



## 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.

## 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

|                              |                                                                                                                          |    |        |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------|----|--------|
| Package                      | 5.0SMDJ                                                                                                                  | 12 | CA - Q |
| Working Peak Reverse Voltage | 12 = 12 V <sub>RWM</sub> (Volts)                                                                                         |    |        |
| Suffix                       | A = 5 % Tolerance Unidirectional Device<br>CA = 5 % Tolerance Bidirectional Device                                       |    |        |
| AEC-Q101 Compliant Suffix    | Q = AEC-Q101 Compliant, 3000 pcs. per 13-inch Reel<br>QH = AEC-Q101 Compliant, 500 pcs. per 7-inch Reel, 3 Reels per Box |    |        |



**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<br>V <sub>BR</sub> (Volts) |        |                          | Reverse<br>Standoff<br>Voltage | Maximum<br>Reverse<br>Leakage<br>@ V <sub>RWM</sub> | Maximum<br>Clamping<br>Voltage<br>@ I <sub>PP</sub> | Peak<br>Pulse<br>Current |
|-----------------------|-----------------|----------------------|-----------------|----------------------------------------------|--------|--------------------------|--------------------------------|-----------------------------------------------------|-----------------------------------------------------|--------------------------|
| Part<br>Number        | Part<br>Marking | Part<br>Number       | Part<br>Marking | Min.                                         | Max.   | @ I <sub>T</sub><br>(mA) | V <sub>RWM</sub> (V)           | I <sub>R</sub> (μA)                                 | 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                    |
| 5.0SMDJ6.0A-Q         | 5RDGQ           | 5.0SMDJ6.0CA-Q       | 5DDGQ           | 6.67                                         | 7.37   | 10                       | 6.0                            | 1050                                                | 10.3                                                | 485.5                    |
| 5.0SMDJ6.5A-Q         | 5RDKQ           | 5.0SMDJ6.5CA-Q       | 5DDKQ           | 7.22                                         | 7.98   | 10                       | 6.5                            | 750                                                 | 11.2                                                | 446.5                    |
| 5.0SMDJ7.0A-Q         | 5PDMQ           | 5.0SMDJ7.0CA-Q       | 5DDMQ           | 7.78                                         | 8.60   | 10                       | 7.0                            | 300                                                 | 12.0                                                | 416.8                    |
| 5.0SMDJ7.5A-Q         | 5PDPQ           | 5.0SMDJ7.5CA-Q       | 5DDPQ           | 8.33                                         | 9.21   | 1                        | 7.5                            | 150                                                 | 12.9                                                | 387.7                    |
| 5.0SMDJ8.0A-Q         | 5PDRQ           | 5.0SMDJ8.0CA-Q       | 5DDRQ           | 8.89                                         | 9.83   | 1                        | 8.0                            | 70                                                  | 13.6                                                | 367.7                    |
| 5.0SMDJ8.5A-Q         | 5PDTQ           | 5.0SMDJ8.5CA-Q       | 5DDTQ           | 9.44                                         | 10.40  | 1                        | 8.5                            | 30                                                  | 14.4                                                | 347.3                    |
| 5.0SMDJ9.0A-Q         | 5PDVQ           | 5.0SMDJ9.0CA-Q       | 5DDVQ           | 10.00                                        | 11.10  | 1                        | 9.0                            | 12                                                  | 15.4                                                | 324.8                    |
| 5.0SMDJ10A-Q          | 5PDXQ           | 5.0SMDJ10CA-Q        | 5DDXQ           | 11.10                                        | 12.30  | 1                        | 10.0                           | 6                                                   | 17.0                                                | 294.2                    |
| 5.0SMDJ11A-Q          | 5PDZQ           | 5.0SMDJ11CA-Q        | 5DDZQ           | 12.20                                        | 13.50  | 1                        | 11.0                           | 2                                                   | 18.2                                                | 274.8                    |
| 5.0SMDJ12A-Q          | 5PEPQ           | 5.0SMDJ12CA-Q        | 5BEPQ           | 13.30                                        | 14.70  | 1                        | 12.0                           | 2                                                   | 19.9                                                | 252.0                    |
| 5.0SMDJ13A-Q          | 5PEQQ           | 5.0SMDJ13CA-Q        | 5BEQQ           | 14.40                                        | 15.90  | 1                        | 13.0                           | 2                                                   | 21.5                                                | 233.0                    |
| 5.0SMDJ14A-Q          | 5PERQ           | 5.0SMDJ14CA-Q        | 5BERQ           | 15.60                                        | 17.20  | 1                        | 14.0                           | 2                                                   | 23.2                                                | 216.0                    |
| 5.0SMDJ15A-Q          | 5PESQ           | 5.0SMDJ15CA-Q        | 5BESQ           | 16.70                                        | 18.50  | 1                        | 15.0                           | 2                                                   | 24.4                                                | 205.0                    |
| 5.0SMDJ16A-Q          | 5PETQ           | 5.0SMDJ16CA-Q        | 5BETQ           | 17.80                                        | 19.70  | 1                        | 16.0                           | 2                                                   | 26.0                                                | 193.0                    |
| 5.0SMDJ17A-Q          | 5PEUQ           | 5.0SMDJ17CA-Q        | 5BEUQ           | 18.90                                        | 20.90  | 1                        | 17.0                           | 2                                                   | 27.6                                                | 181.0                    |
| 5.0SMDJ18A-Q          | 5PEVQ           | 5.0SMDJ18CA-Q        | 5BEVQ           | 20.00                                        | 22.10  | 1                        | 18.0                           | 2                                                   | 29.2                                                | 172.0                    |
| 5.0SMDJ20A-Q          | 5PEWQ           | 5.0SMDJ20CA-Q        | 5BEWQ           | 22.20                                        | 24.50  | 1                        | 20.0                           | 2                                                   | 32.4                                                | 155.0                    |
| 5.0SMDJ22A-Q          | 5PEXQ           | 5.0SMDJ22CA-Q        | 5BEXQ           | 24.40                                        | 26.90  | 1                        | 22.0                           | 2                                                   | 35.5                                                | 141.0                    |
| 5.0SMDJ24A-Q          | 5PEZQ           | 5.0SMDJ24CA-Q        | 5BEZQ           | 26.70                                        | 29.50  | 1                        | 24.0                           | 2                                                   | 38.9                                                | 129.0                    |
| 5.0SMDJ26A-Q          | 5PFEQ           | 5.0SMDJ26CA-Q        | 5BFEQ           | 28.90                                        | 31.90  | 1                        | 26.0                           | 2                                                   | 42.1                                                | 119.0                    |
| 5.0SMDJ28A-Q          | 5PFGQ           | 5.0SMDJ28CA-Q        | 5BFGQ           | 31.10                                        | 34.40  | 1                        | 28.0                           | 2                                                   | 45.4                                                | 110.0                    |
| 5.0SMDJ30A-Q          | 5PFKQ           | 5.0SMDJ30CA-Q        | 5BFKQ           | 33.30                                        | 36.80  | 1                        | 30.0                           | 2                                                   | 48.4                                                | 103.0                    |
| 5.0SMDJ33A-Q          | 5PFMQ           | 5.0SMDJ33CA-Q        | 5BFMQ           | 36.70                                        | 40.60  | 1                        | 33.0                           | 2                                                   | 53.3                                                | 93.9                     |
| 5.0SMDJ36A-Q          | 5PFPQ           | 5.0SMDJ36CA-Q        | 5BFPQ           | 40.00                                        | 44.20  | 1                        | 36.0                           | 2                                                   | 58.1                                                | 86.1                     |
| 5.0SMDJ40A-Q          | 5PFRQ           | 5.0SMDJ40CA-Q        | 5BFRQ           | 44.40                                        | 49.10  | 1                        | 40.0                           | 2                                                   | 64.5                                                | 77.6                     |
| 5.0SMDJ43A-Q          | 5PFTQ           | 5.0SMDJ43CA-Q        | 5BFTQ           | 47.80                                        | 52.80  | 1                        | 43.0                           | 2                                                   | 69.4                                                | 72.1                     |
| 5.0SMDJ45A-Q          | 5PFVQ           | 5.0SMDJ45CA-Q        | 5BFVQ           | 50.00                                        | 55.30  | 1                        | 45.0                           | 2                                                   | 72.7                                                | 68.8                     |
| 5.0SMDJ48A-Q          | 5PFXQ           | 5.0SMDJ48CA-Q        | 5BFXQ           | 53.30                                        | 58.90  | 1                        | 48.0                           | 2                                                   | 77.4                                                | 64.7                     |
| 5.0SMDJ51A-Q          | 5PFZQ           | 5.0SMDJ51CA-Q        | 5BFZQ           | 56.70                                        | 62.70  | 1                        | 51.0                           | 2                                                   | 82.4                                                | 60.7                     |
| 5.0SMDJ54A-Q          | 5RGEQ           | 5.0SMDJ54CA-Q        | 5BGEQ           | 60.00                                        | 66.30  | 1                        | 54.0                           | 2                                                   | 87.1                                                | 57.5                     |
| 5.0SMDJ58A-Q          | 5PGGQ           | 5.0SMDJ58CA-Q        | 5BGGQ           | 64.40                                        | 71.20  | 1                        | 58.0                           | 2                                                   | 93.6                                                | 53.5                     |
| 5.0SMDJ60A-Q          | 5PGKQ           | 5.0SMDJ60CA-Q        | 5BGKQ           | 66.70                                        | 73.70  | 1                        | 60.0                           | 2                                                   | 96.8                                                | 51.7                     |
| 5.0SMDJ64A-Q          | 5PGMQ           | 5.0SMDJ64CA-Q        | 5BGMQ           | 71.10                                        | 78.60  | 1                        | 64.0                           | 2                                                   | 103.0                                               | 48.6                     |
| 5.0SMDJ70A-Q          | 5PGPQ           | 5.0SMDJ70CA-Q        | 5BGPQ           | 77.80                                        | 86.00  | 1                        | 70.0                           | 2                                                   | 113.0                                               | 44.3                     |
| 5.0SMDJ75A-Q          | 5PGRQ           | 5.0SMDJ75CA-Q        | 5BGRQ           | 83.30                                        | 92.10  | 1                        | 75.0                           | 2                                                   | 121.0                                               | 41.4                     |
| 5.0SMDJ78A-Q          | 5PGTQ           | 5.0SMDJ78CA-Q        | 5BGTQ           | 86.70                                        | 95.80  | 1                        | 78.0                           | 2                                                   | 126.0                                               | 39.7                     |
| 5.0SMDJ85A-Q          | 5PGVQ           | 5.0SMDJ85CA-Q        | 5BGVQ           | 94.40                                        | 104.00 | 1                        | 85.0                           | 2                                                   | 137.0                                               | 36.5                     |

Continued on next page

Note:

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

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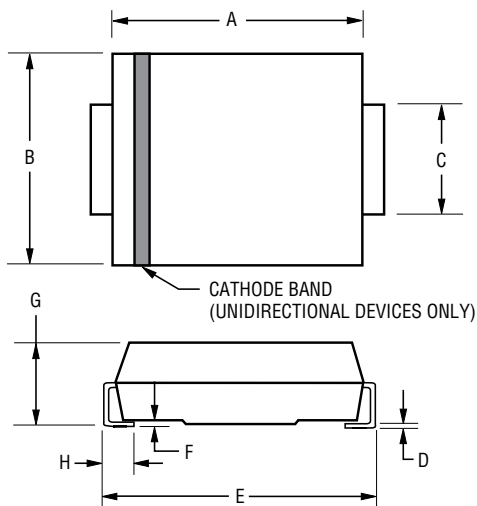
## 5.0SMDJ-Q Transient Voltage Suppressor Diode Series

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

| Unidirectional Device |                 | Bidirectional Device |                 | Breakdown Voltage<br>$V_{BR}$ (Volts) |        |                 | Reverse<br>Standoff<br>Voltage | Maximum<br>Reverse<br>Leakage<br>@ $V_{RWM}$ | Maximum<br>Clamping<br>Voltage<br>@ $I_{PP}$ | Peak<br>Pulse<br>Current |
|-----------------------|-----------------|----------------------|-----------------|---------------------------------------|--------|-----------------|--------------------------------|----------------------------------------------|----------------------------------------------|--------------------------|
| Part<br>Number        | Part<br>Marking | Part<br>Number       | Part<br>Marking | Min.                                  | Max.   | @ $I_T$<br>(mA) | $V_{RWM}$ (V)                  | $I_R$ ( $\mu\text{A}$ )                      | $V_C$ (V)                                    | $I_{PP}$ (A)             |
| 5.0SMDJ90A-Q          | 5PGXQ           |                      |                 | 100.00                                | 111.00 | 1               | 90.0                           | 2                                            | 146.0                                        | 34.3                     |
| 5.0SMDJ100A-Q         | 5PGZQ           |                      |                 | 111.00                                | 123.00 | 1               | 100.0                          | 2                                            | 162.0                                        | 30.9                     |
| 5.0SMDJ110A-Q         | 5PHEQ           |                      |                 | 122.00                                | 135.00 | 1               | 110.0                          | 2                                            | 177.0                                        | 28.3                     |
| 5.0SMDJ120A-Q         | 5PHGQ           |                      |                 | 133.00                                | 147.00 | 1               | 120.0                          | 2                                            | 193.0                                        | 26.0                     |
| 5.0SMDJ130A-Q         | 5PHKQ           |                      |                 | 144.00                                | 159.00 | 1               | 130.0                          | 2                                            | 209.0                                        | 24.0                     |
| 5.0SMDJ150A-Q         | 5PHMQ           |                      |                 | 167.00                                | 185.00 | 1               | 150.0                          | 2                                            | 243.0                                        | 20.6                     |
| 5.0SMDJ160A-Q         | 5PHPQ           |                      |                 | 178.00                                | 197.00 | 1               | 160.0                          | 2                                            | 259.0                                        | 19.3                     |
| 5.0SMDJ170A-Q         | 5PHRQ           |                      |                 | 189.00                                | 209.00 | 1               | 170.0                          | 2                                            | 275.0                                        | 18.2                     |

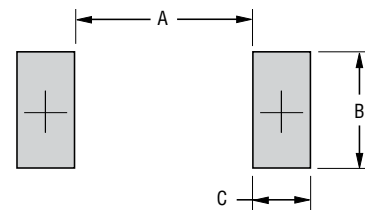
### Product Dimensions



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

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

### Recommended Footprint



| Dimension | SMC (DO-214AB)  |
|-----------|-----------------|
| A (Max.)  | 4.69<br>(0.185) |
| B (Min.)  | 3.07<br>(0.121) |
| C (Min.)  | 1.53<br>(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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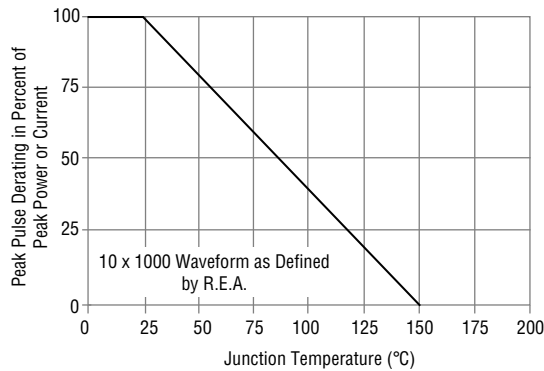
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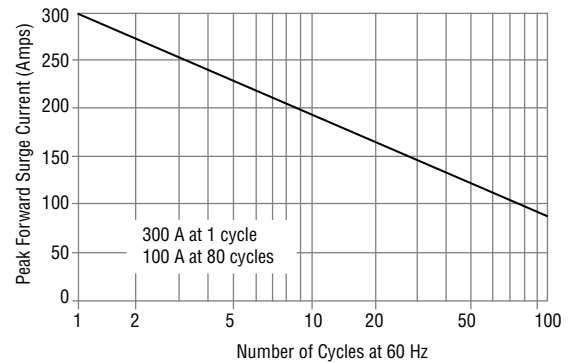
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### Rating & Characteristic Curves

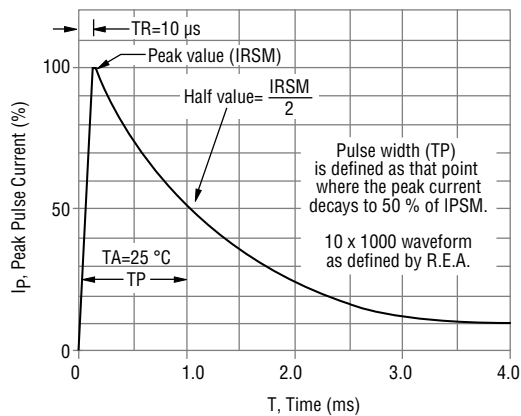
#### Pulse Derating Curve



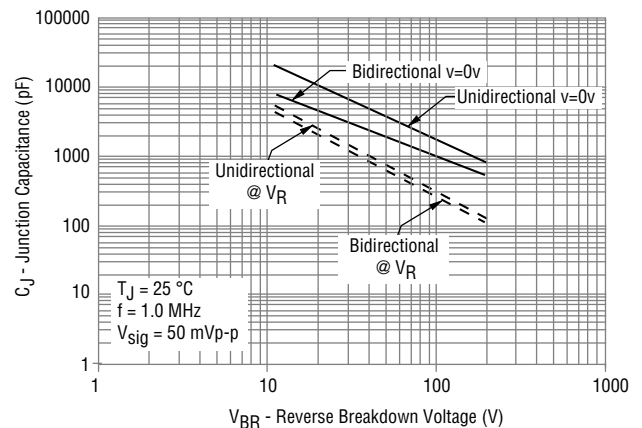
#### Maximum Non-Repetitive Surge Current



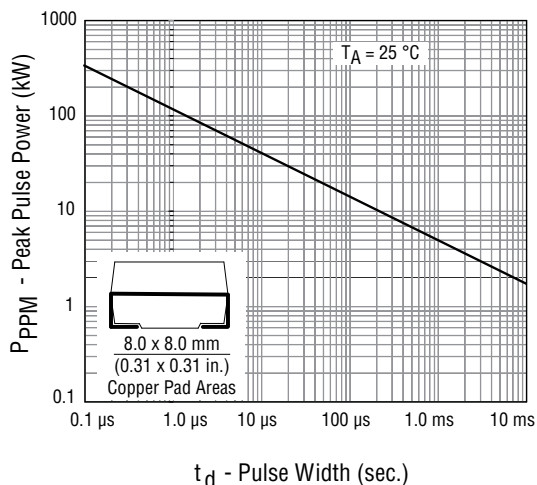
#### Pulse Waveform



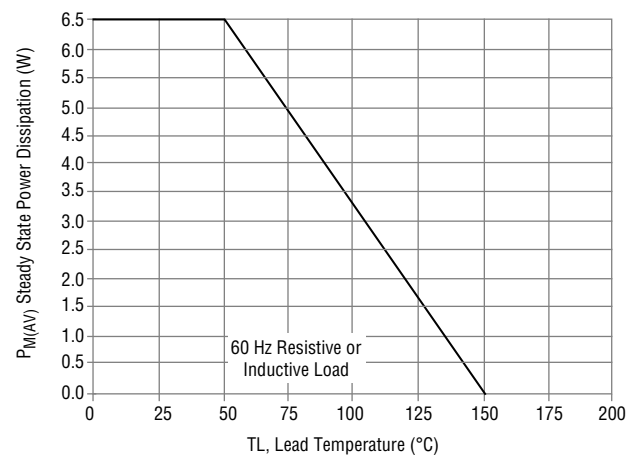
#### Typical Junction Capacitance



#### Pulse Rating Curve



#### Steady State Power Derating Curve



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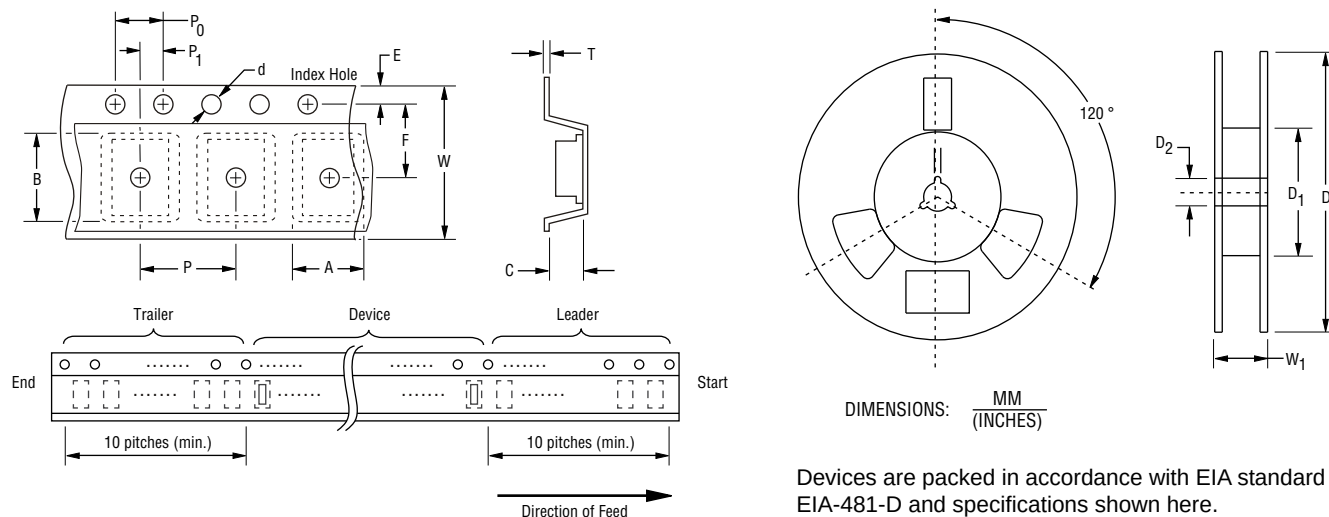
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## 5.0SMDJ-Q Transient Voltage Suppressor Diode Series

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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 $\pm$ 0.079)          |                        |
| Carrier Length         | B              | $8.3 \pm 0.20$<br>(0.327 $\pm$ 0.008)          |                        |
| Carrier Depth          | C              | $2.5 \pm 0.20$<br>(0.098 $\pm$ 0.008)          |                        |
| Sprocket Hole          | d              | $1.50 \pm 0.10$<br>(0.059 $\pm$ 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 $\pm$ 0.004)         |                        |
| Punch Hole Position    | F              | $7.50 \pm 0.10$<br>(0.295 $\pm$ 0.004)         |                        |
| Punch Hole Pitch       | P              | $8.00 \pm 0.10$<br>(0.315 $\pm$ 0.004)         |                        |
| Sprocket Hole Pitch    | P <sub>0</sub> | $4.00 \pm 0.10$<br>(0.157 $\pm$ 0.004)         |                        |
| Embossment Center      | P <sub>1</sub> | $2.00 \pm 0.10$<br>(0.079 $\pm$ 0.004)         |                        |
| Overall Tape Thickness | T              | $0.30 \pm 0.10$<br>(0.012 $\pm$ 0.004)         |                        |
| Tape Width             | W              | $16.00 \pm 0.30$<br>(0.630 $\pm$ 0.012)        |                        |
| Reel Width             | W <sub>1</sub> | $\frac{22.4}{(0.882)}$ MAX.                    |                        |
| Quantity per Reel      | --             | 500                                            | 3,000                  |

REV. 09/19

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