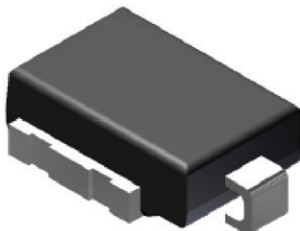


## Surface-Mount PAR® Transient Voltage Suppressors

## 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  $245^\circ\text{C}$
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**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 <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation	P <sub>PPM</sub>	3600	W
with 10/1000 μs waveform		2800	
Power dissipation on infinite heatsink at T <sub>A</sub> = 25 °C (fig. 1)	P <sub>D</sub>	5.0	W
Non-repetitive peak reverse surge current for 10 μs/10 ms exponentially decaying waveform	I <sub>PPM</sub>	70	A
Maximum working stand-off voltage	V <sub>WM</sub>	22.0	V
Peak forward surge current 8.3 ms single half sine-wave	I <sub>FSM</sub>	500	A
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
DEVICE TYPE	BREAKDOWN VOLTAGE V <sub>BR</sub> AT I <sub>T</sub> (V)		TEST CURRENT I <sub>T</sub> (mA)	STAND-OFF VOLTAGE V <sub>WM</sub> (V)
	MIN.	MAX.		
SM5A27HM3	24	30	10	22



ADDITIONAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	MIN.	TYP.	MAX.	UNIT
Temperature coefficient of V <sub>BR</sub>	I <sub>T</sub> = 10 mA		αT	-	-	36	mV/°C
Clamping voltage for 10 μs/10 ms exponentially decaying waveform	I <sub>PP</sub> = 55 A		V <sub>C</sub>	-	-	40.0	V
Instantaneous forward voltage	I <sub>F</sub> = 6.0 A		V <sub>F</sub> <sup>(1)</sup>	-	-	1.0	V
	I <sub>F</sub> = 100 A			-	0.95	-	
Reverse leakage current	Rated V <sub>WM</sub>	T <sub>J</sub> = 25 °C	I <sub>R</sub>	-	-	0.2	μA
		T <sub>J</sub> = 175 °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	$R_{\theta JA}^{(1)}$	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 <sup>(1)</sup>	2.505	I	750	13" diameter plastic tape and reel, anode towards the sprocket hole

**Note**

(1) AEC-Q101 qualified

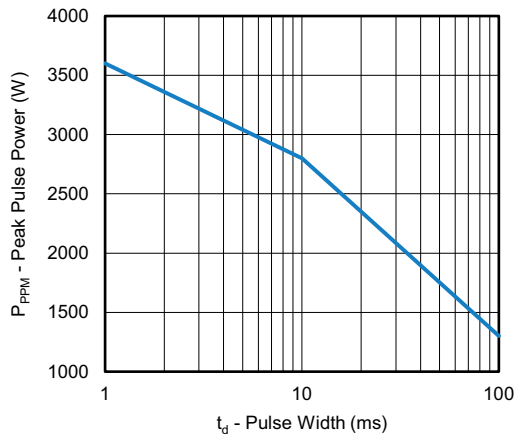
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Peak Pulse Power Derating Curve

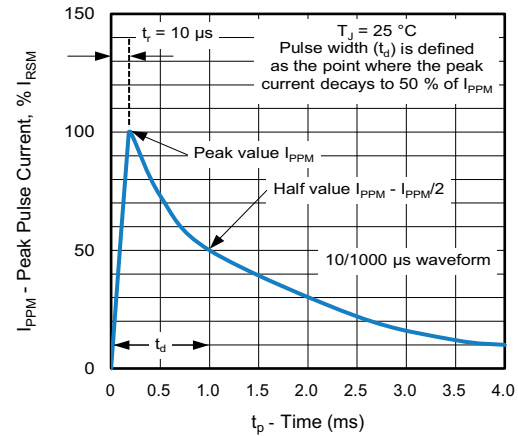


Fig. 4 - Pulse Waveform

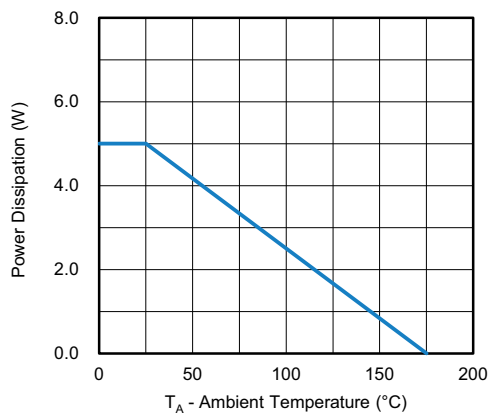


Fig. 2 - Power Derating Curve

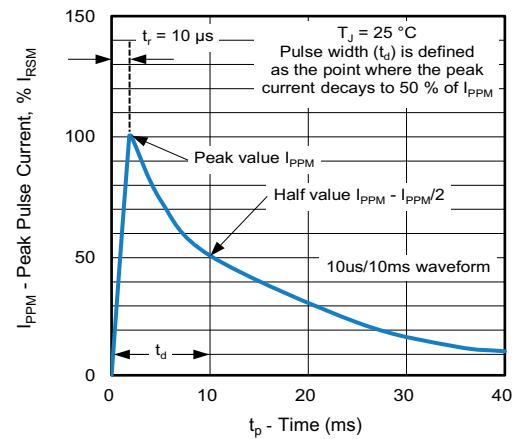


Fig. 5 - Pulse Waveform

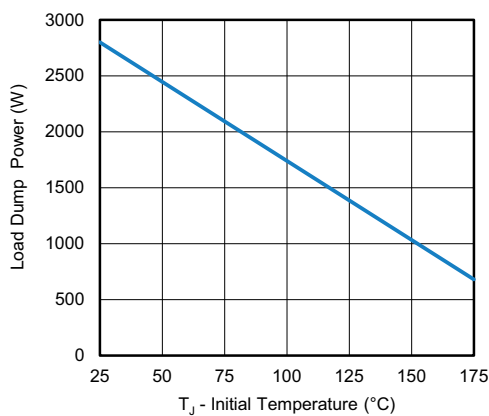


Fig. 3 - Load dump Power Characteristics (10 ms Exponential Waveform)

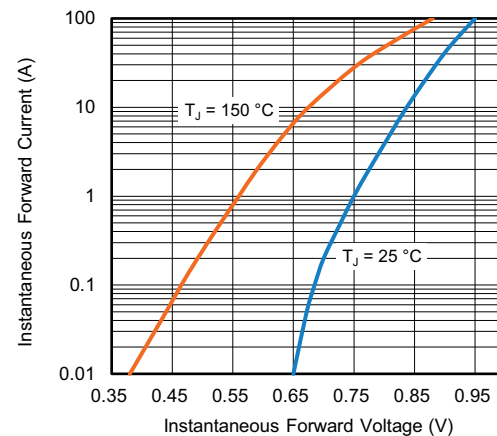


Fig. 6 - Typical Instantaneous Forward Characteristics

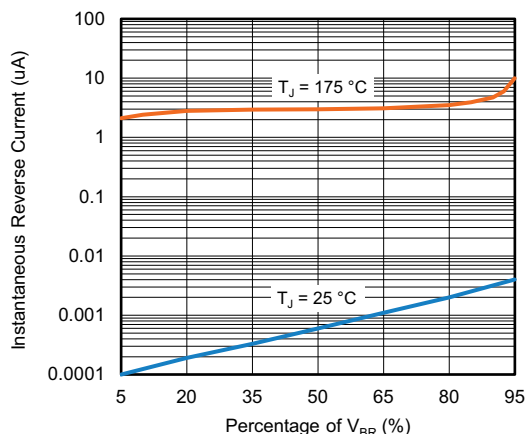


Fig. 7 - Typical Reverse Characteristics

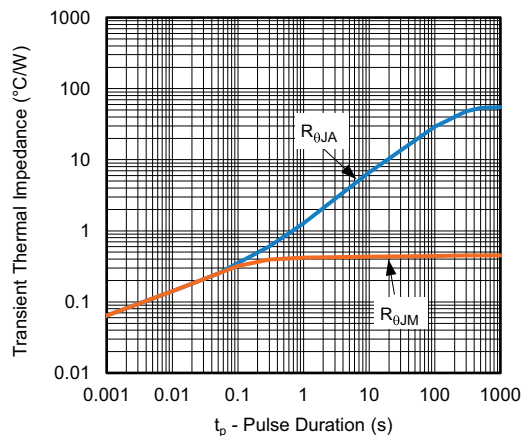
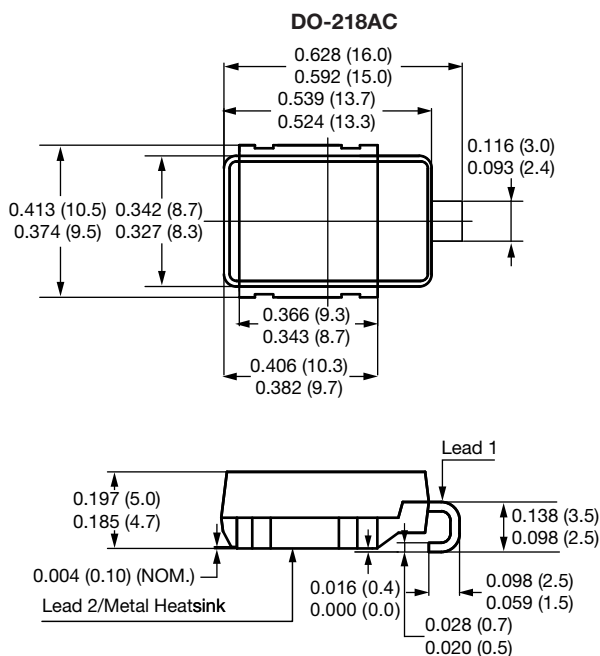
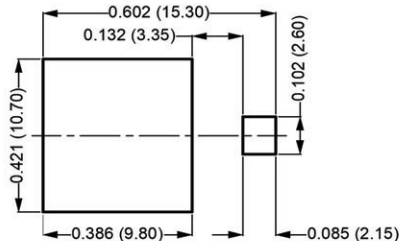


Fig. 8 - Typical Transient Thermal Impedance

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

**Mounting Pad Layout**

**Note**

- Footprint in accordance with IPC 7351 standard



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