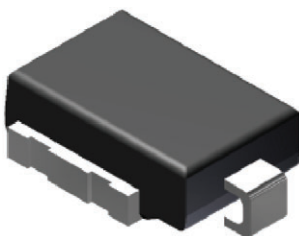


# Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-218 Compatible

Anode  Cathode

## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS         |                  |
|---------------------------------|------------------|
| $V_{WM}$                        | 10 V to 43 V     |
| $V_{BR}$                        | 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              |
| $I_{FSM}$                       | 700 A            |
| $T_J$ max.                      | 175 °C           |
| Polarity                        | Unidirectional   |
| Package                         | DO-218AC         |

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 175$  °C capability suitable for high reliability and automotive requirement
- Unidirectional
- 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 available  
- Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** DO-218AC

Molding compound meets UL 94 V-0 flammability rating  
Base P/NHM3 - RoHS-compliant, 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:** heatsink is anode

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)          |                          |   |      |
|--|--------------------------|---|------|
| PARAMETER  | SYMBOL                   | VALUE                                   | UNIT |
| Peak pulse power dissipation                                     | $P_{PPM}$                | with 10/1000 $\mu$ s waveform<br>6600   | W    |
|  |                          | with 10/10 000 $\mu$ s waveform<br>5200 |      |
| Power dissipation on infinite heatsink at $T_A = 25$ °C (fig. 1) | $P_D$                    | 8.0                                     | W    |
| Peak pulse current with 10/1000 $\mu$ s waveform                 | $I_{PPM}$ <sup>(1)</sup> | 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 at  $T_A = 25$  °C

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| DEVICE TYPE | BREAKDOWN VOLTAGE $V_{BR}$ (V) |      |      | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{WM}$ (V) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $T_J = 175\text{ }^{\circ}\text{C}$ $I_D$ ( $\mu\text{A}$ ) | MAX. PEAK PULSE CURRENT AT 10/1000 $\mu\text{s}$ WAVEFORM (A) | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) | TYPICAL TEMP. COEFFICIENT OF $V_{BR}$ $\alpha_T$ (%/ $^{\circ}\text{C}$ ) |
|-------------|--------------------------------|------|------|-------------------------|--------------------------------|---|---|---|---|---|
|             | MIN.                           | NOM. | MAX. |                         |                                |   |   |   |   |   |
| SM8S10AHM3  | 11.1                           | 11.7 | 12.3 | 5.0                     | 10.0                           | 15  | 250   | 388   | 17.0  | 0.069   |
| SM8S11AHM3  | 12.2                           | 12.9 | 13.5 | 5.0                     | 11.0                           | 10  | 150   | 363   | 18.2  | 0.072   |
| SM8S12AHM3  | 13.3                           | 14.0 | 14.7 | 5.0                     | 12.0                           | 10  | 150   | 332   | 19.9  | 0.074   |
| SM8S13AHM3  | 14.4                           | 15.2 | 15.9 | 5.0                     | 13.0                           | 10  | 150   | 307   | 21.5  | 0.076   |
| SM8S14AHM3  | 15.6                           | 16.4 | 17.2 | 5.0                     | 14.0                           | 10  | 150   | 284   | 23.2  | 0.078   |
| SM8S15AHM3  | 16.7                           | 17.6 | 18.5 | 5.0                     | 15.0                           | 10  | 150   | 270   | 24.4  | 0.080   |
| SM8S16AHM3  | 17.8                           | 18.8 | 19.7 | 5.0                     | 16.0                           | 10  | 150   | 254   | 26.0  | 0.081   |
| SM8S17AHM3  | 18.9                           | 19.9 | 20.9 | 5.0                     | 17.0                           | 10  | 150   | 239   | 27.6  | 0.082   |
| SM8S18AHM3  | 20.0                           | 21.1 | 22.1 | 5.0                     | 18.0                           | 10  | 150   | 226   | 29.2  | 0.083   |
| SM8S20AHM3  | 22.2                           | 23.4 | 24.5 | 5.0                     | 20.0                           | 10  | 150   | 204   | 32.4  | 0.085   |
| SM8S22AHM3  | 24.4                           | 25.7 | 26.9 | 5.0                     | 22.0                           | 10  | 150   | 186   | 35.5  | 0.086   |
| SM8S24AHM3  | 26.7                           | 28.1 | 29.5 | 5.0                     | 24.0                           | 10  | 150   | 170   | 38.9  | 0.087   |
| SM8S26AHM3  | 28.9                           | 30.4 | 31.9 | 5.0                     | 26.0                           | 10  | 150   | 157   | 42.1  | 0.088   |
| SM8S28AHM3  | 31.1                           | 32.8 | 34.4 | 5.0                     | 28.0                           | 10  | 150   | 145   | 45.4  | 0.089   |
| SM8S30AHM3  | 33.3                           | 35.1 | 36.8 | 5.0                     | 30.0                           | 10  | 150   | 136   | 48.4  | 0.090   |
| SM8S33AHM3  | 36.7                           | 38.7 | 40.6 | 5.0                     | 33.0                           | 10  | 150   | 124   | 53.3  | 0.091   |
| SM8S36AHM3  | 40.0                           | 42.1 | 44.2 | 5.0                     | 36.0                           | 10  | 150   | 114   | 58.1  | 0.091   |
| SM8S40AHM3  | 44.4                           | 46.8 | 49.1 | 5.0                     | 40                             | 10  | 150   | 102   | 64.5  | 0.092   |
| SM8S43AHM3  | 47.8                           | 50.3 | 52.8 | 5.0                     | 43                             | 10  | 150   | 95.1  | 69.4  | 0.093   |

**Notes**

- For all types maximum  $V_F = 1.8\text{ V}$  at  $I_F = 100\text{ A}$  measured on 300  $\mu\text{s}$  square pulse width
- (1) To calculate  $V_{BR}$  vs. junction temperature, use the following formula:  $V_{BR}$  at  $T_J = V_{BR}$  at  $25\text{ }^{\circ}\text{C} \times (1 + \alpha_T \times (T_J - 25))$

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

| PARAMETER                  | SYMBOL              | VALUE | UNIT                 |
|----------------------------|---------------------|-------|----------------------|
| Typical thermal resistance | $R_{\theta JA}$ (1) | 55    | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JM}$ (2) | 0.35  | $^{\circ}\text{C/W}$ |

**Notes**

- (1) Thermal resistance junction-to-ambient to follow JEDEC®51-2A, device mounted on FR4 PCB, 2 oz. standard footprint
- (2) Thermal resistance junction-to-mount to follow JEDEC®51-14 using Transient Dual Interface Test Method (TDIM)



## ORDERING INFORMATION TABLE

| Device code | SM | x | S   | xx | A | H | M3 |
|-------------|----|---|---|----|---|---|----|
|             | 1  | 2 | 3   | 4  | 5 | 6 | 7  |
|             | 1  | - | Surface mount   |    |   |   |    |
|             | 2  | - | Power dissipation $P_D$ (5 = 5 W, 6 = 6 W, 8 = 8 W)   |    |   |   |    |
|             | 3  | - | Standard $V_F$ type   |    |   |   |    |
|             | 4  | - | Stand-off voltage   |    |   |   |    |
|             | 5  | - | Breakdown voltage tolerance and polarity (A $\pm$ 5 %, unidirectional)                              |    |   |   |    |
|             | 6  | - | Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)                                  |    |   |   |    |
|             | 7  | - | Material / Environment category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free) |    |   |   |    |

| ORDERING INFORMATION (Example) |                 |                        |               |   |
|--------------------------------|-----------------|------------------------|---------------|---|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE   |
| SM8S10AHM3/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 ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

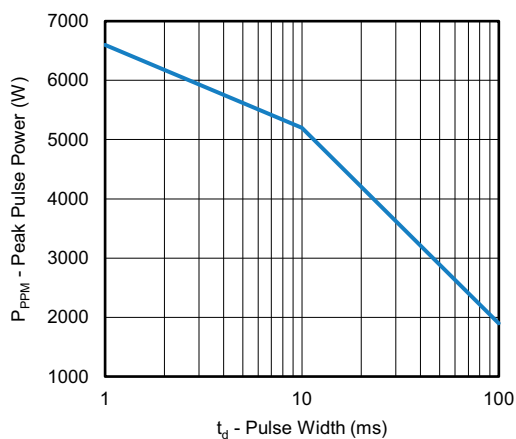


Fig. 1 - Peak Pulse Power Derating Curve

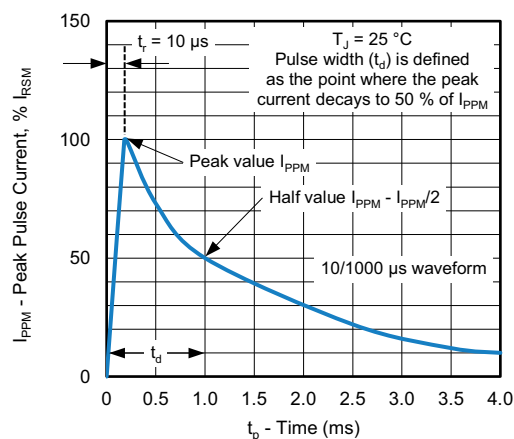


Fig. 4 - Pulse waveform

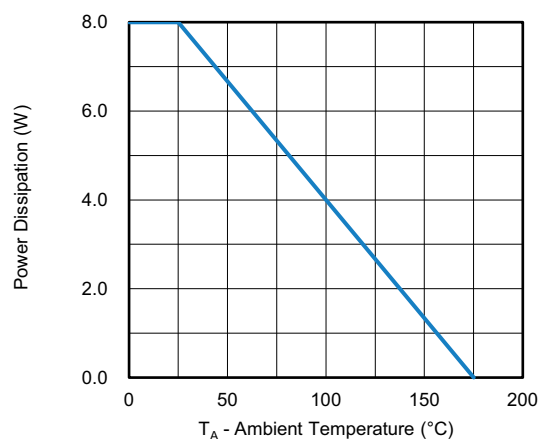


Fig. 2 - Power Derating Curve

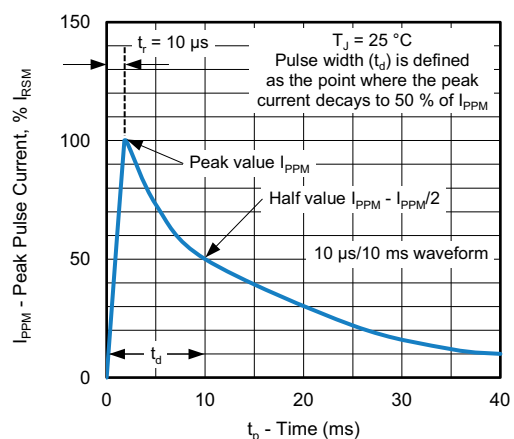


Fig. 5 - Pulse Waveform

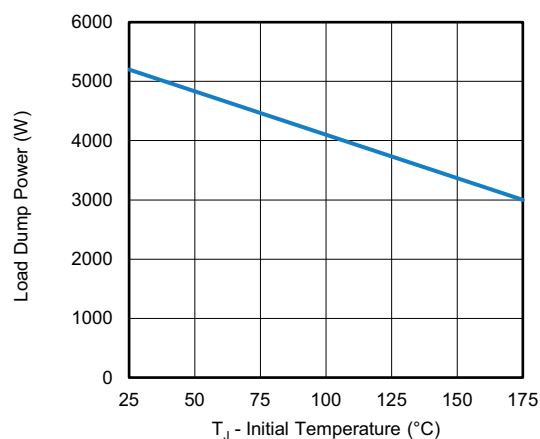


Fig. 3 - Load Dump Power Characteristics (10 ms Exponential Waveform)

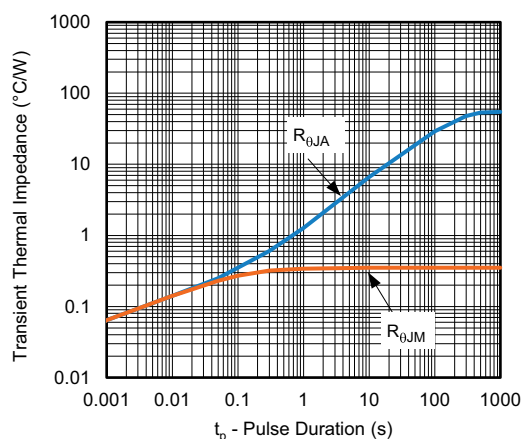


Fig. 6 - Typical Transient Thermal Impedance

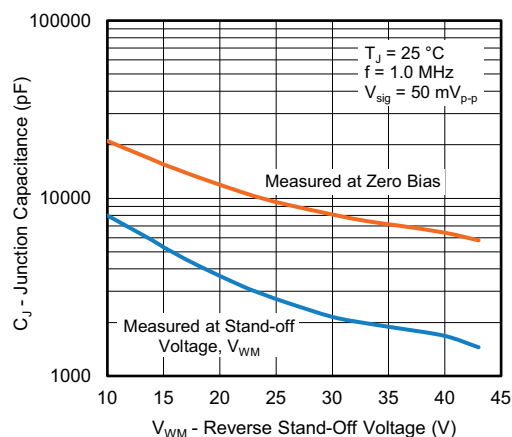
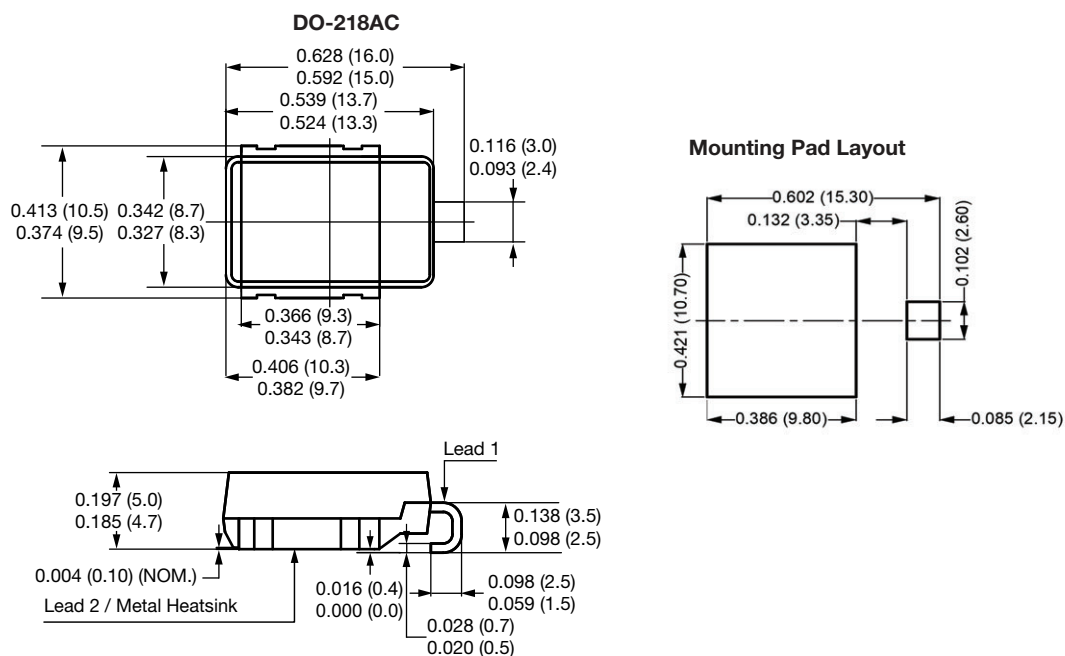


Fig. 7 - Junction Capacitance

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

**Note**

- Footprint in accordance with IPC 7351 standard



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