



**THE DATASHEET OF  
SM8S33HE3/2D**



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

High Temperature Stability and High Reliability Conditions



DO-218AB

PRIMARY CHARACTERISTICS	
$V_{BR}$	11.1 V to 52.8 V
$V_{WM}$	10 V to 43 V
$P_{PPM}$ (10 x 1000 $\mu$ s)	6600 W
$P_{PPM}$ (10 x 10 000 $\mu$ s)	5200 W
$P_D$	8 W
$I_{FSM}$	700 A
$T_J$ max.	175 °C
Polarity	Uni-directional
Package	DO-218AB

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 175$  °C capability suitable for high reliability and automotive requirement
- Available in uni-directional 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## 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\_X - RoHS-compliant and AEC-Q101 qualified ("X" denotes revision code e.g. A, B, ...)

**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 ( $T_C = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation	$P_{PPM}$	with 10/1000 $\mu$ s waveform	6600
		with 10/10 000 $\mu$ s waveform	5200
Power dissipation on infinite heatsink at $T_C = 25$ °C (fig. 1)	$P_D$	8.0	W
Peak pulse current with 10/1000 $\mu$ s waveform	$I_{PPM}^{(1)}$	See next table	A
Peak forward surge current 8.3 ms single half sine-wave	$I_{FSM}$	700	A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175	°C

### Note

<sup>(1)</sup> Non-repetitive current pulse derated above  $T_A = 25$  °C



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_C = 25\text{ }^\circ\text{C}$ 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 $V_{WM}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $T_J = 175\text{ }^\circ\text{C}$ $I_D$ ( $\mu\text{A}$ )	MAX. PEAK PULSE CURRENT AT 10/1000 $\mu\text{s}$ WAVEFORM (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)	TYPICAL TEMP. COEFFICIENT OF $V_{BR}$ $\alpha_T$ ( $\%/^\circ\text{C}$ )
	MIN.	NOM.	MAX.							
SM8S10A	11.1	11.7	12.3	5.0	10.0	15	250	388	17.0	0.069
SM8S11A	12.2	12.9	13.5	5.0	11.0	10	150	363	18.2	0.072
SM8S12A	13.3	14.0	14.7	5.0	12.0	10	150	332	19.9	0.074
SM8S13A	14.4	15.2	15.9	5.0	13.0	10	150	307	21.5	0.076
SM8S14A	15.6	16.4	17.2	5.0	14.0	10	150	284	23.2	0.078
SM8S15A	16.7	17.6	18.5	5.0	15.0	10	150	270	24.4	0.080
SM8S16A	17.8	18.8	19.7	5.0	16.0	10	150	254	26.0	0.081
SM8S17A	18.9	19.9	20.9	5.0	17.0	10	150	239	27.6	0.082
SM8S18A	20.0	21.1	22.1	5.0	18.0	10	150	226	29.2	0.083
SM8S20A	22.2	23.4	24.5	5.0	20.0	10	150	204	32.4	0.085
SM8S22A	24.4	25.7	26.9	5.0	22.0	10	150	186	35.5	0.086
SM8S24A	26.7	28.1	29.5	5.0	24.0	10	150	170	38.9	0.087
SM8S26A	28.9	30.4	31.9	5.0	26.0	10	150	157	42.1	0.088
SM8S28A	31.1	32.8	34.4	5.0	28.0	10	150	145	45.4	0.089
SM8S30A	33.3	35.1	36.8	5.0	30.0	10	150	136	48.4	0.090
SM8S33A	36.7	38.7	40.6	5.0	33.0	10	150	124	53.3	0.091
SM8S36A	40.0	42.1	44.2	5.0	36.0	10	150	114	58.1	0.091
SM8S40A	44.4	46.8	49.1	5.0	40.0	10	150	102	64.5	0.092
SM8S43A	47.8	50.3	52.8	5.0	43.0	10	150	95.1	69.4	0.093

### Notes

- For all types maximum  $V_F = 1.8\text{ V}$  at  $I_F = 100\text{ A}$  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  $25\text{ }^\circ\text{C} \times (1 + \alpha_T \times (T_J - 25))$

<b>THERMAL CHARACTERISTICS</b> ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance, junction to case	$R_{\theta JC}$	0.90	$^\circ\text{C/W}$

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SM8S10AHE3_A/I (1)	2.605	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)

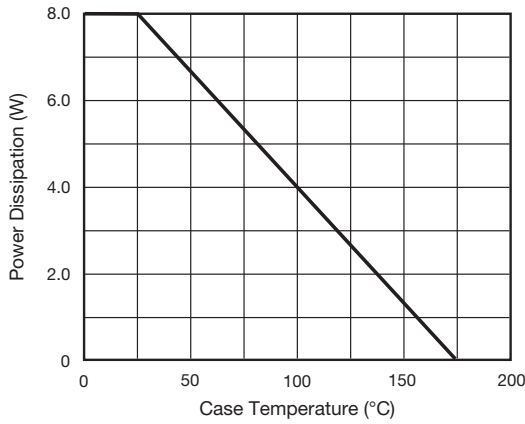


Fig. 1 - Power Derating Curve

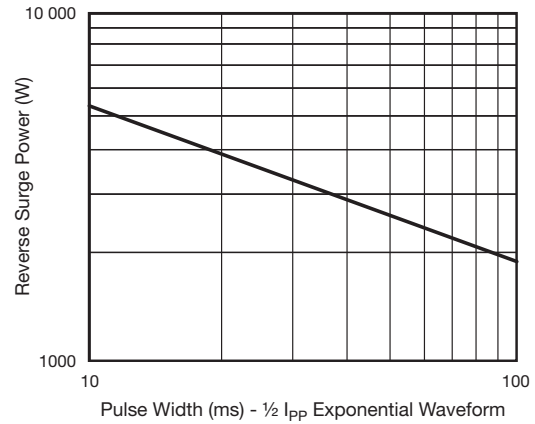


Fig. 4 - Reverse Power Capability

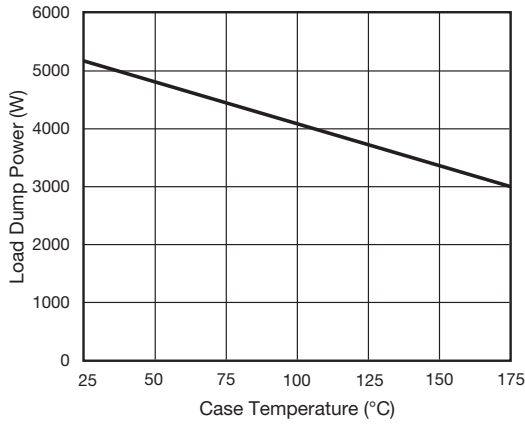


Fig. 2 - Load Dump Power Characteristics (10 ms Exponential Waveform)

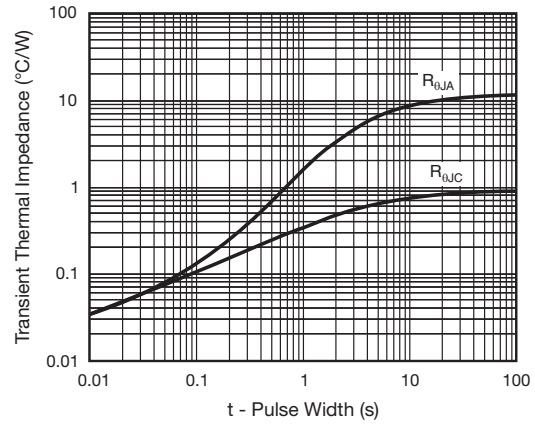


Fig. 5 - Typical Transient Thermal Impedance

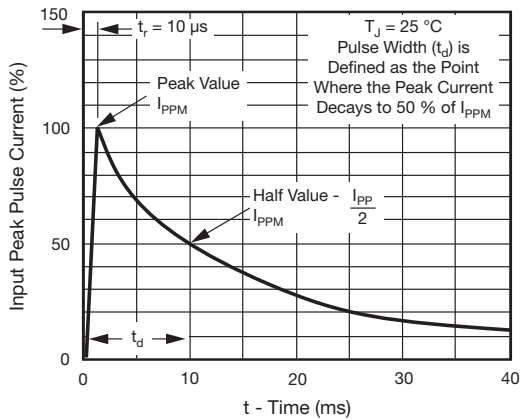


Fig. 3 - Pulse Waveform

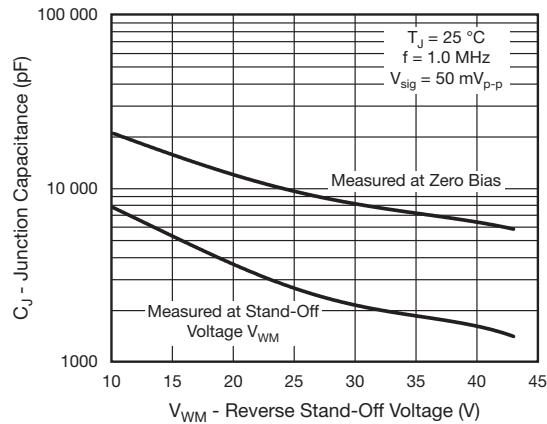
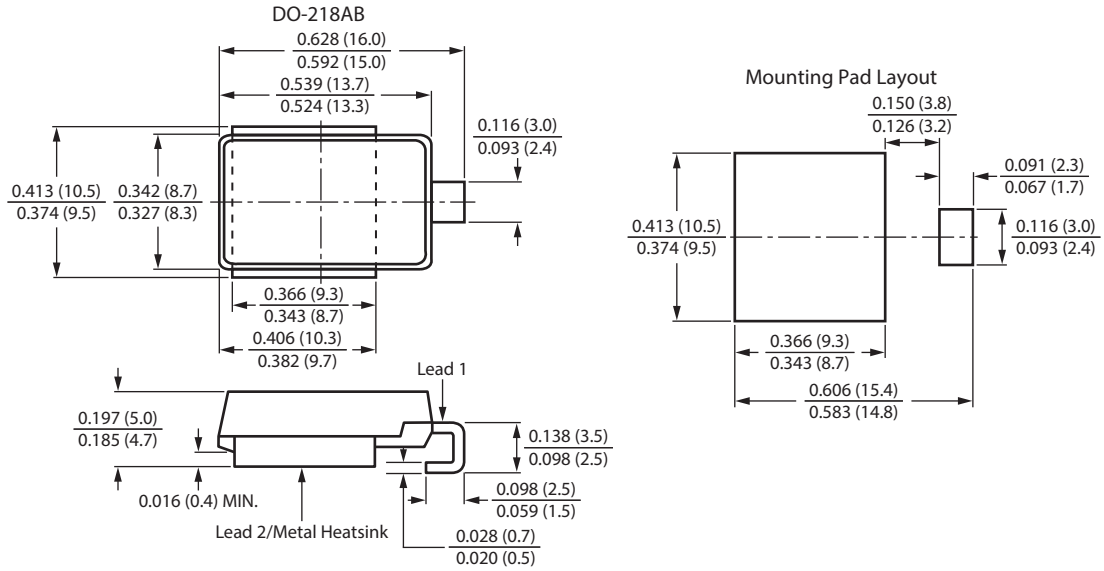


Fig. 6 - Typical Junction Capacitance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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