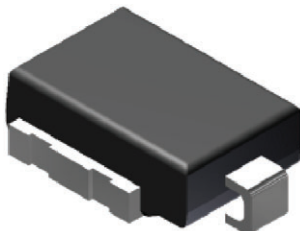


Surface-Mount PAR[®] Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-218 Compatible

Anode Cathode

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|-------------------------------------|----------------|
| V_{BR} | 27 V |
| $P_{PPM} (10 \times 1000 \mu s)$ | 3600 W |
| $P_{PPM} (10 \times 10\,000 \mu s)$ | 2800 W |
| P_D | 5 W |
| V_{WM} | 22 V |
| I_{PPM} | 70 A |
| I_{FSM} | 500 A |
| T_J max. | 175 °C |
| Polarity | Unidirectional |
| Package | DO-218AC |

FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 175^\circ\text{C}$ capability suitable for high reliability and automotive requirement
- Low leakage current
- Low forward voltage drop
- High surge capability
- Meets ISO 7637-2 surge specification
- 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



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 | with 10/1000 μs waveform | P _{PPM} | 3600 | W |
| | with 10/10 000 μs waveform | | 2800 | |
| Power dissipation on infinite heatsink at T _A = 25 °C (fig. 1) | | P _D | 5.0 | W |
| Non-repetitive peak reverse surge current for 10 μs/10 ms exponentially decaying waveform | | I _{PPM} | 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 | °C |

| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | |
|--|---|------|--|---|
| DEVICE TYPE | BREAKDOWN VOLTAGE V _{BR} AT I _T (V) | | TEST CURRENT I _T (mA) | STAND-OFF VOLTAGE V _{WM} (V) |
| | MIN. | MAX. | | |
| SM5A27HM3 | 24 | 30 | 10 | 22 |



| ADDITIONAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | | |
|--|------------------------|-------------------------|-------------------------------|------|------|------|-------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Temperature coefficient of V _{BR} | I _T = 10 mA | | αT | - | - | 36 | mV/°C |
| Clamping voltage for 10 μs/10 ms exponentially decaying waveform | I _{PP} = 55 A | | V _C | - | - | 40.0 | V |
| Instantaneous forward voltage | I _F = 6.0 A | | V _F ⁽¹⁾ | - | - | 1.0 | V |
| | I _F = 100 A | | | - | 0.95 | - | |
| Reverse leakage current | Rated V _{WM} | T _J = 25 °C | I _R | - | - | 0.2 | μA |
| | | T _J = 175 °C | | - | - | 10.0 | |

Note

(1) Measured on a 300 μs square pulse width

| THERMAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) | | | |
|--|-----------------------|-------|----------------------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 55 | $^{\circ}\text{C/W}$ |
| | $R_{\theta JM}^{(2)}$ | 0.45 | $^{\circ}\text{C/W}$ |

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 | A | 27 | H | M3 |
|----|---|---|----|---|----|

①

②

③

④

⑤

⑥

- 1** - Surface mount
- 2** - Power dissipation P_D (5 = 5 W, 6 = 6 W, 8 = 8 W)
- 3** - Automotive TVS designator (low V_F type)
- 4** - 27 V breakdown voltage
- 5** - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)
- 6** - 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 |
| SM5A27HM3/I ⁽¹⁾ | 2.505 | I | 750 | 13" diameter plastic tape and reel, anode towards the sprocket hole |

Note

(1) AEC-Q101 qualified

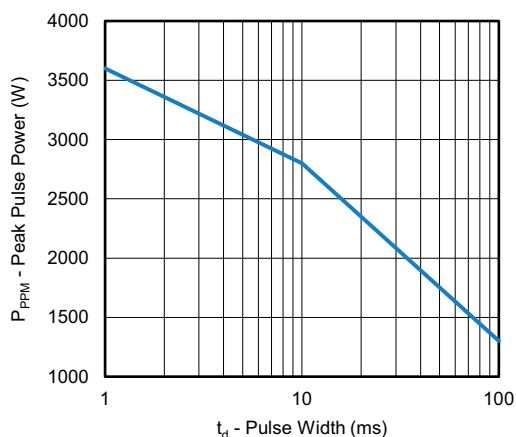
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Peak Pulse Power Derating Curve

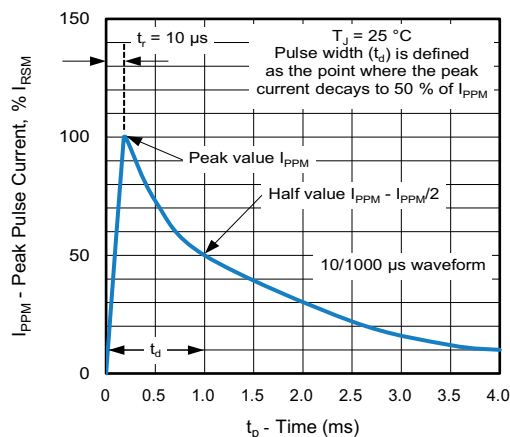


Fig. 4 - Pulse Waveform

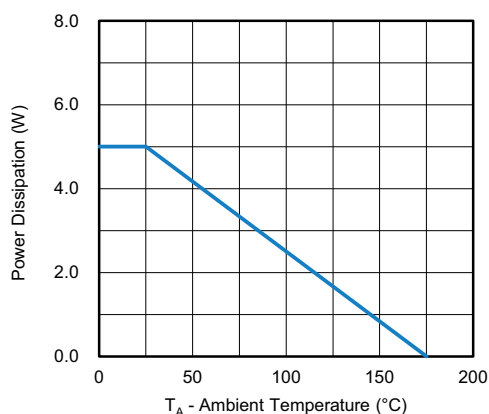


Fig. 2 - Power Derating Curve

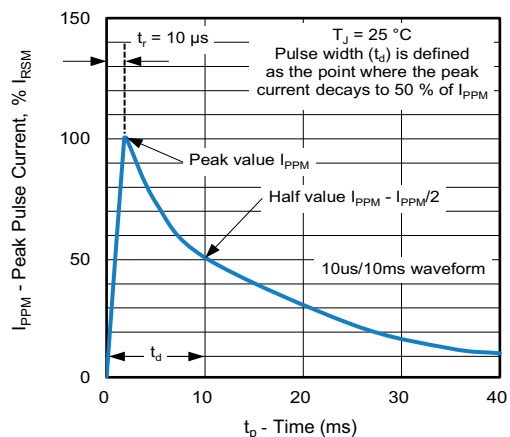


Fig. 5 - Pulse Waveform

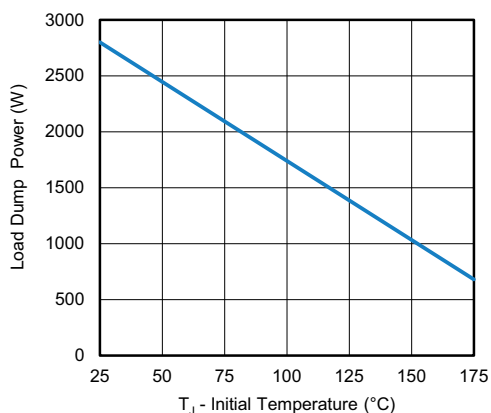


Fig. 3 - Load dump Power Characteristics (10 ms Exponential Waveform)

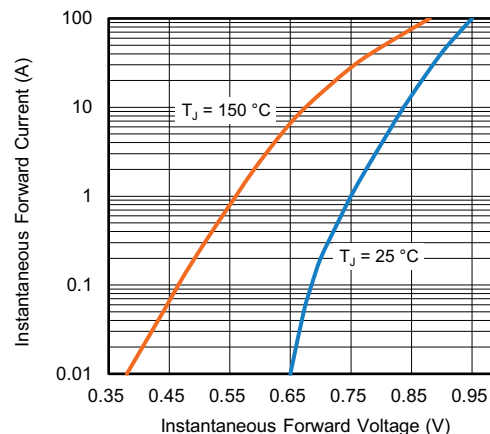


Fig. 6 - Typical Instantaneous Forward Characteristics

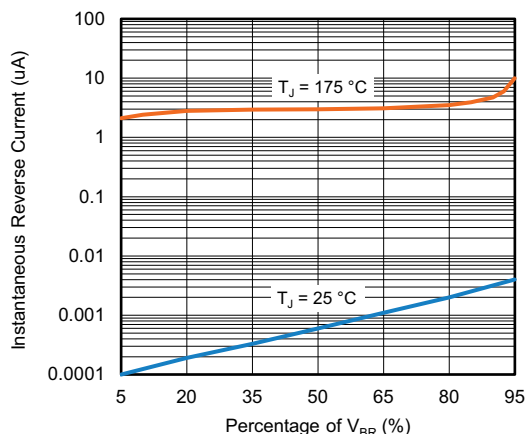


Fig. 7 - Typical Reverse Characteristics

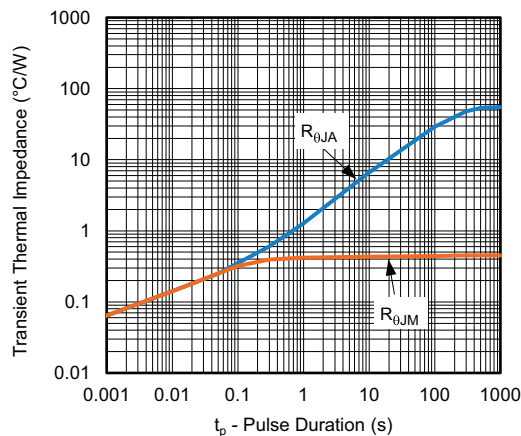
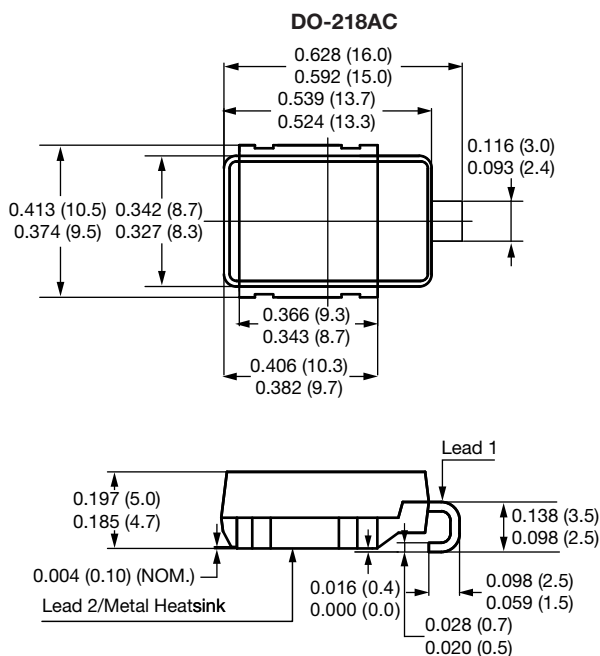
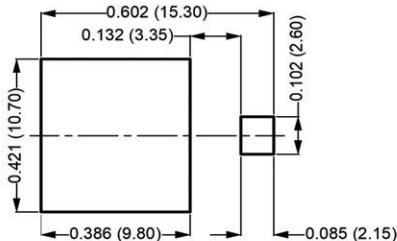


Fig. 8 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Mounting Pad Layout



Note

- Footprint in accordance with IPC 7351 standard



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