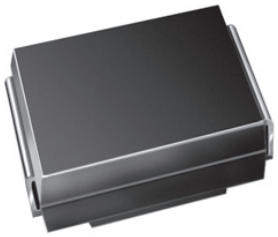
# Surface Mount PAR® Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-214AA (SMBJ)

| PRIMARY CHARACTERISTICS | |
|---|---|
| $V_{BR}$ | 6.8 V to 43 V |
| $V_{WM}$ | 5.50 V to 36.8 V |
| $P_{PPM}$ | 600 W |
| $I_{FSM}$ | 75 A |
| $T_J$ max. | 185 °C |
| Polarity | Uni-directional |
| Package | DO-214AA (SMBJ) |

## TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive and telecommunication.

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J$ = 185 °C capability suitable for high reliability and automotive requirement
- Available in uni-directional polarity only
- 600 W peak pulse power capability with a 10/1000 µs waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- 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

RoHS COMPLIANT

## MECHANICAL DATA

**Case:** DO-214AA (SMBJ)
Molding compound meets UL 94 V-0 flammability rating
Base P/NHE3 - RoHS compliant, AEC-Q101 qualified

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
HE3 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 pulse power dissipation with a 10/1000 µs waveform (fig. 1) (1)(2) | $P_{PPM}$ | 600 | W |
| Peak pulse current with a 10/1000 µs waveform (fig. 3) (1) | $I_{PPM}$ | See table next page | A |
| Peak forward surge current 8.3 ms single half sine-wave (2)(3) | $I_{FSM}$ | 75 | A |
| Maximum instantaneous forward voltage at 50 A (2)(3) | $V_F$ | 3.5 | 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 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads at each terminal
(3) Measured on 8.3 ms single half sine-wave, or equivalent square wave, duty cycle = 4 pulses per minute maximum


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**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °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 °C $I_D$ (µA) | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (2) (A) | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) |
|---|---|---|---|---|---|---|---|---|---|
| | | MIN. | MAX. | | | | | | |
| TPSMB6.8 | KDP | 6.12 | 7.48 | 10 | 5.5 | 500 | 1000 | 55.6 | 10.8 |
| TPSMB6.8A | KEP | 6.45 | 7.14 | 10 | 5.8 | 500 | 1000 | 57.1 | 10.5 |
| TPSMB7.5 | KFP | 6.75 | 8.25 | 10 | 6.05 | 250 | 500 | 51.3 | 11.7 |
| TPSMB7.5A | KGP | 7.13 | 7.88 | 10 | 6.4 | 250 | 500 | 53.1 | 11.3 |
| TPSMB8.2 | KHP | 7.38 | 9.02 | 10 | 6.63 | 100 | 200 | 48 | 12.5 |
| TPSMB8.2A | KKP | 7.79 | 8.61 | 10 | 7.02 | 100 | 200 | 49.6 | 12.1 |
| TPSMB9.1 | KLP | 8.19 | 10 | 1 | 7.37 | 25 | 50 | 43.5 | 13.8 |
| TPSMB9.1A | KMP | 8.65 | 9.55 | 1 | 7.78 | 25 | 50 | 44.8 | 13.4 |
| TPSMB10 | KNP | 9 | 11 | 1 | 8.1 | 5 | 20 | 40 | 15 |
| TPSMB10A | KPP | 9.5 | 10.5 | 1 | 8.55 | 5 | 20 | 41.4 | 14.5 |
| TPSMB11 | KQP | 9.9 | 12.1 | 1 | 8.92 | 2 | 5 | 37 | 16.2 |
| TPSMB11A | KRP | 10.5 | 11.6 | 1 | 9.4 | 2 | 5 | 38.5 | 15.6 |
| TPSMB12 | KSP | 10.8 | 13.2 | 1 | 9.72 | 2 | 5 | 34.7 | 17.3 |
| TPSMB12A | KTP | 11.4 | 12.6 | 1 | 10.2 | 2 | 5 | 35.9 | 16.7 |
| TPSMB13 | KUP | 11.7 | 14.3 | 1 | 10.5 | 2 | 5 | 31.6 | 19 |
| TPSMB13A | KVP | 12.4 | 13.7 | 1 | 11.1 | 2 | 5 | 33 | 18.2 |
| TPSMB15 | KWP | 13.5 | 16.5 | 1 | 12.1 | 1 | 5 | 27.3 | 22 |
| TPSMB15A | KXP | 14.3 | 15.8 | 1 | 12.8 | 1 | 5 | 28.3 | 21.2 |
| TPSMB16 | KYP | 14.4 | 17.6 | 1 | 12.9 | 1 | 5 | 25.5 | 23.5 |
| TPSMB16A | KZP | 15.2 | 16.8 | 1 | 13.6 | 1 | 5 | 26.7 | 22.5 |
| TPSMB18 | LDP | 16.2 | 19.8 | 1 | 14.5 | 1 | 5 | 22.6 | 26.5 |
| TPSMB18A | LEP | 17.1 | 18.9 | 1 | 15.3 | 1 | 5 | 23.8 | 25.2 |
| TPSMB20 | LFP | 18 | 22 | 1 | 16.2 | 1 | 5 | 20.6 | 29.1 |
| TPSMB20A | LGP | 19 | 21 | 1 | 17.1 | 1 | 5 | 21.7 | 27.7 |
| TPSMB22 | LHP | 19.8 | 24.2 | 1 | 17.8 | 1 | 5 | 18.8 | 31.9 |
| TPSMB22A | LKP | 20.9 | 23.1 | 1 | 18.8 | 1 | 5 | 19.6 | 30.6 |
| TPSMB24 | LLP | 21.6 | 26.4 | 1 | 19.4 | 1 | 5 | 17.3 | 34.7 |
| TPSMB24A | LMP | 22.8 | 25.2 | 1 | 20.5 | 1 | 5 | 18.1 | 33.2 |
| TPSMB27 | LNP | 24.3 | 29.7 | 1 | 21.8 | 1 | 5 | 15.3 | 39.1 |
| TPSMB27A | LPP | 25.7 | 28.4 | 1 | 23.1 | 1 | 5 | 16 | 37.5 |
| TPSMB30 | LQP | 27 | 33 | 1 | 24.3 | 1 | 5 | 13.8 | 43.5 |
| TPSMB30A | LRP | 28.5 | 31.5 | 1 | 25.6 | 1 | 5 | 14.5 | 41.4 |
| TPSMB33 | LSP | 29.7 | 36.3 | 1 | 26.8 | 1 | 5 | 12.6 | 47.7 |
| TPSMB33A | LTP | 31.4 | 34.7 | 1 | 28.2 | 1 | 5 | 13.1 | 45.7 |
| TPSMB36 | LUP | 32.4 | 39.6 | 1 | 29.1 | 1 | 5 | 11.5 | 52 |
| TPSMB36A | LVP | 34.2 | 37.8 | 1 | 30.8 | 1 | 5 | 12 | 49.9 |
| TPSMB39 | LWP | 35.1 | 42.9 | 1 | 31.6 | 1 | 5 | 10.6 | 56.4 |
| TPSMB39A | LXP | 37.1 | 41 | 1 | 33.3 | 1 | 5 | 11.1 | 53.9 |
| TPSMB43 | LYP | 38.7 | 47.3 | 1 | 34.8 | 1 | 5 | 9.7 | 61.9 |
| TPSMB43A | LZP | 40.9 | 45.2 | 1 | 36.8 | 1 | 5 | 10.1 | 59.3 |

**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


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| ORDERING INFORMATION (Example) | | | | |
|---|---|---|---|---|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TPSMB6.8AHE3/52T (1) | 0.096 | 52T | 750 | 7" diameter plastic tape and reel |
| TPSMB6.8AHE3/5BT (1) | 0.096 | 5BT | 3200 | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade

## RATINGS AND CHARACTERISTICS CURVES

($T_A$ = 25 °C unless otherwise noted)

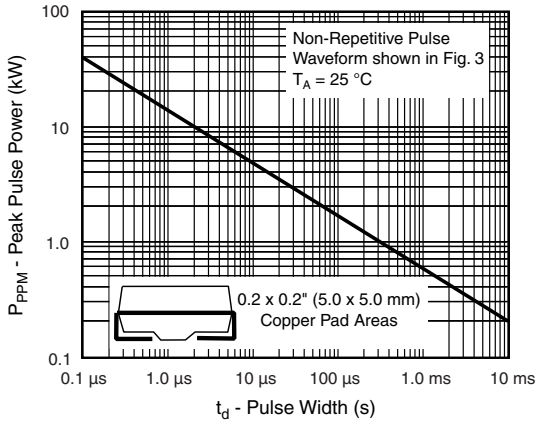



Fig. 1 - Peak Pulse Power Rating Curve

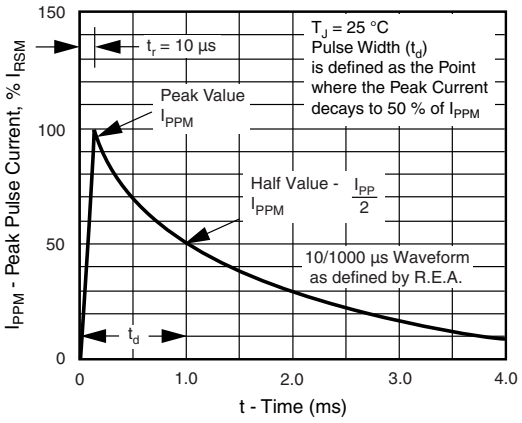



Fig. 3 - Pulse Waveform

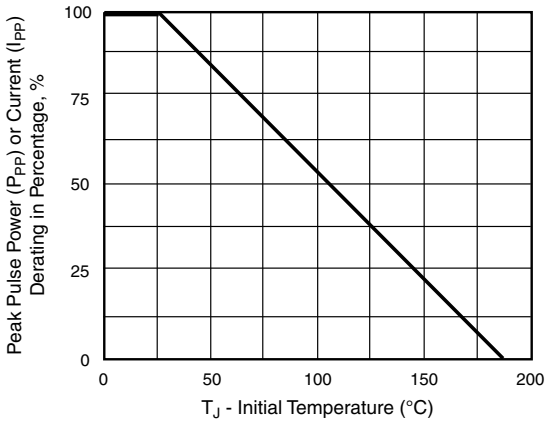



Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

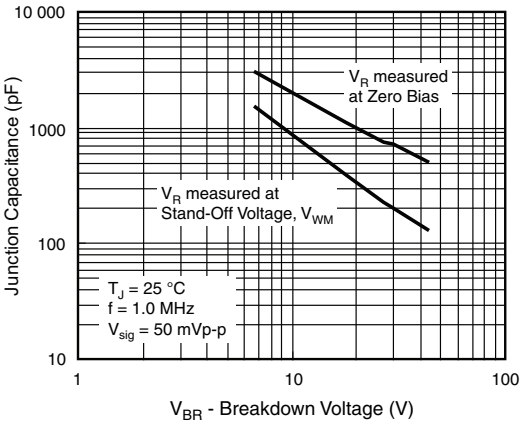



Fig. 4 - Typical Junction Capacitance



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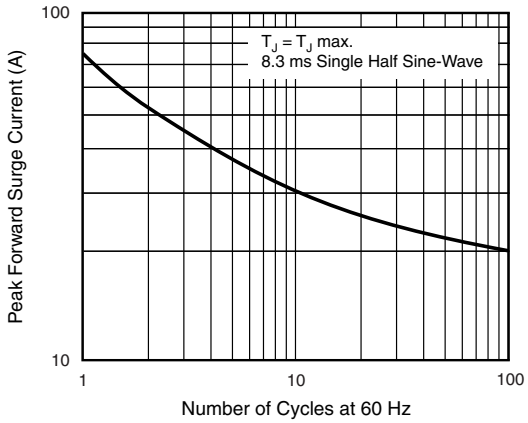
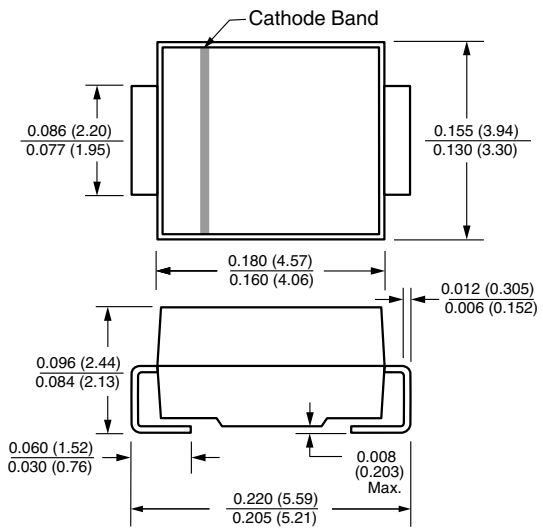


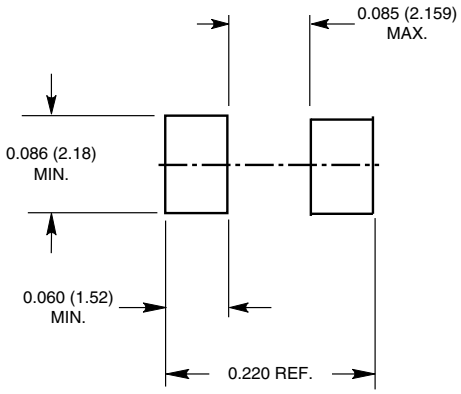

Fig. 5 - Maximum Non-Repetitive/Peak Forward Surge Current

## **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

### DO-214AA (SMBJ)




### Mounting Pad Layout





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