



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

High Temperature Stability and High Reliability Conditions



**DO-218AB**

| PRIMARY CHARACTERISTICS         |                  |
|---------------------------------|------------------|
| $V_{BR}$                        | 11.1 V to 52.8 V |
| $P_{PPM}$ (10 x 1000 $\mu$ s)   | 6600 W           |
| $P_{PPM}$ (10 x 10 000 $\mu$ s) | 5200 W           |
| $P_D$                           | 8 W              |
| $V_{WM}$                        | 10 V to 43 V     |
| $I_{FSM}$                       | 700 A            |
| $T_J$ max.                      | 175 °C           |
| Polarity                        | Uni-directional  |
| Package                         | DO-218AB         |

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 175$  °C capability suitable for high reliability and automotive requirement
- Available in uni-directional polarity only
- Low leakage current
- Low forward voltage drop
- High surge capability
- Meets ISO7637-2 surge specification (varied by test condition)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.

## MECHANICAL DATA

**Case:** DO-218AB

Molding compound meets UL 94 V-0 flammability rating  
 Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified  
 Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified  
 ("X" denotes revision code e.g. A, B, ..., revision code only applicable for part number with  $\pm 5$  % tolerance)

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

HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** heatsink is anode

| MAXIMUM RATINGS ( $T_C = 25$ °C unless otherwise noted)          |                 |                                 |      |
|--|-----------------|---------------------------------|------|
| PARAMETER  | SYMBOL          | VALUE                           | UNIT |
| Peak pulse power dissipation                                     | $P_{PPM}$       | with 10/1000 $\mu$ s waveform   | 6600 |
|  |                 | with 10/10 000 $\mu$ s waveform | 5200 |
| Power dissipation on infinite heatsink at $T_C = 25$ °C (fig. 1) | $P_D$           | 8.0                             | W    |
| Peak pulse current with 10/1000 $\mu$ s waveform                 | $I_{PPM}^{(1)}$ | See next table                  | A    |
| Peak forward surge current 8.3 ms single half sine-wave          | $I_{FSM}$       | 700                             | A    |
| Operating junction and storage temperature range                 | $T_J, T_{STG}$  | -55 to +175                     | °C   |

### Note

<sup>(1)</sup> Non-repetitive current pulse derated above  $T_A = 25$  °C



| ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted) |                                       |      |                                  |                                       |  |  |  |   |
|--|---------------------------------------|------|----------------------------------|---------------------------------------|--|--|--|---|
| DEVICE TYPE  | BREAKDOWN VOLTAGE V <sub>BR</sub> (V) |      | TEST CURRENT I <sub>T</sub> (mA) | STAND-OFF VOLTAGE V <sub>WM</sub> (V) | MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (μA) | MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> T <sub>J</sub> = 175 °C I <sub>D</sub> (μA) | MAX. PEAK PULSE CURRENT AT 10/1000 μs WAVEFORM (A) | MAXIMUM CLAMPING VOLTAGE AT I <sub>PPM</sub> V <sub>C</sub> (V) |
|  | MIN.                                  | MAX. |                                  |                                       |  |  |  |   |
| SM8S10   | 11.1                                  | 13.6 | 5.0                              | 10.0                                  | 15   | 250  | 351  | 18.8  |
| SM8S10A  | 11.1                                  | 12.3 | 5.0                              | 10.0                                  | 15   | 250  | 388  | 17.0  |
| SM8S11   | 12.2                                  | 14.9 | 5.0                              | 11.0                                  | 10   | 150  | 328  | 20.1  |
| SM8S11A  | 12.2                                  | 13.5 | 5.0                              | 11.0                                  | 10   | 150  | 363  | 18.2  |
| SM8S12   | 13.3                                  | 16.3 | 5.0                              | 12.0                                  | 10   | 150  | 300  | 22.0  |
| SM8S12A  | 13.3                                  | 14.7 | 5.0                              | 12.0                                  | 10   | 150  | 332  | 19.9  |
| SM8S13   | 14.4                                  | 17.6 | 5.0                              | 13.0                                  | 10   | 150  | 277  | 23.8  |
| SM8S13A  | 14.4                                  | 15.9 | 5.0                              | 13.0                                  | 10   | 150  | 307  | 21.5  |
| SM8S14   | 15.6                                  | 19.1 | 5.0                              | 14.0                                  | 10   | 150  | 256  | 25.8  |
| SM8S14A  | 15.6                                  | 17.2 | 5.0                              | 14.0                                  | 10   | 150  | 284  | 23.2  |
| SM8S15   | 16.7                                  | 20.4 | 5.0                              | 15.0                                  | 10   | 150  | 245  | 26.9  |
| SM8S15A  | 16.7                                  | 18.5 | 5.0                              | 15.0                                  | 10   | 150  | 270  | 24.4  |
| SM8S16   | 17.8                                  | 21.8 | 5.0                              | 16.0                                  | 10   | 150  | 229  | 28.8  |
| SM8S16A  | 17.8                                  | 19.7 | 5.0                              | 16.0                                  | 10   | 150  | 254  | 26.0  |
| SM8S17   | 18.9                                  | 23.1 | 5.0                              | 17.0                                  | 10   | 150  | 216  | 30.5  |
| SM8S17A  | 18.9                                  | 20.9 | 5.0                              | 17.0                                  | 10   | 150  | 239  | 27.6  |
| SM8S18   | 20.0                                  | 24.4 | 5.0                              | 18.0                                  | 10   | 150  | 205  | 32.2  |
| SM8S18A  | 20.0                                  | 22.1 | 5.0                              | 18.0                                  | 10   | 150  | 226  | 29.2  |
| SM8S20   | 22.2                                  | 27.1 | 5.0                              | 20.0                                  | 10   | 150  | 184  | 35.8  |
| SM8S20A  | 22.2                                  | 24.5 | 5.0                              | 20.0                                  | 10   | 150  | 204  | 32.4  |
| SM8S22   | 24.4                                  | 29.8 | 5.0                              | 22.0                                  | 10   | 150  | 168  | 39.4  |
| SM8S22A  | 24.4                                  | 26.9 | 5.0                              | 22.0                                  | 10   | 150  | 186  | 35.5  |
| SM8S24   | 26.7                                  | 32.6 | 5.0                              | 24.0                                  | 10   | 150  | 153  | 43.0  |
| SM8S24A  | 26.7                                  | 29.5 | 5.0                              | 24.0                                  | 10   | 150  | 170  | 38.9  |
| SM8S26   | 28.9                                  | 35.3 | 5.0                              | 26.0                                  | 10   | 150  | 142  | 46.6  |
| SM8S26A  | 28.9                                  | 31.9 | 5.0                              | 26.0                                  | 10   | 150  | 157  | 42.1  |
| SM8S28   | 31.1                                  | 38.0 | 5.0                              | 28.0                                  | 10   | 150  | 132  | 50.1  |
| SM8S28A  | 31.1                                  | 34.4 | 5.0                              | 28.0                                  | 10   | 150  | 145  | 45.4  |
| SM8S30   | 33.3                                  | 40.7 | 5.0                              | 30.0                                  | 10   | 150  | 123  | 53.5  |
| SM8S30A  | 33.3                                  | 36.8 | 5.0                              | 30.0                                  | 10   | 150  | 136  | 48.4  |
| SM8S33   | 36.7                                  | 44.9 | 5.0                              | 33.0                                  | 10   | 150  | 112  | 59.0  |
| SM8S33A  | 36.7                                  | 40.6 | 5.0                              | 33.0                                  | 10   | 150  | 124  | 53.3  |
| SM8S36   | 40.0                                  | 48.9 | 5.0                              | 36.0                                  | 10   | 150  | 103  | 64.3  |
| SM8S36A  | 40.0                                  | 44.2 | 5.0                              | 36.0                                  | 10   | 150  | 114  | 58.1  |
| SM8S40   | 44.4                                  | 54.3 | 5.0                              | 40                                    | 10   | 150  | 92.4   | 71.4  |
| SM8S40A  | 44.4                                  | 49.1 | 5.0                              | 40                                    | 10   | 150  | 102  | 64.5  |
| SM8S43   | 47.8                                  | 58.4 | 5.0                              | 43                                    | 10   | 150  | 86   | 76.7  |
| SM8S43A  | 47.8                                  | 52.8 | 5.0                              | 43                                    | 10   | 150  | 95.1   | 69.4  |

**Note**

- For all types maximum V<sub>F</sub> = 1.8 V at I<sub>F</sub> = 100 A measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum



| THERMAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted) |                  |       |      |
|---|------------------|-------|------|
| PARAMETER   | SYMBOL           | VALUE | UNIT |
| Typical thermal resistance, junction to case                            | R <sub>θJC</sub> | 0.90  | °C/W |

| ORDERING INFORMATION (Example) |                 |                        |               |   |
|--------------------------------|-----------------|------------------------|---------------|---|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE   |
| SM8S10AHE3/2D <sup>(1)</sup>   | 2.605           | 2D                     | 750           | 13" diameter plastic tape and reel, anode towards the sprocket hole |
| SM8S10AHE3_A/I <sup>(1)</sup>  | 2.605           | I                      | 750           | 13" diameter plastic tape and reel, anode towards the sprocket hole |

**Note**

<sup>(1)</sup> AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)**

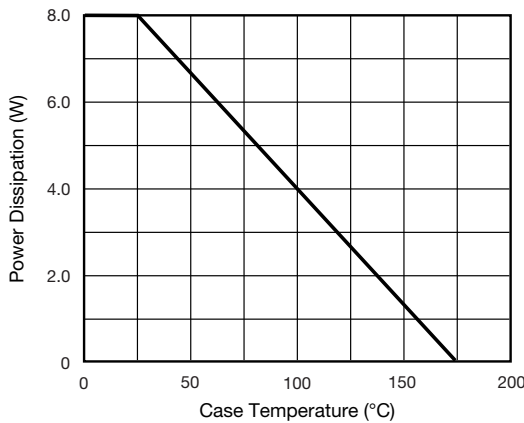


Fig. 1 - Power Derating Curve



Fig. 3 - Pulse Waveform

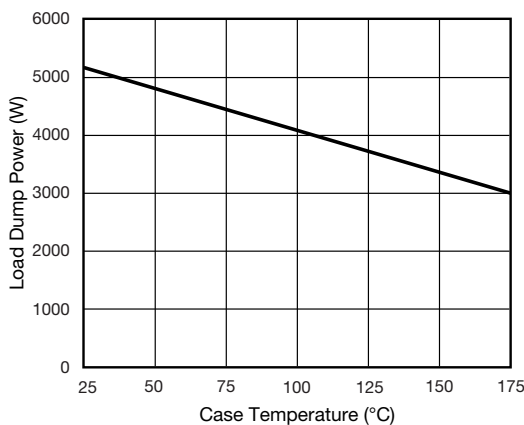


Fig. 2 - Load Dump Power Characteristics (10 ms Exponential Waveform)



Fig. 4 - Reverse Power Capability



Fig. 5 - Typical Transient Thermal Impedance



Fig. 6 - Typical Junction Capacitance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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