

Surface Mount Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



Features

- Round chip produced by chemical method
- Junction passivated by polyimide
- $T_J = 175\text{ }^\circ\text{C}$ capability suitable for high reliability and automotive requirement
- Available in uni-directional and bi-directional polarity
- 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 $245\text{ }^\circ\text{C}$
- AEC-Q101 qualified



DO-218AB

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

Polarity: heatsink is anode

Package: DO-218AB

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.

Maximum Ratings and Electrical characteristics

Ratings at $25\text{ }^\circ\text{C}$ ambient temperature unless otherwise specified.

| Parameter | Symbol | Value | Unit |
|--|-----------------|----------------|--------------------|
| Peak pulse power dissipation with 10/1000 μs waveform with 10/10 000 μs waveform | P_{PPM} | 6600 | W |
| | | 5200 | |
| Power dissipation on infinite heatsink at $T_C = 25\text{ }^\circ\text{C}$ (fig. 1) | P_D | 8.0 | W |
| Peak pulse current with 10/1000 μs waveform | $I_{PPM}^{(1)}$ | See next table | A |
| Peak forward surge current 8.3 ms single half sine-wave | I_{FSM} | 700 | A |
| Typical thermal resistance, junction to case | $R_{\theta JC}$ | 0.90 | $^\circ\text{C/W}$ |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ |

Note

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



SM8S10(C)A thru SM8S43(C)A

Stand-off Voltage - 10 to 43 Volts

ELECTRICAL CHARACTERISTICS (T_C = 25 °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 (μA) | MAXIMUM REVERSE LEAKAGE AT V _{WM} T _J = 175 °C I _D (μA) | MAX. PEAK PULSE CURRENT AT 10/1000 μs WAVEFORM (A) | MAXIMUM CLAMPING VOLTAGE AT I _{PPM} V _C (V) | TYPICAL TEMP. COEFFICIENT OF V _{BR} ⁽¹⁾ α _T (%/°C) |
|-------------|----------|---------------------------------------|------|------|----------------------------------|---------------------------------------|--|--|--|---|---|
| Uni. | Bi. | MIN. | NOM. | MAX. | | | | | | | |
| SM8S10A | SM8S10CA | 11.1 | 11.7 | 12.3 | 5.0 | 10.0 | 15 | 250 | 388 | 17.0 | 0.069 |
| SM8S11A | SM8S11CA | 12.2 | 12.9 | 13.5 | 5.0 | 11.0 | 10 | 150 | 363 | 18.2 | 0.072 |
| SM8S12A | SM8S12CA | 13.3 | 14.0 | 14.7 | 5.0 | 12.0 | 10 | 150 | 332 | 19.9 | 0.074 |
| SM8S13A | SM8S13CA | 14.4 | 15.2 | 15.9 | 5.0 | 13.0 | 10 | 150 | 307 | 21.5 | 0.076 |
| SM8S14A | SM8S14CA | 15.6 | 16.4 | 17.2 | 5.0 | 14.0 | 10 | 150 | 284 | 23.2 | 0.078 |
| SM8S15A | SM8S15CA | 16.7 | 17.6 | 18.5 | 5.0 | 15.0 | 10 | 150 | 270 | 24.4 | 0.080 |
| SM8S16A | SM8S16CA | 17.8 | 18.8 | 19.7 | 5.0 | 16.0 | 10 | 150 | 254 | 26.0 | 0.081 |
| SM8S17A | SM8S17CA | 18.9 | 19.9 | 20.9 | 5.0 | 17.0 | 10 | 150 | 239 | 27.6 | 0.082 |
| SM8S18A | SM8S18CA | 20.0 | 21.1 | 22.1 | 5.0 | 18.0 | 10 | 150 | 226 | 29.2 | 0.083 |
| SM8S20A | SM8S20CA | 22.2 | 23.4 | 24.5 | 5.0 | 20.0 | 10 | 150 | 204 | 32.4 | 0.085 |
| SM8S22A | SM8S22CA | 24.4 | 25.7 | 26.9 | 5.0 | 22.0 | 10 | 150 | 186 | 35.5 | 0.086 |
| SM8S24A | SM8S24CA | 26.7 | 28.1 | 29.5 | 5.0 | 24.0 | 10 | 150 | 170 | 38.9 | 0.087 |
| SM8S26A | SM8S26CA | 28.9 | 30.4 | 31.9 | 5.0 | 26.0 | 10 | 150 | 157 | 42.1 | 0.088 |
| SM8S28A | SM8S28CA | 31.1 | 32.8 | 34.4 | 5.0 | 28.0 | 10 | 150 | 145 | 45.4 | 0.089 |
| SM8S30A | SM8S30CA | 33.3 | 35.1 | 36.8 | 5.0 | 30.0 | 10 | 150 | 136 | 48.4 | 0.090 |
| SM8S33A | SM8S33CA | 36.7 | 38.7 | 40.6 | 5.0 | 33.0 | 10 | 150 | 124 | 53.3 | 0.091 |
| SM8S36A | SM8S36CA | 40.0 | 42.1 | 44.2 | 5.0 | 36.0 | 10 | 150 | 114 | 58.1 | 0.091 |
| SM8S40A | SM8S40CA | 44.4 | 46.8 | 49.1 | 5.0 | 40.0 | 10 | 150 | 102 | 64.5 | 0.092 |
| SM8S43A | SM8S43CA | 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 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

⁽¹⁾ To calculate V_{BR} vs. junction temperature, use the following formula: V_{BR} at T_J = V_{BR} at 25 °C x (1 + α_T x (T_J - 25))



SM8S10(C)A thru SM8S43(C)A

Stand-off Voltage - 10 to 43 Volts

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

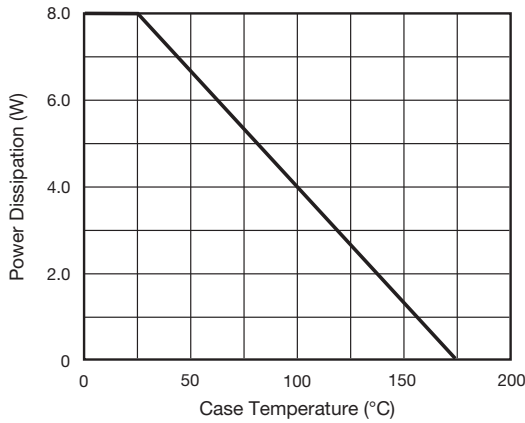


Fig. 1 - Power Derating Curve

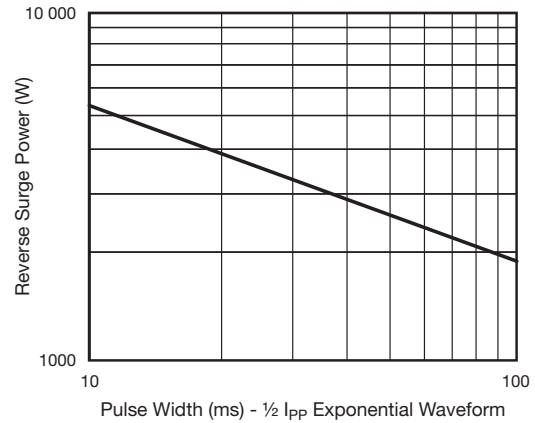


Fig. 4 - Reverse Power Capability

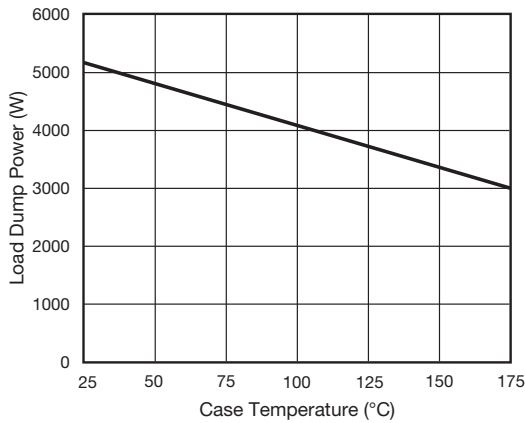


Fig. 2 - Load Dump Power Characteristics (10 ms Exponential Waveform)

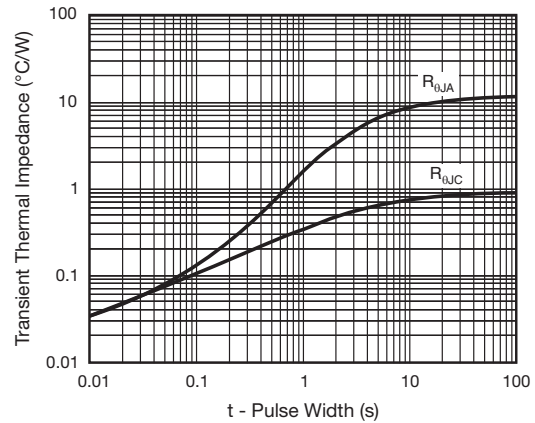


Fig. 5 - Typical Transient Thermal Impedance

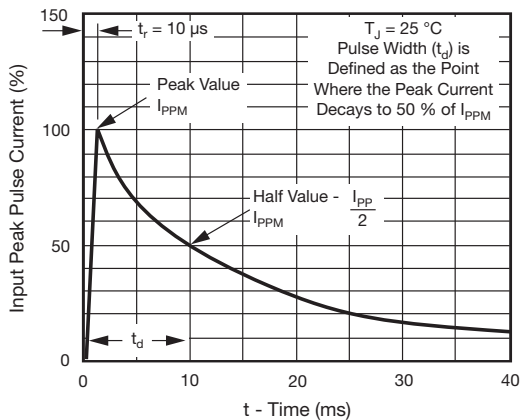


Fig. 3 - Pulse Waveform

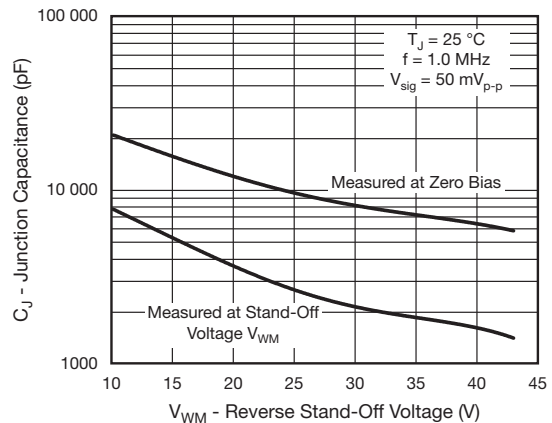
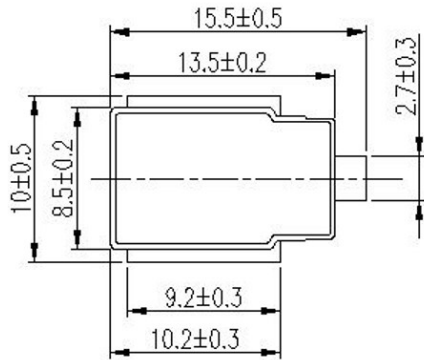


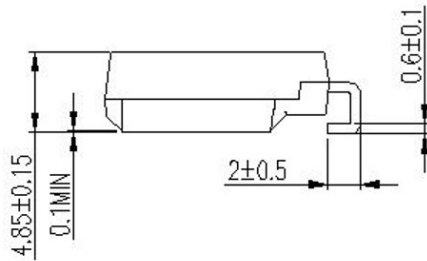
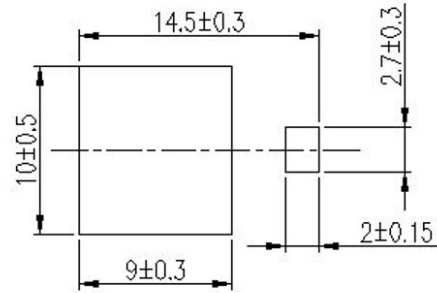
Fig. 6 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS (millimeters)

DO-218AB



Mounting Pad Layout



ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE | BASE QUANTITY | DELIVERY MODE |
|---------------|-----------------|---------|---------------|-------------------------------------|
| SM8S | 2.600 | DO-218 | NA | According to customer's requirement |

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