



## Features

- RoHS compliant\* and halogen free\*\*
- Surface mount SMC package
- Standoff voltage: 5 to 170 volts
- Peak Pulse Power: 5000 watts
- AEC-Q101 compliant\*\*\*
- UL Recognized

## Applications

- Protection of power buses
- Protection of I/O interfaces
- Overvoltage transient protection
- Telecom, computer, industrial and consumer electronics applications

# 5.0SMDJ-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-214AB (SMC) size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 5 V up to 170 V and Breakdown Voltage up to 189 V. Typical fast response times are less than 1.0 ps from 0 V to Breakdown Voltage.

Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and the flat configuration minimizes roll away.

## Additional Information

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## Agency Recognition

| Description |                                      |
|-------------|--------------------------------------|
| UL          | File Number: <a href="#">E153537</a> |

## Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

| Parameter                                                                                                          | Symbol             | Value       | Unit  |
|--------------------------------------------------------------------------------------------------------------------|--------------------|-------------|-------|
| Minimum Peak Pulse Power Dissipation (T <sub>p</sub> = 1 ms) (Note 1,2)                                            | P <sub>PK</sub>    | 5000        | Watts |
| Peak Forward Surge Current<br>8.3 ms Single Half Sine Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3,4) | I <sub>FSM</sub>   | 300         | Amps  |
| Steady State Power Dissipation @ T <sub>L</sub> = 50 °C                                                            | P <sub>M(AV)</sub> | 6.5         | Watts |
| Maximum Instantaneous Forward Voltage @ I <sub>PP</sub> = 100 A<br>(For Unidirectional Units Only)                 | V <sub>F</sub>     | 5           | Volts |
| Operating Temperature Range                                                                                        | T <sub>J</sub>     | -55 to +150 | °C    |
| Storage Temperature Range                                                                                          | T <sub>STG</sub>   | -55 to +150 | °C    |

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T<sub>A</sub> = 25 °C per Pulse Derating Curve.
2. Thermal Resistance Junction to Lead.
3. 8.3 ms Single Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).
4. Mounted on 8.0 mm x 8.0 mm copper pad area to each terminal.

**BOURNS®**

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## How to Order

5.0SMDJ 12 CA - Q

Package \_\_\_\_\_  
5.0SMDJ = SMC/DO-214AB

Working Peak Reverse Voltage \_\_\_\_\_  
12 = 12 V<sub>RWM</sub> (Volts)

Suffix \_\_\_\_\_  
A = 5 % Tolerance Unidirectional Device  
CA = 5 % Tolerance Bidirectional Device

AEC-Q101 Compliant Suffix \_\_\_\_\_  
Q = AEC-Q101 Compliant, 3000 pcs. per 13-inch Reel  
QH = AEC-Q101 Compliant, 500 pcs. per 7-inch Reel



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

\* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

\*\* Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

\*\*\* Q suffix for automotive and other applications requiring appropriate AEC-Q101 compliance for electronic limiters.

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# 5.0SMDJ-Q Transient Voltage Suppressor Diode Series

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## Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

| Unidirectional Device |              | Bidirectional Device |              | Breakdown Voltage V <sub>BR</sub> (Volts) |        |                       | Reverse Standoff Voltage | Max. Reverse Leakage @ V <sub>RWM</sub> | Max. Clamping Voltage @ I <sub>pp</sub> (10/1000 μs) | Max. Peak Pulse Current (10/1000 μs) | Max. Clamping Voltage @ I <sub>pp</sub> (8/20 μs) | Max. Peak Pulse Current (8/20 μs) |
|-----------------------|--------------|----------------------|--------------|-------------------------------------------|--------|-----------------------|--------------------------|-----------------------------------------|------------------------------------------------------|--------------------------------------|---------------------------------------------------|-----------------------------------|
| Part Number           | Part Marking | Part Number          | Part Marking | Min.                                      | Max.   | @ I <sub>T</sub> (mA) | V <sub>RWM</sub> (V)     | I <sub>R</sub> (μA)                     | V <sub>C</sub> (V)                                   | I <sub>pp</sub> (A)                  | V <sub>C</sub> (V)                                | I <sub>pp</sub> (A)               |
| 5.0SMDJ5.0A-Q         | 5RDEQ        | 5.0SMDJ5.0CA-Q       | 5DDEQ        | 6.40                                      | 7.00   | 10                    | 5.0                      | 1050                                    | 9.2                                                  | 543.6                                | 12.0                                              | 4077.0                            |
| 5.0SMDJ6.0A-Q         | 5RDGQ        | 5.0SMDJ6.0CA-Q       | 5DDGQ        | 6.67                                      | 7.37   | 10                    | 6.0                      | 1050                                    | 10.3                                                 | 485.5                                | 13.4                                              | 3641.3                            |
| 5.0SMDJ6.5A-Q         | 5RDKQ        | 5.0SMDJ6.5CA-Q       | 5DDKQ        | 7.22                                      | 7.98   | 10                    | 6.5                      | 750                                     | 11.2                                                 | 446.5                                | 14.6                                              | 3348.8                            |
| 5.0SMDJ7.0A-Q         | 5PDMQ        | 5.0SMDJ7.0CA-Q       | 5DDMQ        | 7.78                                      | 8.60   | 10                    | 7.0                      | 300                                     | 12.0                                                 | 416.8                                | 15.6                                              | 3126.0                            |
| 5.0SMDJ7.5A-Q         | 5PDPQ        | 5.0SMDJ7.5CA-Q       | 5DDPQ        | 8.33                                      | 9.21   | 1                     | 7.5                      | 150                                     | 12.9                                                 | 387.7                                | 16.8                                              | 2907.8                            |
| 5.0SMDJ8.0A-Q         | 5PDRQ        | 5.0SMDJ8.0CA-Q       | 5DDRQ        | 8.89                                      | 9.83   | 1                     | 8.0                      | 70                                      | 13.6                                                 | 367.7                                | 17.7                                              | 2757.8                            |
| 5.0SMDJ8.5A-Q         | 5PDTQ        | 5.0SMDJ8.5CA-Q       | 5DDTQ        | 9.44                                      | 10.40  | 1                     | 8.5                      | 30                                      | 14.4                                                 | 347.3                                | 18.7                                              | 2604.8                            |
| 5.0SMDJ9.0A-Q         | 5PDVQ        | 5.0SMDJ9.0CA-Q       | 5DDVQ        | 10.00                                     | 11.10  | 1                     | 9.0                      | 12                                      | 15.4                                                 | 324.8                                | 20.0                                              | 2436.0                            |
| 5.0SMDJ10A-Q          | 5PDXQ        | 5.0SMDJ10CA-Q        | 5DDXQ        | 11.10                                     | 12.30  | 1                     | 10.0                     | 6                                       | 17.0                                                 | 294.2                                | 22.1                                              | 2206.5                            |
| 5.0SMDJ11A-Q          | 5PDZQ        | 5.0SMDJ11CA-Q        | 5DDZQ        | 12.20                                     | 13.50  | 1                     | 11.0                     | 2                                       | 18.2                                                 | 274.8                                | 23.7                                              | 2061.0                            |
| 5.0SMDJ12A-Q          | 5PEPQ        | 5.0SMDJ12CA-Q        | 5BEPQ        | 13.30                                     | 14.70  | 1                     | 12.0                     | 2                                       | 19.9                                                 | 252.0                                | 25.9                                              | 1890.0                            |
| 5.0SMDJ13A-Q          | 5PEQQ        | 5.0SMDJ13CA-Q        | 5BEQQ        | 14.40                                     | 15.90  | 1                     | 13.0                     | 2                                       | 21.5                                                 | 233.0                                | 28.0                                              | 1747.5                            |
| 5.0SMDJ14A-Q          | 5PERQ        | 5.0SMDJ14CA-Q        | 5BERQ        | 15.60                                     | 17.20  | 1                     | 14.0                     | 2                                       | 23.2                                                 | 216.0                                | 30.2                                              | 1620.0                            |
| 5.0SMDJ15A-Q          | 5PESQ        | 5.0SMDJ15CA-Q        | 5BESQ        | 16.70                                     | 18.50  | 1                     | 15.0                     | 2                                       | 24.4                                                 | 205.0                                | 31.7                                              | 1537.5                            |
| 5.0SMDJ16A-Q          | 5PETQ        | 5.0SMDJ16CA-Q        | 5BETQ        | 17.80                                     | 19.70  | 1                     | 16.0                     | 2                                       | 26.0                                                 | 193.0                                | 33.8                                              | 1447.5                            |
| 5.0SMDJ17A-Q          | 5PEUQ        | 5.0SMDJ17CA-Q        | 5BEUQ        | 18.90                                     | 20.90  | 1                     | 17.0                     | 2                                       | 27.6                                                 | 181.0                                | 35.9                                              | 1357.5                            |
| 5.0SMDJ18A-Q          | 5PEVQ        | 5.0SMDJ18CA-Q        | 5BEVQ        | 20.00                                     | 22.10  | 1                     | 18.0                     | 2                                       | 29.2                                                 | 172.0                                | 38.0                                              | 1290.0                            |
| 5.0SMDJ20A-Q          | 5PEWQ        | 5.0SMDJ20CA-Q        | 5BEWQ        | 22.20                                     | 24.50  | 1                     | 20.0                     | 2                                       | 32.4                                                 | 155.0                                | 42.1                                              | 1162.5                            |
| 5.0SMDJ22A-Q          | 5PEXQ        | 5.0SMDJ22CA-Q        | 5BEXQ        | 24.40                                     | 26.90  | 1                     | 22.0                     | 2                                       | 35.5                                                 | 141.0                                | 46.2                                              | 1057.5                            |
| 5.0SMDJ24A-Q          | 5PEZQ        | 5.0SMDJ24CA-Q        | 5BEZQ        | 26.70                                     | 29.50  | 1                     | 24.0                     | 2                                       | 38.9                                                 | 129.0                                | 50.6                                              | 967.5                             |
| 5.0SMDJ26A-Q          | 5PFEQ        | 5.0SMDJ26CA-Q        | 5BFEQ        | 28.90                                     | 31.90  | 1                     | 26.0                     | 2                                       | 42.1                                                 | 119.0                                | 54.7                                              | 892.5                             |
| 5.0SMDJ28A-Q          | 5PFGQ        | 5.0SMDJ28CA-Q        | 5BFGQ        | 31.10                                     | 34.40  | 1                     | 28.0                     | 2                                       | 45.4                                                 | 110.0                                | 59.0                                              | 825.0                             |
| 5.0SMDJ30A-Q          | 5PFKQ        | 5.0SMDJ30CA-Q        | 5BFKQ        | 33.30                                     | 36.80  | 1                     | 30.0                     | 2                                       | 48.4                                                 | 103.0                                | 62.9                                              | 772.5                             |
| 5.0SMDJ33A-Q          | 5PFMQ        | 5.0SMDJ33CA-Q        | 5BFMQ        | 36.70                                     | 40.60  | 1                     | 33.0                     | 2                                       | 53.3                                                 | 93.9                                 | 69.3                                              | 704.3                             |
| 5.0SMDJ36A-Q          | 5PFPQ        | 5.0SMDJ36CA-Q        | 5BFPQ        | 40.00                                     | 44.20  | 1                     | 36.0                     | 2                                       | 58.1                                                 | 86.1                                 | 75.5                                              | 645.8                             |
| 5.0SMDJ40A-Q          | 5PFRQ        | 5.0SMDJ40CA-Q        | 5BFRQ        | 44.40                                     | 49.10  | 1                     | 40.0                     | 2                                       | 64.5                                                 | 77.6                                 | 83.9                                              | 582.0                             |
| 5.0SMDJ43A-Q          | 5PFTQ        | 5.0SMDJ43CA-Q        | 5BFTQ        | 47.80                                     | 52.80  | 1                     | 43.0                     | 2                                       | 69.4                                                 | 72.1                                 | 90.2                                              | 540.8                             |
| 5.0SMDJ45A-Q          | 5PFVQ        | 5.0SMDJ45CA-Q        | 5BFVQ        | 50.00                                     | 55.30  | 1                     | 45.0                     | 2                                       | 72.7                                                 | 68.8                                 | 94.5                                              | 516.0                             |
| 5.0SMDJ48A-Q          | 5PFXQ        | 5.0SMDJ48CA-Q        | 5BFXQ        | 53.30                                     | 58.90  | 1                     | 48.0                     | 2                                       | 77.4                                                 | 64.7                                 | 100.6                                             | 485.3                             |
| 5.0SMDJ51A-Q          | 5PFZQ        | 5.0SMDJ51CA-Q        | 5BFZQ        | 56.70                                     | 62.70  | 1                     | 51.0                     | 2                                       | 82.4                                                 | 60.7                                 | 107.1                                             | 455.3                             |
| 5.0SMDJ54A-Q          | 5RGEQ        | 5.0SMDJ54CA-Q        | 5BGEQ        | 60.00                                     | 66.30  | 1                     | 54.0                     | 2                                       | 87.1                                                 | 57.5                                 | 113.2                                             | 431.3                             |
| 5.0SMDJ58A-Q          | 5PGGQ        | 5.0SMDJ58CA-Q        | 5BGGQ        | 64.40                                     | 71.20  | 1                     | 58.0                     | 2                                       | 93.6                                                 | 53.5                                 | 121.7                                             | 401.3                             |
| 5.0SMDJ60A-Q          | 5PGKQ        | 5.0SMDJ60CA-Q        | 5BGKQ        | 66.70                                     | 73.70  | 1                     | 60.0                     | 2                                       | 96.8                                                 | 51.7                                 | 125.8                                             | 387.8                             |
| 5.0SMDJ64A-Q          | 5PGMQ        | 5.0SMDJ64CA-Q        | 5BGMQ        | 71.10                                     | 78.60  | 1                     | 64.0                     | 2                                       | 103.0                                                | 48.6                                 | 133.9                                             | 364.5                             |
| 5.0SMDJ70A-Q          | 5PGPQ        | 5.0SMDJ70CA-Q        | 5BGPQ        | 77.80                                     | 86.00  | 1                     | 70.0                     | 2                                       | 113.0                                                | 44.3                                 | 146.9                                             | 332.3                             |
| 5.0SMDJ75A-Q          | 5PGRQ        | 5.0SMDJ75CA-Q        | 5BGRQ        | 83.30                                     | 92.10  | 1                     | 75.0                     | 2                                       | 121.0                                                | 41.4                                 | 157.3                                             | 310.5                             |
| 5.0SMDJ78A-Q          | 5PGTQ        | 5.0SMDJ78CA-Q        | 5BGTQ        | 86.70                                     | 95.80  | 1                     | 78.0                     | 2                                       | 126.0                                                | 39.7                                 | 163.8                                             | 297.8                             |
| 5.0SMDJ85A-Q          | 5PGVQ        | 5.0SMDJ85CA-Q        | 5BGVQ        | 94.40                                     | 104.00 | 1                     | 85.0                     | 2                                       | 137.0                                                | 36.5                                 | 178.1                                             | 273.8                             |

Continued on next page

Note:

1. 'Q' suffix denotes AEC-Q101 compliance.

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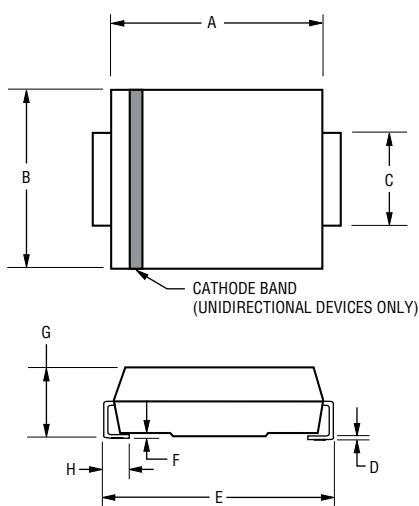
## 5.0SMDJ-Q Transient Voltage Suppressor Diode Series

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

| Unidirectional Device |              | Bidirectional Device |              | Breakdown Voltage $V_{BR}$ (Volts) |        |              | Reverse Standoff Voltage | Maximum Reverse Leakage @ $V_{RWM}$ | Max. Clamping Voltage @ $I_{pp}$ (10/1000 $\mu\text{s}$ ) | Max. Peak Pulse Current (10/1000 $\mu\text{s}$ ) | Max. Clamping Voltage @ $I_{pp}$ (8/20 $\mu\text{s}$ ) | Max. Peak Pulse Current (8/20 $\mu\text{s}$ ) |
|-----------------------|--------------|----------------------|--------------|------------------------------------|--------|--------------|--------------------------|-------------------------------------|-----------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------|-----------------------------------------------|
| Part Number           | Part Marking | Part Number          | Part Marking | Min.                               | Max.   | @ $I_T$ (mA) | $V_{RWM}$ (V)            | $I_R$ ( $\mu\text{A}$ )             | $V_c$ (V)                                                 | $I_{pp}$ (A)                                     | $V_c$ (V)                                              | $I_{pp}$ (A)                                  |
| 5.0SMDJ90A-Q          | 5PGXQ        |                      |              | 100.00                             | 111.00 | 1            | 90.0                     | 2                                   | 146.0                                                     | 34.3                                             | 189.8                                                  | 257.3                                         |
| 5.0SMDJ100A-Q         | 5PGZQ        |                      |              | 111.00                             | 123.00 | 1            | 100.0                    | 2                                   | 162.0                                                     | 30.9                                             | 210.6                                                  | 231.8                                         |
| 5.0SMDJ110A-Q         | 5PHEQ        |                      |              | 122.00                             | 135.00 | 1            | 110.0                    | 2                                   | 177.0                                                     | 28.3                                             | 230.1                                                  | 212.3                                         |
| 5.0SMDJ120A-Q         | 5PHGQ        |                      |              | 133.00                             | 147.00 | 1            | 120.0                    | 2                                   | 193.0                                                     | 26.0                                             | 250.9                                                  | 195.0                                         |
| 5.0SMDJ130A-Q         | 5PHKQ        |                      |              | 144.00                             | 159.00 | 1            | 130.0                    | 2                                   | 209.0                                                     | 24.0                                             | 271.7                                                  | 180.0                                         |
| 5.0SMDJ150A-Q         | 5PHMQ        |                      |              | 167.00                             | 185.00 | 1            | 150.0                    | 2                                   | 243.0                                                     | 20.6                                             | 315.9                                                  | 154.5                                         |
| 5.0SMDJ160A-Q         | 5PHPQ        |                      |              | 178.00                             | 197.00 | 1            | 160.0                    | 2                                   | 259.0                                                     | 19.3                                             | 336.7                                                  | 144.8                                         |
| 5.0SMDJ170A-Q         | 5PHRQ        |                      |              | 189.00                             | 209.00 | 1            | 170.0                    | 2                                   | 275.0                                                     | 18.2                                             | 357.5                                                  | 136.5                                         |

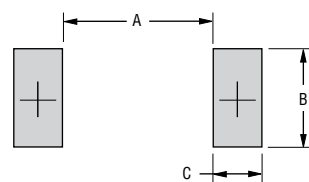
### Product Dimensions



| Dimension | SMC (DO-214AB)                        |
|-----------|---------------------------------------|
| A         | $\frac{6.60 - 7.11}{(0.260 - 0.280)}$ |
| B         | $\frac{5.59 - 6.22}{(0.220 - 0.245)}$ |
| C         | $\frac{2.90 - 3.20}{(0.114 - 0.126)}$ |
| D         | $\frac{0.15 - 0.31}{(0.006 - 0.012)}$ |
| E         | $\frac{7.75 - 8.13}{(0.305 - 0.320)}$ |
| F         | $\frac{0.20}{(0.008)} \text{ MAX.}$   |
| G         | $\frac{2.01 - 2.62}{(0.080 - 0.103)}$ |
| H         | $\frac{0.76 - 1.52}{(0.030 - 0.060)}$ |

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

### Recommended Footprint



| Dimension | SMC (DO-214AB)         |
|-----------|------------------------|
| A (Max.)  | $\frac{4.69}{(0.185)}$ |
| B (Min.)  | $\frac{3.07}{(0.121)}$ |
| C (Min.)  | $\frac{1.53}{(0.060)}$ |

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

### Physical Specifications

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

### Environmental Specifications

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

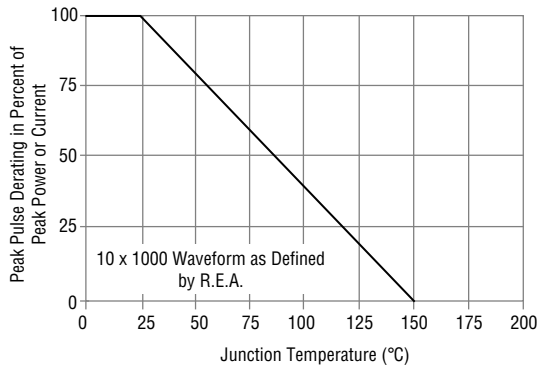
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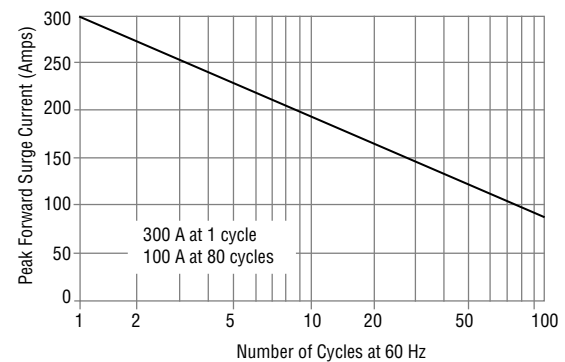
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### Rating & Characteristic Curves

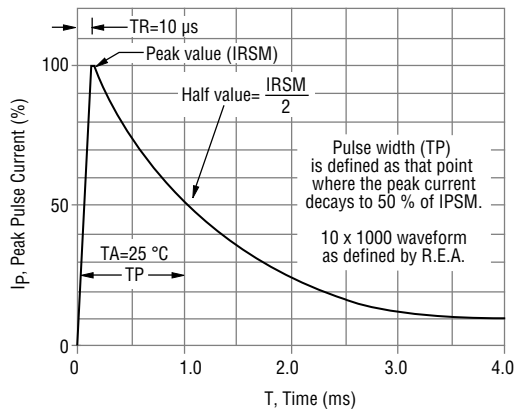
#### Pulse Derating Curve



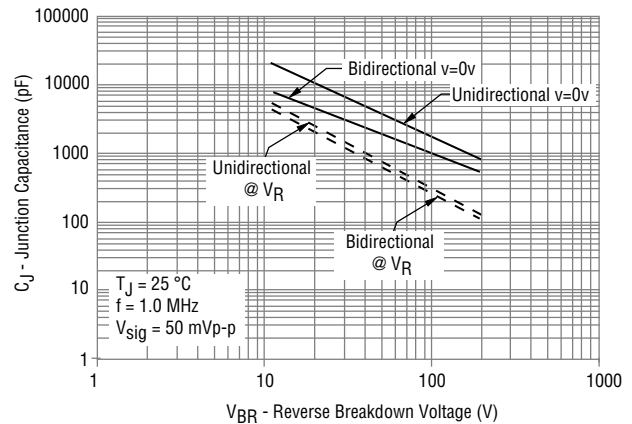
#### Maximum Non-Repetitive Surge Current



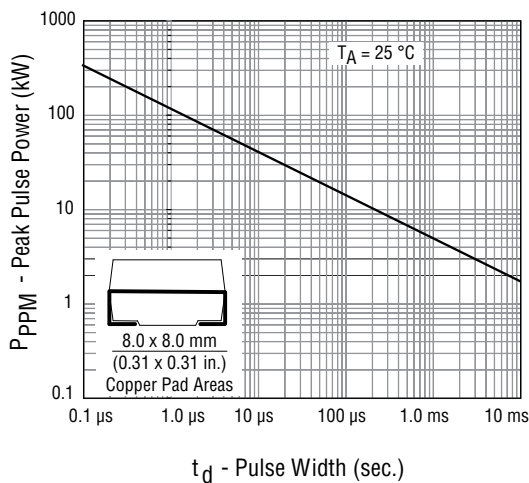
#### Pulse Waveform



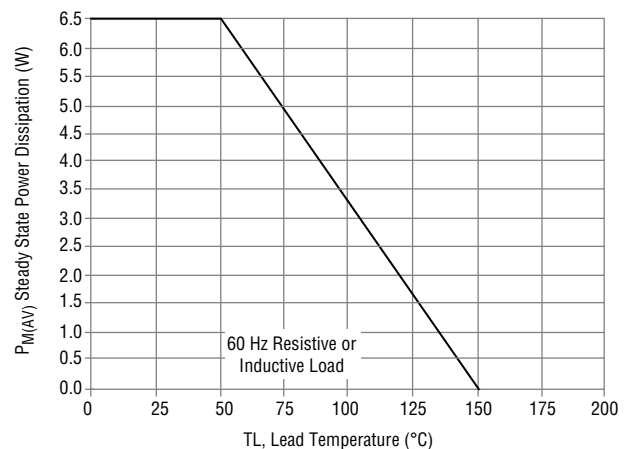
#### Typical Junction Capacitance



#### Pulse Rating Curve



#### Steady State Power Derating Curve



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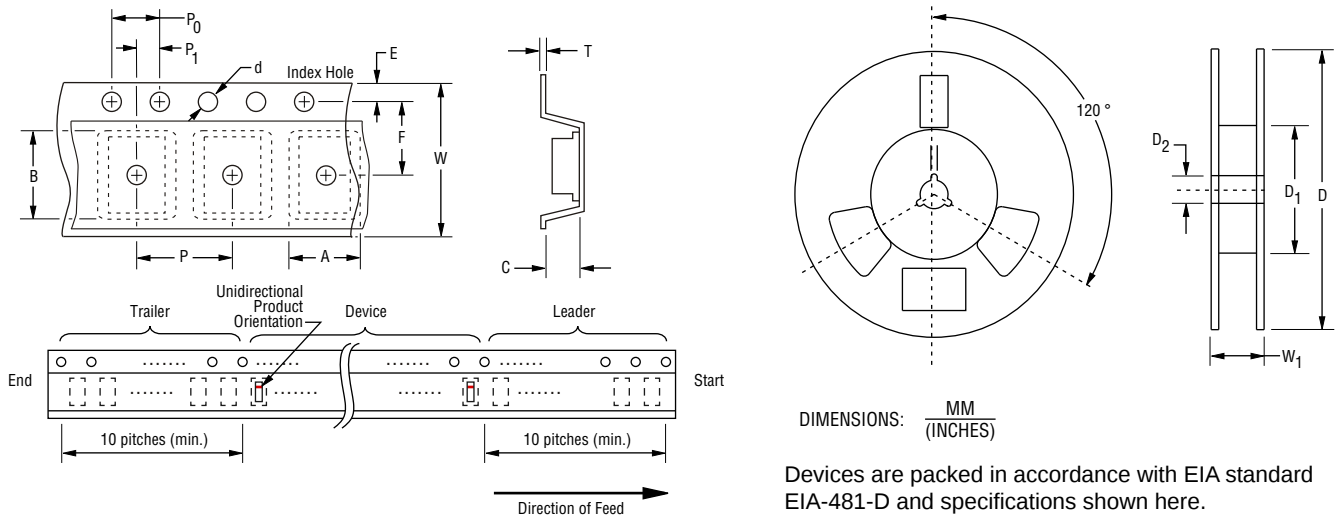
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## 5.0SMDJ-Q Transient Voltage Suppressor Diode Series

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### Packaging Information

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



| Item                   | Symbol         | SMC (DO-214AB)                              |                        |
|------------------------|----------------|---------------------------------------------|------------------------|
|                        |                | 7-Inch Reel                                 | 13-Inch Reel           |
| Carrier Width          | A              | $6.0 \pm 0.20$<br>(0.236 ± 0.079)           |                        |
| Carrier Length         | B              | $8.3 \pm 0.20$<br>(0.327 ± 0.008)           |                        |
| Carrier Depth          | C              | $2.5 \pm 0.20$<br>(0.098 ± 0.008)           |                        |
| Sprocket Hole          | d              | $1.50 \pm 0.10$<br>(0.059 ± 0.004)          |                        |
| Reel Outside Diameter  | D              | $\frac{178}{(7.008)}$                       | $\frac{330}{(12.992)}$ |
| Reel Inner Diameter    | D <sub>1</sub> | $\frac{50.0}{(1.969)}$ 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              | $7.50 \pm 0.10$<br>(0.295 ± 0.004)          |                        |
| Punch Hole Pitch       | P              | $8.00 \pm 0.10$<br>(0.315 ± 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              | $0.30 \pm 0.10$<br>(0.012 ± 0.004)          |                        |
| Tape Width             | W              | $16.00 \pm 0.30$<br>(0.630 ± 0.012)         |                        |
| Reel Width             | W <sub>1</sub> | $\frac{22.4}{(0.882)}$ MAX.                 |                        |
| Quantity per Reel      | --             | 500                                         | 3,000                  |

REV. 03/20

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Users should verify actual device performance in their specific applications.

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