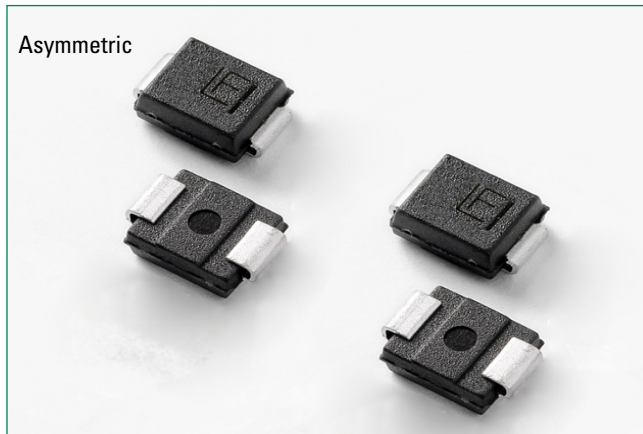


TPSMB Asymmetric Series

Surface Mount – 600W



Maximum Ratings and Thermal Characteristics

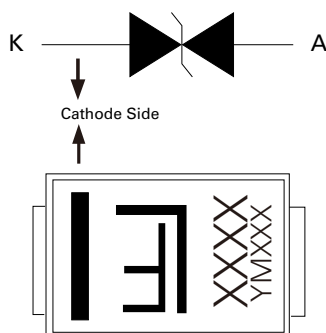
($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|------------|----------------------|
| Peak Pulse Power Dissipation ($I_{PP} \times V_C$) by 10/1000 μs waveform (Fig.1)(Note 1), (Note 2) | P_{PPM}^1 | 600 | W |
| | P_{PPM}^2 | | |
| Power Dissipation on infinite heat sink at $T_J=50^{\circ}\text{C}$ | P_{MAV} | 5.0 | W |
| Operating Junction Temperature Range | T_J | -65 to 175 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -65 to 175 | |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 20 | $^{\circ}\text{C/W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 100 | $^{\circ}\text{C/W}$ |
| Typical Junction Capacitance | C_J | 650 | pF |

Notes:

1. Non-repetitive current pulse, per Fig.4 and derated above $T_A=25^{\circ}\text{C}$ per Fig. 3.
2. Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) to each terminal.

Pin out & Functional Diagram



Description

The TPSMB Asymmetric 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 P_{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
- UL Recognized compound meeting flammability rating V-0.
- Meet MSL level1, per J-STD-020, High temperature soldering guaranteed: 260 $^{\circ}\text{C}$ /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, VCC bus and other vulnerable circuits used in Automotive applications.

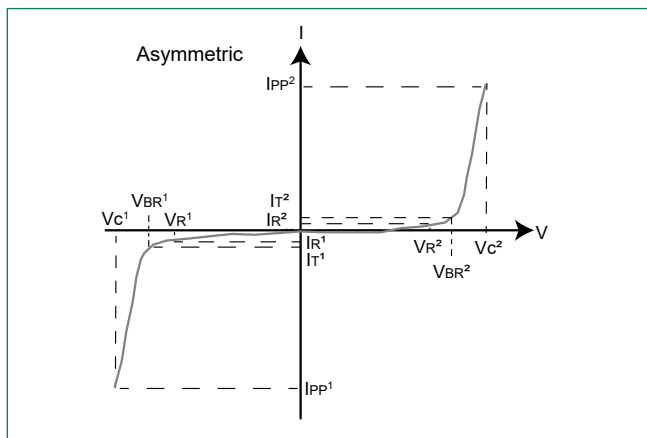
TPSMB Asymmetric Series

Surface Mount – 600W

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

| Part Number | Marking | K \rightarrow \leftarrow A | | | | | | | | | | | | | |
|-------------|---------|---|-------------------------------------|--|------|---|---|---------------------------|---|-------------------------------------|--|------|---|---|---------------------------|
| | | Maximum Reverse Leakage I_{R^1} @ V_{R^1} (μA) | Stand off Voltage V_{R^1} (Volts) | Breakdown Voltage V_{BR^1} (Volts) @ I_T^1 | | Maximum Clamping Voltage V_C^1 @ I_{PP^1} (V) | Maximum Peak Pulse Current I_{PP^1} (A) | Test Current I_T^1 (mA) | Maximum Reverse Leakage I_{R^2} @ V_{R^2} (μA) | Stand off Voltage V_{R^2} (Volts) | Breakdown Voltage V_{BR^2} (Volts) @ I_T^2 | | Maximum Clamping Voltage V_C^2 @ I_{PP^2} (V) | Maximum Peak Pulse Current I_{PP^2} (A) | Test Current I_T^2 (mA) |
| | | | | MIN | MAX | | | | | | MIN | MAX | | | |
| TPSMB2616CA | 2616 | 1 | 26 | 28.9 | 31.9 | 42.1 | 14.3 | 1 | 1 | 16 | 17.8 | 19.7 | 26 | 23.1 | 1 |

I-V Curve Characteristics



- P_{PPM} Peak Pulse Power Dissipation** ($I_{PP} \times V_C$) – Max power dissipation
- V_R^1/V_R^2 Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- V_{BR^1}/V_{BR^2} Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current (I_T)
- V_C^1/V_C^2 Clamping Voltage** – Peak voltage measured across the TVS at a specified I_{ppm} (peak impulse current)
- I_{R^1}/I_{R^2} Reverse Leakage Current** – Current measured at V_R

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

Figure 1:
TVS Transients Clamping Waveform

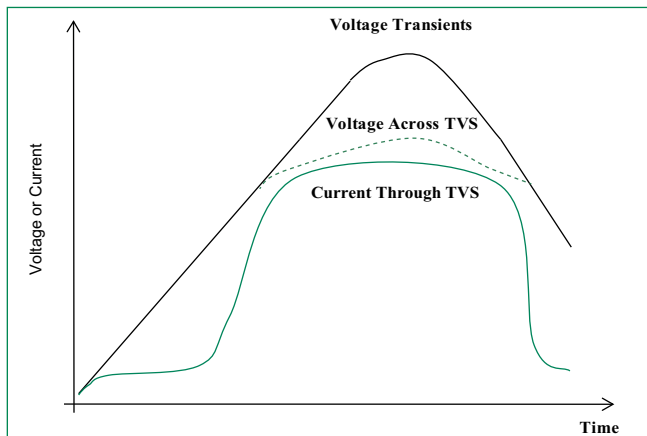
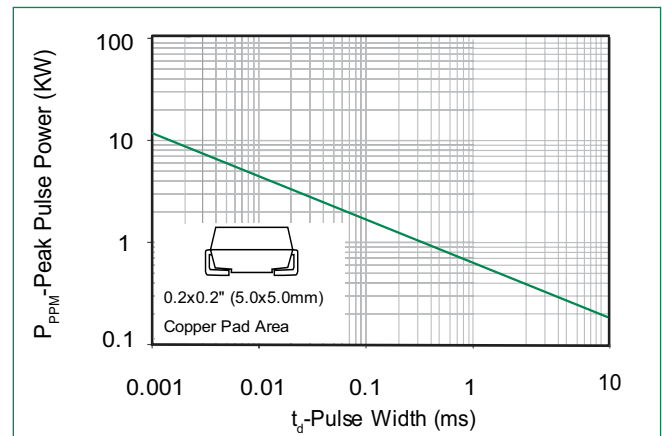


Figure 2:
Peak Pulse Power Rating Curve



TPSMB Asymmetric Series

Surface Mount – 600W

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

Figure 3:
Peak Pulse Power Derating Curve

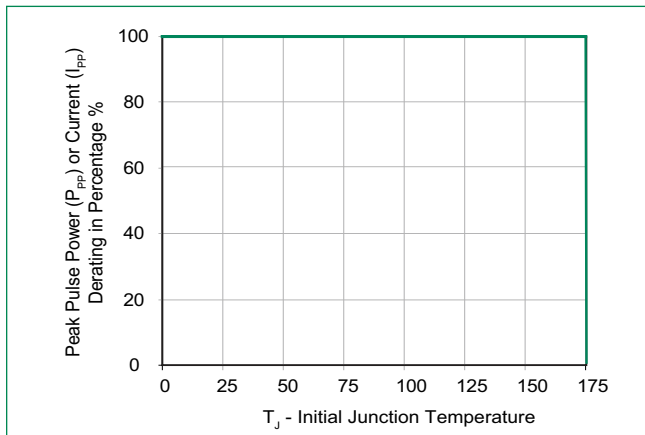
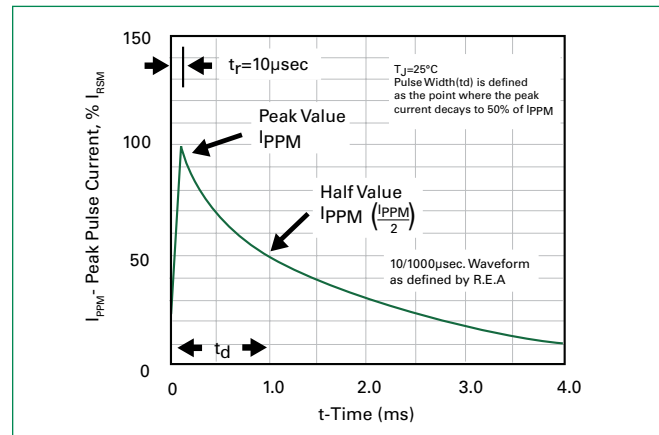
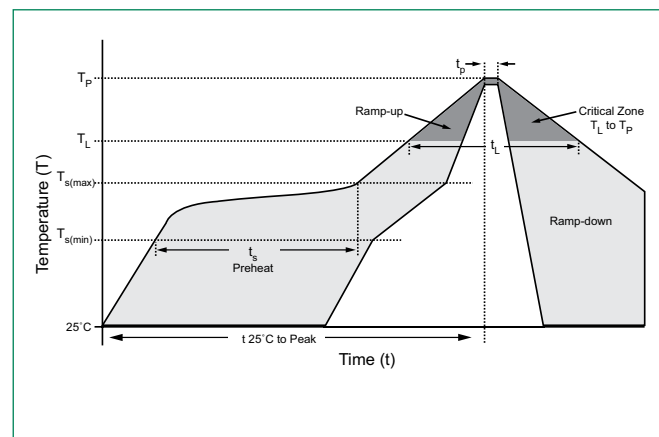


Figure 4:
Pulse Waveform



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

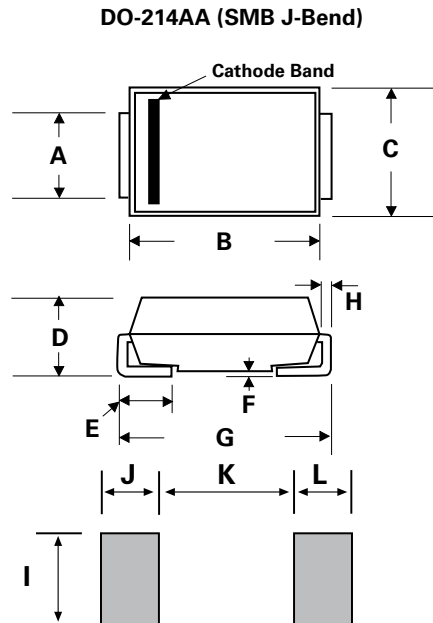
Environmental Specifications

| | |
|---------------------|--------------------------|
| 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 Asymmetric Series

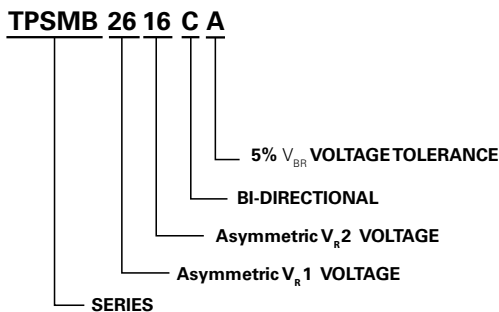
Surface Mount – 600W

Dimensions

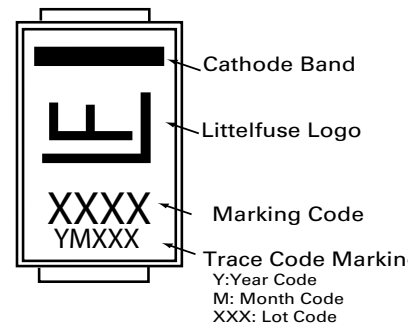


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.077 | 0.086 | 1.950 | 2.200 |
| B | 0.160 | 0.180 | 4.060 | 4.570 |
| C | 0.130 | 0.155 | 3.300 | 3.940 |
| D | 0.084 | 0.096 | 2.130 | 2.440 |
| E | 0.030 | 0.060 | 0.760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

Part Numbering System



Part Marking System



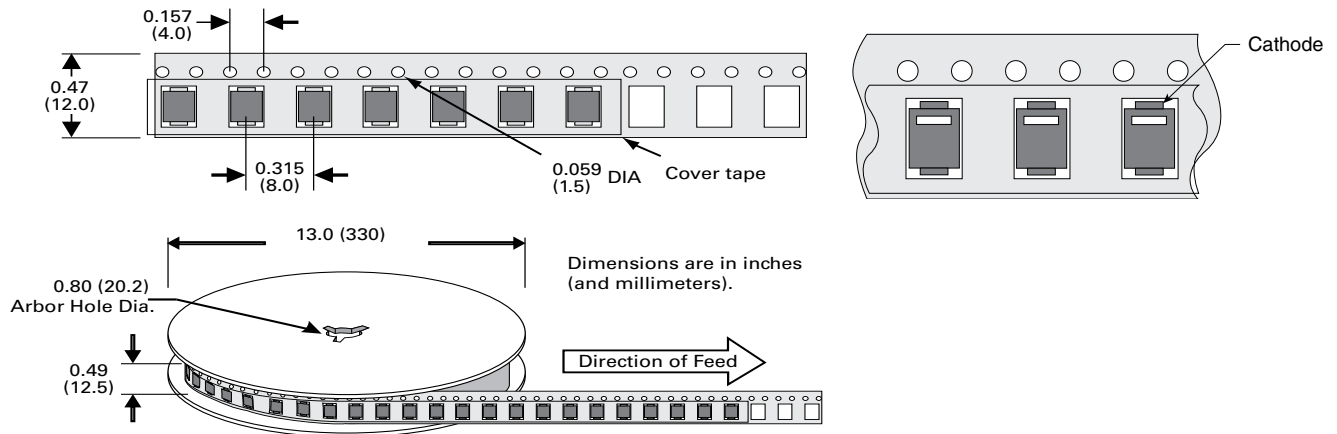
Product Selector & Packaging Option

| Part number | Marking Code | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|--------------|-------------------|----------|----------------------------------|-------------------------|
| TPSMB2616CA | 2616 | DO-214AA | 3000 | Tape & Reel - 12mm tape/13" reel | EIA STD RS-481 |

TPSMB Asymmetric Series

Surface Mount – 600W

Tape and Reel Specification



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