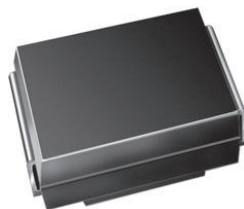


# Surface-Mount PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



**SMB (DO-214AA)**

Cathode  Anode

| PRIMARY CHARACTERISTICS |                  |
|-------------------------|------------------|
| $V_{BR}$                | 12 V to 51 V     |
| $V_{WM}$                | 10.2 V to 43.6 V |
| $P_{PPM}$               | 1500 W           |
| $T_J$ max.              | 185 °C           |
| Polarity                | Unidirectional   |
| Package                 | SMB (DO-214AA)   |

## TYPICAL APPLICATIONS

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

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185$  °C capability suitable for high reliability and automotive requirement
- 1500 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- Unidirectional
- Excellent clamping capability
- 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/doc299912](http://www.vishay.com/doc299912)



## MECHANICAL DATA

**Case:** SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**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 pulse power dissipation with a 10/1000 $\mu$ s waveform (fig.1) <sup>(1)</sup> | $P_{PPM}$      | 1500                | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform (fig.3) <sup>(1)</sup>           | $I_{PPM}$      | See table next page | A    |
| Operating junction and storage temperature range                                    | $T_J, T_{STG}$ | -65 to +185         | °C   |

### Note

<sup>(1)</sup> Non-repetitive current pulse, per fig.3 and derated above  $T_A = 25$  °C per fig.2

**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 $V_{WM}$ $I_R$ ( $\mu\text{A}$ ) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $T_J = 150\text{ }^{\circ}\text{C}$ $I_D$ ( $\mu\text{A}$ ) | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (A) | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) | TYPICAL TEMP. COEFFICIENT OF $V_{BR}^{(2)}$ $\alpha T$ ( $\%/^{\circ}\text{C}$ ) |
|-------------|---------------------|-----------------------------------------------|------|------|-------------------------|--------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------|
|             |                     | MIN.                                          | NOM. | MAX. |                         |                                |                                                             |                                                                                                 |                                                |                                                 |                                                                                  |
| T15B12A     | KX5                 | 11.4                                          | 12.0 | 12.6 | 1.0                     | 10.2                           | 2.0                                                         | 12.0                                                                                            | 91.2                                           | 17.0                                            | 0.070                                                                            |
| T15B13A     | KZ5                 | 12.4                                          | 13.0 | 13.7 | 1.0                     | 11.1                           | 2.0                                                         | 10.0                                                                                            | 83.8                                           | 18.5                                            | 0.072                                                                            |
| T15B15A     | LG5                 | 14.3                                          | 15.0 | 15.8 | 1.0                     | 12.8                           | 1.0                                                         | 10.0                                                                                            | 73.1                                           | 21.2                                            | 0.076                                                                            |
| T15B16A     | LK5                 | 15.2                                          | 16.0 | 16.8 | 1.0                     | 13.6                           | 1.0                                                         | 10.0                                                                                            | 68.9                                           | 22.5                                            | 0.078                                                                            |
| T15B18A     | LM5                 | 17.1                                          | 18.0 | 18.9 | 1.0                     | 15.3                           | 1.0                                                         | 10.0                                                                                            | 60.8                                           | 25.5                                            | 0.080                                                                            |
| T15B20A     | LR5                 | 19.0                                          | 20.0 | 21.0 | 1.0                     | 17.1                           | 1.0                                                         | 10.0                                                                                            | 56.0                                           | 27.7                                            | 0.082                                                                            |
| T15B22A     | LS5                 | 20.9                                          | 22.0 | 23.1 | 1.0                     | 18.8                           | 1.0                                                         | 10.0                                                                                            | 50.7                                           | 30.6                                            | 0.084                                                                            |
| T15B24A     | LV5                 | 22.8                                          | 24.0 | 25.2 | 1.0                     | 20.5                           | 1.0                                                         | 10.0                                                                                            | 46.7                                           | 33.2                                            | 0.085                                                                            |
| T15B27A     | LW5                 | 25.7                                          | 27.0 | 28.4 | 1.0                     | 23.1                           | 1.0                                                         | 10.0                                                                                            | 41.3                                           | 37.5                                            | 0.087                                                                            |
| T15B30A     | ME5                 | 28.5                                          | 30.0 | 31.5 | 1.0                     | 25.6                           | 1.0                                                         | 10.0                                                                                            | 37.4                                           | 41.4                                            | 0.088                                                                            |
| T15B33A     | MG5                 | 31.4                                          | 33.0 | 34.7 | 1.0                     | 28.2                           | 1.0                                                         | 10.0                                                                                            | 33.9                                           | 45.7                                            | 0.089                                                                            |
| T15B36A     | MJ5                 | 34.2                                          | 36.0 | 37.8 | 1.0                     | 30.8                           | 1.0                                                         | 15.0                                                                                            | 31.1                                           | 49.9                                            | 0.090                                                                            |
| T15B39A     | MM5                 | 37.1                                          | 39.0 | 41.0 | 1.0                     | 33.3                           | 1.0                                                         | 15.0                                                                                            | 28.8                                           | 53.9                                            | 0.091                                                                            |
| T15B43A     | MN5                 | 40.9                                          | 43.0 | 45.2 | 1.0                     | 36.8                           | 1.0                                                         | 20.0                                                                                            | 26.1                                           | 59.3                                            | 0.092                                                                            |
| T15B47A     | MR5                 | 44.7                                          | 47.0 | 49.4 | 1.0                     | 40.2                           | 1.0                                                         | 20.0                                                                                            | 23.9                                           | 64.8                                            | 0.092                                                                            |
| T15B51A     | MT5                 | 48.5                                          | 51.0 | 53.6 | 1.0                     | 43.6                           | 1.0                                                         | 20.0                                                                                            | 22.1                                           | 70.1                                            | 0.093                                                                            |

**Notes**

- (1)  $V_{BR}$  measured after  $I_T$  applied for 300  $\mu\text{s}$ ,  $I_T$  = square wave pulse or equivalent  
(2) To calculate  $V_{BR}$  vs. junction temperature, use the following formula:  $V_{BR}$  at  $T_J = V_{BR}$  at  $25\text{ }^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$   
(3) All terms and symbols are consistent with ANSI/IEEE C62.35

**IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| STANDARD      | TEST TYPE         | TEST CONDITIONS              | SYMBOL | VALUE |
|---------------|-------------------|------------------------------|--------|-------|
| IEC 61000-4-2 | Contact discharge | C = 150 pF, R = 330 $\Omega$ | ESD    | 30 kV |
|               | Air discharge     |                              |        | 30 kV |

**ORDERING INFORMATION** (Example)

| PREFERRED P/N               | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|-----------------------------|-----------------|------------------------|---------------|------------------------------------|
| T15B12AHM3/H <sup>(1)</sup> | 0.107           | H                      | 750           | 7" diameter plastic tape and reel  |
| T15B12AHM3/I <sup>(1)</sup> | 0.107           | I                      | 3200          | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

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

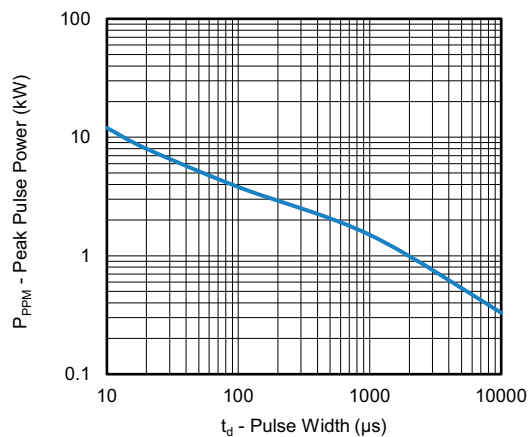


Fig. 1 - Peak Pulse Power Rating Curve

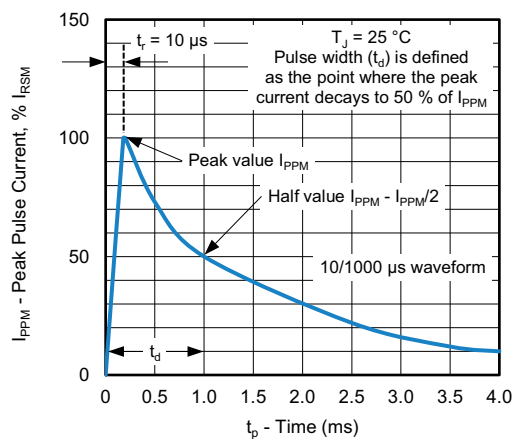


Fig. 3 - Pulse Waveform

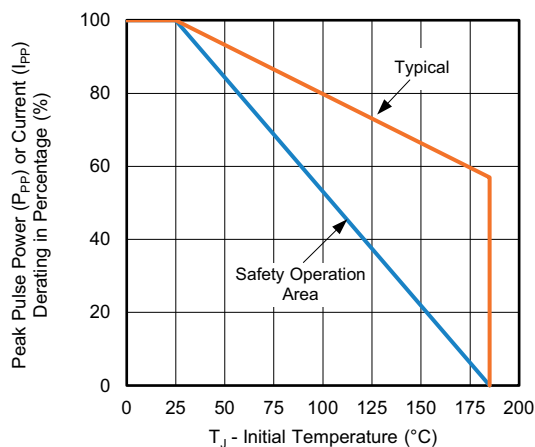


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

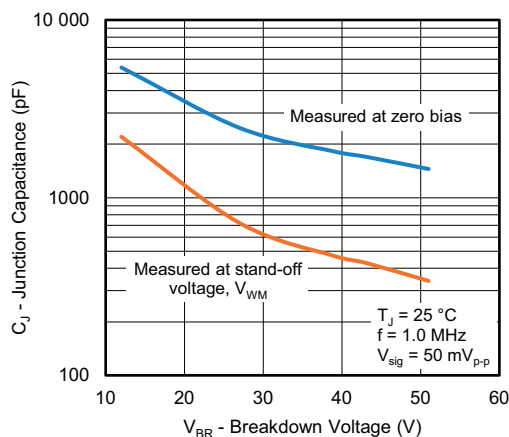


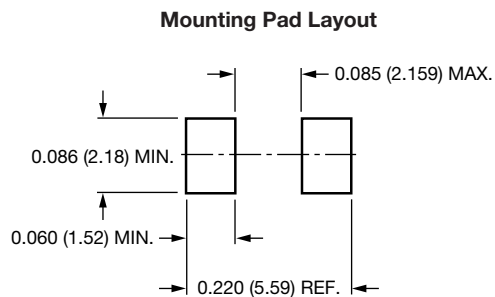
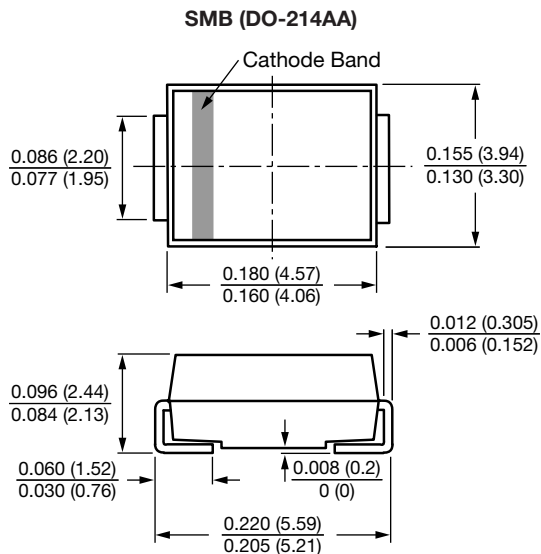
Fig. 4 - Typical Junction Capacitance

#### Note

- Fig.1, power calculations is based on  $I_{PPM}$  times defined maximum clamping voltage by pulse width



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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