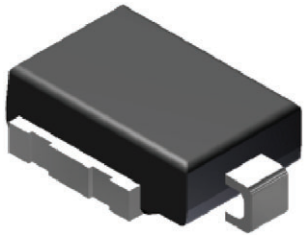
Surface-Mount PAR® Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-218 Compatible

Anode ○—▶|—○ Cathode

LINKS TO ADDITIONAL RESOURCES

Related Documents | Packages | Marking

PRIMARY CHARACTERISTICS	
V_{BR}	27 V
P_{PPM} (10 x 1000 µs)	3600 W
P_{PPM} (10 x 10 000 µs)	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 °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

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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 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	$R_{θJA}$ (1)	55	°C/W
	$R_{θJM}$ (2)	0.45	°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

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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

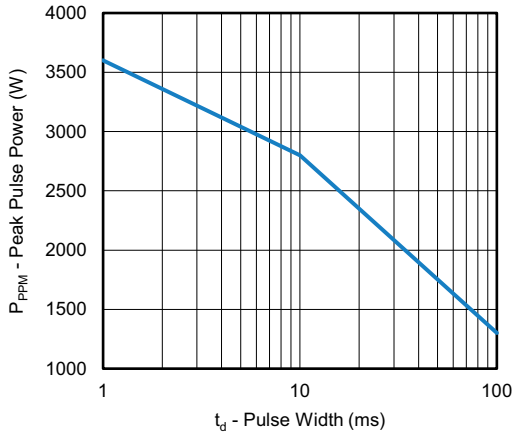

Fig. 1 - Peak Pulse Power Derating Curve

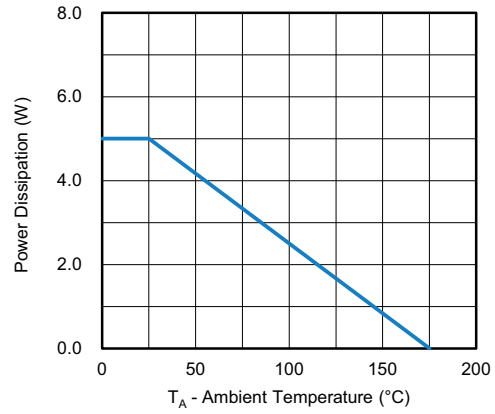

Fig. 2 - Power Derating Curve

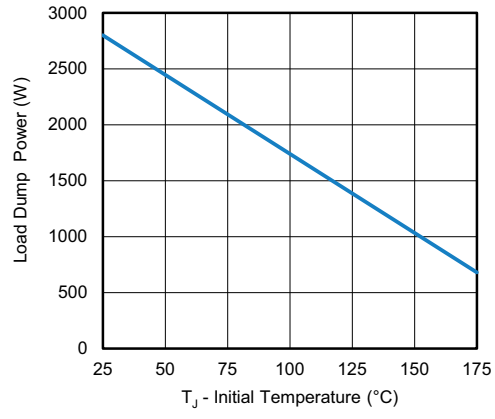

Fig. 3 - Load dump Power Characteristics
(10 ms Exponential Waveform)

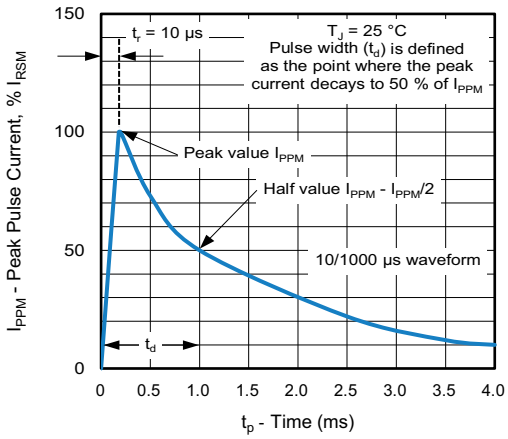

Fig. 4 - Pulse Waveform

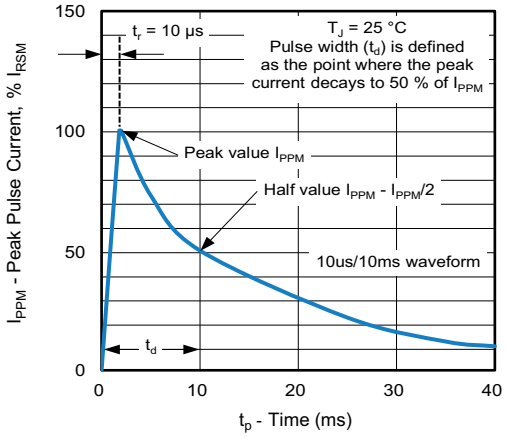

Fig. 5 - Pulse Waveform

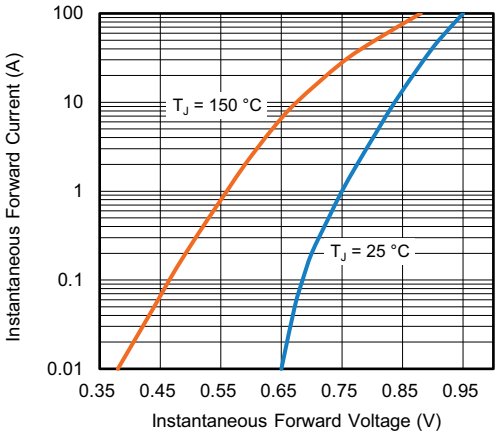

Fig. 6 - Typical Instantaneous Forward Characteristics

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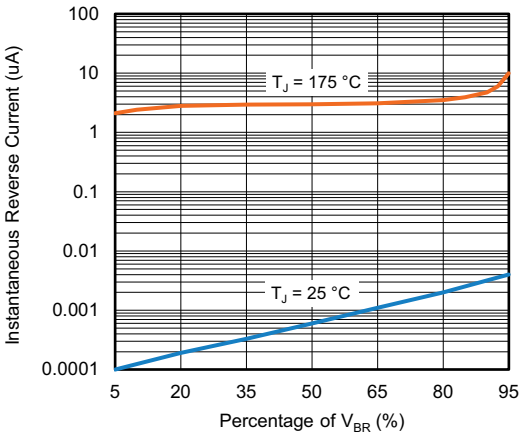


Fig. 7 - Typical Reverse Characteristics

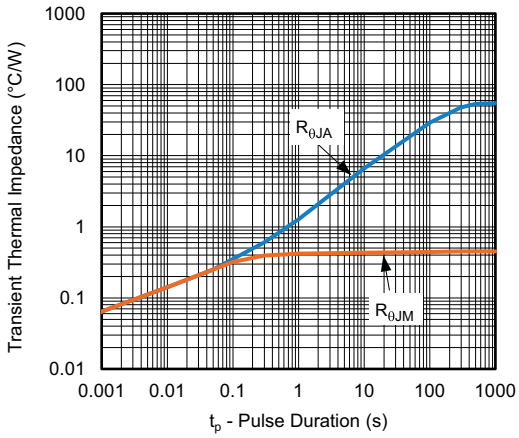
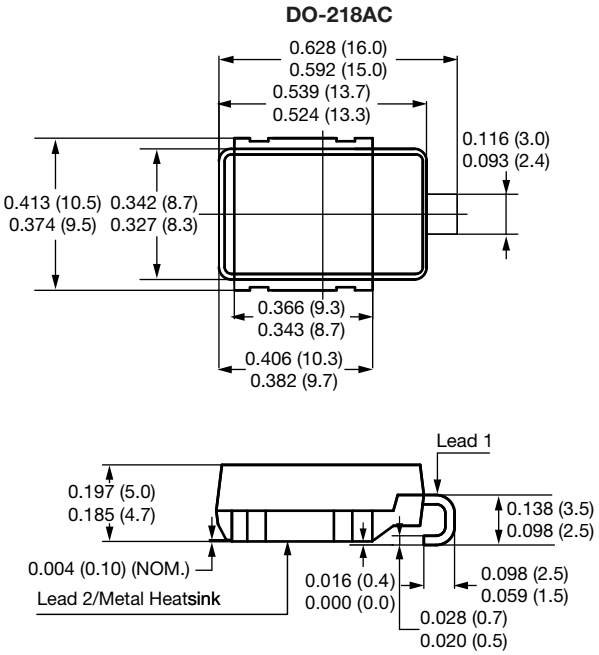
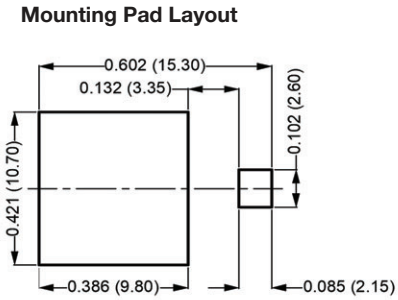


Fig. 8 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





Note

- Footprint in accordance with IPC 7351 standard

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