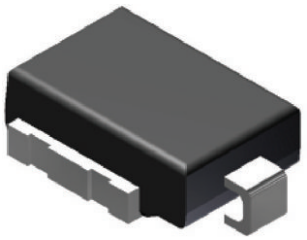
Surface Mount PAR® Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-218 Compatible

PRIMARY CHARACTERISTICS	
V_{WM}	10 V to 43 V
V_{BR}	11.1 V to 52.8 V
P_{PPM} (10 x 1000 µs)	3600 W
P_{PPM} (10 x 10 000 µs)	2800 W
P_D	5 W
I_{FSM}	500 A
T_J max.	175 °C
Polarity	Unidirectional
Package	DO-218AC

FEATURES

RoHS COMPLIANT

- Junction passivation optimized design passivated anisotropic rectifier technology
- T_J = 175 °C capability suitable for high reliability and automotive requirement
- Available in unidirectional polarity only
- 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/NHE3
- Material categorization: for definitions of compliance please see 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-218AC
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

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_C = 25 °C (fig. 1)		P_D	5.0	W
Peak pulse current with 10/1000 µs waveform		I_{PPM} (1)	See next table	A
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

Note

(1) Non-repetitive current pulse at T_A = 25 °C

ELECTRICAL CHARACTERISTICS (T_A = 25 °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 (µA)	MAXIMUM REVERSE LEAKAGE AT V_{WM} T_J = 175 °C I_D (µA)	MAX. PEAK PULSE CURRENT AT 10/1000 µs WAVEFORM (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	TYPICAL TEMP. COEFFICIENT OF V_{BR} [1] αT (%/°C)
	MIN.	NOM.	MAX.							
SM5S10AT	11.1	11.7	12.3	5.0	10.0	15	250	212	17.0	0.069
SM5S11AT	12.2	12.9	13.5	5.0	11.0	10	150	198	18.2	0.072
SM5S12AT	13.3	14.0	14.7	5.0	12.0	10	150	181	19.9	0.074
SM5S13AT	14.4	15.2	15.9	5.0	13.0	10	150	167	21.5	0.076
SM5S14AT	15.6	16.4	17.2	5.0	14.0	10	150	155	23.2	0.078
SM5S15AT	16.7	17.6	18.5	5.0	15.0	10	150	148	24.4	0.080
SM5S16AT	17.8	18.8	19.7	5.0	16.0	10	150	138	26.0	0.081
SM5S17AT	18.9	19.9	20.9	5.0	17.0	10	150	130	27.6	0.082
SM5S18AT	20.0	21.1	22.1	5.0	18.0	10	150	123	29.2	0.083
SM5S20AT	22.2	23.4	24.5	5.0	20.0	10	150	111	32.4	0.085
SM5S22AT	24.4	25.7	26.9	5.0	22.0	10	150	101	35.5	0.086
SM5S24AT	26.7	28.1	29.5	5.0	24.0	10	150	93	38.9	0.087
SM5S26AT	28.9	30.4	31.9	5.0	26.0	10	150	86	42.1	0.088
SM5S28AT	31.1	32.8	34.4	5.0	28.0	10	150	79	45.4	0.089
SM5S30AT	33.3	35.1	36.8	5.0	30.0	10	150	74	48.4	0.090
SM5S33AT	36.7	38.7	40.6	5.0	33.0	10	150	68	53.3	0.091
SM5S36AT	40.0	42.1	44.2	5.0	36.0	10	150	62	58.1	0.091
SM5S40AT	44.4	46.8	49.1	5.0	40.0	10	150	56	64.5	0.092
SM5S43AT	47.8	50.3	52.8	5.0	43.0	10	150	52	69.4	0.093

Notes

- For all types maximum V_F = 2.0 V at I_F = 100 A measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

[1] To calculate V_{BR} vs. junction temperature, use the following formula: V_{BR} at T_J = V_{BR} at 25 °C x (1 + αT x (T_J - 25))

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

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SM5S10ATHE3/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 °C unless otherwise noted)

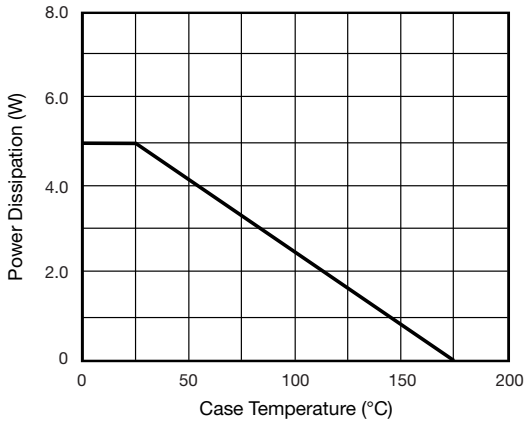


Fig. 1 - Power Derating Curve

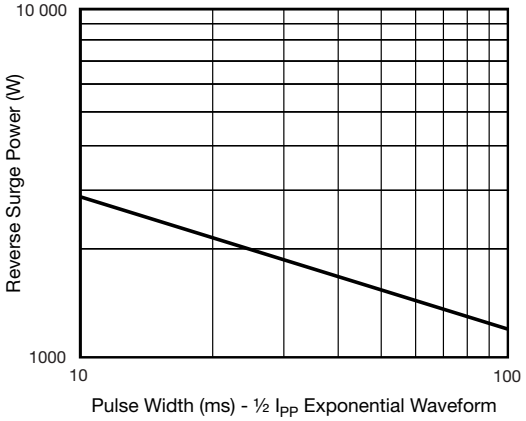


Fig. 4 - Reverse Power Capability

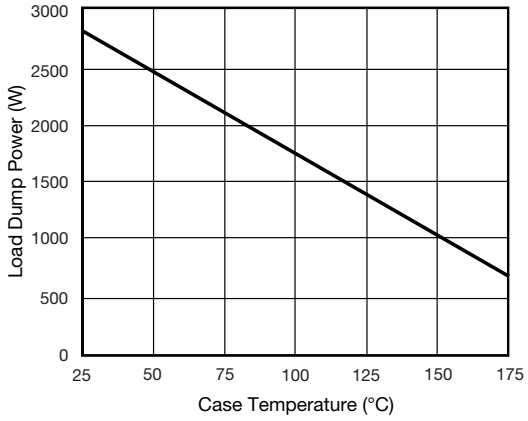


Fig. 2 - Load Dump Power Characteristics
(10 ms Exponential Waveform)

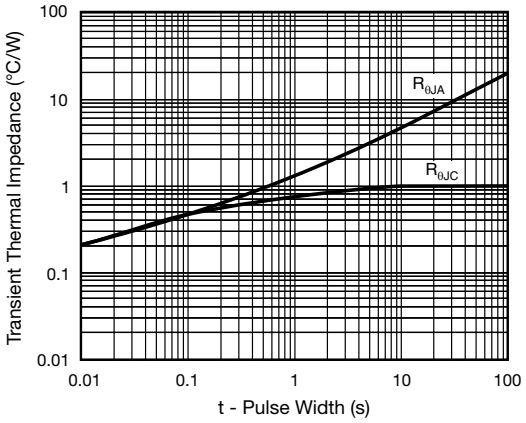


Fig. 5 - Typical Transient Thermal Impedance

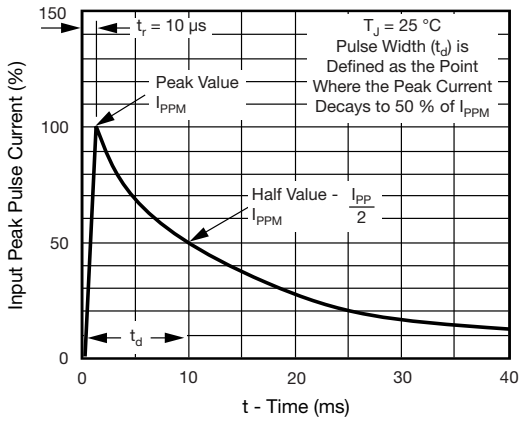
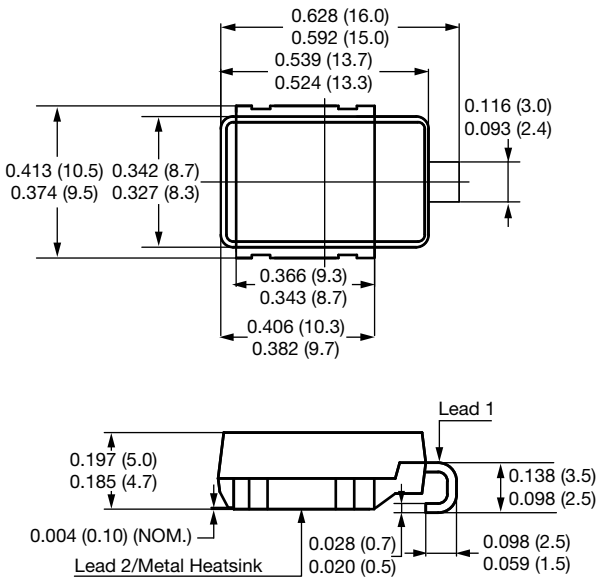


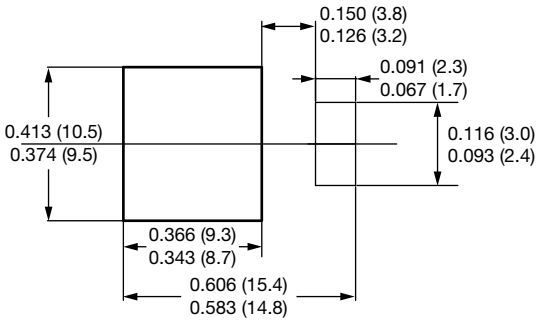
Fig. 3 - Pulse Waveform

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-218AC



Mounting Pad Layout



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