

## Features

- Maximum Peak Power Dissipation: 7000 watts
- Meets ISO7637-2 / ISO16750-2 Surge specification (varies by test condition)
- RoHS compliant\*
- AEC-Q101 compliant\*\*

## Applications

- High peak power applications (up to rated limits)
- High temperature applications (up to rated limits)
- Clamping diode
- Load switching and lighting

# SM8SF-Q Transient Voltage Suppressor Diode Series

## General Information

The Model SM8SF-Q Series TVS diodes are designed to provide overvoltage protection for sensitive electronics, meeting ISO7637-2 and ISO16750-2 requirements (varies by test condition).

The Model SM8SF-Q Series offers a choice of Working Peak Reverse Voltages from 24 V to 36 V and Breakdown Voltage up to 40 V. The SM8SF-Q is available in a compact DFN package of 8.1 mm x 10.5 mm, with a low profile of just 1.3 mm, facilitating layout in today's compact PCB designs.

## Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Parameter   | Symbol    | Value       | Unit             |
|---|-----------|-------------|------------------|
| Maximum Peak Pulse Power Dissipation (10/1000 $\mu\text{s}$ )         | $P_{PK}$  | 7000        | W                |
| Power Dissipation with Infinite Heatsink ( $T_C = 25^\circ\text{C}$ ) | $P_D$     | 5           | W                |
| Operating Temperature Range   | $T_J$     | -55 to +175 | $^\circ\text{C}$ |
| Storage Temperature Range   | $T_{STG}$ | -55 to +175 | $^\circ\text{C}$ |

## Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Unidirectional Device |         | Bidirectional Device |         | Breakdown Voltage $V_{BR}$ (Volts) |      |              | Working Peak Reverse Voltage | Maximum Reverse Leakage @ $V_{RWM}$ | Maximum Reverse Voltage @ $I_{RSM}$ | Maximum Reverse Surge Current |
|-----------------------|---------|----------------------|---------|------------------------------------|------|--------------|------------------------------|-------------------------------------|-------------------------------------|-------------------------------|
| Part No.              | Marking | Part No.             | Marking | Min.                               | Max. | @ $I_T$ (mA) | $V_{RWM}$ (V)                | $I_R$ ( $\mu\text{A}$ )             | $V_{RSM}$ (V)                       | $I_{RSM}$ (A)                 |
| SM8SF24A-Q            | 24A     | SM8SF24CA-Q          | 24CA    | 26.7                               | 29.5 | 5            | 24                           | 10                                  | 38.9                                | 180                           |
| SM8SF28A-Q            | 28A     | SM8SF28CA-Q          | 28CA    | 31.1                               | 34.4 | 5            | 28                           | 10                                  | 45.4                                | 154                           |
| SM8SF30A-Q            | 30A     | SM8SF30CA-Q          | 30CA    | 33.3                               | 36.8 | 5            | 30                           | 10                                  | 48.4                                | 145                           |
| SM8SF33A-Q            | 33A     | SM8SF33CA-Q          | 33CA    | 36.7                               | 40.6 | 5            | 33                           | 10                                  | 53.3                                | 131                           |
| SM8SF36A-Q            | 36A     | SM8SF36CA-Q          | 36CA    | 40.0                               | 44.2 | 5            | 36                           | 10                                  | 58.1                                | 120                           |

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\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

\*\*"Q" part number suffix for automotive and other applications requiring appropriate AEC-Q101 compliance.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

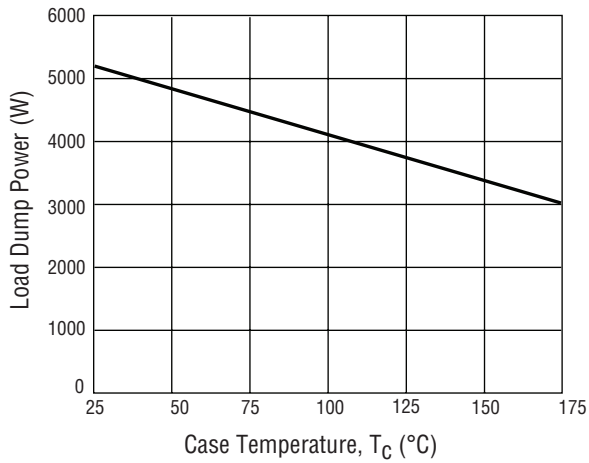
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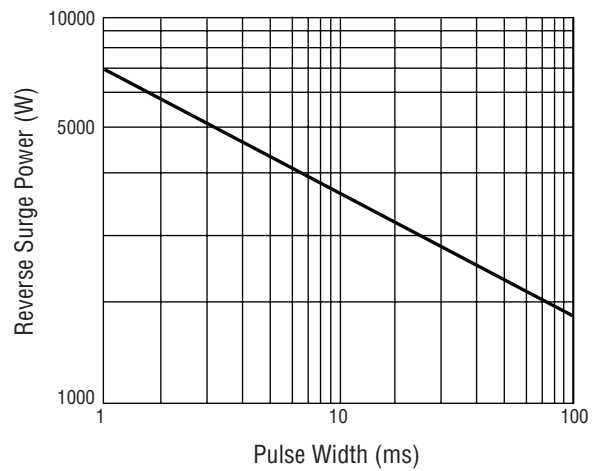


## Performance Graphs

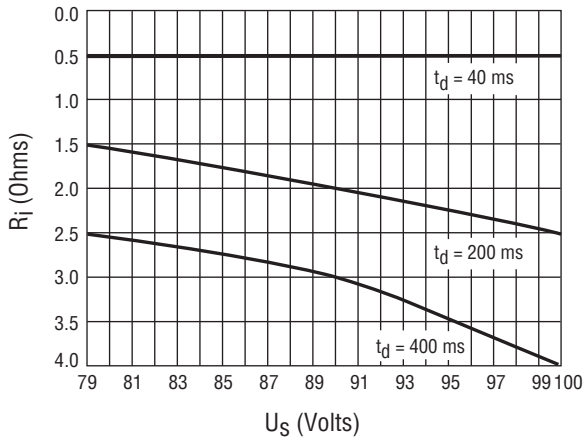
### Load Dump Power Characteristics



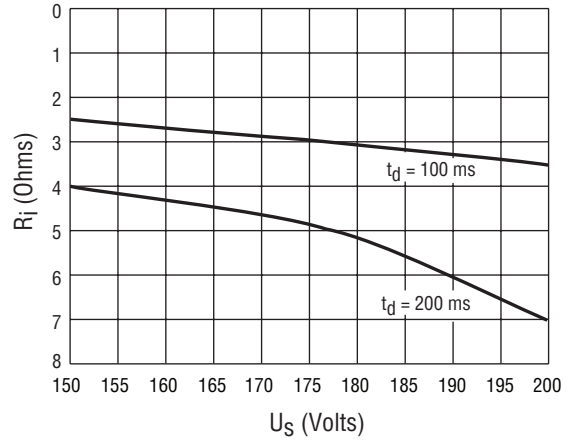
### Peak Pulse Power Derating Curve



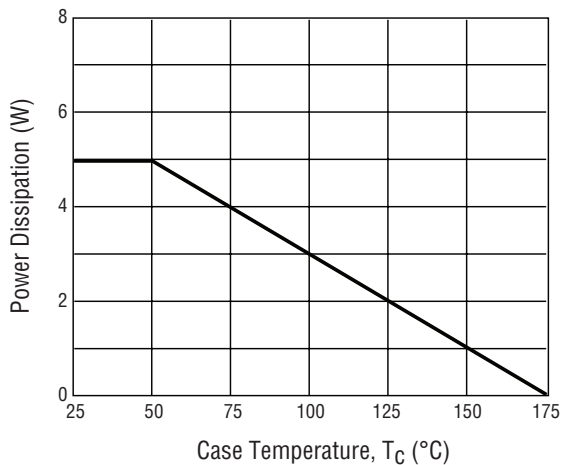
### ISO 7637-2: Pulse 5a, Single Pulse: SM8SF-24A-Q



### ISO 7637-2: Pulse 5a, Single Pulse: SM8SF-33A-Q



### Power Dissipation

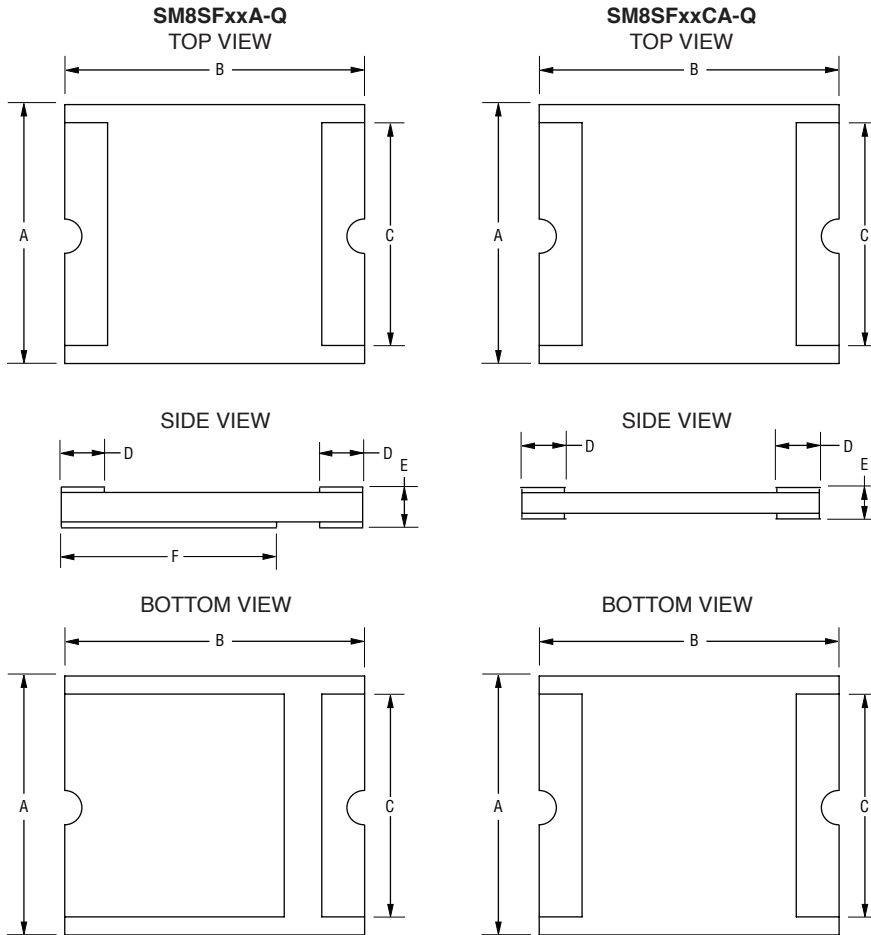


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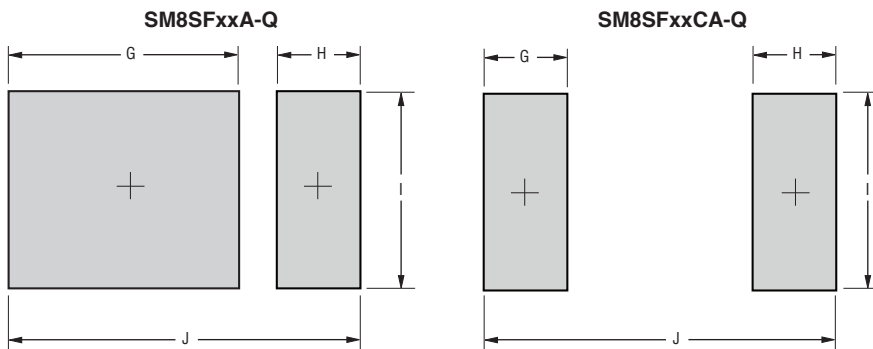
## Product Dimensions



| Dimension | Value                                    |
|-----------|--|
| A         | $8.1 \pm 0.15$<br>( $0.319 \pm 0.006$ )  |
| B         | $10.5 \pm 0.20$<br>( $0.413 \pm 0.008$ ) |
| C         | $7.0 \pm 0.15$<br>( $0.276 \pm 0.006$ )  |
| D         | $1.5 \pm 0.15$<br>( $0.059 \pm 0.006$ )  |
| E         | $1.3 \pm 0.20$<br>( $0.051 \pm 0.008$ )  |
| F         | $7.5 \pm 0.15$<br>( $0.295 \pm 0.006$ )  |

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Recommended Footprint



| Dim.   | SM8SFxxA-Q  | SM8SFxxCA-Q |
|--------|-------------|-------------|
| G      | $9.5$       | $3.5$       |
| (Min.) | ( $0.374$ ) | ( $0.138$ ) |
| H      | $3.5$       | $3.5$       |
| (Min.) | ( $0.138$ ) | ( $0.138$ ) |
| I      | $8.0$       | $8.0$       |
| (Min.) | ( $0.315$ ) | ( $0.315$ ) |
| J      | $14.5$      | $14.5$      |
| (Ref.) | ( $0.571$ ) | ( $0.571$ ) |

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

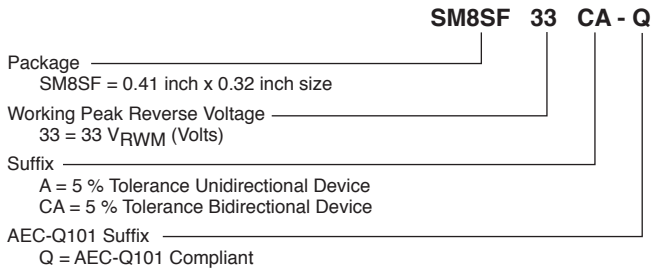
# SM8SF-Q Transient Voltage Suppressor Diode Series



## Physical Specifications

Case ..... Molded plastic per UL Class 94V-0  
 Polarity..... Cathode band indicates unidirectional device  
 No cathode band indicates bidirectional device

## How to Order

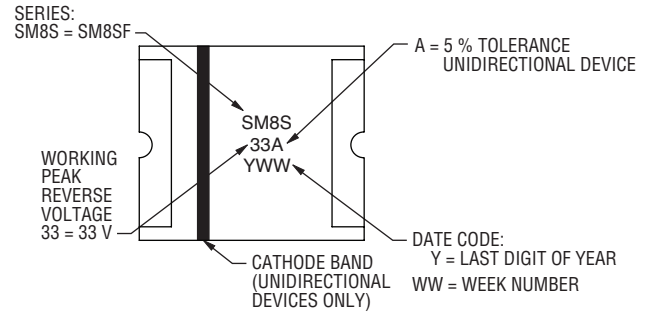


## Environmental Specifications

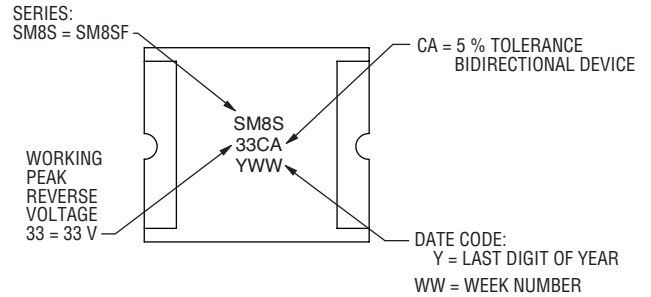
Moisture Sensitivity Level ..... 1  
 ESD Classification (HBM) ..... 3B

## Typical Part Marking

### SM8SFxxA-Q



### SM8SFxxCA-Q

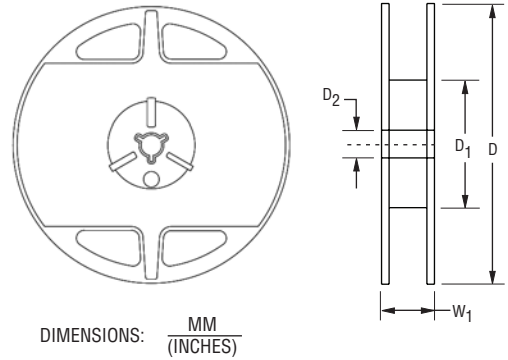
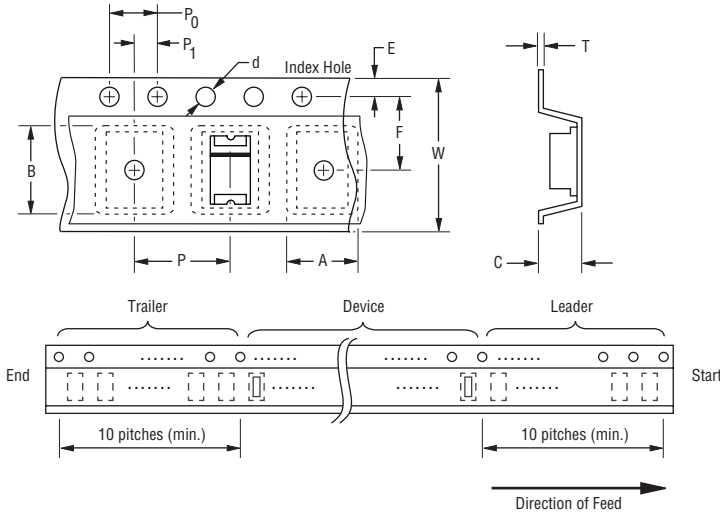


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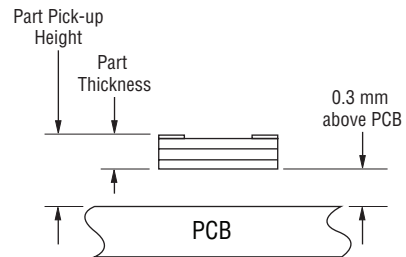
## Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



Devices are packed in accordance with EIA 481 standard specifications shown here.

| Item                   | Symbol         | SM8SF Series                               |
|------------------------|----------------|--|
| Carrier Width          | A              | $\frac{8.35 \pm 0.10}{(0.329 \pm 0.004)}$  |
| Carrier Length         | B              | $\frac{10.75 \pm 0.10}{(0.423 \pm 0.004)}$ |
| Carrier Depth          | C              | $\frac{1.65 \pm 0.10}{(0.065 \pm 0.004)}$  |
| Sprocket Hole          | d              | $\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$  |
| Reel Outside Diameter  | D              | $\frac{178 \pm 1.0}{(7.008 \pm 0.039)}$    |
| Reel Inner Diameter    | D <sub>1</sub> | $\frac{60 \pm 1.0}{(2.362 \pm 0.039)}$     |
| Feed Hole Diameter     | D <sub>2</sub> | $\frac{13.5 \pm 0.50}{(0.531 \pm 0.02)}$   |
| Sprocket Hole Position | E              | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$  |
| Punch Hole Position    | F              | $\frac{5.50 \pm 0.10}{(0.217 \pm 0.004)}$  |
| Punch Hole Pitch       | P              | $\frac{12.00 \pm 0.10}{(0.472 \pm 0.004)}$ |
| Sprocket Hole Pitch    | P <sub>0</sub> | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$  |
| Embossment Center      | P <sub>1</sub> | $\frac{2.00 \pm 0.10}{(0.079 \pm 0.004)}$  |
| Overall Tape Thickness | T              | $\frac{0.40}{(0.016)}$ MAX.                |
| Tape Width             | W              | $\frac{16.00 \pm 0.30}{(0.630 \pm 0.012)}$ |
| Reel Width             | W <sub>1</sub> | $\frac{18.1 \pm 1.2}{(0.713 \pm 0.047)}$   |
| Quantity per Reel      | --             | 750  |



Recommended pick-up height: The bottom of the device should be 0.3 mm above the PCB.

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