

## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- High current transient suppressor
- Glass passivated junction.
- Low leakage current
- Excellent Clamping Capability.
- 6600W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Meets RoHS2.0 (2011/65/EU) but Halogen
- Meets MSL level 1, per J-STD-020
- Meets ISO7637-2 5a surge specification
- AEC-Q101 qualified (Automotive grade with suffix "Q".)
- Exsemi technology



### Mechanical Data

- Case: DO-218AB
- Polarity: Heatsink is anode
- Epoxy: UL 94V-0 rate flame retardant

### Applications

SM8S Series TVS diodes can be used in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.

### Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000 $\mu$ s waveform	$P_{PPM}$	Minimum 6600	Watts
Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1)	$I_{PPM}$	See Table	Amps
Power dissipation on infinite heatsink at $T_L=25^\circ\text{C}$	$P_D$	8	Watts
Peak forward surge current, 8.3ms single half sine-wave	$I_{FSM}$	700	Amps
Operating junction and Storage Temperature Rang	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$

Note: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^\circ\text{C}$  per Fig.2.

Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ )

Part Number		$V_R$	$I_R@V_R$		$V_{BR} @ I_T$		$I_T$	$V_C @ I_{pp}$	$I_{pp}$
Uni-polar	Bi-polar	V	$\mu\text{A}@25^{\circ}\text{C}$	$\mu\text{A}@175^{\circ}\text{C}$	min(V)	max (V)	mA	V	A
SM8S10A	SM8S10CA	10.0	5	250	11.1	12.3	5	17.0	388
SM8S11A	SM8S11CA	11.0	5	150	12.2	13.5	5	18.2	363
SM8S12A	SM8S12CA	12.0	5	150	13.3	14.7	5	19.9	332
SM8S13A	SM8S13CA	13.0	5	150	14.4	15.9	5	21.5	307
SM8S14A	SM8S14CA	14.0	5	150	15.6	17.2	5	23.2	284
SM8S15A	SM8S15CA	15.0	5	150	16.7	18.5	5	24.4	270
SM8S16A	SM8S16CA	16.0	5	150	17.8	19.7	5	26.0	253
SM8S17A	SM8S17CA	17.0	5	150	18.9	20.9	5	27.6	239
SM8S18A	SM8S18CA	18.0	5	150	20.0	22.1	5	29.2	226
SM8S20A	SM8S20CA	20.0	5	150	22.2	24.5	5	32.4	204
SM8S22A	SM8S22CA	22.0	5	150	24.4	26.9	5	35.5	186
SM8S24A	SM8S24CA	24.0	5	150	26.7	29.5	5	38.9	170
SM8S26A	SM8S26CA	26.0	5	150	28.9	31.9	5	42.1	157
SM8S28A	SM8S28CA	28.0	5	150	31.1	34.4	5	45.4	145
SM8S30A	SM8S30CA	30.0	5	150	33.3	36.8	5	48.4	136
SM8S32A	SM8S32CA	32.0	5	150	35.5	39.4	5	51.4	128.5
SM8S33A	SM8S33CA	33.0	5	150	36.7	40.6	5	53.3	124
SM8S36A	SM8S36CA	36.0	5	150	40.0	44.2	5	58.1	114
SM8S40A	SM8S40CA	40.0	5	150	44.4	49.1	5	64.5	102
SM8S43A	SM8S43CA	43.0	5	150	47.8	52.8	5	69.4	95.1

Note:

①. 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.

②. Surge waveform: 10/1000 $\mu\text{s}$

$V_R$  : Stand-off Voltage -- Maximum voltage that can be applied

$V_{BR}$ : Breakdown Voltage

$V_C$ : Clamping Voltage -- Peak voltage measured across the suppressor at a specified  $I_{pp}$

$I_R$ : Reverse Leakage Current

$I_T$ : Test current

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

Figure 1. Load Dump Power Characteristics

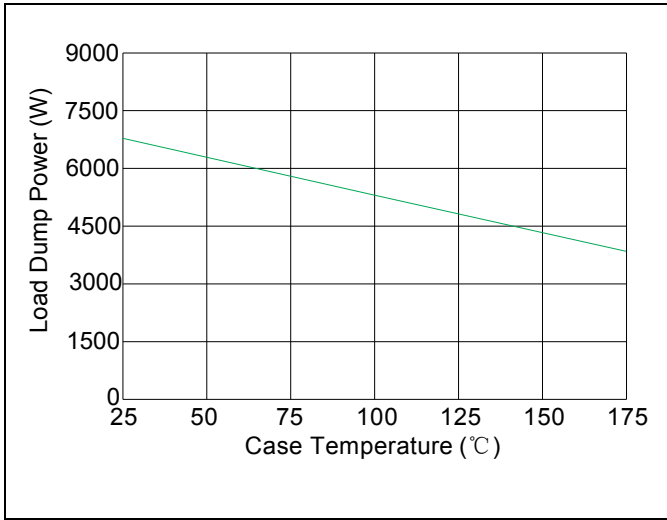


Figure 2. Reverse Power Capability



Figure 3. Pulse Waveform

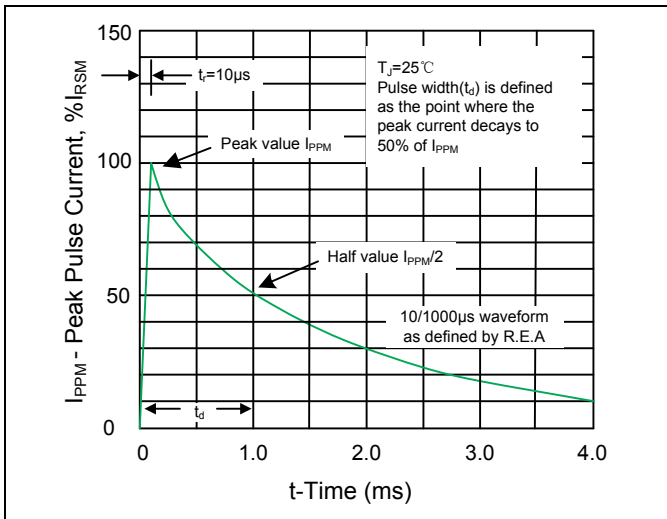


Figure 4. Steady State Power Dissipation Derating Curve

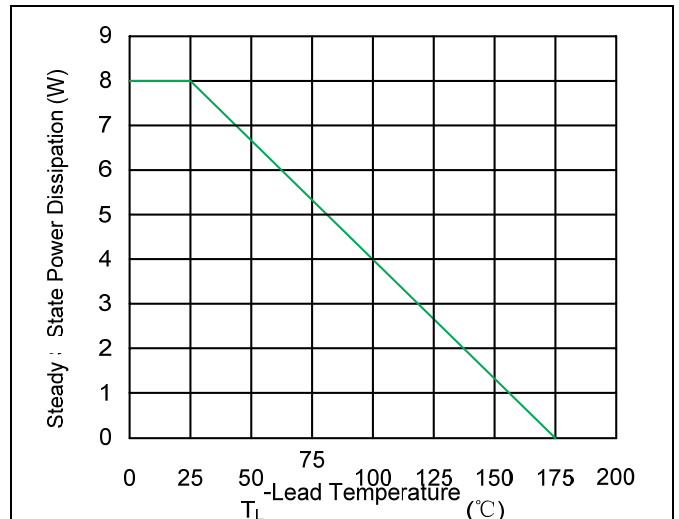


Figure 5. Typical Transient Thermal Impedance

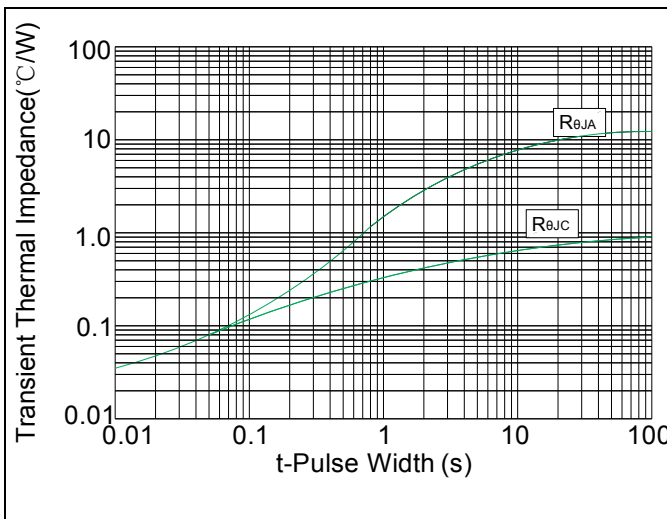
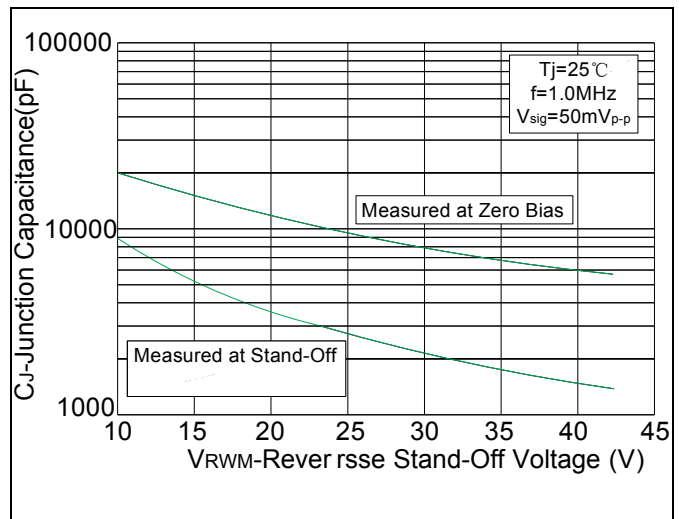


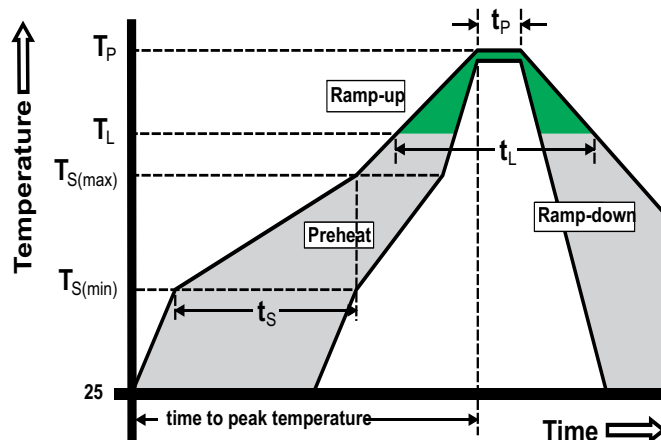
Figure 6. Typical Junction Capacitance



Recommended Soldering Conditions

Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak		5°C/second max
$T_{S(max)}$ to $T_L$ - Ramp-up Rate		5°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $T_S$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		260°C



Physical Specifications

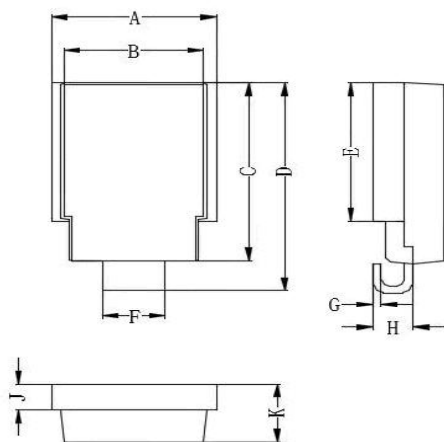
<b>Terminal Finish</b>	100% Matte Tin-plated
<b>Body Material</b>	UL Recognized compound meeting flammability rating V-0
<b>Lead Material</b>	Copper Alloy

Environmental Specifications

<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Temperature Cycling</b>	JESD22-A104
<b>MSL</b>	JEDEC-J-STD-020, LEVEL 1
<b>H3TRB</b>	JESD22-A101
<b>RSH</b>	JESD22-A111

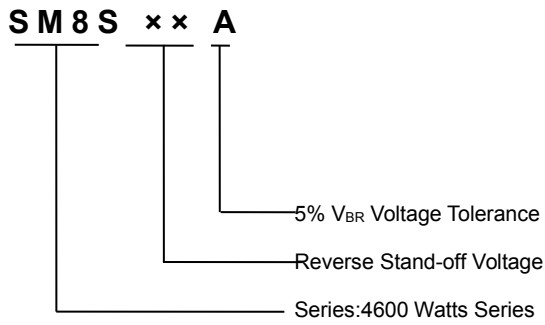
Dimensions

DO-218AB

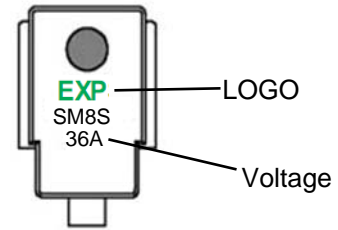


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.374	0.413	9.5	10.5
B	0.323	0.350	8.2	8.9
C	0.512	0.539	13	13.7
D	0.591	0.630	15	16
E	0.374	0.417	9.5	10.6
F	0.118	0.157	3	4
G	0.022	0.026	0.55	0.65
H	0.118	0.138	3	3.5
J	0.075	0.083	1.9	2.1
K	0.185	0.209	4.7	5.3

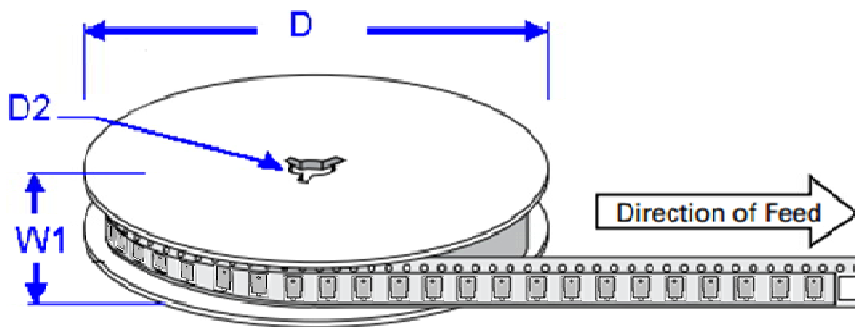
Part Numbering System



Part Marking System



Packaging



Dimensions	millimeters	inches
D	$330 \pm 0.2$	$13.0 \pm 0.008$
D2	$13.2 \pm 0.2$	$0.52 \pm 0.008$
W1	$24 \pm 0.2$	$0.94 \pm 0.008$

OUTLINE	REEL (PCS)	PER CARTON (PCS)	REEL DIAMETERS (mm)
TAPING	750	3000	330