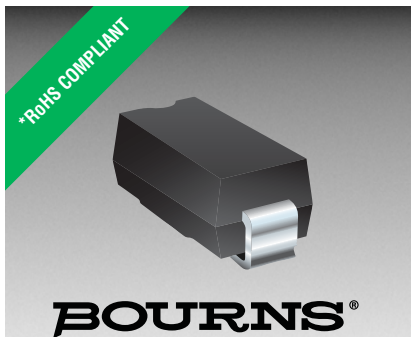




## Features

- RoHS compliant\*
- Surface Mount SMA package
- Standoff Voltage: 5.0 to 495 volts
- Power Dissipation: 400 watts

## Applications

- IEC 61000-4-2 ESD (Min. Level 4)
- IEC 61000-4-4 EFT
- IEC 61000-4-5 Surge

# SMAJ Transient Voltage Suppressor Diode Series

## General Information

The markets of portable communications, computing and video equipment are challenging the semiconductor industry to develop increasingly smaller electronic components.

Bourns offers Transient Voltage Suppressor Diodes for surge and ESD protection applications, in compact chip package DO-214AC (SMA) size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 5 V up to 495 V and Breakdown Voltage up to 550 V. Typical fast response times are less than 1.0 picoseconds for unidirectional devices and less than 5.0 picoseconds for bidirectional devices from 0 V to Minimum 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.

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

| Parameter                                                                                                        | Symbol      | Value       | Unit             |
|------------------------------------------------------------------------------------------------------------------|-------------|-------------|------------------|
| Minimum Peak Pulse Power Dissipation ( $T_P = 1\text{ ms}$ ) (Note 1,2)                                          | $P_{PK}$    | 400         | Watts            |
| Peak Forward Surge Current<br>8.3 ms Single Half Sine Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3) | $I_{FSM}$   | 40          | Amps             |
| Steady State Power Dissipation @ $T_L = 75^\circ\text{C}$                                                        | $P_{M(AV)}$ | 1.0         | Watts            |
| Maximum Instantaneous Forward Voltage @ $I_{PP} = 35\text{ A}$<br>(For Unidirectional Units Only)                | $V_F$       | 3.5<br>5.0  | Volts            |
| Operating Temperature Range                                                                                      | $T_J$       | -55 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range                                                                                        | $T_{STG}$   | -55 to +150 | $^\circ\text{C}$ |

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above  $T_A = 25^\circ\text{C}$  per Pulse Derating Curve.
2. Thermal Resistance Junction to Lead.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).

**BOURNS®**

### Asia-Pacific:

Tel: +886-2 2562-4117  
Fax: +886-2 2562-4116

### EMEA:

Tel: +36 88 520 390  
Fax: +36 88 520 211

### The Americas:

Tel: +1-951 781-5500  
Fax: +1-951 781-5700

[www.bourns.com](http://www.bourns.com)

## How to Order

Package SMAJ 5.0 CA  
 SMAJ = SMA/DO-214AC  
 Working Peak Reverse Voltage 5.0 = 5.0 VRWM (Volts)  
 Suffix CA  
 A = 5 % Tolerance Unidirectional Device  
 CA = 5 % Tolerance Bidirectional Device

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

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

# SMAJ 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) |      |                       | Working Peak Reverse Voltage | Maximum Reverse Leakage @ V <sub>RWM</sub> | Maximum Reverse Voltage @ I <sub>RSM</sub> | Maximum Reverse Surge Current |
|-----------------------|---------|----------------------|---------|----------------------------------------------|------|-----------------------|------------------------------|--------------------------------------------|--------------------------------------------|-------------------------------|
| Part No.              | Marking | Part No.             | Marking | Min.                                         | Max. | @ I <sub>T</sub> (mA) | V <sub>RWM</sub> (V)         | I <sub>R</sub> (μA)                        | V <sub>RSM</sub> (V)                       | I <sub>RSM</sub> (A)          |
| SMAJ5.0A              | HE      | SMAJ5.0CA            | TE      | 6.40                                         | 7.00 | 10                    | 5.0                          | 800                                        | 9.2                                        | 43.5                          |
| SMAJ6.0A              | HG      | SMAJ6.0CA            | TG      | 6.67                                         | 7.37 | 10                    | 6.0                          | 800                                        | 10.3                                       | 38.8                          |
| SMAJ6.5A              | HK      | SMAJ6.5CA            | TK      | 7.22                                         | 7.98 | 10                    | 6.5                          | 500                                        | 11.2                                       | 35.7                          |
| SMAJ7.0A              | HM      | SMAJ7.0CA            | TM      | 7.78                                         | 8.60 | 10                    | 7.0                          | 200                                        | 12.0                                       | 33.3                          |
| SMAJ7.5A              | HP      | SMAJ7.5CA            | TP      | 8.33                                         | 9.21 | 1.0                   | 7.5                          | 100                                        | 12.9                                       | 31.0                          |
| SMAJ8.0A              | HR      | SMAJ8.0CA            | TR      | 8.89                                         | 9.83 | 1.0                   | 8.0                          | 50                                         | 13.6                                       | 29.4                          |
| SMAJ8.5A              | HT      | SMAJ8.5CA            | TT      | 9.44                                         | 10.4 | 1.0                   | 8.5                          | 20                                         | 14.4                                       | 27.8                          |
| SMAJ9.0A              | HV      | SMAJ9.0CA            | TV      | 10.0                                         | 11.1 | 1.0                   | 9.0                          | 10                                         | 15.4                                       | 26.0                          |
| SMAJ10A               | HX      | SMAJ10CA             | TX      | 11.1                                         | 12.3 | 1.0                   | 10                           | 5                                          | 17.0                                       | 23.5                          |
| SMAJ11A               | HZ      | SMAJ11CA             | TZ      | 12.2                                         | 13.5 | 1.0                   | 11                           | 1.0                                        | 18.2                                       | 22.0                          |
| SMAJ12A               | IE      | SMAJ12CA             | UE      | 13.3                                         | 14.7 | 1.0                   | 12                           | 1.0                                        | 19.9                                       | 20.1                          |
| SMAJ13A               | IG      | SMAJ13CA             | UG      | 14.4                                         | 15.9 | 1.0                   | 13                           | 1.0                                        | 21.5                                       | 18.6                          |
| SMAJ14A               | IK      | SMAJ14CA             | UK      | 15.6                                         | 17.2 | 1.0                   | 14                           | 1.0                                        | 23.2                                       | 17.2                          |
| SMAJ15A               | IM      | SMAJ15CA             | UM      | 16.7                                         | 18.5 | 1.0                   | 15                           | 1.0                                        | 24.4                                       | 16.4                          |
| SMAJ16A               | IP      | SMAJ16CA             | UP      | 17.8                                         | 19.7 | 1.0                   | 16                           | 1.0                                        | 26.0                                       | 15.3                          |
| SMAJ17A               | IR      | SMAJ17CA             | UR      | 18.9                                         | 20.9 | 1.0                   | 17                           | 1.0                                        | 27.6                                       | 14.5                          |
| SMAJ18A               | IT      | SMAJ18CA             | UT      | 20.0                                         | 22.1 | 1.0                   | 18                           | 1.0                                        | 29.2                                       | 13.7                          |
| SMAJ20A               | IV      | SMAJ20CA             | UV      | 22.2                                         | 24.5 | 1.0                   | 20                           | 1.0                                        | 32.4                                       | 12.3                          |
| SMAJ22A               | IX      | SMAJ22CA             | UX      | 24.4                                         | 26.9 | 1.0                   | 22                           | 1.0                                        | 35.5                                       | 11.3                          |
| SMAJ24A               | IZ      | SMAJ24CA             | UZ      | 26.7                                         | 29.5 | 1.0                   | 24                           | 1.0                                        | 38.9                                       | 10.3                          |
| SMAJ26A               | JE      | SMAJ26CA             | VE      | 28.9                                         | 31.9 | 1.0                   | 26                           | 1.0                                        | 42.1                                       | 9.5                           |
| SMAJ28A               | JG      | SMAJ28CA             | VG      | 31.1                                         | 34.4 | 1.0                   | 28                           | 1.0                                        | 45.4                                       | 8.8                           |
| SMAJ30A               | JK      | SMAJ30CA             | VK      | 33.3                                         | 36.8 | 1.0                   | 30                           | 1.0                                        | 48.4                                       | 8.3                           |
| SMAJ33A               | JM      | SMAJ33CA             | VM      | 36.7                                         | 40.6 | 1.0                   | 33                           | 1.0                                        | 53.3                                       | 7.5                           |
| SMAJ36A               | JP      | SMAJ36CA             | VP      | 40                                           | 44.2 | 1.0                   | 36                           | 1.0                                        | 58.1                                       | 6.9                           |
| SMAJ40A               | JR      | SMAJ40CA             | VR      | 44.4                                         | 49.1 | 1.0                   | 40                           | 1.0                                        | 64.5                                       | 6.2                           |
| SMAJ43A               | JT      | SMAJ43CA             | VT      | 47.8                                         | 52.8 | 1.0                   | 43                           | 1.0                                        | 69.4                                       | 5.8                           |
| SMAJ45A               | JV      | SMAJ45CA             | VV      | 50                                           | 55.3 | 1.0                   | 45                           | 1.0                                        | 72.7                                       | 5.5                           |
| SMAJ48A               | JX      | SMAJ48CA             | VX      | 53.3                                         | 58.9 | 1.0                   | 48                           | 1.0                                        | 77.4                                       | 5.2                           |
| SMAJ51A               | JZ      | SMAJ51CA             | VZ      | 56.7                                         | 62.7 | 1.0                   | 51                           | 1.0                                        | 82.4                                       | 4.9                           |
| SMAJ54A               | RE      | SMAJ54CA             | WE      | 60                                           | 66.3 | 1.0                   | 54                           | 1.0                                        | 87.1                                       | 4.6                           |
| SMAJ58A               | RG      | SMAJ58CA             | WG      | 64.4                                         | 71.2 | 1.0                   | 58                           | 1.0                                        | 93.6                                       | 4.3                           |
| SMAJ60A               | RK      | SMAJ60CA             | WK      | 66.7                                         | 73.7 | 1.0                   | 60                           | 1.0                                        | 96.8                                       | 4.1                           |
| SMAJ64A               | RM      | SMAJ64CA             | WM      | 71.1                                         | 78.6 | 1.0                   | 64                           | 1.0                                        | 103                                        | 3.9                           |
| SMAJ70A               | RP      | SMAJ70CA             | WP      | 77.8                                         | 86.0 | 1.0                   | 70                           | 1.0                                        | 113                                        | 3.5                           |
| SMAJ75A               | RR      | SMAJ75CA             | WR      | 83.3                                         | 92.1 | 1.0                   | 75                           | 1.0                                        | 121                                        | 3.3                           |
| SMAJ78A               | RT      | SMAJ78CA             | WT      | 86.7                                         | 95.8 | 1.0                   | 78                           | 1.0                                        | 126                                        | 3.2                           |
| SMAJ85A               | RV      | SMAJ85CA             | WV      | 94.4                                         | 104  | 1.0                   | 85                           | 1.0                                        | 137                                        | 2.9                           |
| SMAJ90A               | RX      | SMAJ90CA             | WX      | 100                                          | 111  | 1.0                   | 90                           | 1.0                                        | 146                                        | 2.7                           |
| SMAJ100A              | RZ      | SMAJ100CA            | WZ      | 111                                          | 123  | 1.0                   | 100                          | 1.0                                        | 162                                        | 2.5                           |
| SMAJ110A              | SE      | SMAJ110CA            | XE      | 122                                          | 135  | 1.0                   | 110                          | 1.0                                        | 177                                        | 2.3                           |
| SMAJ120A              | SG      | SMAJ120CA            | XG      | 133                                          | 147  | 1.0                   | 120                          | 1.0                                        | 193                                        | 2.1                           |
| SMAJ130A              | SK      | SMAJ130CA            | XK      | 144                                          | 159  | 1.0                   | 130                          | 1.0                                        | 209                                        | 1.9                           |
| SMAJ150A              | SM      | SMAJ150CA            | XM      | 167                                          | 185  | 1.0                   | 150                          | 1.0                                        | 243                                        | 1.6                           |
| SMAJ160A              | SP      | SMAJ160CA            | XP      | 178                                          | 197  | 1.0                   | 160                          | 1.0                                        | 259                                        | 1.5                           |
| SMAJ170A              | SR      | SMAJ170CA            | XR      | 189                                          | 209  | 1.0                   | 170                          | 1.0                                        | 275                                        | 1.5                           |
| SMAJ180A              | ST      | SMAJ180CA            | XT      | 201                                          | 222  | 1.0                   | 180                          | 1.0                                        | 292                                        | 1.4                           |
| SMAJ200A              | SV      | SMAJ200CA            | XV      | 224                                          | 247  | 1.0                   | 200                          | 1.0                                        | 324                                        | 1.2                           |
| SMAJ220A              | SX      | SMAJ220CA            | XX      | 246                                          | 272  | 1.0                   | 220                          | 1.0                                        | 356                                        | 1.1                           |
| SMAJ250A              | SZ      | SMAJ250CA            | XZ      | 279                                          | 309  | 1.0                   | 250                          | 1.0                                        | 405                                        | 1.0                           |
| SMAJ300A              | FE      | SMAJ300CA            | GE      | 335                                          | 371  | 1.0                   | 300                          | 1.0                                        | 486                                        | 0.8                           |
| SMAJ350A              | FG      | SMAJ350CA            | GG      | 391                                          | 432  | 1.0                   | 350                          | 1.0                                        | 567                                        | 0.7                           |
| SMAJ400A              | FK      | SMAJ400CA            | GK      | 447                                          | 494  | 1.0                   | 400                          | 1.0                                        | 648                                        | 0.6                           |
| SMAJ434A              | 434U    | SMAJ434CA            | 434D    | 485                                          | 535  | 1.0                   | 434                          | 1.0                                        | 698                                        | 0.6                           |
| SMAJ440A              | FM      | SMAJ440CA            | GM      | 492                                          | 543  | 1.0                   | 440                          | 1.0                                        | 713                                        | 0.6                           |
| SMAJ495A              | 495U    | SMAJ495CA            | 495D    | 522                                          | 578  | 1.0                   | 495                          | 1.0                                        | 760                                        | 0.5                           |

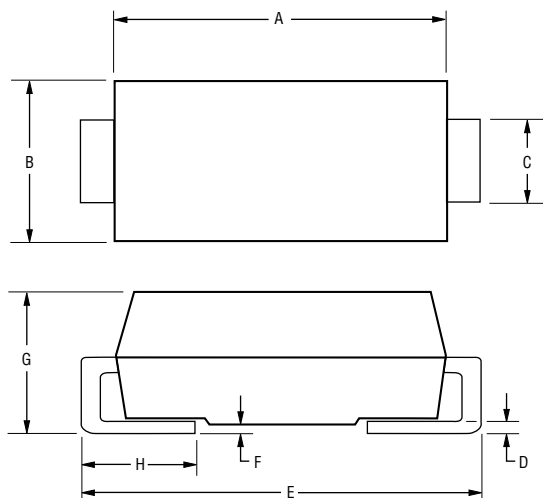
Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device. 3. For bidirectional devices with a V<sub>R</sub> of 10 volts or less, the I<sub>R</sub> limit is double.  
2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

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# SMAJ Transient Voltage Suppressor Diode Series

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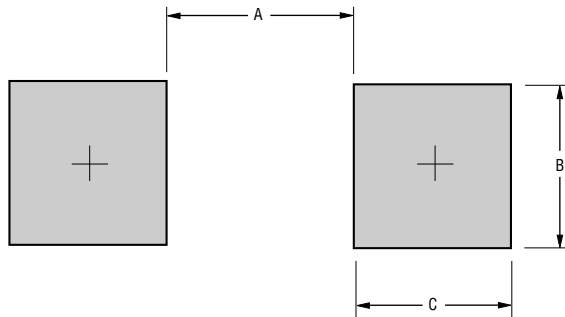
## Product Dimensions



| Dimension | SMA (DO-214AC)                         |
|-----------|----------------------------------------|
| A         | $\frac{3.99 - 4.57}{(0.157 - 0.180)}$  |
| B         | $\frac{2.29 - 2.92}{(0.090 - 0.115)}$  |
| C         | $\frac{1.25 - 1.65}{(0.049 - 0.065)}$  |
| D         | $\frac{0.15 - 0.31}{(0.006 - 0.112)}$  |
| E         | $\frac{4.83 - 5.59}{(0.190 - 0.220)}$  |
| F         | $\frac{0.05 - 0.203}{(0.002 - 0.008)}$ |
| G         | $\frac{1.98 - 2.62}{(0.078 - 0.103)}$  |
| H         | $\frac{0.76 - 1.52}{(0.030 - 0.060)}$  |

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

## Recommended Footprint



| Dimension | SMA (DO-214AC)         |
|-----------|------------------------|
| A (Max.)  | $\frac{2.70}{(0.106)}$ |
| B (Min.)  | $\frac{2.10}{(0.083)}$ |
| C (Min.)  | $\frac{1.27}{(0.050)}$ |

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

## Physical Specifications

Case .....Molded plastic per UL Class 94V-0  
Polarity..... Cathode band indicates unidirectional device  
No cathode band indicates bidirectional device  
Weight .....0.064 grams

Specifications are subject to change without notice.

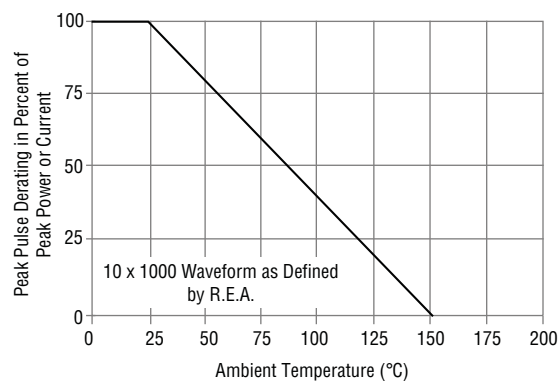
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# SMAJ Transient Voltage Suppressor Diode Series

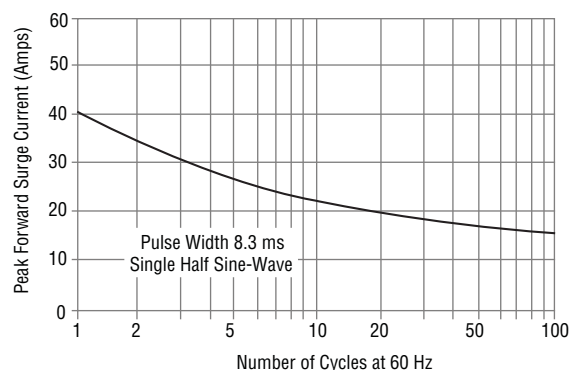
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## Rating & Characteristic Curves

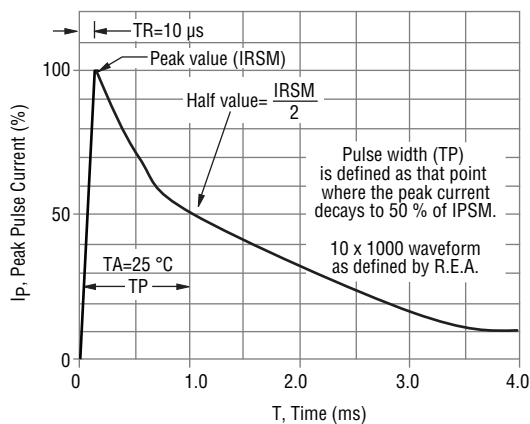
### Pulse Derating Curve



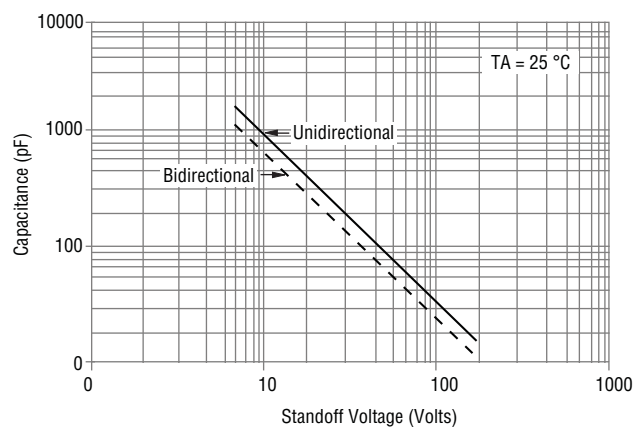
### Maximum Non-Repetitive Surge Current



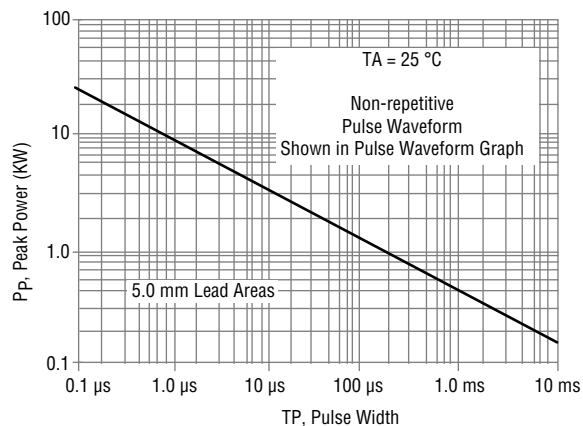
### Pulse Waveform



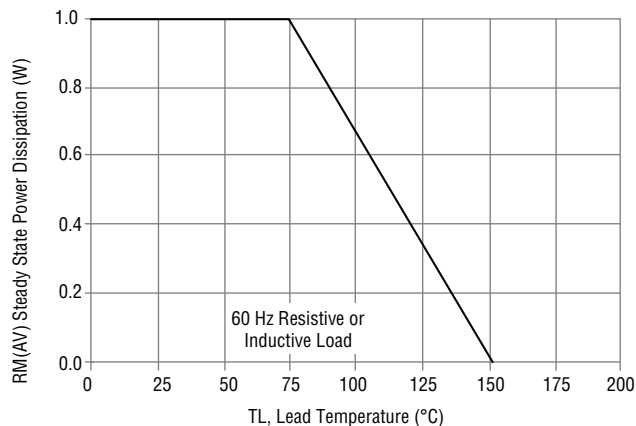
### Typical Junction Capacitance



### Pulse Rating Curve



### Steady State Power Derating Curve



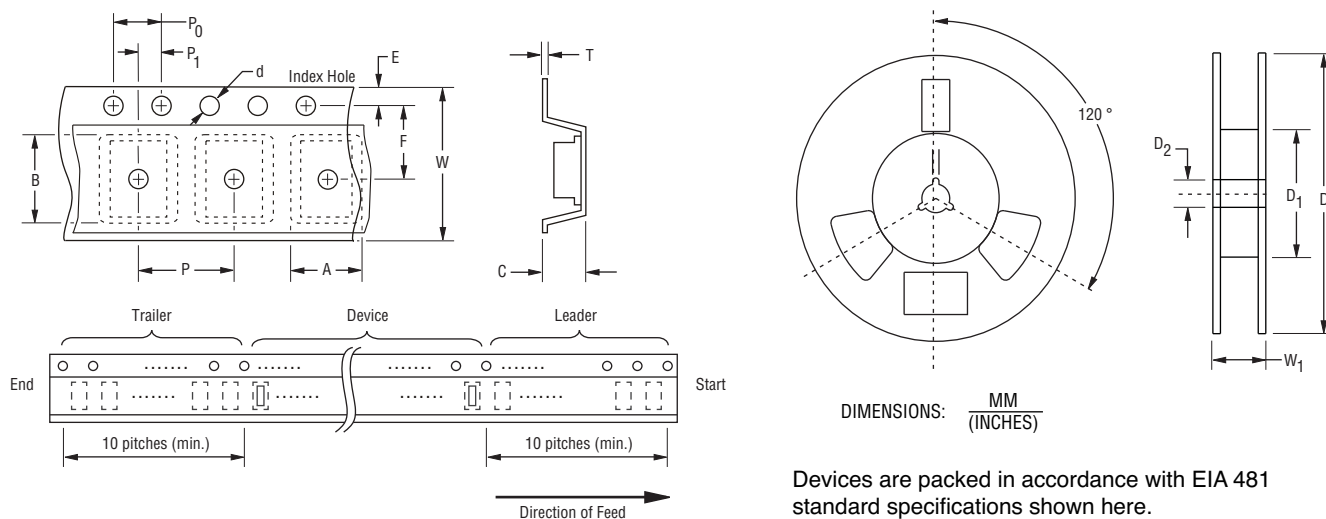
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# SMAJ Transient Voltage Suppressor Diode Series

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## Packaging Information

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



| Item                   | Symbol         | SMA (DO-214AC)                      |
|------------------------|----------------|-------------------------------------|
| Carrier Width          | A              | $2.90 \pm 0.20$<br>(0.114 ± 0.008)  |
| Carrier Length         | B              | $5.50 \pm 0.20$<br>(0.217 ± 0.008)  |
| Carrier Depth          | C              | $2.26 \pm 0.20$<br>(0.089 ± 0.008)  |
| Sprocket Hole          | d              | $1.50 \pm 0.10$<br>(0.061 ± 0.004)  |
| Reel Outside Diameter  | D              | $330$<br>(12.992)                   |
| Reel Inner Diameter    | D <sub>1</sub> | $50.0$<br>(1.969) MIN.              |
| Feed Hole Diameter     | D <sub>2</sub> | $13.0 \pm 0.20$<br>(0.512 ± 0.008)  |
| Sprocket Hole Position | E              | $1.75 \pm 0.10$<br>(0.069 ± 0.004)  |
| Punch Hole Position    | F              | $5.50 \pm 0.05$<br>(0.217 ± 0.002)  |
| Punch Hole Pitch       | P              | $4.00 \pm 0.10$<br>(0.157 ± 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> | $2.00 \pm 0.05$<br>(0.079 ± 0.002)  |
| Overall Tape Thickness | T              | $0.30 \pm 0.10$<br>(0.012 ± 0.004)  |
| Tape Width             | W              | $12.00 \pm 0.30$<br>(0.472 ± 0.012) |
| Reel Width             | W <sub>1</sub> | $18.4$<br>(0.724) MAX.              |
| Quantity per Reel      | --             | 5,000                               |

REV. 04/15

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