A         | P6SMB200CA       | 200A         | 200C | 171                                 | 190                                  | 210   | 1                       | 274   | 2.2                                     | 1   |
| P6SMB220A         | P6SMB220CA       | 220A         | 220C | 185                                 | 209                                  | 231   | 1                       | 328   | 1.9                                     | 1   |
| P6SMB250A         | P6SMB250CA       | 250A         | 250C | 214                                 | 237                                  | 263   | 1                       | 344   | 1.8                                     | 1   |
| P6SMB300A         | P6SMB300CA       | 300A         | 300C | 256                                 | 285                                  | 315   | 1                       | 414   | 1.5                                     | 1   |
| P6SMB350A         | P6SMB350CA       | 350A         | 350C | 300                                 | 332                                  | 368   | 1                       | 482   | 1.3                                     | 1   |
| P6SMB400A         | P6SMB400CA       | 400A         | 400C | 342                                 | 380                                  | 420   | 1                       | 548   | 1.1                                     | 1   |
| P6SMB440A         | P6SMB440CA       | 440A         | 440C | 376                                 | 418                                  | 462   | 1                       | 602   | 1                                       | 1   |
| P6SMB480A         | P6SMB480CA       | 480A         | 480C | 408                                 | 456                                  | 504   | 1                       | 658   | 0.9                                     | 1   |
| P6SMB510A         | P6SMB510CA       | 510A         | 510C | 434                                 | 485                                  | 535   | 1                       | 698   | 0.9                                     | 1   |
| P6SMB530A         | P6SMB530CA       | 530A         | 530C | 477                                 | 503.5                                | 556.5 | 1                       | 725   | 0.8                                     | 1   |
| P6SMB540A         | P6SMB540CA       | 540A         | 540C | 486                                 | 513                                  | 567   | 1                       | 740   | 0.8                                     | 1   |
| P6SMB550A         | P6SMB550CA       | 550A         | 550C | 495                                 | 522.5                                | 577.5 | 1                       | 760   | 0.8                                     | 1   |

»Rating And Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)

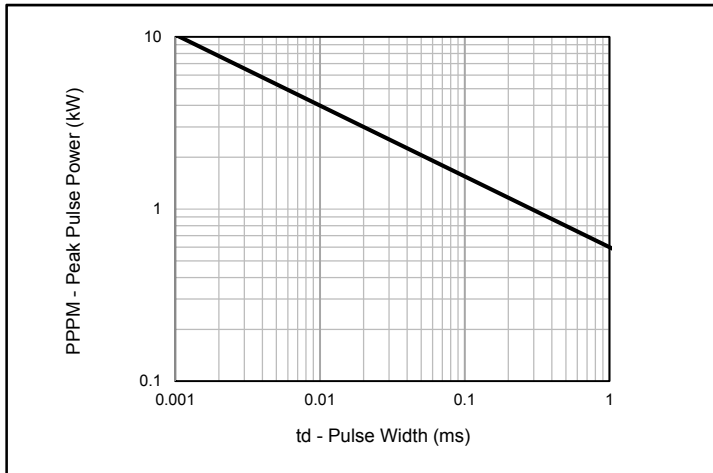


Fig.1 - Peak Pulse Power Rating

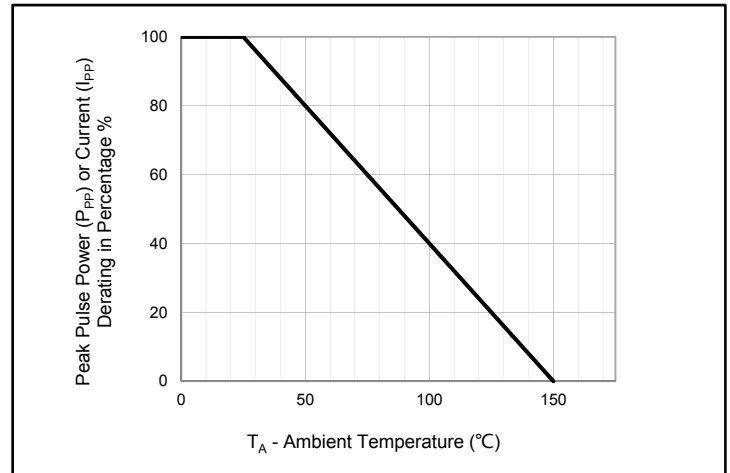


Fig.2 - Pulse Derating Curve

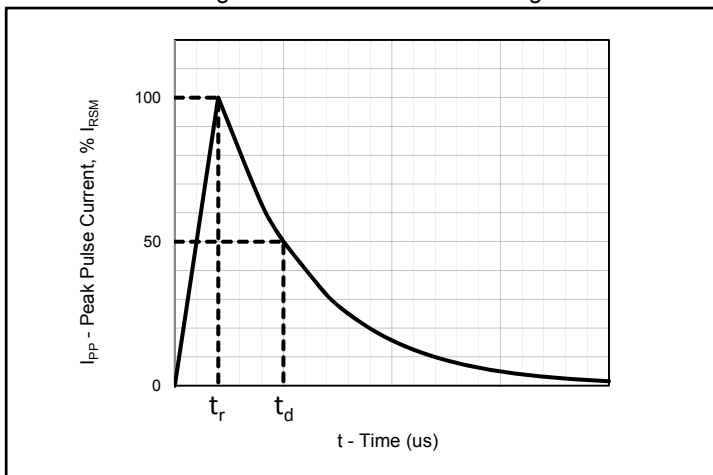


Fig.3 - Pulse Waveform

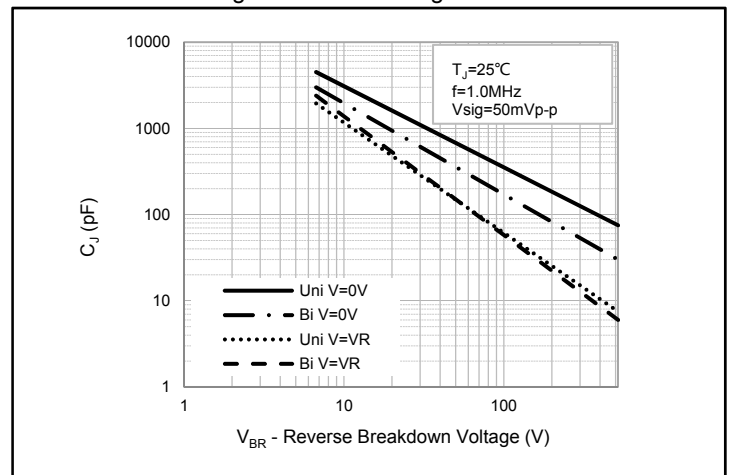


Fig.4 - Typical Junction Capacitance

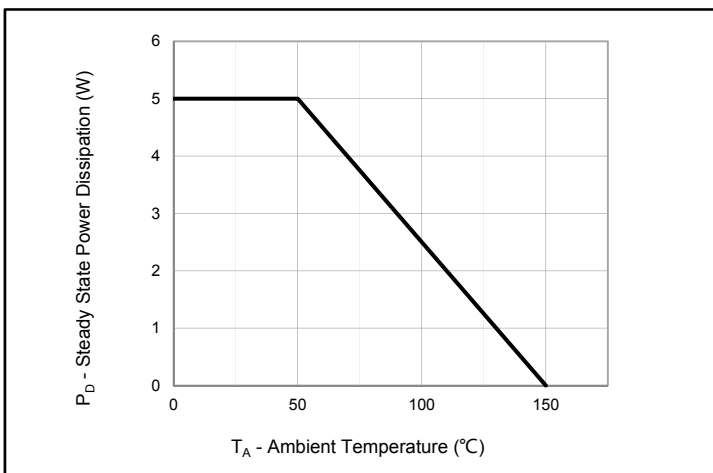


Fig.5 - Steady State Power Dissipation Derating Curve

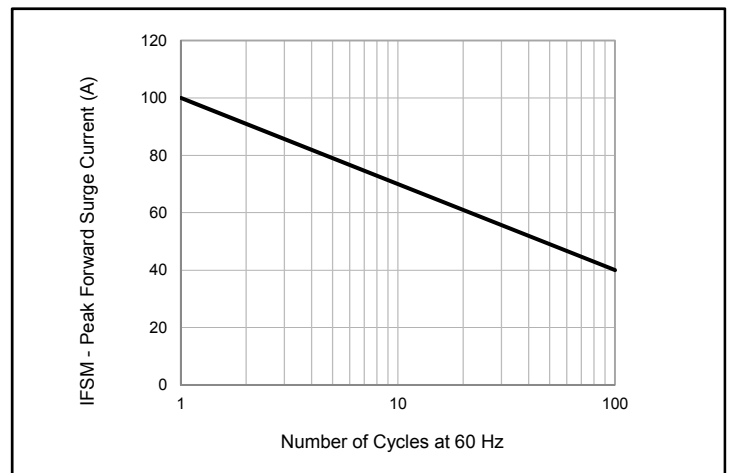
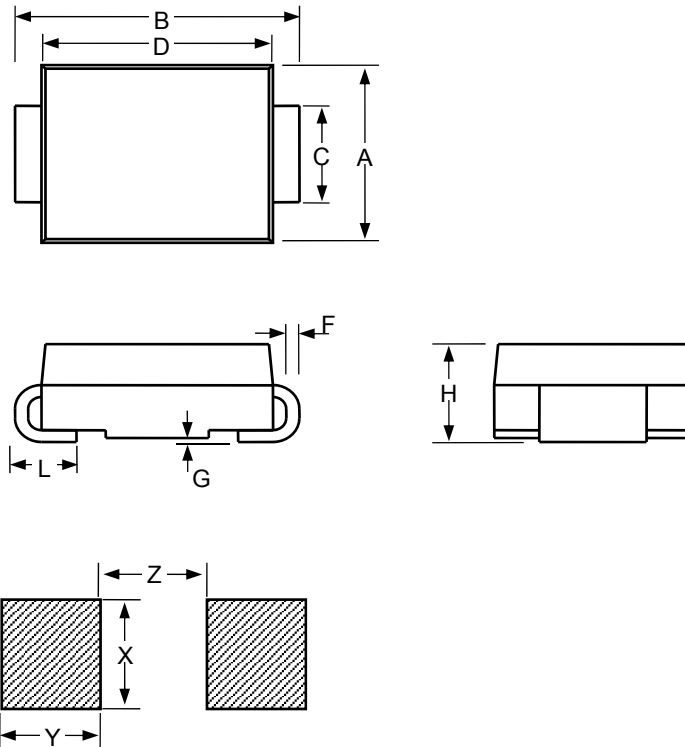


Fig.6 - Maximum Non-Repetitive Peak Forward Surge Current  
Uni-Directional Only

»Package Dimensions



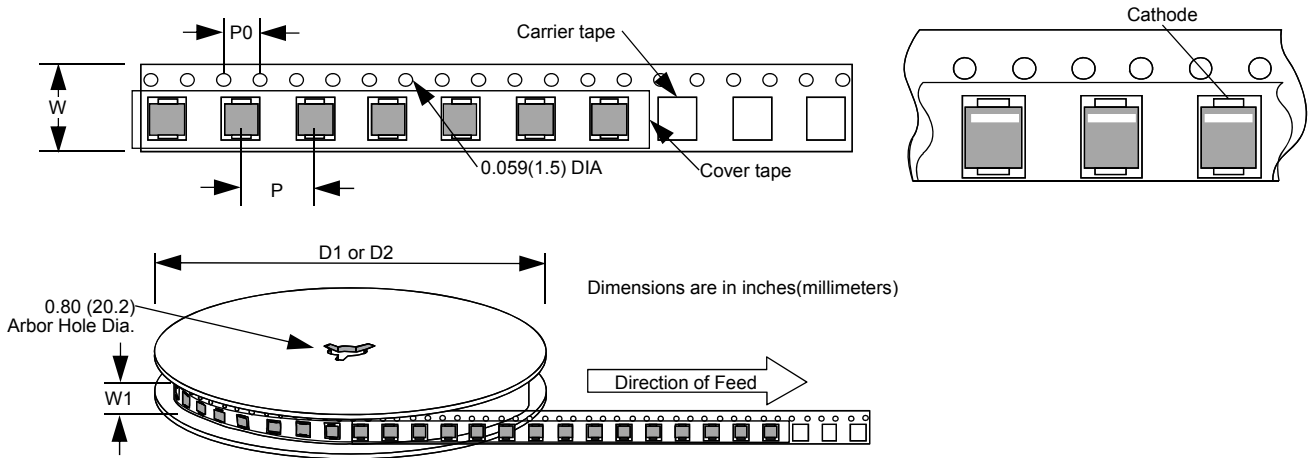
| SMB       |        |       |       |             |      |       |
|-----------|--------|-------|-------|-------------|------|-------|
| Dimension | Inches |       |       | Millimeters |      |       |
|           | MIN    | NOM   | MAX   | MIN         | NOM  | MAX   |
| A         | 0.134  | 0.144 | 0.155 | 3.4         | 3.67 | 3.94  |
| B         | 0.205  | 0.213 | 0.22  | 5.21        | 5.4  | 5.59  |
| C         | 0.075  | 0.079 | 0.083 | 1.9         | 2    | 2.1   |
| D         | 0.169  |       | 0.185 | 4.3         |      | 4.7   |
| F         | 0.006  |       | 0.012 | 0.152       |      | 0.305 |
| G         | -      |       | 0.008 | -           |      | 0.203 |
| H         | 0.085  | 0.091 | 0.096 | 2.15        | 2.3  | 2.45  |
| L         | 0.03   |       | 0.06  | 0.76        |      | 1.52  |
| X         |        | 0.11  |       |             | 2.8  |       |
| Y         |        | 0.079 |       |             | 2    |       |
| Z         |        | 0.079 |       |             | 2    |       |

»Soldering Parameters



| Reflow Condition                                       |                                    | Lead-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 – 180 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 ( $t_L$ )                   | 60 – 150 secs           |
| Peak Temperature ( $T_P$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 20 – 40 secs            |
| Ramp-down Rate   |                                    | 6°C/second max          |
| Time 25°C to peak Temperature (t)                      |                                    | 8 minutes Max.          |
| Do not exceed  |                                    | 260°C                   |

»Tape and Reel Specification



| Dimension | Inches |       |     | Millimeters |       |     |
|-----------|--------|-------|-----|-------------|-------|-----|
|           | MIN    | NOM   | MAX | MIN         | NOM   | MAX |
| P         |        | 0.315 |     |             | 8     |     |
| P0        |        | 0.157 |     |             | 4     |     |
| W         |        | 0.472 |     |             | 12    |     |
| W1        |        | 0.492 |     |             | 12.5  |     |
| D1        |        | 7     |     |             | 177.8 |     |
| D2        |        | 13    |     |             | 330.2 |     |