

Transient Voltage Suppression Diodes Surface Mount – 6600W > SM8S series

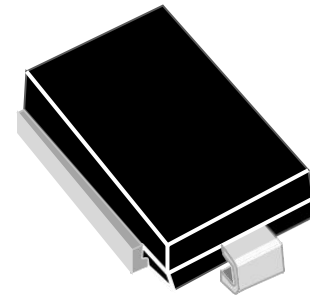
Descriptions

Transient Voltage Suppressors (TVS) are semiconductor devices designed to provide protection against over voltage transients. When over voltage events occur, the silicon TVS activates 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, with maximum working voltage 5V to 550V, maximum power dissipation from 200W-5000W.

Features

- Glass passivated chip junction in DO-218AB Package
- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 175^{\circ}\text{C}$ 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
- RoHS compliant



DO-218AB

Order Information

| Device | Qty per Box | Tape |
|---------|-------------|----------|
| SM8SxxA | 750 | 13" Reel |

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 | P_{PP} | with 10/1000 μs waveform | 6600 |
| | | with 10/10000 μs waveform | 5200 |
| Power dissipation on infinite heatsink at $T_C = 25^{\circ}\text{C}$ | P_D | 8.0 | 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} | 700 | A |
| Operating junction and Storage Temperature Range | T_J, T_{STG} | -55~175 | $^{\circ}\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JC}$ | 0.9 | $^{\circ}\text{C}/\text{W}$ |

Notes:

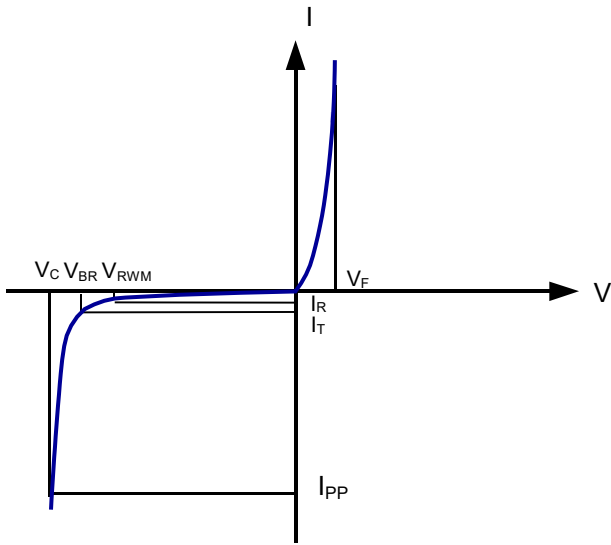
1) Non-repetitive current pulse derated above $T_A = 25^{\circ}\text{C}$

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

| Type Number | V _{RMW} | I _R @V _{RMW} | | V _{BR} @I _T | | I _T | V _C @I _{PP} | I _{PP} |
|-------------|------------------|----------------------------------|-----------------------------|---------------------------------|--------|----------------|---------------------------------|-----------------|
| | | (μA) @25°C | (μA) @T _J =175°C | Min(V) | Max(V) | | | |
| SM8S10A | 10.0 | 5 | 250 | 11.1 | 12.3 | 5 | 17.0 | 388 |
| SM8S11A | 11.0 | 5 | 150 | 12.2 | 13.5 | 5 | 18.2 | 363 |
| SM8S12A | 12.0 | 5 | 150 | 13.3 | 14.7 | 5 | 19.9 | 332 |
| SM8S13A | 13.0 | 5 | 150 | 14.4 | 15.9 | 5 | 21.5 | 307 |
| SM8S14A | 14.0 | 5 | 150 | 15.6 | 17.2 | 5 | 23.2 | 284 |
| SM8S15A | 15.0 | 5 | 150 | 16.7 | 18.5 | 5 | 24.4 | 270 |
| SM8S16A | 16.0 | 5 | 150 | 17.8 | 19.7 | 5 | 26.0 | 253 |
| SM8S17A | 17.0 | 5 | 150 | 18.9 | 20.9 | 5 | 27.6 | 239 |
| SM8S18A | 18.0 | 5 | 150 | 20.0 | 22.1 | 5 | 29.2 | 226 |
| SM8S20A | 20.0 | 5 | 150 | 22.2 | 24.5 | 5 | 32.4 | 204 |
| SM8S22A | 22.0 | 5 | 150 | 24.4 | 26.9 | 5 | 35.5 | 186 |
| SM8S24A | 24.0 | 5 | 150 | 26.7 | 29.5 | 5 | 38.9 | 170 |
| SM8S26A | 26.0 | 5 | 150 | 28.9 | 31.9 | 5 | 42.1 | 157 |
| SM8S28A | 28.0 | 5 | 150 | 31.1 | 34.4 | 5 | 45.4 | 145 |
| SM8S30CA | 30.0 | 5 | 150 | 33.3 | 36.8 | 5 | 48.4 | 136 |
| SM8S32CA | 32.0 | 5 | 150 | 35.5 | 39.4 | 5 | 51.4 | 128.5 |
| SM8S33CA | 33.0 | 5 | 150 | 36.7 | 40.6 | 5 | 53.3 | 124 |
| SM8S36CA | 36.0 | 5 | 150 | 40.0 | 44.2 | 5 | 58.1 | 114 |
| SM8S40CA | 40.0 | 5 | 150 | 44.4 | 49.1 | 5 | 64.5 | 102 |
| SM8S43CA | 43.0 | 5 | 150 | 47.8 | 52.8 | 5 | 69.4 | 95.1 |

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

VRWM - Reverse Stand-Off Voltage - Working Peak Reverse Voltage

VBR - Breakdown Voltage - Maximum current that flows through the TVS at a specified test current (I_T)

IT - Test Current - Test Current

VC - Clamping Voltage - Peak voltage measured across the suppressor at a specified I_{ppm} (peak impulse current)

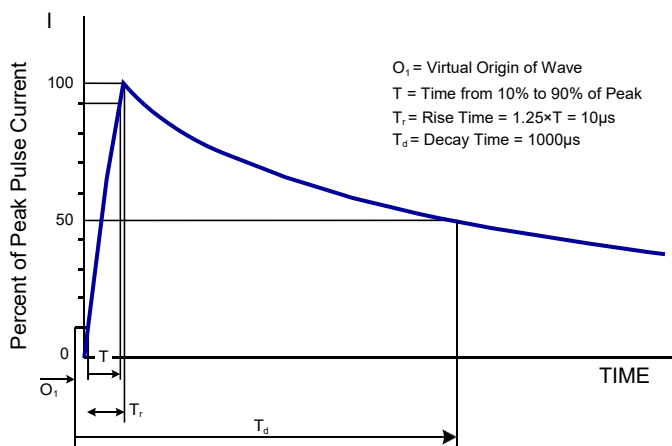
IPP - Peak Pulse Current - Maximum Reverse Peak Pulse Current

PPP - Peak Pulse Power Dissipation - Max power dissipation

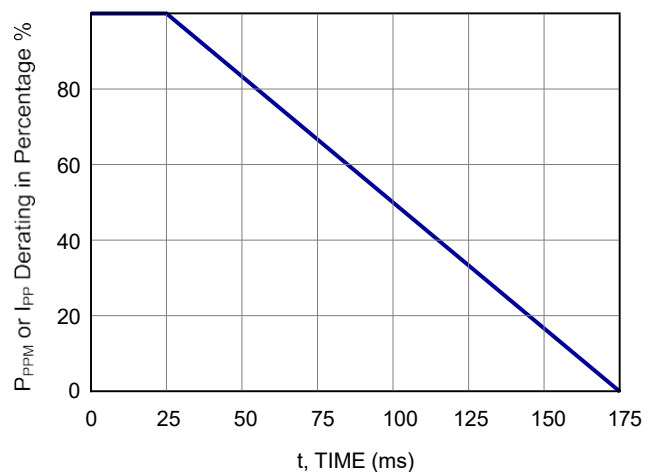
IR - Reverse Leakage Current - Current measured at V_{RWM}

VF - Forward Voltage - Drop for Uni-directional

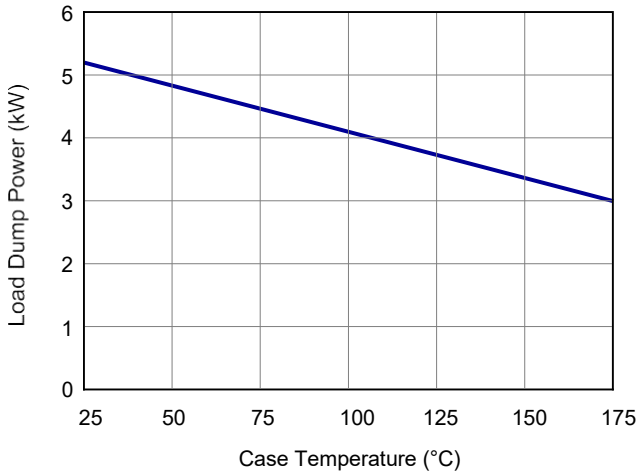
Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



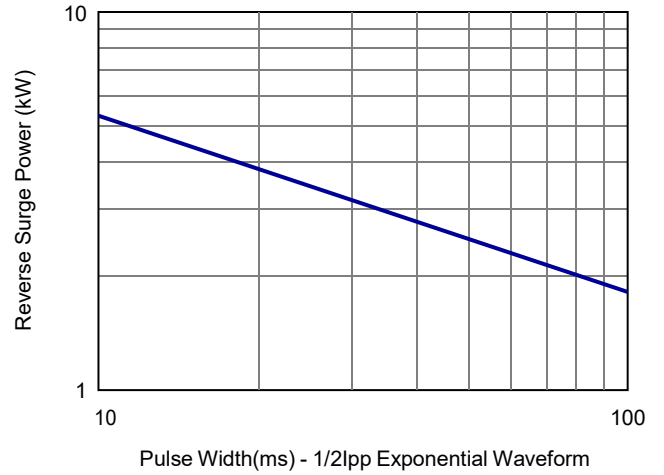
Pulse Waveform- 10/1000µs



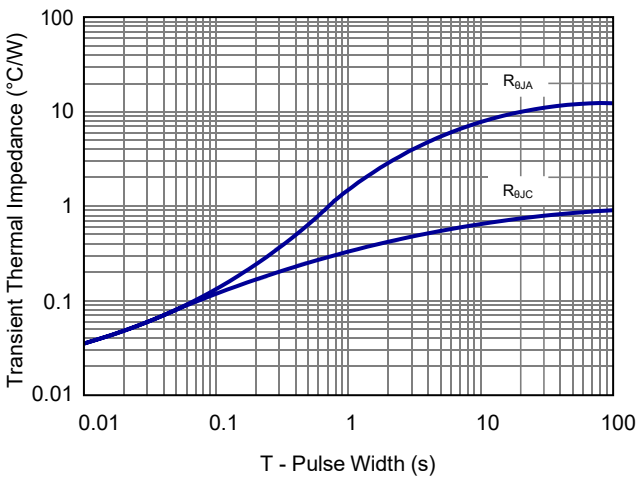
Pulse Derating Curve



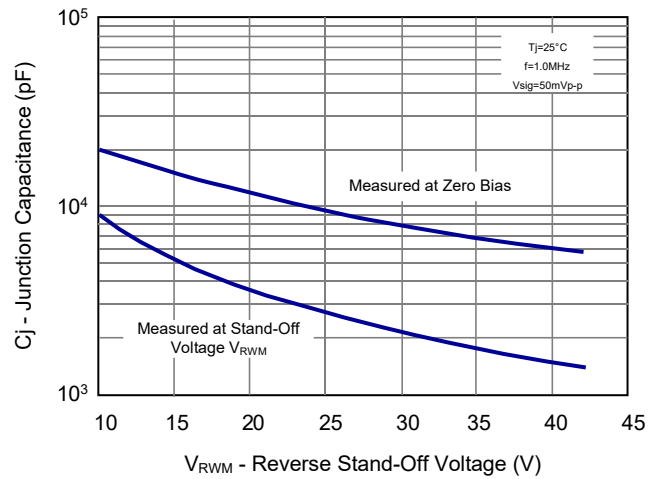
Load Dump Power Characteristics
(10ms Exponential Waveform)



Reverse Power Capability



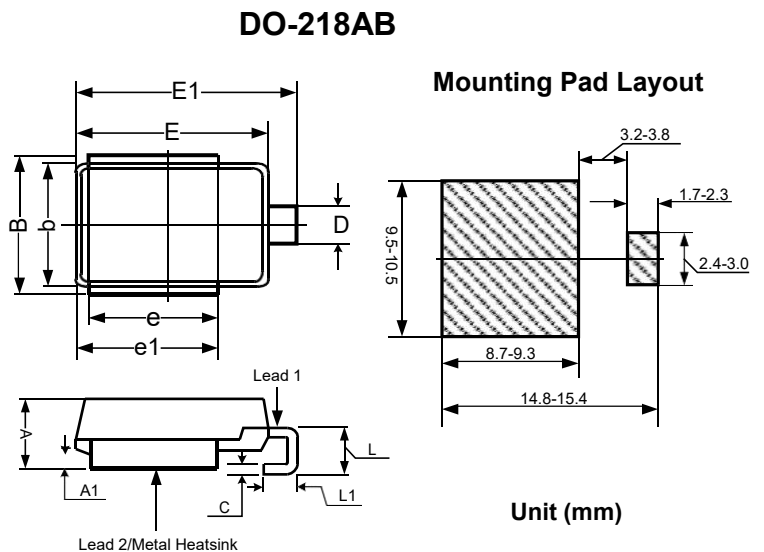
Typical Transient Thermal Impedance



Typical Junction Capacitance

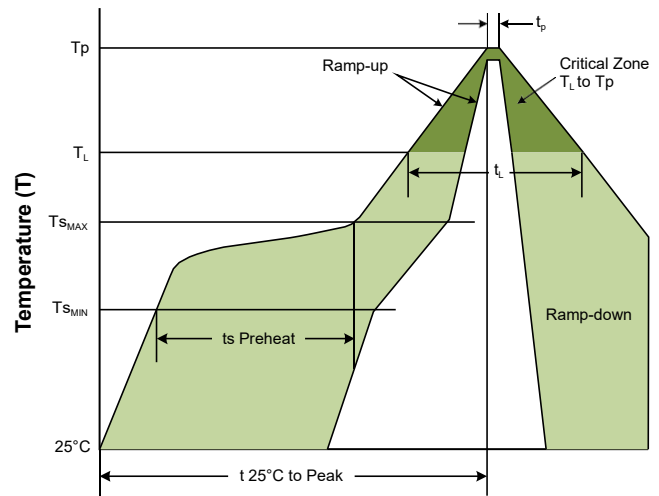
Product Dimensions

| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.185 | 0.201 | 4.70 | 5.10 |
| 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 | 0.118 | 2.40 | 3.00 |
| 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 | 0.106 | 0.146 | 2.70 | 3.70 |
| L1 | 0.059 | 0.098 | 1.50 | 2.50 |



Soldering Parameters

| Profile Feature | Lead-Free Assembly |
|---|------------------------------------|
| Average Ramp-up Rate ($T_{S_{MAX}}$ to T_p) Average Ramp-down Rate (T_p to T_L) | 3°C/second max. 6°C/second max. |
| Preheat • Temperature Min ($T_{S_{MIN}}$) • Temperature Max ($T_{S_{MAX}}$) • Time (t_s 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 (T_p) | 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 | 280 °C |



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