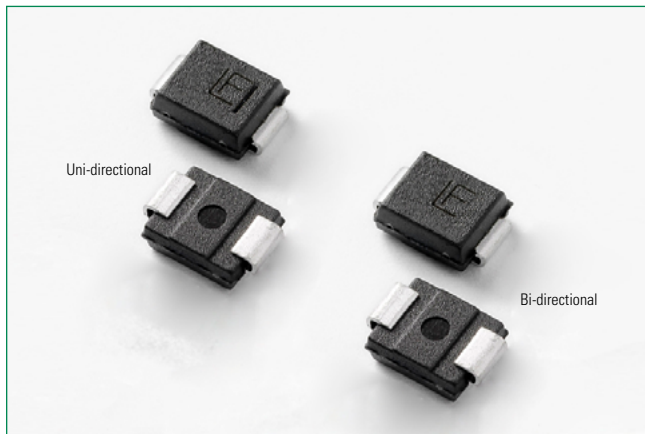


TPSMB Series

Surface Mount – 600W



Agency Approvals

| Agency | Agency Number |
|--------|---------------|
| | E230531 |

Maximum Ratings & Thermal Characteristics

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

| Parameter | Symbol | Value | Unit |
|--|-----------------------|------------|------|
| Peak Pulse Power Dissipation by 10/1000 μs waveform (Fig.1)(Note 1), (Note 2) | P_{PPM} | 600 | W |
| Power Dissipation on infinite heat sink at $T_L=50^{\circ}\text{C}$ | $P_{\text{M(AV)}}$ | 5.0 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | I_{FSM} | 100 | A |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional only (Note 4) | V_F | 3.5/5 | V |
| Operating Junction Temperature Range ($V_{\text{BR}} \leq 91\text{V}$) | T_J | -65 to 175 | °C |
| Operating Junction Temperature Range ($V_{\text{BR}} > 91\text{V}$) | T_J | -65 to 150 | |
| Storage Temperature Range | T_{STG} | -65 to 175 | |
| Typical Thermal Resistance Junction to Lead | $R_{\theta\text{JL}}$ | 20 | °C/W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta\text{JA}}$ | 100 | °C/W |

Notes:

- Non-repetitive current pulse, per Fig.4 and derated above $T_A=25^{\circ}\text{C}$ per Fig. 3.
- Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) to each terminal.
- Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only, duty cycle=4 per minute maximum.
- $V_F < 3.5\text{V}$ for part number with $V_{\text{BR}} < 300\text{V}$, $V_F < 5.0\text{V}$ for part number with $V_{\text{BR}} \geq 300\text{V}$.

Description

The TPSMB series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- High reliability application and automotive grade AEC Q101 qualified
- Surface mount component to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Glass passivated chip junction
- 600W PPM (peak pulse power) capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ns from 0V to V_{BR} min
- Excellent clamping capability
- Low incremental surge resistance
- Typical $I_{\text{R}} \leq 1\mu\text{A}$ for $V_{\text{R}} > 10.2\text{V}$
- UL Recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, High temperature soldering guaranteed: 260°C/10 seconds at terminals
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

Applications

TVS components are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Automotive applications.

Functional Diagram



Bi-directional




Uni-directional

TPSMB Series

Surface Mount – 600W

Electrical Characteristics

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

| Part Number (Uni) | Part Number (Bi) | Marking | | Typical I_R @ 150°C (μA) | 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 | | | | | | |
| TPSMB75A | - | 7V5AA | - | 500 | 6.40 | 7.13 | 7.88 | 10 | 11.3 | 54.0 | 500 | 0.052 | X |
| TPSMB8.2A | - | 8V2AA | - | 200 | 7.02 | 7.79 | 8.61 | 10 | 12.1 | 50.4 | 200 | 0.058 | X |
| TPSMB9.1A | - | 9V1AA | - | 50 | 7.78 | 8.65 | 9.55 | 1 | 13.4 | 45.5 | 50 | 0.063 | X |
| TPSMB10A | TPSMB10CA | 10AA | 10CA | 20 | 8.55 | 9.50 | 10.50 | 1 | 14.5 | 42.1 | 10 | 0.066 | X |
| TPSMB11A | TPSMB11CA | 11AA | 11CA | 8 | 9.40 | 10.50 | 11.60 | 1 | 15.6 | 39.1 | 5 | 0.069 | X |
| TPSMB12A | TPSMB12CA | 12AA | 12CA | 8 | 10.20 | 11.40 | 12.60 | 1 | 16.7 | 36.5 | 5 | 0.071 | X |
| TPSMB13A | TPSMB13CA | 13AA | 13CA | 8 | 11.10 | 12.40 | 13.70 | 1 | 18.2 | 33.5 | 1 | 0.074 | X |
| TPSMB15A | TPSMB15CA | 15AA | 15CA | 8 | 12.80 | 14.30 | 15.80 | 1 | 21.2 | 28.8 | 1 | 0.076 | X |
| TPSMB16A | TPSMB16CA | 16AA | 16CA | 8 | 13.60 | 15.20 | 16.80 | 1 | 22.5 | 27.1 | 1 | 0.080 | X |
| TPSMB18A | TPSMB18CA | 18AA | 18CA | 8 | 15.30 | 17.10 | 18.90 | 1 | 25.5 | 24.2 | 1 | 0.083 | X |
| TPSMB20A | TPSMB20CA | 20AA | 20CA | 8 | 17.10 | 19.00 | 21.00 | 1 | 27.7 | 22.0 | 1 | 0.085 | X |
| TPSMB22A | TPSMB22CA | 22AA | 22CA | 8 | 18.80 | 20.90 | 23.10 | 1 | 30.6 | 19.9 | 1 | 0.088 | X |
| TPSMB24A | TPSMB24CA | 24AA | 24CA | 8 | 20.50 | 22.80 | 25.20 | 1 | 33.2 | 18.4 | 1 | 0.091 | X |
| TPSMB27A | TPSMB27CA | 27AA | 27CA | 8 | 23.10 | 25.70 | 28.40 | 1 | 37.5 | 16.3 | 1 | 0.092 | X |
| TPSMB30A | TPSMB30CA | 30AA | 30CA | 8 | 25.60 | 28.50 | 31.50 | 1 | 41.4 | 14.7 | 1 | 0.093 | X |
| TPSMB33A | TPSMB33CA | 33AA | 33CA | 8 | 28.20 | 31.40 | 34.70 | 1 | 45.7 | 13.3 | 1 | 0.094 | X |
| TPSMB36A | TPSMB36CA | 36AA | 36CA | 8 | 30.80 | 34.20 | 37.80 | 1 | 49.9 | 12.2 | 1 | 0.096 | X |
| TPSMB39A | TPSMB39CA | 39AA | 39CA | 8 | 33.30 | 37.10 | 41.00 | 1 | 53.9 | 11.3 | 1 | 0.097 | X |
| TPSMB43A | TPSMB43CA | 43AA | 43CA | 8 | 36.80 | 40.90 | 45.20 | 1 | 59.3 | 10.3 | 1 | 0.098 | X |
| TPSMB47A | TPSMB47CA | 47AA | 47CA | 8 | 40.20 | 44.70 | 49.40 | 1 | 64.8 | 9.4 | 1 | 0.099 | X |
| TPSMB51A | TPSMB51CA | 51AA | 51CA | 8 | 43.60 | 48.50 | 53.60 | 1 | 70.1 | 8.7 | 1 | 0.100 | X |
| TPSMB56A | TPSMB56CA | 56AA | 56CA | 8 | 47.80 | 53.20 | 58.80 | 1 | 77.0 | 7.9 | 1 | 0.101 | X |
| TPSMB58A | TPSMB58CA | 58AA | 58CA | 8 | 52.78 | 55.10 | 60.90 | 1 | 79.8 | 7.7 | 1 | 0.101 | X |
| TPSMB62A | TPSMB62CA | 62AA | 62CA | 8 | 53.00 | 58.90 | 65.10 | 1 | 85.0 | 7.2 | 1 | 0.102 | X |
| TPSMB64A | TPSMB64CA | 64AA | 64CA | 8 | 54.40 | 60.80 | 67.20 | 1 | 86.90 | 7.0 | 1 | 0.102 | X |
| TPSMB68A | TPSMB68CA | 68AA | 68CA | 8 | 58.10 | 64.60 | 71.40 | 1 | 92.0 | 6.6 | 1 | 0.103 | X |
| TPSMB75A | TPSMB75CA | 75AA | 75CA | 8 | 64.10 | 71.30 | 78.80 | 1 | 103.0 | 5.9 | 1 | 0.104 | X |
| TPSMB82A | TPSMB82CA | 82AA | 82CA | 8 | 70.10 | 77.90 | 86.10 | 1 | 113.0 | 5.4 | 1 | 0.105 | X |
| TPSMB91A | TPSMB91CA | 91AA | 91CA | 8 | 77.80 | 86.50 | 95.50 | 1 | 125.0 | 4.9 | 1 | 0.106 | X |
| TPSMB100A | TPSMB100CA | 100A | 100C | - | 85.50 | 95.00 | 105.00 | 1 | 137.0 | 4.5 | 1 | 0.106 | X |
| TPSMB110A | TPSMB110CA | 110A | 110C | - | 94.00 | 105.00 | 116.00 | 1 | 152.0 | 4.0 | 1 | 0.107 | X |
| TPSMB120A | TPSMB120CA | 120A | 120C | - | 102.00 | 114.00 | 126.00 | 1 | 165.0 | 3.7 | 1 | 0.107 | X |
| TPSMB130A | TPSMB130CA | 130A | 130C | - | 111.00 | 124.00 | 137.00 | 1 | 179.0 | 3.4 | 1 | 0.107 | X |
| TPSMB150A | TPSMB150CA | 150A | 150C | - | 128.00 | 143.00 | 158.00 | 1 | 207.0 | 2.9 | 1 | 0.108 | X |
| TPSMB160A | TPSMB160CA | 160A | 160C | - | 136.00 | 152.00 | 168.00 | 1 | 219.0 | 2.8 | 1 | 0.108 | X |
| TPSMB170A | TPSMB170CA | 170A | 170C | - | 145.00 | 162.00 | 179.00 | 1 | 234.0 | 2.6 | 1 | 0.108 | X |
| TPSMB180A | TPSMB180CA | 180A | 180C | - | 154.00 | 171.00 | 189.00 | 1 | 246.0 | 2.5 | 1 | 0.108 | X |
| TPSMB200A | TPSMB200CA | 200A | 200C | - | 171.00 | 190.00 | 210.00 | 1 | 274.0 | 2.2 | 1 | 0.108 | X |
| TPSMB210A | TPSMB210CA | 210A | 210C | - | 179.60 | 199.50 | 220.50 | 1 | 288.0 | 2.1 | 1 | 0.110 | X |
| TPSMB220A | TPSMB220CA | 220A | 220C | - | 185.00 | 209.00 | 231.00 | 1 | 328.0 | 1.9 | 1 | 0.110 | X |
| TPSMB250A | TPSMB250CA | 250A | 250C | - | 214.00 | 237.00 | 263.00 | 1 | 344.0 | 1.8 | 1 | 0.110 | X |
| TPSMB300A-A | TPSMB300CA-A | 300A | 300C | - | 256.00 | 285.00 | 315.00 | 1 | 414.0 | 1.5 | 1 | 0.110 | X |
| TPSMB350A-A | TPSMB350CA-A | 350A | 350C | - | 300.00 | 332.00 | 368.00 | 1 | 482.0 | 1.3 | 1 | 0.112 | X |
| TPSMB400A-A | TPSMB400CA-A | 400A | 400C | - | 342.00 | 380.00 | 420.00 | 1 | 548.0 | 1.1 | 1 | 0.112 | X |
| TPSMB440A-A | TPSMB440CA-A | 440A | 440C | - | 376.00 | 418.00 | 462.00 | 1 | 602.0 | 1.0 | 1 | 0.112 | X |
| TPSMB480A-A | TPSMB480CA-A | 480A | 480C | - | 408.00 | 456.00 | 504.00 | 1 | 658.0 | 0.9 | 1 | 0.112 | X |
| TPSMB510A-A | TPSMB510CA-A | 510A | 510C | - | 434.00 | 485.00 | 535.00 | 1 | 698.0 | 0.9 | 1 | 0.112 | X |
| TPSMB520A-A | TPSMB520CA-A | 520A | 520C | - | 443.00 | 494.50 | 545.50 | 1 | 718.0 | 0.9 | 1 | 0.112 | X |
| TPSMB530A-A | TPSMB530CA-A | 530A | 530C | - | 451.00 | 503.50 | 556.50 | 1 | 725.0 | 0.8 | 1 | 0.112 | X |
| TPSMB540A-A | TPSMB540CA-A | 540A | 540C | - | 460.00 | 513.00 | 567.00 | 1 | 740.0 | 0.8 | 1 | 0.112 | X |
| TPSMB550A-A | TPSMB550CA-A | 550A | 550C | - | 468.00 | 522.50 | 577.50 | 1 | 760.0 | 0.8 | 1 | 0.112 | X |
| - | TPSMB600CA-A | - | 600C | - | 511.00 | 570.00 | 630.00 | 1 | 828.0 | 0.8 | 1 | 0.112 | - |
| - | TPSMB650CA-A | - | 650C | - | 553.00 | 617.50 | 682.50 | 1 | 897.0 | 0.8 | 1 | 0.112 | - |

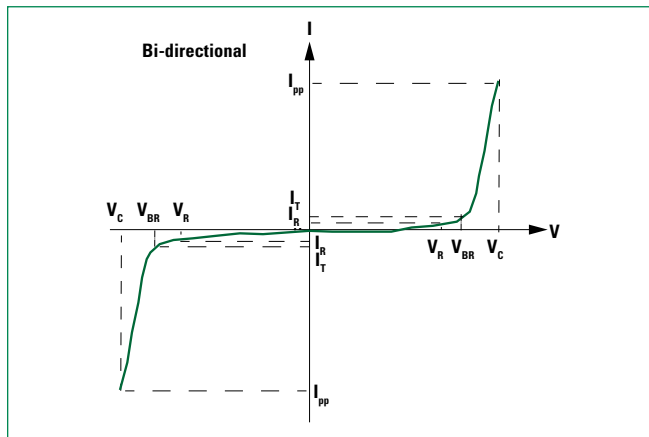
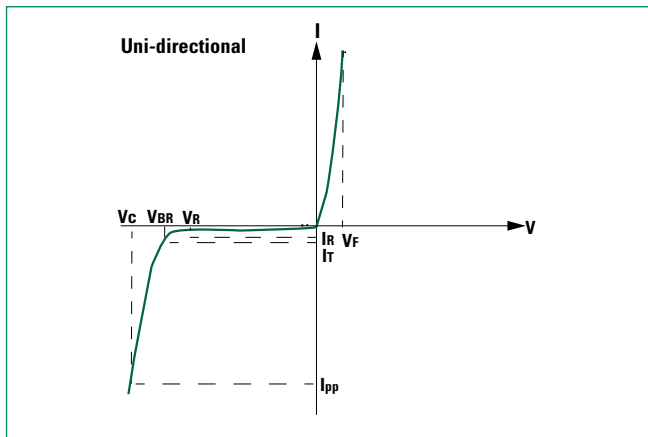
Note:

- For bidirectional type having V_R of 10 volts and less, the I_R limit is double.
- V_{BR} @ $T_A = 25^\circ\text{C} \times (1 + \alpha T \times (T_A - 25))$ (αT : Temperature Coefficient).
- The CTI (Comparative Tracking Index) of TPSMB600CA-A and TPSMB650CA-A is 600 and other parts is 550

TPSMB Series

Surface Mount – 600W

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation – Max power dissipation
V_R Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage – Maximum voltage that flows thogh the TVS at a specified test current (I_T)

V_C Clamping Voltage – Peak voltage measured across the TVS at a specified I_{ppm} (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

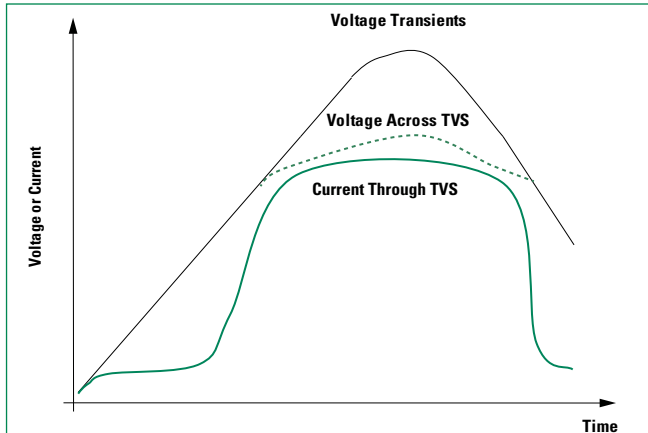


Figure 3 - Peak Pulse Power Derating Curve

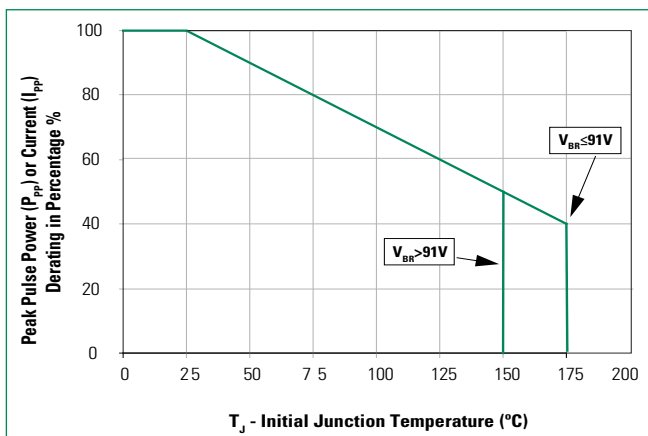


Figure 2 - Peak Power Rating Curve

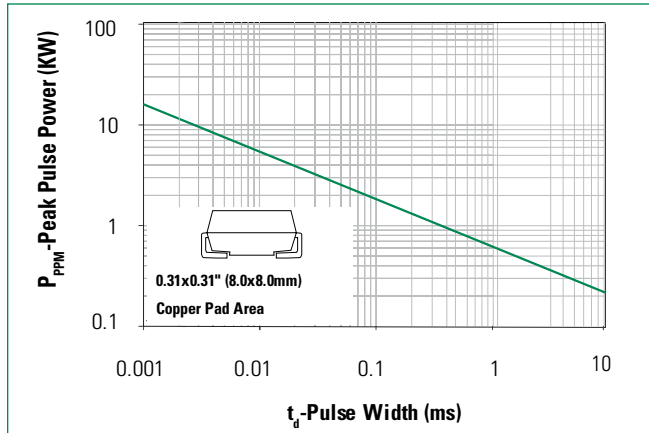
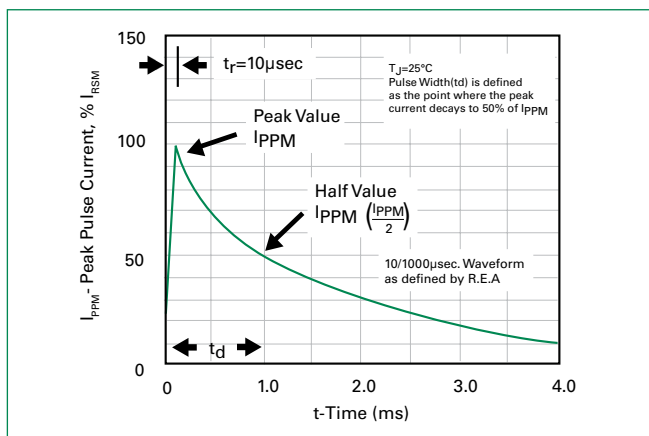


Figure 4 - Pulse Waveform



TPSMB Series

Surface Mount – 600W

Figure 5 - Typical Junction Capacitance

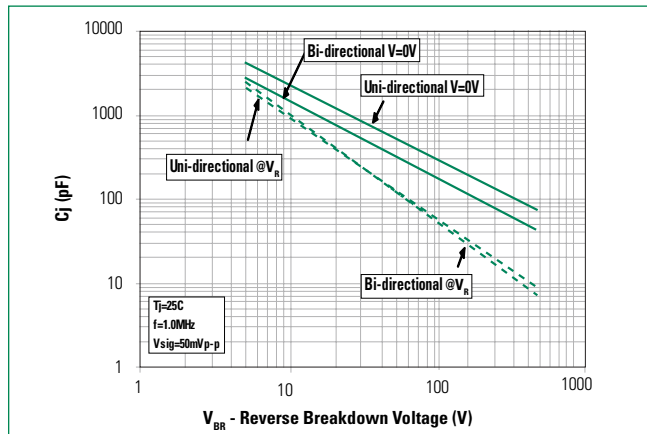
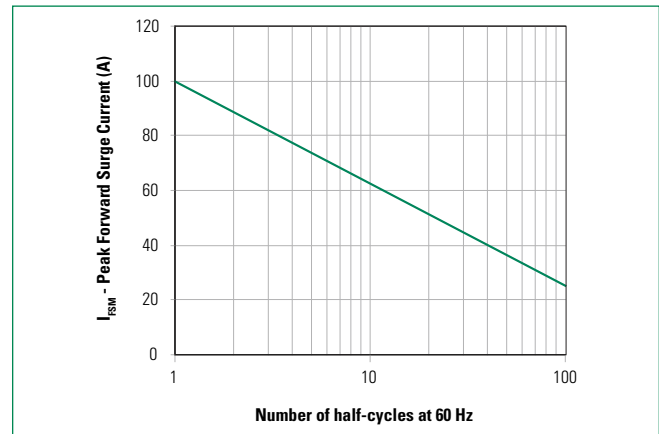
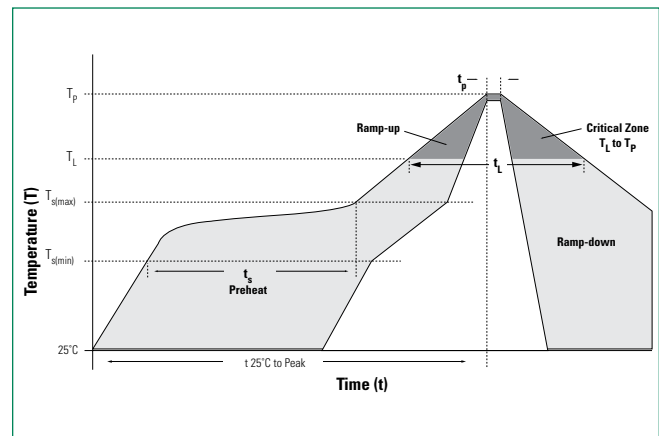


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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 – 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_s) | 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 gram |
| Case | JEDEC DO214AA. Molded plastic body over glass passivated junction |
| Polarity | Color band denotes cathode for unidirectional components. |
| Terminal | Matte Tin-plated leads, Solderable per JESD22-B102 |

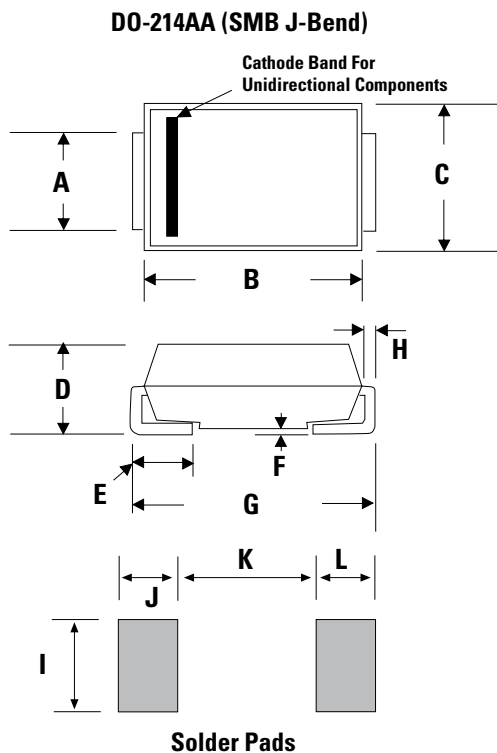
Environmental Specifications

| | |
|----------------------------|--------------------------|
| 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 |

TPSMB Series

Surface Mount – 600W

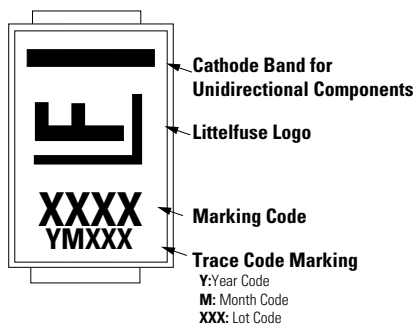
Dimensions



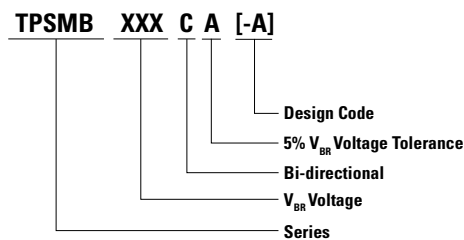
| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.077 | 0.086 | 1.950 | 2.200 |
| B | 0.160 | 0.180 | 4.060 | 4.570 |
| C | 0.130 | 0.155 | 3.300 | 3.940 |
| D | 0.084 | 0.096 | 2.130 | 2.440 |
| E | 0.030 | 0.060 | 0.760 | 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 | - |

Note: Dimension in inches and (millimeters)

Part Marking System



Part Numbering System



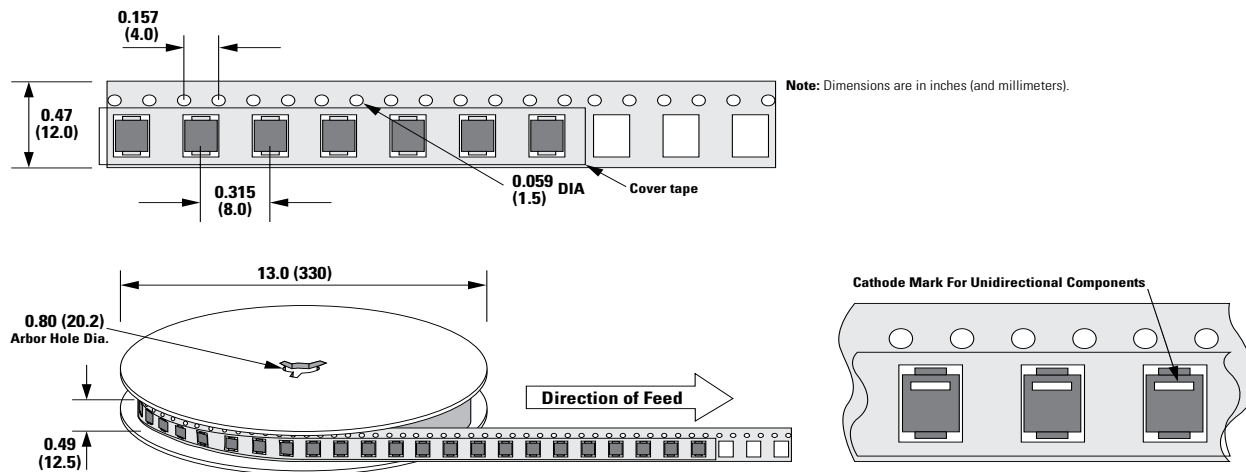
Packaging

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

TPSMB Series

Surface Mount – 600W

Tape and Reel Specification



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

单击下面可查看定价，库存，交付和生命周期等信息

[>>Littelfuse\(美国力特\)](#)