# SM6S Series Datasheet

## Description

The SM6S series is designed specifically to use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump pulse protection.

## Features

- Ideally suited for load dump protection
- Flammability Classification 94V-0
- 4600W peak pulse power capability at 10/1000μs waveform,
- repetition rate (duty cycle): 0.01%
- Integrally molded heatsink provides a very low thermal
- resistance for maximum heat dissipation
- Low leakage current at TJ = 150°C & TJ = 175°C
- High temperature soldering guaranteed
  260°C for 10 seconds at terminals
- Meets ISO7637-2 surge spec.
- Low forward voltage drop
- Meets RoHS2.0 (2011/65/EU) but Halogen
- Meets MSL level 1, per J-STD-020
- Meets AEC-Q101 requirement
- Unit Weight: 2.59g/PCS

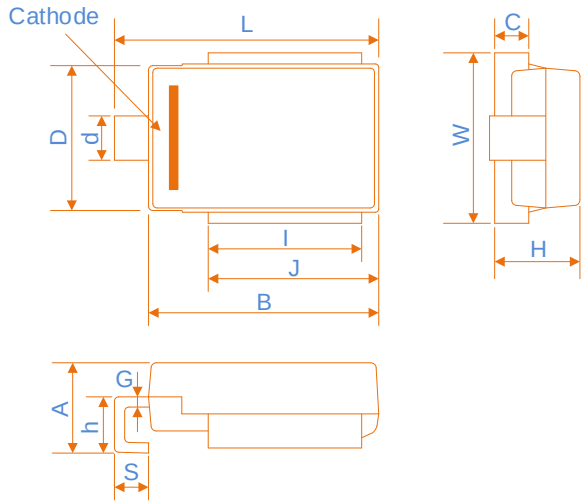
## Maximum Ratings and Characteristics

Ratings at 25℃ ambient temperature unless otherwise specified.

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak pulse power dissipation at 10/1000μs waveform (Note1, Note2, Fig.1) | $P_{PPM}$ | Minimum 4600 | Watts |
| Peak pulse current of at 10/1000μs waveform (Note 1, Fig.3) | $I_{PPM}$ | See Table | Amps |
| Steady state power dissipation at $T_A$=25℃ (Fig.5) | $P_{M(AV)}$ | 8.0 | Watts |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2, Fig.6) | $I_{FSM}$ | 700 | Amps |
| Operating junction and Storage Temperature Ranges. | $T_J$,$T_{STG}$ | -55 to +150 | ℃ |
| Typical thermal resistance junction to Case | $R_{\theta JC}$ | 0.9 | ℃/W |

Notes: 1. Non-repetitive current pulse, per Fig.3 and Derating above $T_A$=25℃ per Fig.2.
2. 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minutes maximum.

## Dimensions (DO-218)



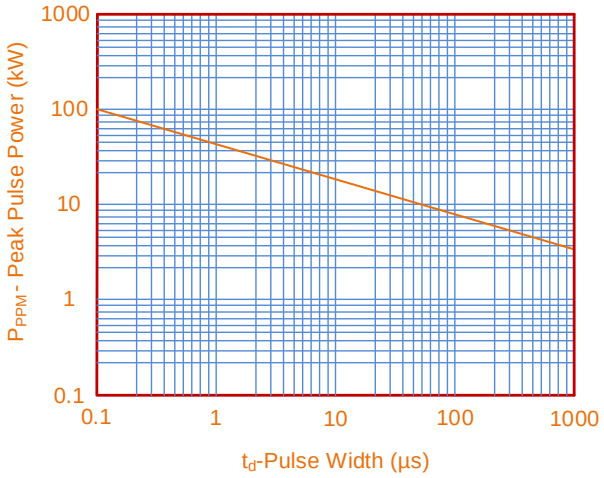

| Dimensions | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 4.8 | 5.8 | 0.189 | 0.228 |
| B | 13.3 | 13.7 | 0.524 | 0.540 |
| C | 1.7 | 2.3 | 0.067 | 0.091 |
| D | 8.3 | 8.7 | 0.327 | 0.343 |
| d | 2.3 | 3.1 | 0.091 | 0.122 |
| G | 0.5 | 0.7 | 0.020 | 0.028 |
| H | 4.9 | 5.2 | 0.193 | 0.205 |
| h | 2.5 | 3.9 | 0.098 | 0.154 |
| I | 8.7 | 9.3 | 0.342 | 0.366 |
| J | 9.7 | 10.3 | 0.382 | 0.406 |
| W | 9.5 | 10.5 | 0.374 | 0.414 |
| S | 1.5 | 2.5 | 0.059 | 0.099 |
| L | 15 | 16 | 0.591 | 0.630 |

## Electrical Characteristics (TA=25℃)

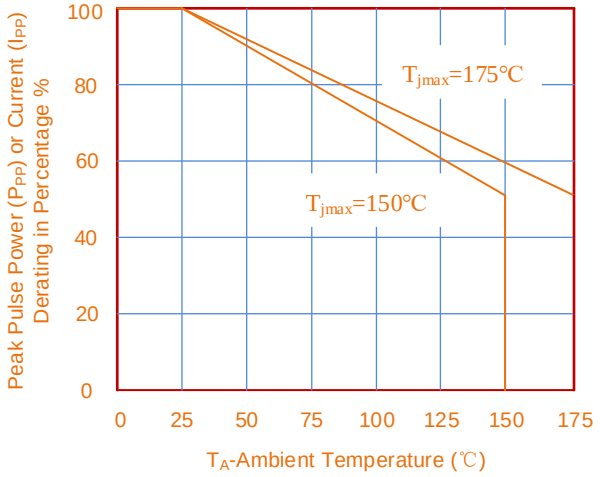
| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage @$I_T$ | | Test Current | Maximum Clamping Voltage @$I_{PP}$ | Peak Pulse Current | Reverse Leakage @$V_R$ |
|---|---|---|---|---|---|---|---|---|
| Unidirectional | Bidirectional | $V_R$(V) | Min(V) | Max(V) | $I_T$(mA) | $V_C$(V) | $I_{PP}$(A) | $I_R$(μA) |
| SM6S 18A | SM6S 18CA | 18.0 | 20.00 | 22.10 | 5 | 29.2 | 158.0 | 2 |
| SM6S 20A | SM6S 20CA | 20.0 | 22.20 | 24.50 | 5 | 32.4 | 142.0 | 2 |
| SM6S 22A | SM6S 22CA | 22.0 | 24.40 | 26.90 | 5 | 35.5 | 130.0 | 2 |
| SM6S 24A | SM6S 24CA | 24.0 | 26.70 | 29.50 | 5 | 38.9 | 118.0 | 2 |
| SM6S 26A | SM6S 26CA | 26.0 | 28.90 | 31.90 | 5 | 42.1 | 190.1 | 2 |
| SM6S 28A | SM6S 28CA | 28.0 | 31.10 | 34.40 | 5 | 45.4 | 109.0 | 2 |
| SM6S 30A | SM6S 30CA | 30.0 | 33.30 | 36.80 | 5 | 48.4 | 101.0 | 2 |
| SM6S 33A | SM6S 33CA | 33.0 | 36.70 | 40.60 | 5 | 53.3 | 95.0 | 2 |
| SM6S 36A | SM6S 36CA | 36.0 | 40.00 | 44.20 | 5 | 58.1 | 86.0 | 2 |
| SM6S 43A | SM6S 43CA | 43.0 | 47.80 | 52.80 | 5 | 69.4 | 79.0 | 2 |

## Ratings and Characteristic Curves (Ta=25℃ unless otherwise noted)

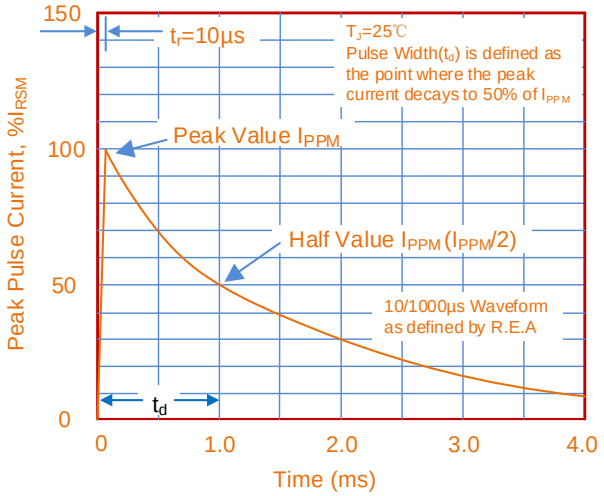
### Figure 1. Peak Pulse Power Rating Curve



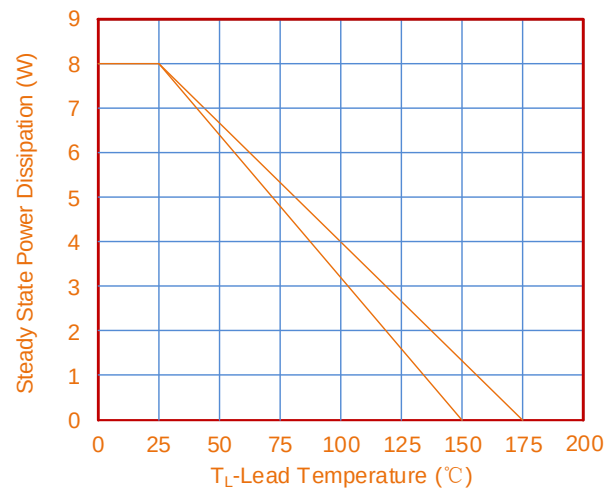

### Figure 2. Pulse Derating Curve



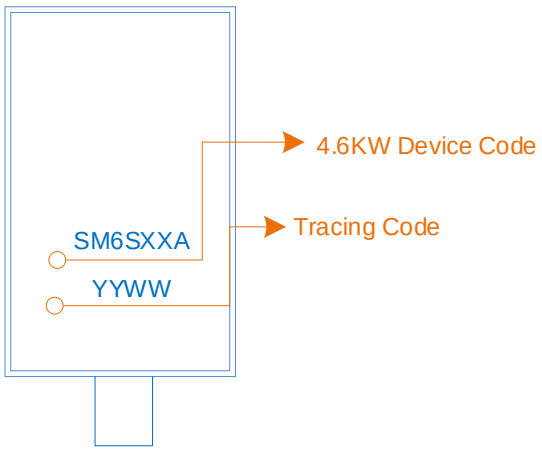

### Figure 3. Pulse Waveform

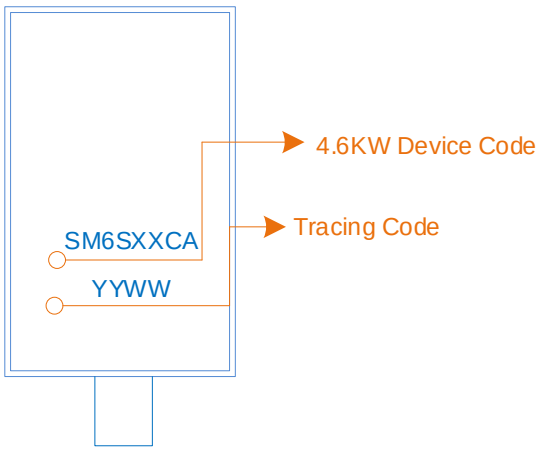



### Figure 4. Steady State Power Dissipation Derating

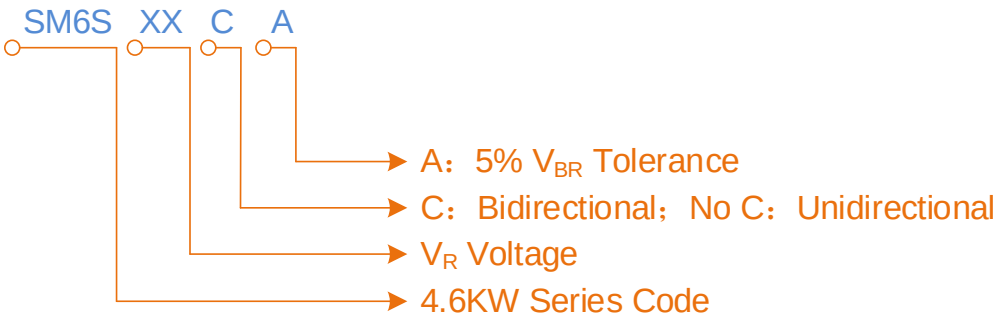



## Marking Code

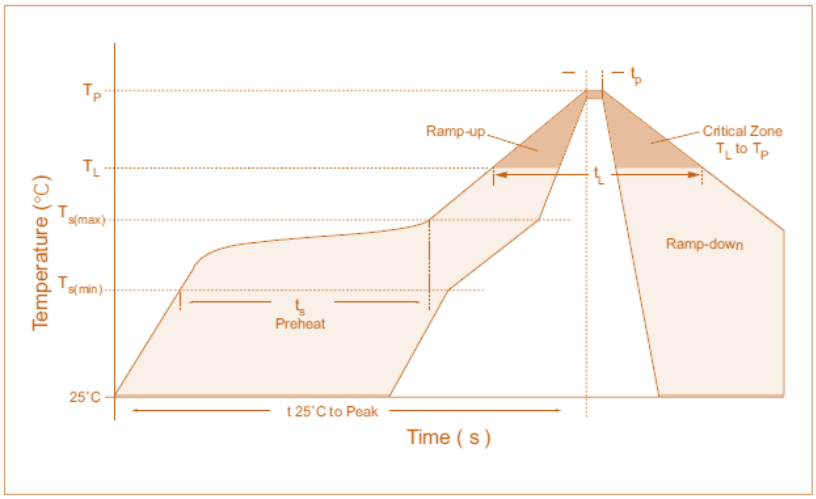


## Part Number Code



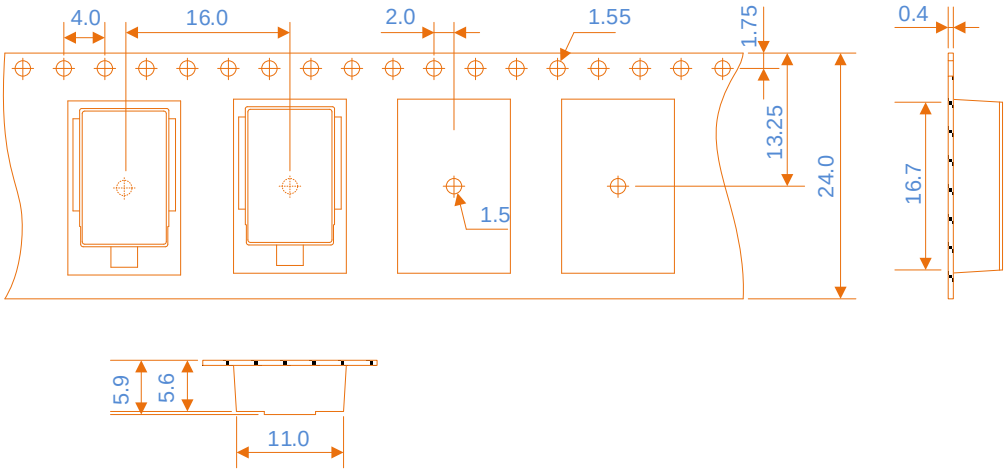

## Soldering Parameters



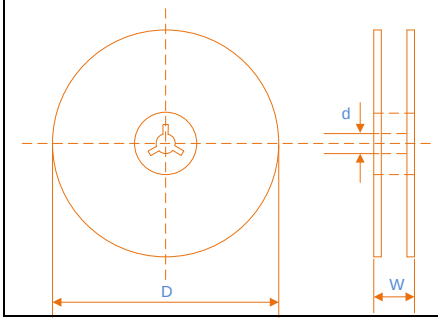

| Reflow Condition | | Lead–free Soldering |
|---|---|---|
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) ($t_s$) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp ($T_A$) to peak | | 3°C/second max |
| $T_{S(max)}$ to $T_A$ - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature ($T_A$) | 217°C |
| | - Time (min to max) ($t_s$) | 60 – 150 seconds |
| Peak Temperature ($T_p$) | | 260°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 Temperature | | 260°C |

## Packaging Specification

Tape




13 Inches Reel




| | |
|---|---|
| D | Φ330.0±2.0 |
| d | Φ13.5±0.5 |
| W | 29.0±2.0 |
| Quantity: 700PCS/Reel | |