



## Features

- Maximum Peak Power Dissipation: 6600 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

# SM8S-Q Transient Voltage Suppressor Diode Series

## General Information

Bourns offers Transient Voltage Suppressor Diodes for surge and ESD protection applications, in compact chip package DO-218 size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 16 V up to 43 V. Typical fast response times are less than 1.0 picosecond from 0 V to Breakdown Voltage.

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

| Parameter                                                             | Symbol    | Value       | Unit             |
|-----------------------------------------------------------------------|-----------|-------------|------------------|
| Maximum Peak Pulse Power Dissipation (10/1000 $\mu\text{s}$ )         | $P_{PK}$  | 6600        | W                |
| Maximum Peak Pulse Power Dissipation (10/10000 $\mu\text{s}$ )        | $P_{PK}$  | 5200        | W                |
| Power Dissipation with Infinite Heatsink ( $T_C = 25^\circ\text{C}$ ) | $P_D$     | 8           | 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.              | Part No.             | Min.                               | Max.  | @ $I_T$ (mA) | $V_{RWM}$ (V)                | $I_R$ ( $\mu\text{A}$ )             | $V_{RSM}$ (V)                       | $I_{RSM}$ (A)                 |
| SM8S16A               | SM8S16CA             | 17.80                              | 19.70 | 5            | 16.0                         | 10                                  | 26.0                                | 254.0                         |
| SM8S17A               | SM8S17CA             | 18.90                              | 20.90 | 5            | 17.0                         | 10                                  | 27.6                                | 239.0                         |
| SM8S18A               | SM8S18CA             | 20.00                              | 22.10 | 5            | 18.0                         | 10                                  | 29.2                                | 226.0                         |
| SM8S20A               | SM8S20CA             | 22.20                              | 24.50 | 5            | 20.0                         | 10                                  | 32.4                                | 204.0                         |
| SM8S22A               | SM8S22CA             | 24.40                              | 26.90 | 5            | 22.0                         | 10                                  | 35.5                                | 186.0                         |
| SM8S24A               | SM8S24CA             | 26.70                              | 29.50 | 5            | 24.0                         | 10                                  | 38.9                                | 170.0                         |
| SM8S26A               | SM8S26CA             | 28.90                              | 31.90 | 5            | 26.0                         | 10                                  | 42.1                                | 157.0                         |
| SM8S28A               | SM8S28CA             | 31.10                              | 34.40 | 5            | 28.0                         | 10                                  | 45.4                                | 145.0                         |
| SM8S30A               | SM8S30CA             | 33.30                              | 36.80 | 5            | 30.0                         | 10                                  | 48.4                                | 136.0                         |
| SM8S33A               | SM8S33CA             | 36.70                              | 40.60 | 5            | 33.0                         | 10                                  | 53.3                                | 124.0                         |
| SM8S36A               | SM8S36CA             | 40.00                              | 44.20 | 5            | 36.0                         | 10                                  | 58.1                                | 114.0                         |
| SM8S40A               | SM8S40CA             | 44.40                              | 49.10 | 5            | 40.0                         | 10                                  | 64.5                                | 102.0                         |
| SM8S43A               | SM8S43CA             | 47.80                              | 52.80 | 5            | 43.0                         | 10                                  | 69.4                                | 95.0                          |

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**Asia-Pacific:** Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

**EMEA:** Tel: +36 88 885 877 • Email: eurocus@bourns.com

**The Americas:** Tel: +1-951 781-5500 • Email: americus@bourns.com

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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.

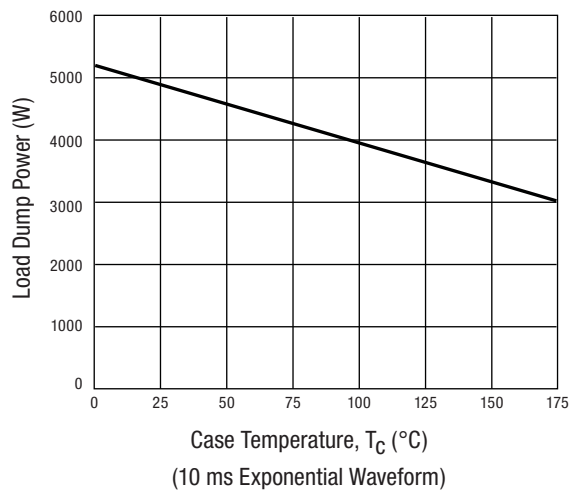
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# SM8S-Q Transient Voltage Suppressor Diode Series

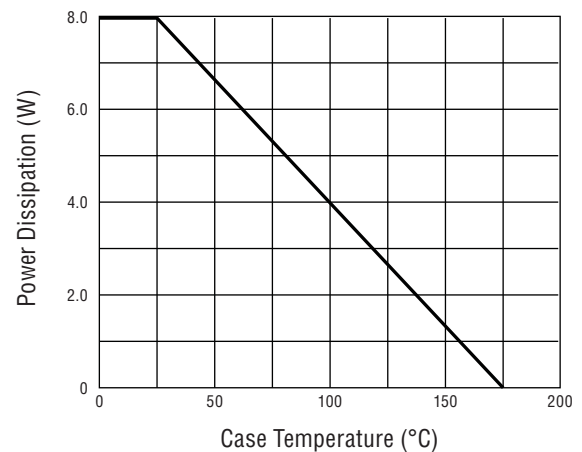
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## Performance Graphs

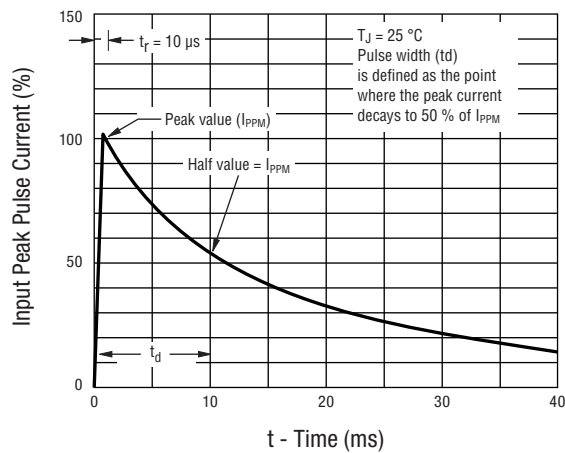
### Load Dump Power Characteristics



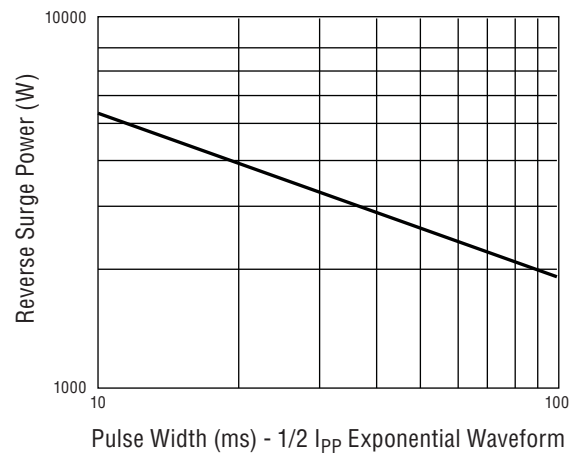
### Steady State Power Dissipation



### Pulse Waveform



### Maximum Non-Repetitive Surge Current



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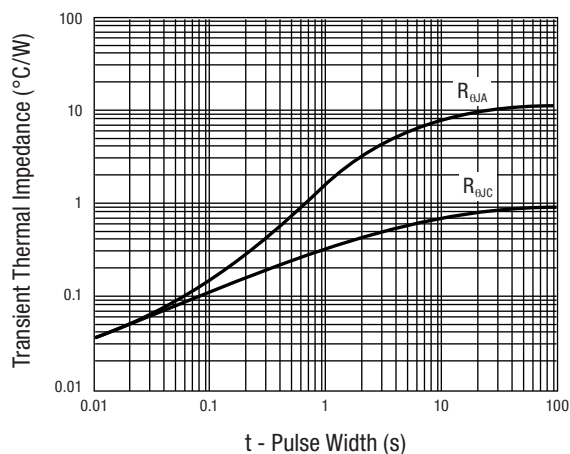
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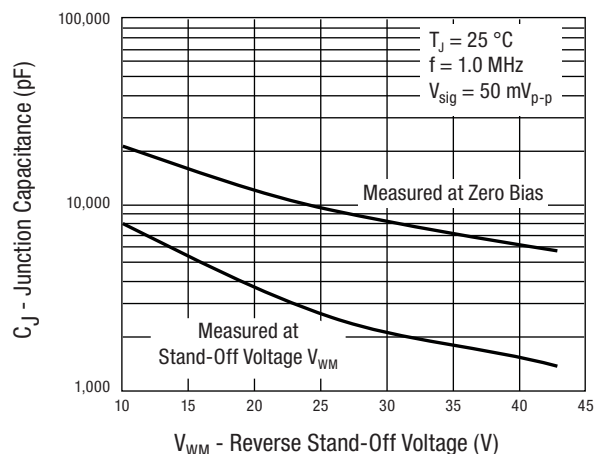
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## Performance Graphs

### Typical Transient Thermal Impedance



### Typical Junction Capacitance



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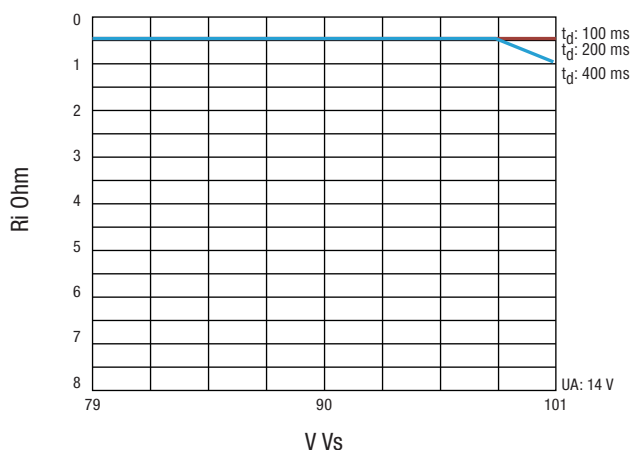
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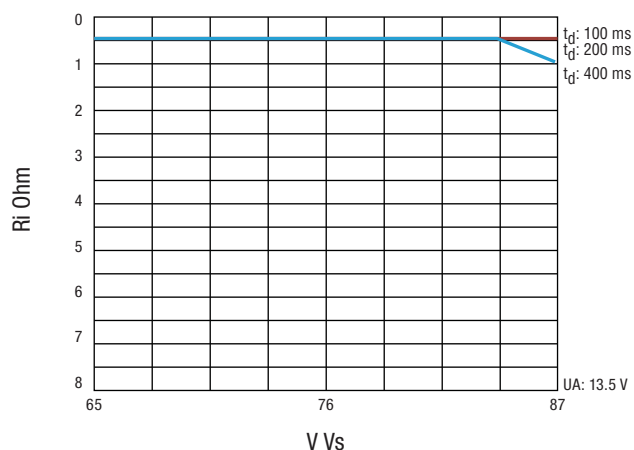
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## Performance Graphs

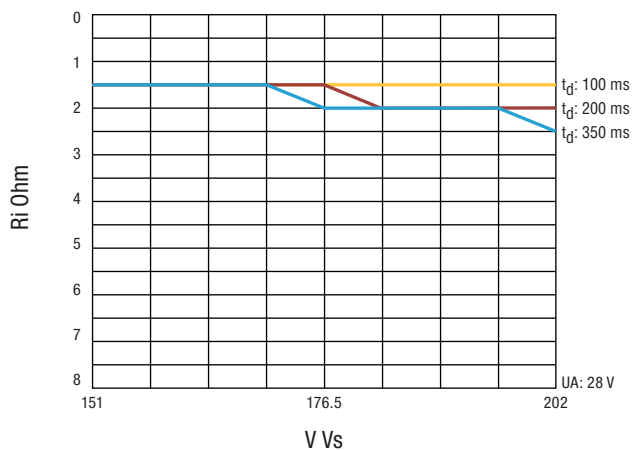
ISO 16750-2 Test A (10 Pulse) - SM8S24A



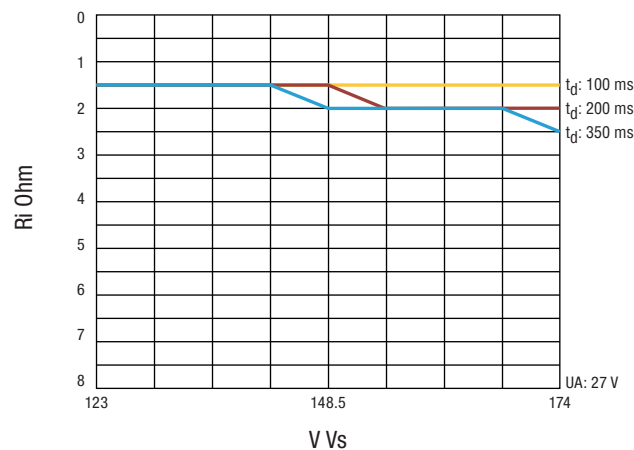
ISO 7637-2 5a (1 Pulse) - SM8S24A



ISO 16750-2 Test A (10 Pulse) - SM8S36A



ISO 7637-2 5a (1 Pulse) - SM8S36A



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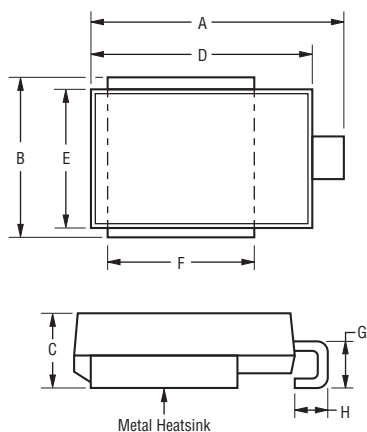
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## SM8S-Q Transient Voltage Suppressor Diode Series

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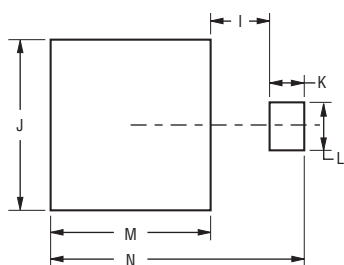
### Product Dimensions



| Dimension | Value                              |
|-----------|------------------------------------|
| A         | $15.5 \pm 0.5$<br>(0.610 ± 0.02)   |
| B         | $10.0 \pm 0.5$<br>(0.394 ± 0.02)   |
| C         | $4.85 \pm 0.15$<br>(0.191 ± 0.006) |
| D         | $13.5 \pm 0.2$<br>(0.531 ± 0.008)  |
| E         | $8.5 \pm 0.2$<br>(0.335 ± 0.008)   |
| F         | $9.0 \pm 0.3$<br>(0.354 ± 0.012)   |
| G         | $3.0 \pm 0.5$<br>(0.118 ± 0.02)    |
| H         | $2.0 \pm 0.5$<br>(0.079 ± 0.02)    |

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

### Recommended Footprint



| Dimension | Value                             |
|-----------|-----------------------------------|
| I         | $3.5 \pm 0.3$<br>(0.138 ± 0.012)  |
| J         | $10.0 \pm 0.5$<br>(0.394 ± 0.02)  |
| K         | $2.0 \pm 0.3$<br>(0.079 ± 0.012)  |
| L         | $2.7 \pm 0.3$<br>(0.106 ± 0.012)  |
| M         | $9.0 \pm 0.3$<br>(0.354 ± 0.012)  |
| N         | $14.5 \pm 0.4$<br>(0.571 ± 0.016) |

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

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## SM8S-Q Transient Voltage Suppressor Diode Series

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### 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

**SM8S 18 CA - Q**

Package .....  
SM8S = DO-218 Package

Working Peak Reverse Voltage .....  
18 = 18 V<sub>RWM</sub> (Volts)

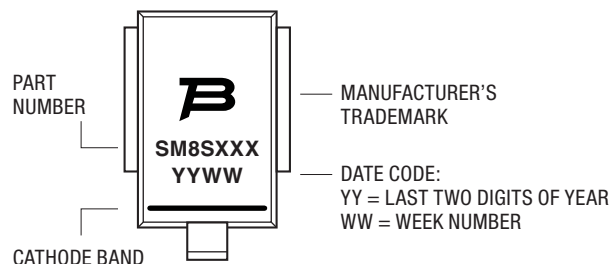
Suffix .....  
A = 5 % Tolerance Unidirectional Device  
CA = 5 % Tolerance Bidirectional Device

AEC-Q101 Suffix .....  
Q = AEC-Q101 Compliant

### Environmental Specifications

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

### Typical Part Marking



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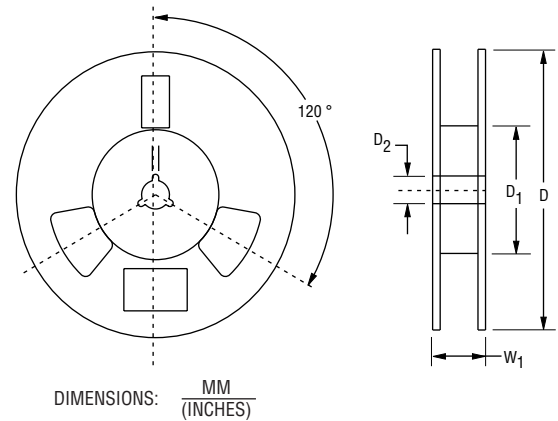
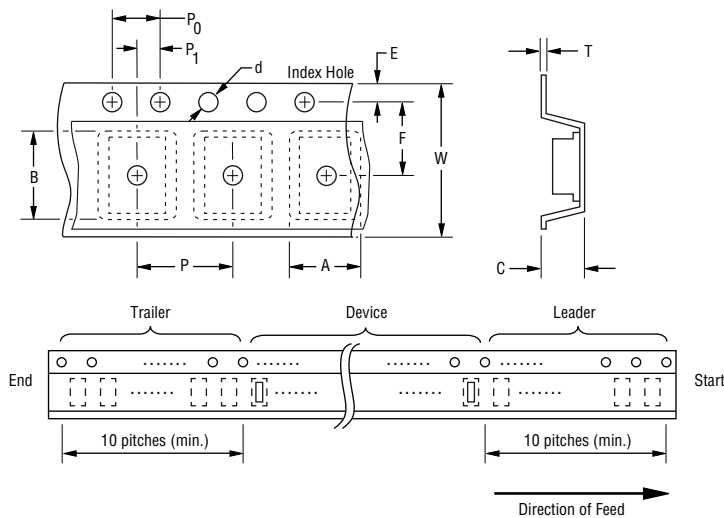
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# SM8S-Q Transient Voltage Suppressor Diode Series

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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         | SM8S-Q Series                                       |
|------------------------|----------------|-----------------------------------------------------|
| Carrier Width          | A              | $10.77 \pm 0.20$<br>(0.424 ± 0.008)                 |
| Carrier Length         | B              | $16.33 \pm 0.20$<br>(0.643 ± 0.008)                 |
| Carrier Depth          | C              | $6.02 \pm 0.20$<br>(0.237 ± 0.008)                  |
| Sprocket Hole          | d              | $1.50 + 0.10 / - 0.00$<br>(0.059 + 0.004 / - 0.00)  |
| Reel Outside Diameter  | D              | $330 \pm 2.0$<br>(12.992 ± 0.079)                   |
| Reel Inner Diameter    | D <sub>1</sub> | $60.0$<br>(2.362) MIN.                              |
| Feed Hole Diameter     | D <sub>2</sub> | $13.0 + 0.50 / - 0.20$<br>(0.512 + 0.020 / - 0.008) |
| Sprocket Hole Position | E              | $1.75 \pm 0.10$<br>(0.069 ± 0.004)                  |
| Punch Hole Position    | F              | $11.5 \pm 0.10$<br>(0.453 ± 0.004)                  |
| Punch Hole Pitch       | P              | $16.0 \pm 0.10$<br>(0.63 ± 0.004)                   |
| Sprocket Hole Pitch    | P <sub>0</sub> | $4.00 \pm 0.10$<br>(0.157 ± 0.004)                  |
| Embossment Center      | P <sub>1</sub> | $2.00 \pm 0.10$<br>(0.079 ± 0.004)                  |
| Overall Tape Thickness | T              | $12$<br>(0.472) MAX.                                |
| Tape Width             | W              | $24.0 \pm 0.30$<br>(0.945 ± 0.012)                  |
| Reel Width             | W <sub>1</sub> | $30.4$<br>(1.197) MAX.                              |
| Quantity per Reel      | --             | 750                                                 |

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