

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

High Temperature Stability and High Reliability Conditions



**DO-218AB**

Cathode  Anode



**RoHS**  
COMPLIANT

## FEATURES

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

## 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

**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

| PRIMARY CHARACTERISTICS       |                               |
|-------------------------------|-------------------------------|
| $V_{BR}$                      | 27 V                          |
| $P_{PPM}$ (10 x 1000 $\mu$ s) | 3600 W                        |
| $P_D$                         | 5 W                           |
| $V_{WM}$                      | 22 V                          |
| $I_{RSM}$                     | 70 A                          |
| $I_{FSM}$                     | 500 A                         |
| $T_J$ max.                    | $175\text{ }^{\circ}\text{C}$ |
| Polarity                      | Unidirectional                |
| Package                       | DO-218AB                      |

| MAXIMUM RATINGS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)                   |                |             |                    |
|------------------------------------------------------------------------------------------------|----------------|-------------|--------------------|
| PARAMETER                                                                                      | SYMBOL         | VALUE       | UNIT               |
| Peak pulse power dissipation with 10/1000 $\mu$ s waveform                                     | $P_{PPM}$      | 3600        | W                  |
| Power dissipation on infinite heatsink at $T_C = 25\text{ }^{\circ}\text{C}$ (fig. 1)          | $P_D$          | 5.0         | W                  |
| Non-repetitive peak reverse surge current for 10 $\mu$ s/10 ms exponentially decaying waveform | $I_{RSM}$      | 70          | A                  |
| Maximum working stand-off voltage                                                              | $V_{WM}$       | 22.0        | V                  |
| Peak forward surge current 8.3 ms single half sine-wave                                        | $I_{FSM}$      | 500         | A                  |
| Operating junction and storage temperature range                                               | $T_J, T_{STG}$ | -55 to +175 | $^{\circ}\text{C}$ |

| ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                                               |      |                                      |
|-----------------------------------------------------------------------------------------|-----------------------------------------------|------|--------------------------------------|
| DEVICE TYPE                                                                             | BREAKDOWN VOLTAGE<br>$V_{BR}$ AT $I_T$<br>(V) |      | STAND-OFF VOLTAGE<br>$V_{WM}$<br>(V) |
|                                                                                         | MIN.                                          | MAX. |                                      |
| SM5A27                                                                                  | 24                                            | 30   | 22                                   |



| ADDITIONAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                        |             |                                     |      |      |                        |
|-----------------------------------------------------------------------------------------|------------------------|-------------|-------------------------------------|------|------|------------------------|
| PARAMETER                                                                               | TEST CONDITIONS        | SYMBOL      | MIN.                                | TYP. | MAX. | UNIT                   |
| Zener voltage temperature coefficient                                                   | $I_Z = 10\text{ mA}$   | $V_{ZTC}$   | -                                   | -    | 36   | mV/ $^{\circ}\text{C}$ |
| Clamping voltage for 10 $\mu\text{s}$ /10 ms exponentially decaying waveform            | $I_{PP} = 55\text{ A}$ | $V_C$       | -                                   | -    | 40.0 | V                      |
| Instantaneous forward voltage                                                           | $I_F = 6.0\text{ A}$   | $V_F^{(1)}$ | -                                   | -    | 1.0  | V                      |
|                                                                                         | $I_F = 100\text{ A}$   |             | -                                   | 0.95 | -    |                        |
| Reverse leakage current                                                                 | Rated $V_{WM}$         | $I_R$       | $T_J = 25\text{ }^{\circ}\text{C}$  | -    | 0.2  | $\mu\text{A}$          |
|                                                                                         |                        |             | $T_J = 175\text{ }^{\circ}\text{C}$ | -    | 10.0 |                        |

**Note**(1) Measured on a 300  $\mu\text{s}$  square pulse width

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                 |       |                             |
|--------------------------------------------------------------------------------------|-----------------|-------|-----------------------------|
| PARAMETER                                                                            | SYMBOL          | VALUE | UNIT                        |
| Typical thermal resistance, junction to case                                         | $R_{\theta JC}$ | 1.0   | $^{\circ}\text{C}/\text{W}$ |

| ORDERING INFORMATION (Example) |                 |                        |               |                                                                     |
|--------------------------------|-----------------|------------------------|---------------|---------------------------------------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                                                       |
| SM5A27HE3/2D (1)               | 2.505           | 2D                     | 750           | 13" diameter plastic tape and reel, anode towards the sprocket hole |

**Note**

(1) AEC-Q101 qualified

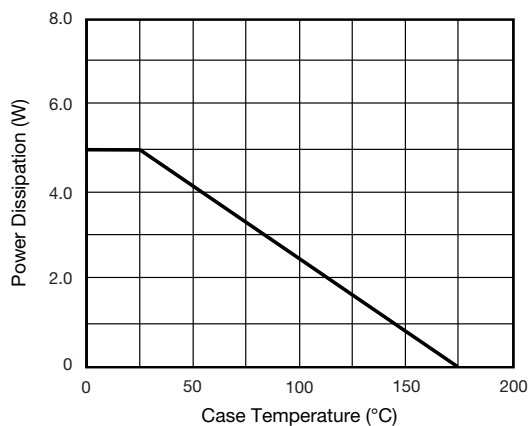
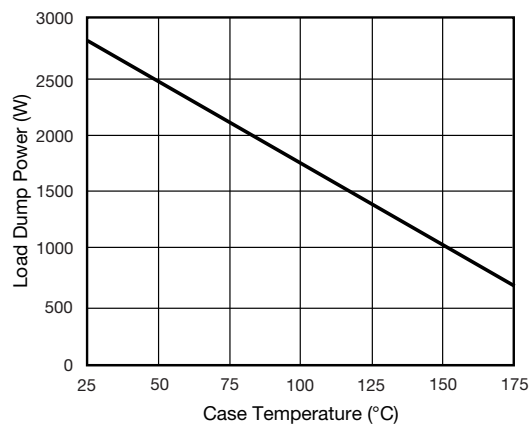
**RATINGS AND CHARACTERISTICS CURVES**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Power Derating Curve

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

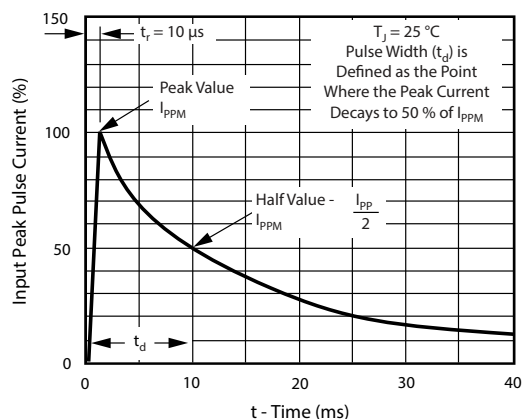


Fig. 3 - Pulse Waveform

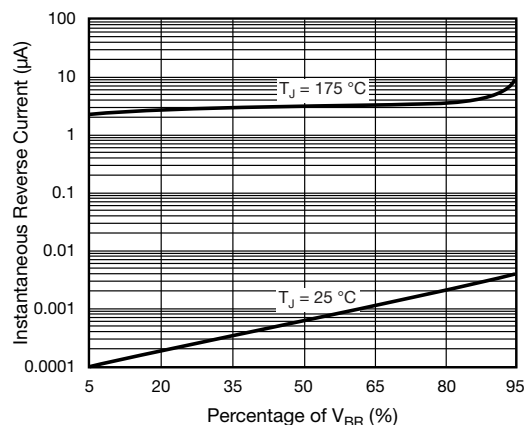


Fig. 6 - Typical Reverse Characteristics

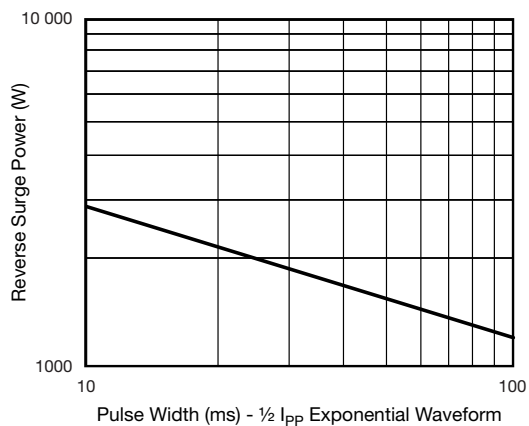


Fig. 4 - Reverse Power Capability

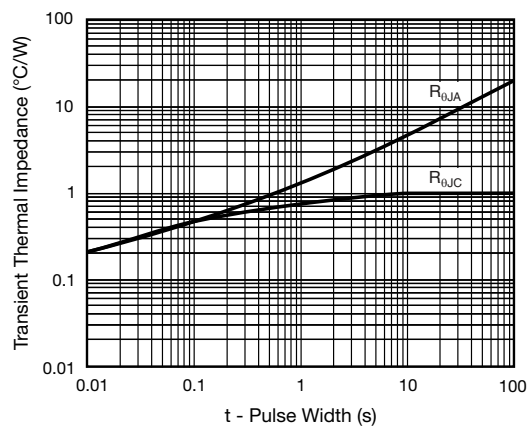


Fig. 7 - Typical Transient Thermal Impedance

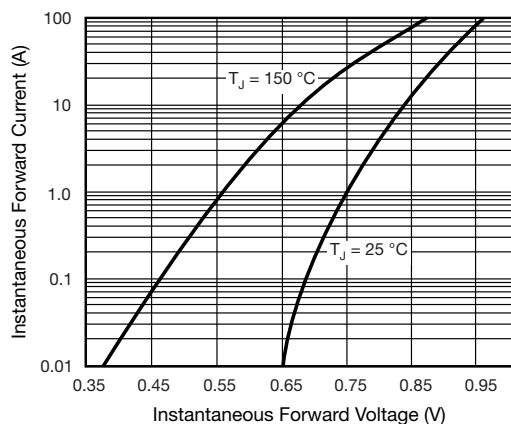
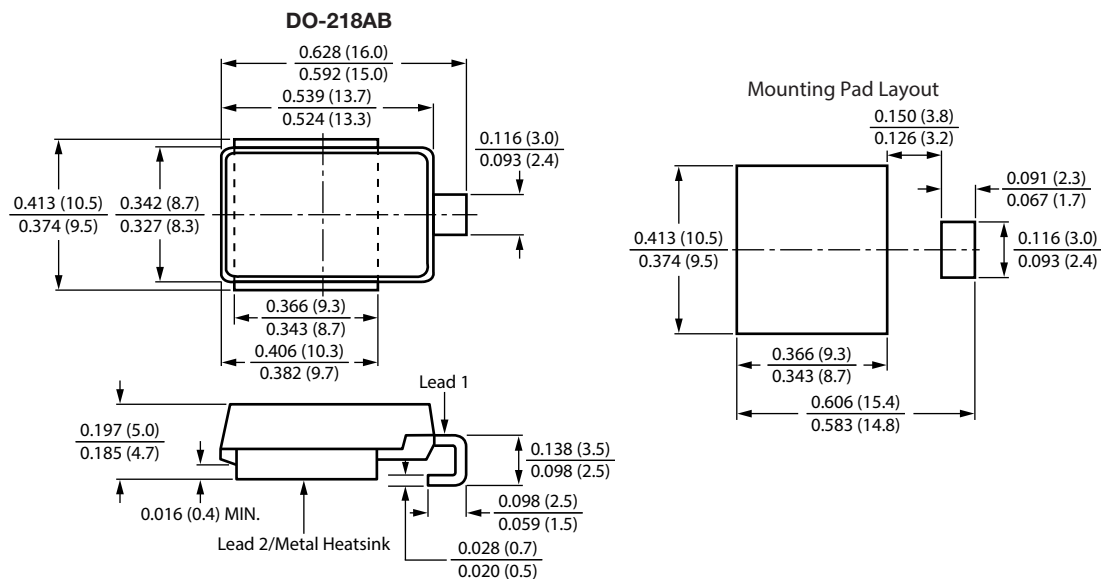


Fig. 5 - Typical Instantaneous Forward Characteristics



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





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