



**THE DATASHEET OF
TPSMP33AHM3_A/H**



High Power Density Surface Mount PAR[®] Transient Voltage Suppressors

eSMP[®] Series

SMP (DO-220AA)

Anode Cathode

LINKS TO ADDITIONAL RESOURCES


| PRIMARY CHARACTERISTICS | |
|--|-----------------|
| V_{BR} | 6.8 V to 43 V |
| V_{WM} | 5.8 V to 36.8 V |
| P_{PPM} (for V_{BR} 6.8 V) | 250 W |
| P_{PPM} (for V_{BR} 7.5 V to 12 V) | 300 W |
| P_{PPM} (for V_{BR} 13 V to 43 V) | 400 W |
| P_D | 2.5 W |
| I_{FSM} | 40 A |
| T_J max. | 185 °C |
| Polarity | Unidirectional |
| Package | SMP (DO-220AA) |

FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185$ °C capability suitable for high reliability and automotive requirement
- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Unidirection only
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

 AUTOMOTIVE
GRADE

**RoHS
COMPLIANT
HALOGEN
FREE**
TYPICAL APPLICATIONS

Protection for ICs, drive transistors, signal lines of sensor units, and electronic units in consumer, computer, industrial, and automotive applications.

MECHANICAL DATA

Case: SMP (DO-220AA)

Molding compound meets UL 94 V-0 flammability rating
Base P/NHM3_X - halogen-free, RoHS-compliant and AEC-Q101 qualified ("X" denotes revision code e.g. A, B, ...)

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HM3 suffix meets JESD 201 class 2 whisker test

Polarity: color band denotes cathode end

| MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted) | | | |
|---|----------------|---------------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak power dissipation with a 10/1000 μ s waveform (fig. 1 and 3) ⁽¹⁾⁽²⁾ | P_{PPM} | See table next page | W |
| Peak power pulse current with a 10/1000 μ s waveform (fig. 1) ⁽¹⁾ | I_{PPM} | See table next page | A |
| Power dissipation on infinite heatsink, $T_A = 75$ °C | P_D | 2.5 | W |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 40 | A |
| Maximum instantaneous forward voltage at 25 A ⁽³⁾ | V_F | 2.5 | V |
| Operating junction and storage temperature range | T_J, T_{STG} | -65 to +185 | °C |

Notes

- (1) Non-repetitive current pulse, per fig. 3 and derated above $T_A = 25$ °C per fig. 2
- (2) Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal
- (3) Pulse test: 300 μ s pulse width, 1 % duty cycle



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | | | | | | | |
|---|---------------------|---|------|-------------------------|--------------------------------|---|---|--|---|---|
| DEVICE TYPE | DEVICE MARKING CODE | BREAKDOWN VOLTAGE $V_{BR}^{(1)}$ AT I_T (V) | | TEST CURRENT I_T (mA) | STAND-OFF VOLTAGE V_{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V_{WM} I_R (μA) | MAXIMUM REVERSE LEAKAGE AT V_{WM} $T_J = 150\text{ }^\circ\text{C}$ I_D (μA) | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A) | MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V) | MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} ($\%/^\circ\text{C}$) |
| | | MIN. | MAX. | | | | | | | |
| TPSMP6.8A | AEP | 6.45 | 7.14 | 10.0 | 5.80 | 300 | 1000 | 23.8 | 10.5 | 0.057 |
| TPSMP7.5A | AGP | 7.13 | 7.88 | 10.0 | 6.40 | 150 | 500 | 26.5 | 11.3 | 0.061 |
| TPSMP8.2A | AKP | 7.79 | 8.61 | 10.0 | 7.02 | 50.0 | 200 | 24.8 | 12.1 | 0.065 |
| TPSMP9.1A | AMP | 8.65 | 9.55 | 1.0 | 7.78 | 10.0 | 50.0 | 22.4 | 13.4 | 0.068 |
| TPSMP10A | APP | 9.50 | 10.5 | 1.0 | 8.55 | 5.0 | 20.0 | 20.7 | 14.5 | 0.073 |
| TPSMP11A | ARP | 10.5 | 11.6 | 1.0 | 9.40 | 2.0 | 10.0 | 19.2 | 15.6 | 0.075 |
| TPSMP12A | ATP | 11.4 | 12.6 | 1.0 | 10.2 | 1.0 | 5.0 | 18.0 | 16.7 | 0.078 |
| TPSMP13A | AVP | 12.4 | 13.7 | 1.0 | 11.1 | 1.0 | 5.0 | 22.0 | 18.2 | 0.081 |
| TPSMP15A | AXP | 14.3 | 15.8 | 1.0 | 12.8 | 1.0 | 5.0 | 18.9 | 21.2 | 0.084 |
| TPSMP16A | AZP | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 5.0 | 17.8 | 22.5 | 0.086 |
| TPSMP18A | BEP | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 5.0 | 15.9 | 25.5 | 0.088 |
| TPSMP20A | BGP | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 5.0 | 14.4 | 27.7 | 0.090 |
| TPSMP22A | BKP | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 5.0 | 13.1 | 30.6 | 0.092 |
| TPSMP24A | BMP | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 5.0 | 12.0 | 33.2 | 0.094 |
| TPSMP27A | BPP | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 5.0 | 10.7 | 37.5 | 0.096 |
| TPSMP30A | BRP | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 5.0 | 9.7 | 41.4 | 0.097 |
| TPSMP33A | BTP | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 5.0 | 8.8 | 45.7 | 0.098 |
| TPSMP36A | BVP | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 5.0 | 8.0 | 49.9 | 0.099 |
| TPSMP39A | BXP | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 5.0 | 7.4 | 53.9 | 0.100 |
| TPSMP43A | BZP | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 5.0 | 6.7 | 59.3 | 0.101 |

Notes

- (1) V_{BR} measured after I_T applied for 300 μs , I_T = square wave pulse or equivalent
(2) Surge current waveform per fig. 3 and derated per fig. 2
(3) All terms and symbols are consistent with ANSI/IEEE C62.35

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TPSMP6.8AHM3_A/H ⁽¹⁾ | 0.024 | H | 3000 | 7" diameter plastic tape and reel |
| TPSMP6.8AHM3_A/I ⁽¹⁾ | 0.024 | I | 10 000 | 13" diameter plastic tape and reel |

Note

- (1) Automotive grade



RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

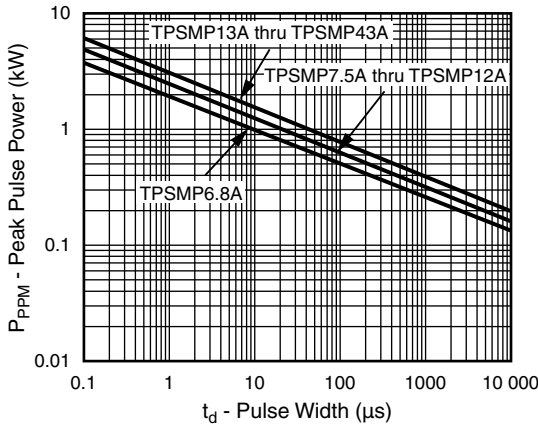


Fig. 1 - Peak Pulse Power Rating Curve

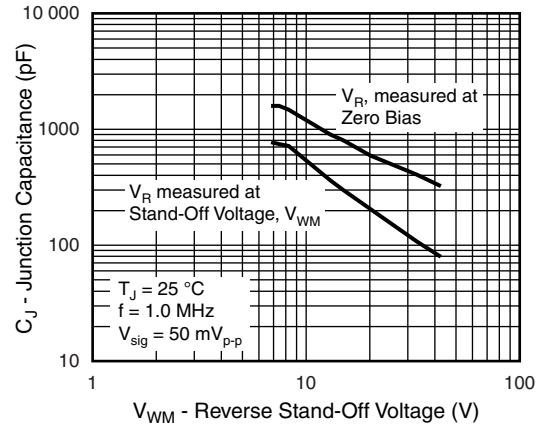


Fig. 4 - Typical Junction Capacitance

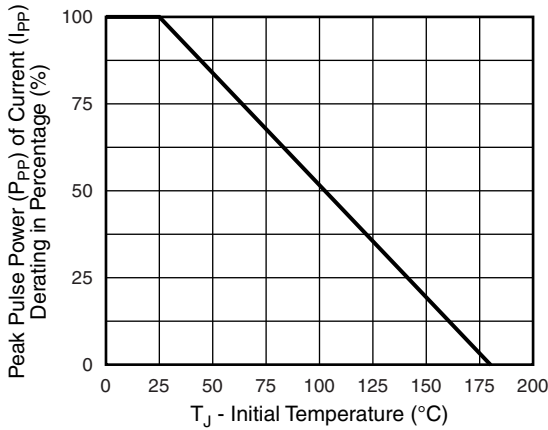


Fig. 2 - Pulse Derating Curve

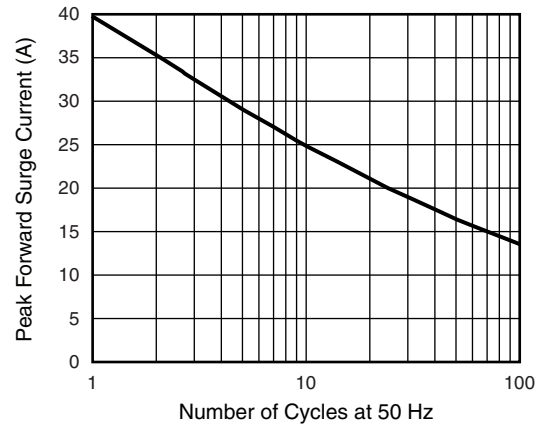


Fig. 5 - Maximum Peak Forward Surge Current

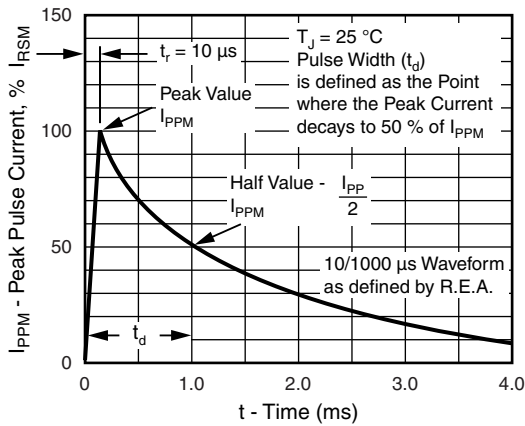


Fig. 3 - Pulse Waveform

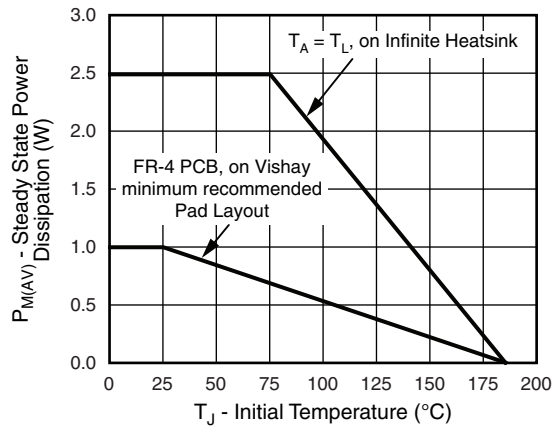
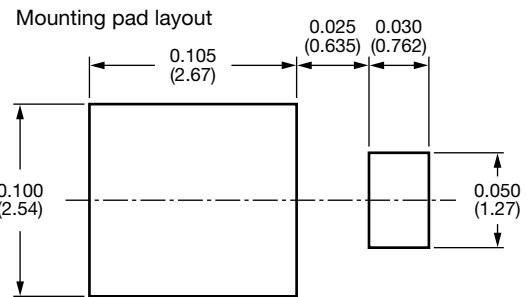
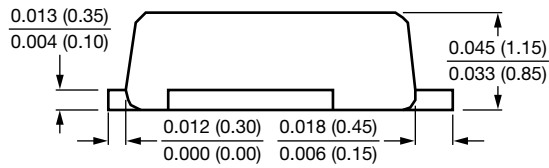
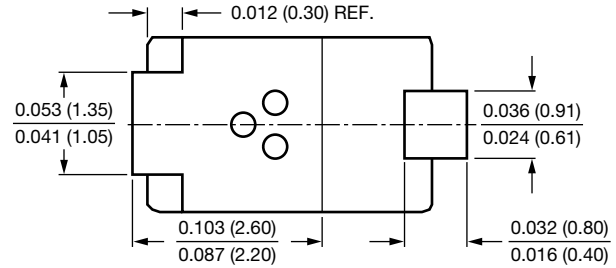
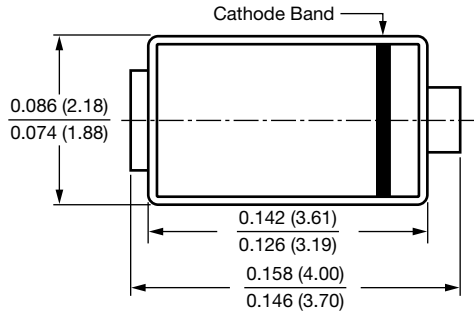


Fig. 6 - Steady State Power Derating Curve



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMP (DO-220AA)





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