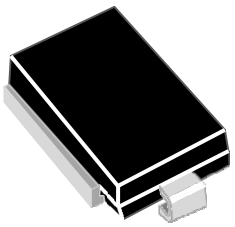
Transient Voltage Suppression Diodes
Surface Mount – 3600W

Descriptions

Transient Voltage Suppressors (TVS) are semiconductor devices designed to provide protection against over voltage transients. When over voltage events occur, the silicon TVS actives from an very high impedance status to a very low impedance status by operating in the avalanche mode and uses a large junction area to absorb large transient currents in a fast response time, protecting voltage sensitive electronics equipment from damaging.

Boarden supplies unipolar and bipolar TVS devices with axial and SMD packages.



DO-218AB

Features

- Glass passivated chip junction in DO-218AB Package
- Junction passivation optimized design passivated anisotropic rectifier technology
- T_J = 175℃ 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℃
- AEC-Q101 qualified
- RoHS compliant

Applications

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 Thermal Characteristics (TA=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Peak Pulse Power Dissipation	with 10/1000 μs waveform	P_{PPM}	3600	W
	with 10/10000 μs waveform		2800	
Power dissipation on infinite heatsink at T_C = 25°C		P_D	5.0	W
Peak pulse current with 10/1000 μs waveform		I_{PPM}(1)	See next table	A
Peak Forward Surge Current,8.3ms Single Half Sine-Wave		I_{FSM}	500	A
Operating junction and Storage Temperature Range		T_J, T_{STG}	-55~175	°C
Typical Thermal Resistance Junction to Lead		$R_{\theta JC}$	0.9	°C/W

Notes:

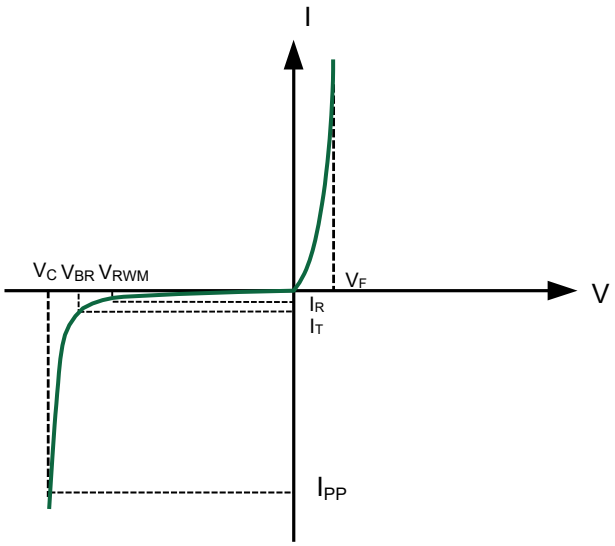
1) Non-repetitive current pulse derated above TA=25° C

Electrical Characteristics (TA=25°C unless otherwise noted)

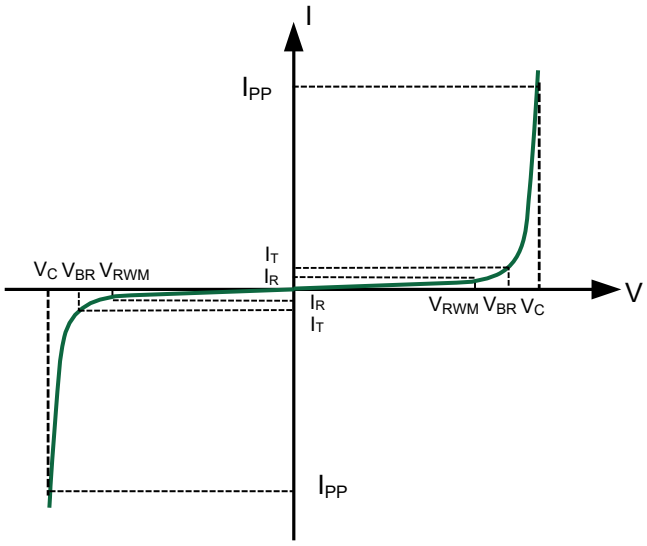
Part Number		V_{RWM}	V_{BR}@I_TV		I_T	I_{PP}	V_C@I_{PP}Max.	I_R@V_{RWM}	Package
UNT	BI	V	min.	max.	mA	A	V	uA	Package
SM5S10A	SM5S10CA	10.0	11.10	12.30	5	212.0	17.0	15	DO-218AB
SM5S11A	SM5S11CA	11.0	12.20	13.50	5	198.0	18.2	10	DO-218AB
SM5S12A	SM5S12CA	12.0	13.30	14.70	5	181.0	19.9	10	DO-218AB
SM5S13A	SM5S13CA	13.0	14.40	15.90	5	167.0	21.5	10	DO-218AB
SM5S14A	SM5S14CA	14.0	15.60	17.20	5	155.0	23.2	10	DO-218AB
SM5S15A	SM5S15CA	15.0	16.70	18.50	5	148.0	24.4	10	DO-218AB
SM5S16A	SM5S16CA	16.0	17.80	19.70	5	138.0	26.0	10	DO-218AB
SM5S17A	SM5S17CA	17.0	18.90	20.90	5	130.0	27.6	10	DO-218AB
SM5S18A	SM5S18CA	18.0	20.00	22.10	5	123.0	29.2	10	DO-218AB
SM5S20A	SM5S20CA	20.0	22.20	24.50	5	111.0	32.4	10	DO-218AB
SM5S22A	SM5S22CA	22.0	24.40	26.90	5	101.0	35.5	10	DO-218AB
SM5S24A	SM5S24CA	24.0	26.70	29.50	5	93.0	38.9	10	DO-218AB
SM5S26A	SM5S26CA	26.0	28.90	31.90	5	86.0	42.1	10	DO-218AB
SM5S28A	SM5S28CA	28.0	31.10	34.40	5	79.0	45.4	10	DO-218AB
SM5S30A	SM5S30CA	30.0	33.30	36.80	5	74.0	48.4	10	DO-218AB
SM5S33A	SM5S33CA	33.0	36.70	40.60	5	68.0	53.3	10	DO-218AB
SM5S36A	SM5S36CA	36.0	40.00	44.20	5	62.0	58.1	10	DO-218AB
SM5S40A	SM5S40CA	40.0	44.40	49.10	5	56.0	64.5	10	DO-218AB
SM5S43A	SM5S43CA	43.0	47.80	52.80	5	52.0	69.4	10	DO-218AB

For all types maximum V_F = 1.8 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

I-V Curve Characteristics



Uni-Directional TVS



Bi-Directional TVS

V_{RWM} - Reverse Stand-Off Voltage - Working Peak Reverse Voltage

V_{BR} - Breakdown Voltage - Maximum current that flows though the TVS at a specified test current (I_T)

I_T - Test Current - Test Current

V_C - Clamping Voltage - Peak voltage measured across the suppressor at a specified Ippm (peak impulse current)

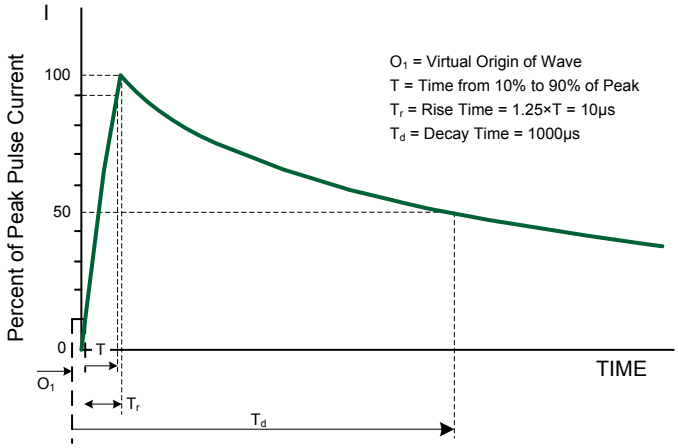
I_{PP} - Peak Pulse Current - Maximum Reverse Peak Pulse Current

P_{PP} - Peak Pulse Power Dissipation - Max power dissipation

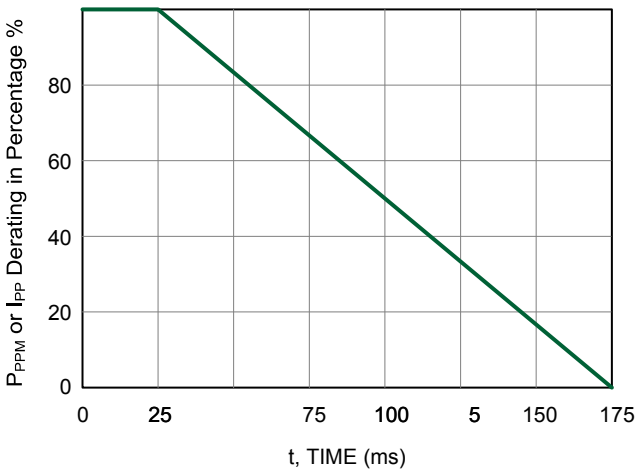
I_R - Reverse Leakage Current - Current measured at V_{RWM}

V_F - Forward Voltage - Drop for Uni-directional

Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

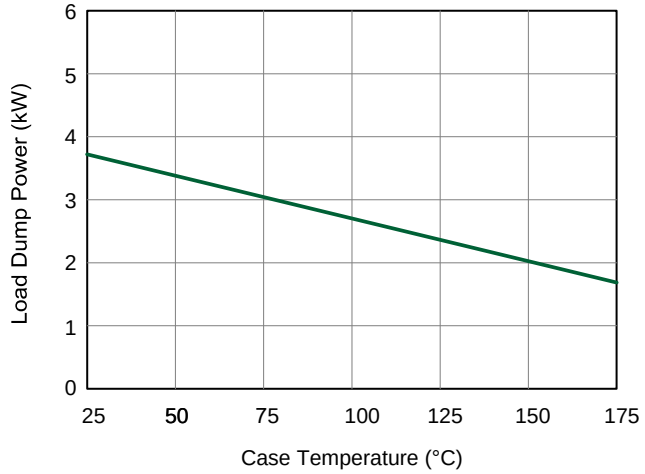


Pulse Waveform- 10/1000μs

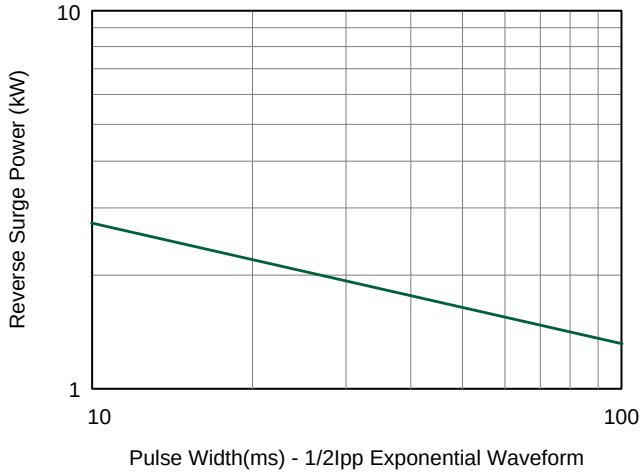


Pulse Derating Curve

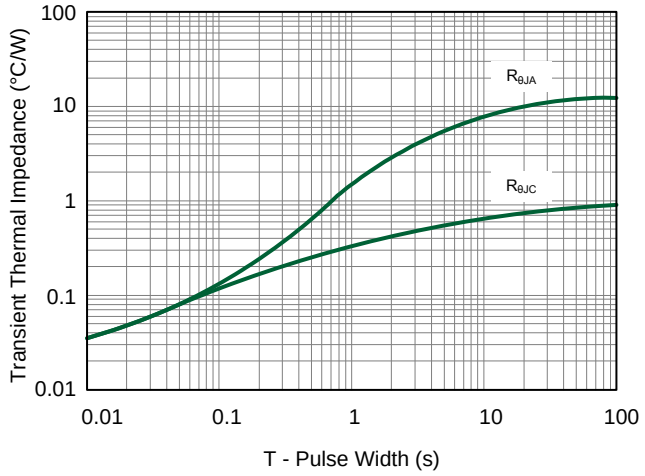
Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



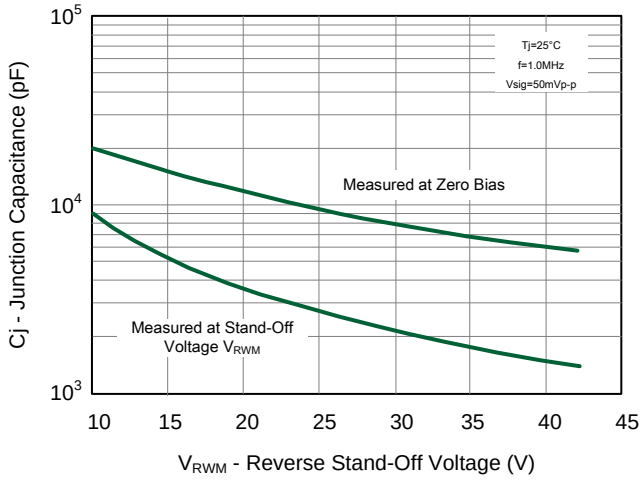
Load Dump Power Characteristics (10ms Exponential Waveform)



Reverse Power Capability



Typical Transient Thermal Impedance

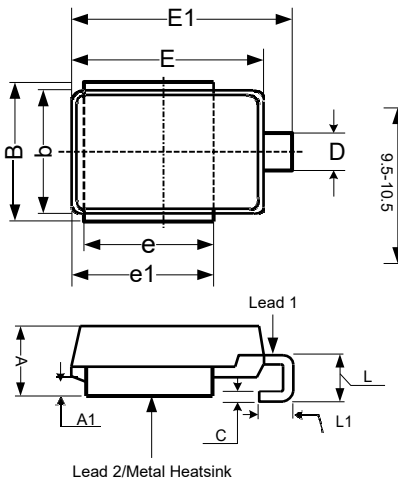


Typical Junction Capacitance

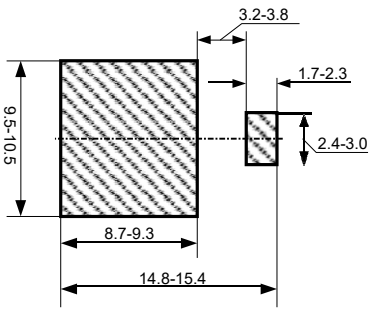
Product Dimensions

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.185	0.204	4.70	5.20
A1	0.016	-	0.40	-
B	0.374	0.413	9.50	10.50
b	0.327	0.342	8.30	8.70
C	0.020	0.028	0.50	0.70
D	0.094	0.137	2.40	3.50
E	0.524	0.539	13.30	13.70
E1	0.592	0.628	15.00	16.00
e	0.335	0.358	8.50	9.10
e1	0.374	0.398	9.50	10.10
L	0.098	0.146	2.50	3.70
L1	0.059	0.098	1.50	2.50

DO-218AB



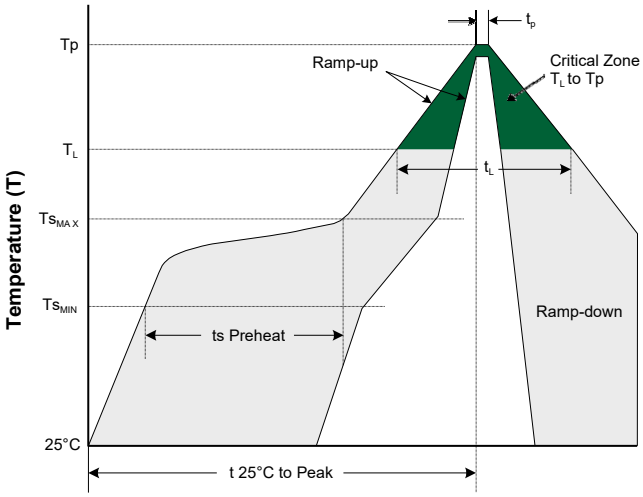
Mounting Pad Layout



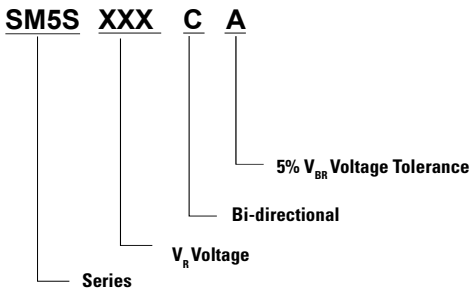
Unit (mm)

Soldering Parameters

Profile Feature	Lead-Free Assembly
Average Ramp-up Rate (Ts_{MAX} to Tp) Average Ramp-down Rate (Tp to T_L)	3°C/second max. 6°C/second max.
Preheat • Temperature Min (Ts_{MIN}) • Temperature Max (Ts_{MAX}) • Time (ts Preheat)	 150°C 200°C 60-180 seconds
Time maintained above: • Temperature (T_L) • Time (t_L)	 217°C 60-150 seconds
Peak/Classification Temperature • Temperature (Tp)	 $260^{+0/-5}$°C
Time within 5°C of actual Peak Time (t_p)	 20-40 seconds
Time 25°C to peak Temperature	8 minutes max
Do not exceed	260 °C



Part Numbering System



Order Information

Device	Package	Quantity	Tape
SM5S series	DO-218AB	750	13" Reel