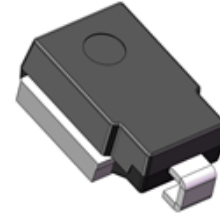


Description

The SM8T Series use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.



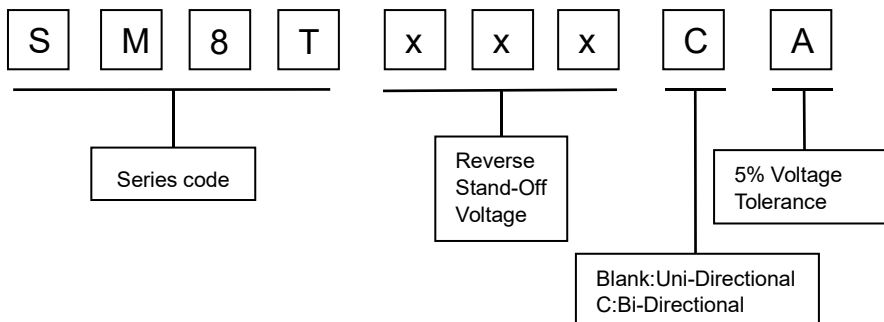
Features

- Chip produced by chemical method
- Junction passivated by high temperature resistant insulating adhesive
- $T_J = 175\text{ °C}$ capability suitable for high reliability and automotive requirement
- SM8SXXA Available in Uni-directional polarity only
- SM8SXXCA Available in Bi-directional polarity only
- Low leakage current
- Low forward voltage drop for uni-directional production
- High surge capability
- Meets ISO16750-2 surge specification (varied by test condition)
- LF maximum peak of 245 °C
- AEC-Q101 qualified

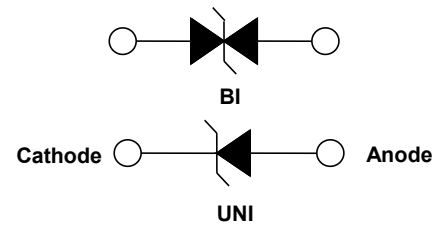
Mechanical Data

- 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

Part Number Code



Electrical symbol



Mechanical Characteristics (TA=25°C unless otherwise specified)

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|-----------------|---------------------------------------|------|
| Peak pulse power dissipation | P_{PPM} | with 10/1000 μs waveform | 8000 |
| | | with 10/10 000 μs waveform | 6000 |
| Power dissipation on infinite heatsink at $T_C = 25\text{ °C}$ (fig. 2) | P_D | 8.5 | W |
| Peak pulse current with 10/1000 μs waveform | $I_{PPM}^{(1)}$ | See next table | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +175 | °C |

Note

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

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

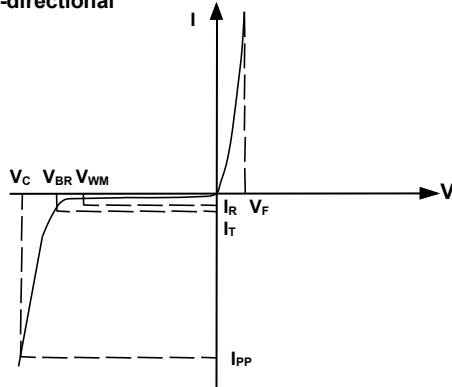
| TYPE NUMBER | BREAKDOWN VOLTAGE VBR (V) | | | TEST CURRENT IT (mA) | STAND-OFF VOLTAGE VWM (V) | MAXIMUM REVERSE LEAKAGE AT VWM ID (µA) | MAXIMUM REVERSE LEAKAGE AT VWM TJ = 175 °C ID (µA) | MAX. PEAK PULSE CURRENT AT 10/1000 µs WAVEFORM (A) | MAXIMUM CLAMPING VOLTAGE AT IPPM VC (V) |
|-------------|---------------------------|------|-------|----------------------|---------------------------|--|--|--|---|
| | MIN. | NOM. | MAX. | | | | | | |
| SM8T10A/CA | 11.1 | 11.7 | 12.3 | 5.0 | 10.0 | 10 | 150 | 471 | 17.0 |
| SM8T11A/CA | 12.2 | 12.9 | 13.5 | 5.0 | 11.0 | 10 | 150 | 440 | 18.2 |
| SM8T12A/CA | 13.3 | 14.0 | 14.7 | 5.0 | 12.0 | 10 | 150 | 402 | 19.9 |
| SM8T13A/CA | 14.4 | 15.2 | 15.9 | 5.0 | 13.0 | 10 | 150 | 372 | 21.5 |
| SM8T14A/CA | 15.6 | 16.4 | 17.2 | 5.0 | 14.0 | 10 | 150 | 345 | 23.2 |
| SM8T15A/CA | 16.7 | 17.6 | 18.5 | 5.0 | 15.0 | 10 | 150 | 328 | 24.4 |
| SM8T16A/CA | 17.8 | 18.8 | 19.7 | 5.0 | 16.0 | 10 | 150 | 308 | 26.0 |
| SM8T17A/CA | 18.9 | 19.9 | 20.9 | 5.0 | 17.0 | 10 | 150 | 290 | 27.6 |
| SM8T18A/CA | 20.0 | 21.1 | 22.1 | 5.0 | 18.0 | 10 | 150 | 274 | 29.2 |
| SM8T20A/CA | 22.2 | 23.4 | 24.5 | 5.0 | 20.0 | 10 | 150 | 247 | 32.4 |
| SM8T22A/CA | 24.4 | 25.7 | 26.9 | 5.0 | 22.0 | 10 | 150 | 225 | 35.5 |
| SM8T24A/CA | 26.7 | 28.1 | 29.5 | 5.0 | 24.0 | 10 | 150 | 205 | 38.9 |
| SM8T26A/CA | 28.9 | 30.4 | 31.9 | 5.0 | 26.0 | 10 | 150 | 190 | 42.1 |
| SM8T28A/CA | 31.1 | 32.8 | 34.4 | 5.0 | 28.0 | 10 | 150 | 176 | 45.4 |
| SM8T30A/CA | 33.3 | 35.1 | 36.8 | 5.0 | 30.0 | 10 | 150 | 165 | 48.4 |
| SM8T33A/CA | 36.7 | 38.7 | 40.6 | 5.0 | 33.0 | 10 | 150 | 150 | 53.3 |
| SM8T36A/CA | 40.0 | 42.1 | 44.2 | 5.0 | 36.0 | 10 | 150 | 138 | 58.1 |
| SM8T40A/CA | 44.4 | 46.8 | 49.1 | 5.0 | 40.0 | 10 | 150 | 124 | 64.5 |
| SM8T43A/CA | 47.8 | 50.3 | 52.8 | 5.0 | 43.0 | 10 | 150 | 115 | 69.4 |
| SM8T45A/CA | 50.0 | 52.7 | 55.3 | 5.0 | 45.0 | 10 | 150 | 110 | 72.7 |
| SM8T48A/CA | 53.3 | 56.1 | 58.9 | 5.0 | 48.0 | 10 | 150 | 103 | 77.4 |
| SM8T51A/CA | 56.7 | 59.7 | 62.7 | 5.0 | 51.0 | 10 | 150 | 97 | 82.4 |
| SM8T54A/CA | 60.0 | 63.1 | 66.3 | 5.0 | 54.0 | 10 | 150 | 92 | 87.1 |
| SM8T58A/CA | 64.4 | 67.8 | 71.2 | 5.0 | 58.0 | 10 | 150 | 85 | 93.6 |
| SM8T60A/CA | 66.7 | 70.2 | 73.7 | 5.0 | 60.0 | 10 | 150 | 83 | 96.8 |
| SM8T64A/CA | 71.1 | 74.9 | 78.6 | 5.0 | 64.0 | 10 | 150 | 78 | 103 |
| SM8T70A/CA | 77.8 | 81.9 | 86.0 | 5.0 | 70.0 | 10 | 150 | 71 | 113 |
| SM8T75A/CA | 83.3 | 87.7 | 92.1 | 5.0 | 75.0 | 10 | 150 | 66 | 121 |
| SM8T78A/CA | 86.7 | 91.3 | 95.8 | 5.0 | 78.0 | 10 | 150 | 63 | 126 |
| SM8T85A/CA | 94.4 | 99.2 | 104.0 | 5.0 | 85.0 | 10 | 150 | 58 | 137 |

Notes

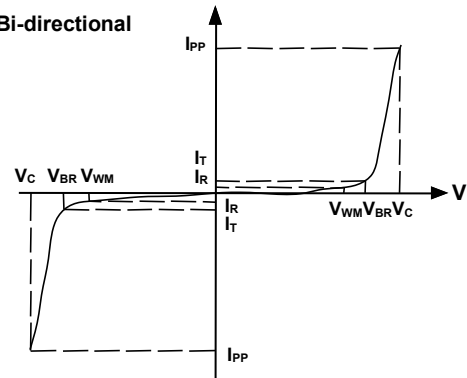
- For all uni-directional types maximum $V_F = 1.8\text{ V}$ at $I_F = 100\text{ A}$ measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

I-V Curve Characteristics

Uni-directional



Bi-directional



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

V_{WM} Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation

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

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

I_R Reverse Leakage Current -- Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

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

Figure 1 - TVS Transients Clamping Waveform

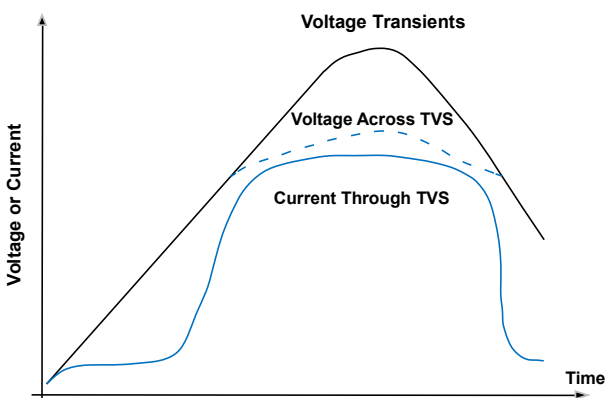
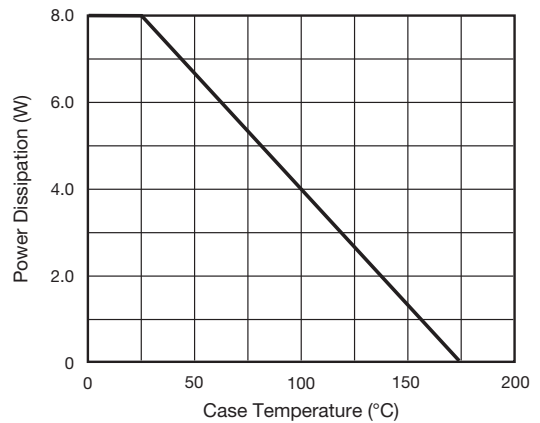


Figure 2 - Pulse Derating Curve



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

Figure 3 - Load Dump Power Characteristics

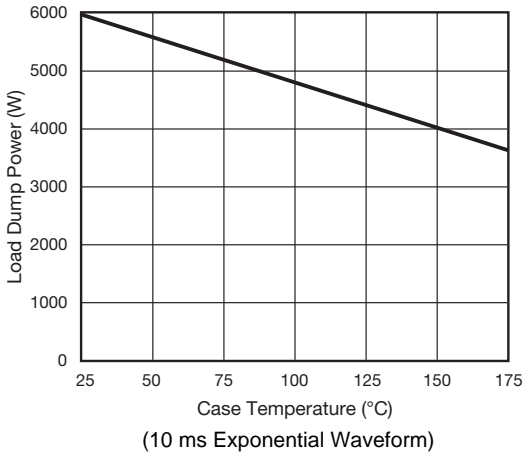


Figure 4 - Pulse Waveform

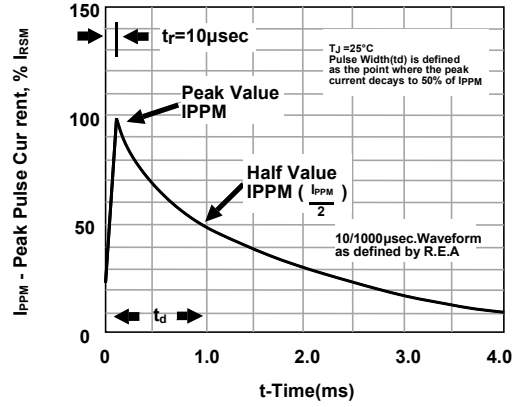
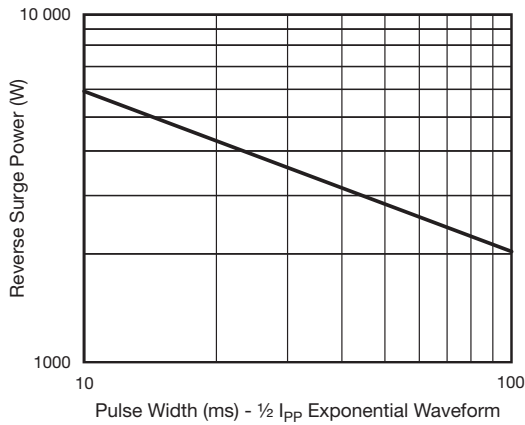
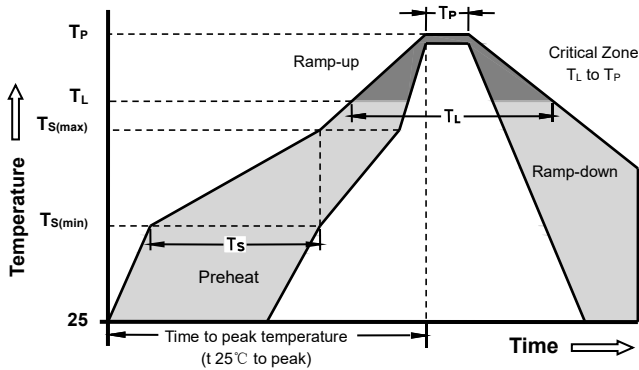


Figure 5 - Reverse Power Capability

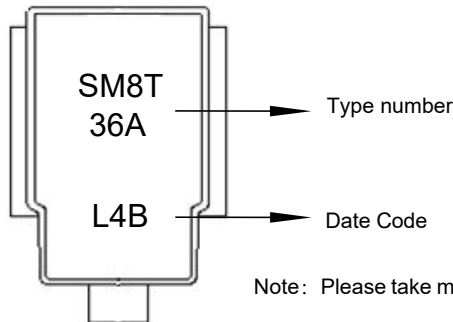


Soldering Parameters - Reflow Soldering (Surface Mount Devices)



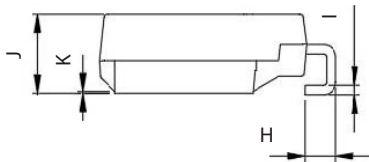
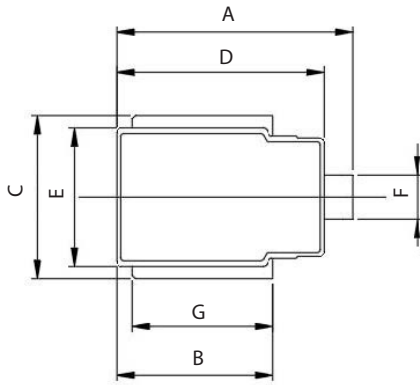
| Reflow Condition | | Pb - Free assembly |
|--|-----------------------------------|--------------------|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | 150°C |
| | -Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 -180 Seconds |
| Average ramp up rate (Liquids Temp T_L) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquids) | 217°C |
| | - Time (min to max) (t_s) | 60 -150 Seconds |
| Peak Temperature (T_P) | | 260 +0/-5°C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 - 40 Seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_P) | | 8 minutes Max |
| Do not exceed | | 260°C |

Part Marking System

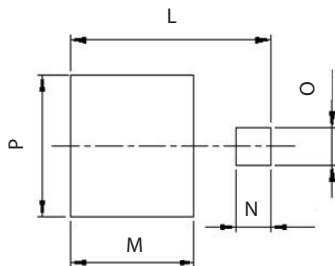


Note: Please take material release date as the production date.

Dimensions(DO-218AB)



Mounting Pad Layout



| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 15.0 | 16.0 | 0.591 | 0.630 |
| B | 9.9 | 10.5 | 0.390 | 0.374 |
| C | 9.5 | 10.5 | 0.374 | 0.413 |
| D | 13.3 | 13.7 | 0.524 | 0.539 |
| E | 8.3 | 8.7 | 0.327 | 0.343 |
| F | 2.4 | 3.0 | 0.094 | 0.118 |
| G | 8.9 | 9.5 | 0.350 | 0.374 |
| H | 2.0 | 2.6 | 0.079 | 0.102 |
| I | 0.5 | 0.7 | 0.020 | 0.028 |
| J | 4.7 | 5.0 | 0.185 | 0.197 |
| K | 0.1 | - | 0.004 | - |
| L | 14.7 | 15.3 | 0.579 | 0.602 |
| M | 9.0 | 9.6 | 0.354 | 0.378 |
| N | 2.3 | 2.9 | 0.091 | 0.114 |
| O | 2.4 | 3.0 | 0.094 | 0.118 |
| P | 9.5 | 10.5 | 0.374 | 0.413 |

Odering Information

| TYPE NUMBER | UNIT WEIGHT (g) | PACKAGE | BASE QUANTITY |
|-------------|-----------------|----------|---------------|
| SM8TXXA/CA | 2.90 | DO-218AB | 750/reel |