



**THE DATASHEET OF  
SM8S13-E3/2D**





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

High Temperature Stability and High Reliability Conditions



DO-218AB

PRIMARY CHARACTERISTICS	
$V_{WM}$	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

### 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



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 - 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 ( $T_C = 25$ °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



ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted)								
DEVICE TYPE	BREAKDOWN VOLTAGE V <sub>BR</sub> (V)		TEST CURRENT I <sub>T</sub> (mA)	STAND-OFF VOLTAGE V <sub>WM</sub> (V)	MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (μA)	MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> T <sub>J</sub> = 175 °C I <sub>D</sub> (μA)	MAX. PEAK PULSE CURRENT AT 10/1000 μs WAVEFORM (A)	MAXIMUM CLAMPING VOLTAGE AT I <sub>PPM</sub> V <sub>C</sub> (V)
	MIN.	MAX.						
SM8S10	11.1	13.6	5.0	10.0	15	250	351	18.8
SM8S10A	11.1	12.3	5.0	10.0	15	250	388	17.0
SM8S11	12.2	14.9	5.0	11.0	10	150	328	20.1
SM8S11A	12.2	13.5	5.0	11.0	10	150	363	18.2
SM8S12	13.3	16.3	5.0	12.0	10	150	300	22.0
SM8S12A	13.3	14.7	5.0	12.0	10	150	332	19.9
SM8S13	14.4	17.6	5.0	13.0	10	150	277	23.8
SM8S13A	14.4	15.9	5.0	13.0	10	150	307	21.5
SM8S14	15.6	19.1	5.0	14.0	10	150	256	25.8
SM8S14A	15.6	17.2	5.0	14.0	10	150	284	23.2
SM8S15	16.7	20.4	5.0	15.0	10	150	245	26.9
SM8S15A	16.7	18.5	5.0	15.0	10	150	270	24.4
SM8S16	17.8	21.8	5.0	16.0	10	150	229	28.8
SM8S16A	17.8	19.7	5.0	16.0	10	150	254	26.0
SM8S17	18.9	23.1	5.0	17.0	10	150	216	30.5
SM8S17A	18.9	20.9	5.0	17.0	10	150	239	27.6
SM8S18	20.0	24.4	5.0	18.0	10	150	205	32.2
SM8S18A	20.0	22.1	5.0	18.0	10	150	226	29.2
SM8S20	22.2	27.1	5.0	20.0	10	150	184	35.8
SM8S20A	22.2	24.5	5.0	20.0	10	150	204	32.4
SM8S22	24.4	29.8	5.0	22.0	10	150	168	39.4
SM8S22A	24.4	26.9	5.0	22.0	10	150	186	35.5
SM8S24	26.7	32.6	5.0	24.0	10	150	153	43.0
SM8S24A	26.7	29.5	5.0	24.0	10	150	170	38.9
SM8S26	28.9	35.3	5.0	26.0	10	150	142	46.6
SM8S26A	28.9	31.9	5.0	26.0	10	150	157	42.1
SM8S28	31.1	38.0	5.0	28.0	10	150	132	50.1
SM8S28A	31.1	34.4	5.0	28.0	10	150	145	45.4
SM8S30	33.3	40.7	5.0	30.0	10	150	123	53.5
SM8S30A	33.3	36.8	5.0	30.0	10	150	136	48.4
SM8S33	36.7	44.9	5.0	33.0	10	150	112	59.0
SM8S33A	36.7	40.6	5.0	33.0	10	150	124	53.3
SM8S36	40.0	48.9	5.0	36.0	10	150	103	64.3
SM8S36A	40.0	44.2	5.0	36.0	10	150	114	58.1
SM8S40	44.4	54.3	5.0	40	10	150	92.4	71.4
SM8S40A	44.4	49.1	5.0	40	10	150	102	64.5
SM8S43	47.8	58.4	5.0	43	10	150	86	76.7
SM8S43A	47.8	52.8	5.0	43	10	150	95.1	69.4

**Note**

- For all types maximum V<sub>F</sub> = 1.8 V at I<sub>F</sub> = 100 A measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum



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

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SM8S10AHE3/2D <sup>(1)</sup>	2.605	2D	750	13" diameter plastic tape and reel, anode towards the sprocket hole

**Note**

<sup>(1)</sup> AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES**

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

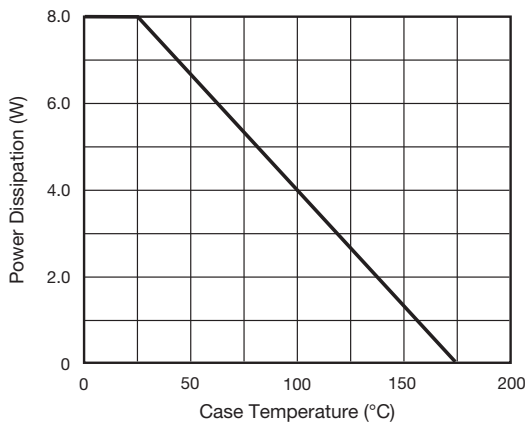


Fig. 1 - Power Derating Curve

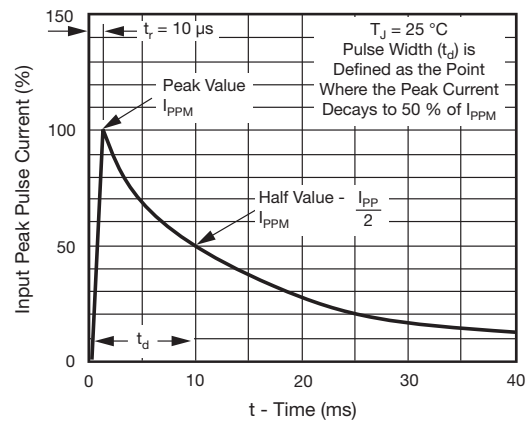


Fig. 3 - Pulse Waveform

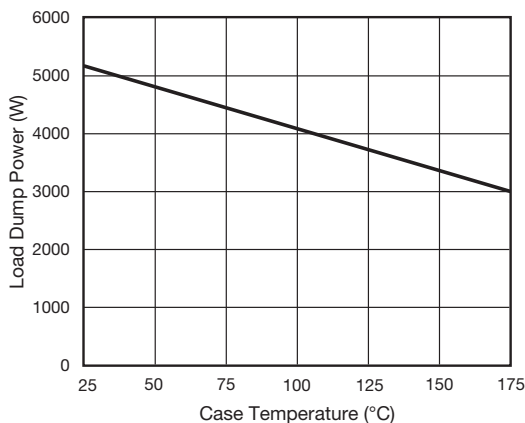


Fig. 2 - Load Dump Power Characteristics (10 ms Exponential Waveform)

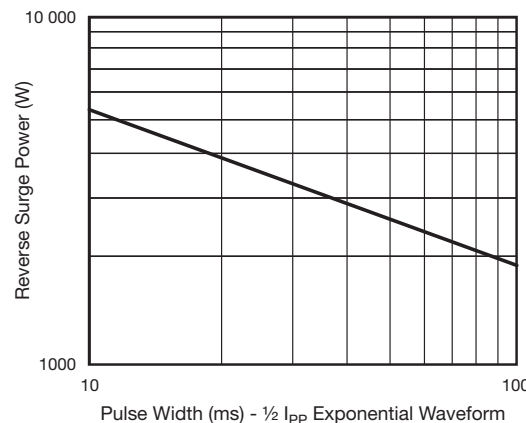


Fig. 4 - Reverse Power Capability

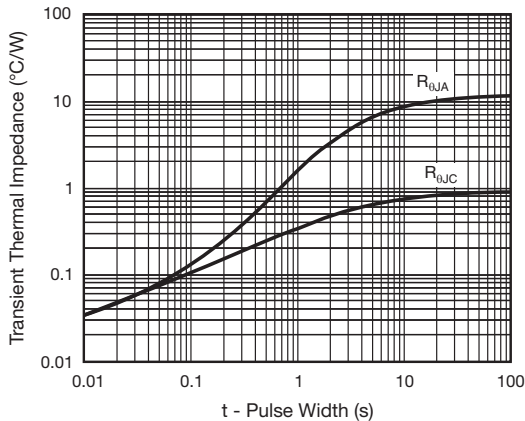


Fig. 5 - Typical Transient Thermal Impedance

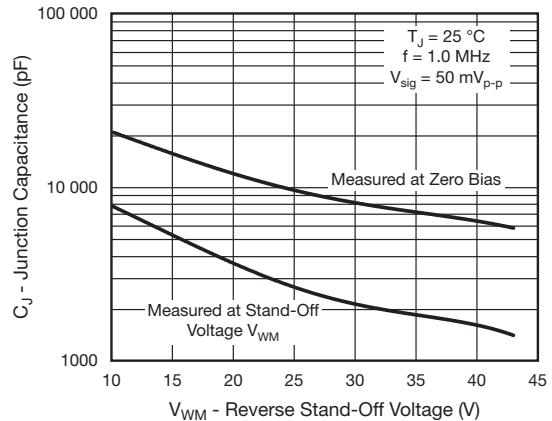
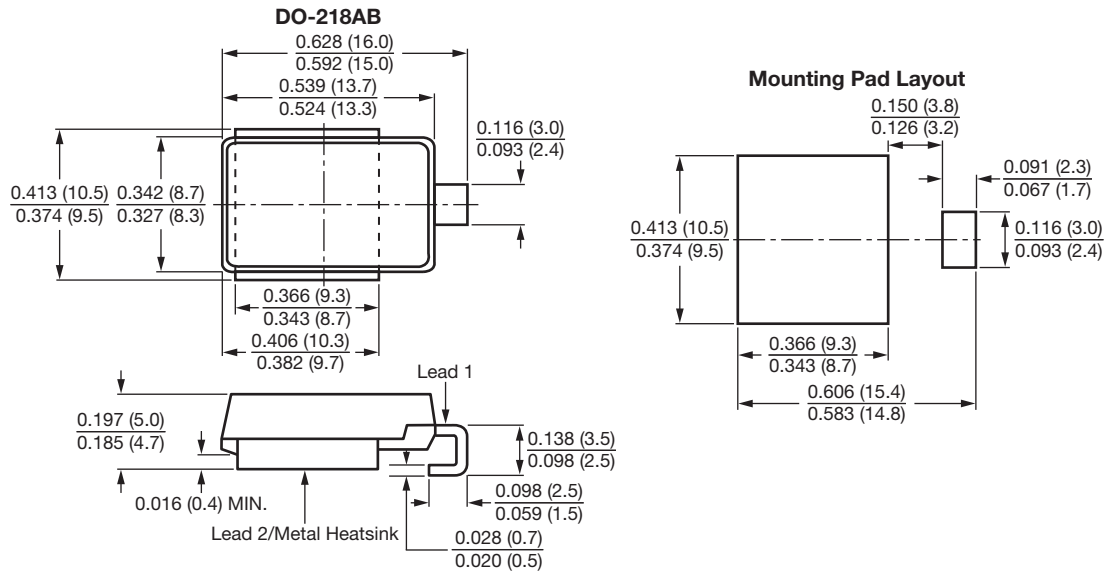


Fig. 6 - Typical Junction Capacitance

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





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