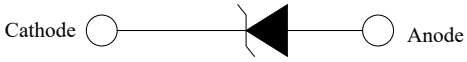
# Automotive Protection Surface Mount Transient Voltage Suppressors

## Features

- Chip produced by chemical method
- Junction passivated by high temperature resistant insulating adhesive
- $T_J$ = 175 °C capability suitable for high reliability and automotive requirement
- Low leakage current
- Low forward voltage drop
- High surge capability
- Meets ISO 16750-2 surge specification (varied by test condition)
- LF maximum peak of 245 °C
- AEC-Q101 qualified

DO-218AB

Bi-directional




Uni-directional

## 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

## Maximum Ratings ($T_A$=25°C unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Peak pulse power dissipation | with 10/1000 µs waveform | $P_{PPM}$ | 4600 | W |
| | with 10/10 000 µs waveform | | 3600 | |
| Power dissipation on infinite heatsink at $T_C$ = 25 °C (fig. 1) | | $P_D$ | 6.0 | 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 | | $I_{FSM}$ | 600 | A |
| Operating junction and storage temperature range | | $T_J$, $T_{STG}$ | -55 to +175 | °C |

**Note**

(1) Non-repetitive current pulse derated above $T_A$ = 25 °C

## Thermal Characteristics ($T_A$=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Typical thermal resistance, junction to case | $R_{\theta JC}$ | 0.95 | °C/W |

## Ordering Information (Example)

| Part Number | Unit Weight (g) | Package | Quantity | Delivery Mode |
|---|---|---|---|---|
| SM6S Series | 2.85 | DO-218AB | 750 pcs | According to customer's requirement |

## Ratings and Characteristics Curves ($T_A$=25°C unless otherwise noted)

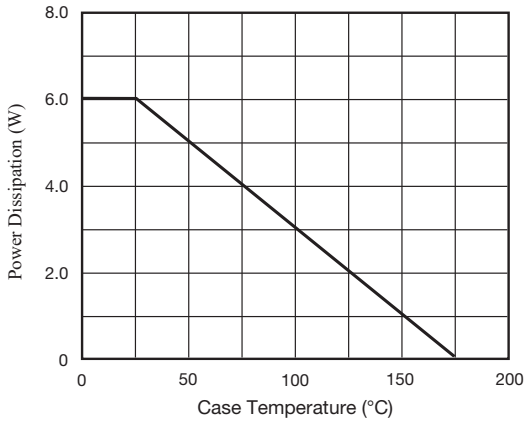



Fig. 1 - Power Derating Curve

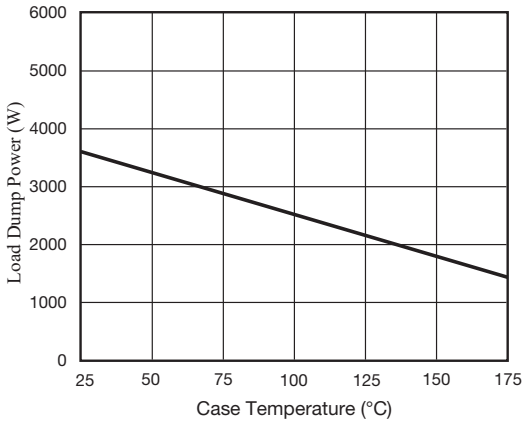



Fig. 2 - Load Dump Power Characteristics (10 ms Exponential Waveform)

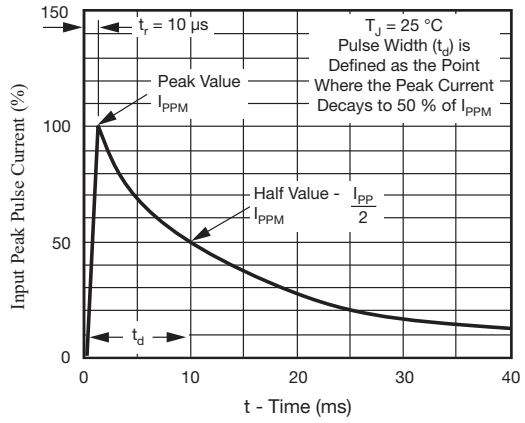



Fig. 3 - Pulse Waveform

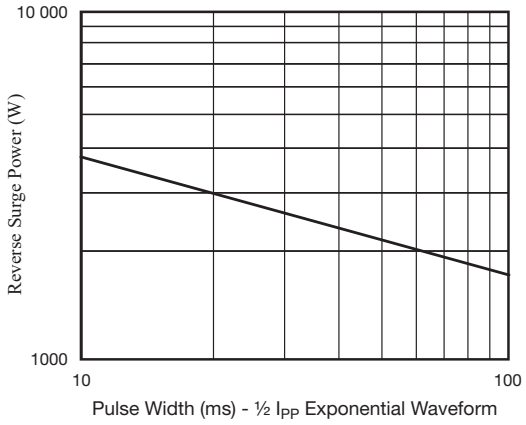



Fig. 4 - Reverse Power Capability

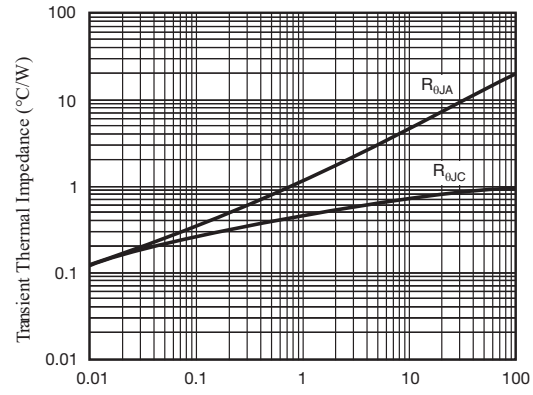



Fig. 5 - Typical Transient Thermal Impedance

## Electrical Characteristics ($T_A$=25°C unless otherwise noted)

| Part Number | | Breakdown Voltage $V_{BR}$ (V) | | | Test Current $I_T$ (mA) | Stand-off Voltage $V_{RWM}$ (V) | Reverse Leakage $I_R$ @$V_{RWM}$ (μA) | Reverse Leakage $I_R$ @$V_{RWM}$ $T_J$=175°C (μA) | Reverse Surge Current $I_{PP}$ (A) | Clamping Voltage $V_C$ @$I_{PP}$ (V) | Coefficient OF $V_{BR}$ (1) αT (%/°C) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Uni | Bi | Min. | Nom. | Max. | | | | | | | |
| SM6S10A | SM6S10CA | 11.1 | 11.7 | 12.3 | 5.0 | 10.0 | 10 | 150 | 271 | 17.0 | 0.069 |
| SM6S11A | SM6S11CA | 12.2 | 12.9 | 13.5 | 5.0 | 11.0 | 10 | 150 | 253 | 18.2 | 0.072 |
| SM6S12A | SM6S12CA | 13.3 | 14.0 | 14.7 | 5.0 | 12.0 | 10 | 150 | 231 | 19.9 | 0.074 |
| SM6S13A | SM6S13CA | 14.4 | 15.2 | 15.9 | 5.0 | 13.0 | 10 | 150 | 214 | 21.5 | 0.076 |
| SM6S14A | SM6S14CA | 15.6 | 16.4 | 17.2 | 5.0 | 14.0 | 10 | 150 | 198 | 23.2 | 0.078 |
| SM6S15A | SM6S15CA | 16.7 | 17.6 | 18.5 | 5.0 | 15.0 | 10 | 150 | 189 | 24.4 | 0.080 |
| SM6S16A | SM6S16CA | 17.8 | 18.8 | 19.7 | 5.0 | 16.0 | 10 | 150 | 177 | 26.0 | 0.081 |
| SM6S17A | SM6S17CA | 18.9 | 19.9 | 20.9 | 5.0 | 17.0 | 10 | 150 | 167 | 27.6 | 0.082 |
| SM6S18A | SM6S18CA | 20.0 | 21.1 | 22.1 | 5.0 | 18.0 | 10 | 150 | 158 | 29.2 | 0.083 |
| SM6S20A | SM6S20CA | 22.2 | 23.4 | 24.5 | 5.0 | 20.0 | 10 | 150 | 142 | 32.4 | 0.085 |
| SM6S22A | SM6S22CA | 24.4 | 25.7 | 26.9 | 5.0 | 22.0 | 10 | 150 | 130 | 35.5 | 0.086 |
| SM6S24A | SM6S24CA | 26.7 | 28.1 | 29.5 | 5.0 | 24.0 | 10 | 150 | 118 | 38.9 | 0.087 |
| SM6S26A | SM6S26CA | 28.9 | 30.4 | 31.9 | 5.0 | 26.0 | 10 | 150 | 109 | 42.1 | 0.088 |
| SM6S28A | SM6S28CA | 31.1 | 32.8 | 34.4 | 5.0 | 28.0 | 10 | 150 | 101 | 45.4 | 0.089 |
| SM6S30A | SM6S30CA | 33.3 | 35.1 | 36.8 | 5.0 | 30.0 | 10 | 150 | 95 | 48.4 | 0.090 |
| SM6S33A | SM6S33CA | 36.7 | 38.7 | 40.6 | 5.0 | 33.0 | 10 | 150 | 86 | 53.3 | 0.091 |
| SM6S36A | SM6S36CA | 40.0 | 42.1 | 44.2 | 5.0 | 36.0 | 10 | 150 | 79 | 58.1 | 0.091 |
| SM6S40A | SM6S40CA | 44.4 | 46.8 | 49.1 | 5.0 | 40.0 | 10 | 150 | 71 | 64.5 | 0.092 |
| SM6S43A | SM6S43CA | 47.8 | 50.3 | 52.8 | 5.0 | 43.0 | 10 | 150 | 66 | 69.4 | 0.093 |

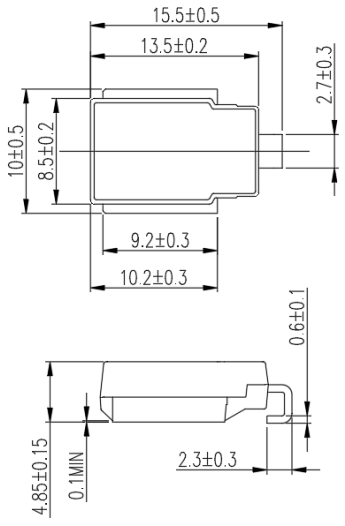
**Notes**

- For all types maximum $V_F$ = 1.9 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 + αT x ($T_J$ - 25))

## Package Outline Dimensions (millimeters)

**DO-218AB**




**Mounting Pad Layout**