




THE DATASHEET OF SMAJ160CA





Features

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

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.

Additional Information

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Agency Recognition

| Description | |
|-------------|--------------------------------------|
| UL | File Number: E153537 |

Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

| Parameter | Symbol | Value | Unit |
|--|--------------------|-------------|-------|
| Minimum Peak Pulse Power Dissipation (T _P = 1 ms) (Note 1,2) | P _{PK} | 400 | Watts |
| Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3) | I _{FSM} | 40 | Amps |
| Steady State Power Dissipation @ T _L = 75 °C | P _{M(AV)} | 1.0 | Watts |
| Maximum Instantaneous Forward Voltage @ I _{PP} = 35 A (For Unidirectional Units Only) | V _F | 3.5 5.0 | Volts |
| Operating Temperature Range | T _J | -55 to +150 | °C |
| Storage Temperature Range | T _{STG} | -55 to +150 | °C |

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T_A = 25 °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).

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How to Order

SMAJ 5.0 CA - H

Package _____
SMAJ = SMA/DO-214AC

Working Peak Reverse Voltage _____
5.0 = 5.0 V_{RWM} (Volts)

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

Reel _____
(blank) = 13 inch reel
-H = 7 inch reel



WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.
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SMAJ Transient Voltage Suppressor Diode Series

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Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

| Unidirectional Device | | Bidirectional Device | | Breakdown Voltage V _{BR} (Volts) | | | Working Peak Reverse Voltage | Maximum Reverse Leakage @ V _{RWM} | Maximum Clamping Voltage @ I _{pp} (10/1000 μs) | Maximum Peak Pulse Current (10/1000 μs) | Maximum Clamping Voltage @ I _{pp} (8/20 μs) | Maximum Peak Pulse Current (8/20 μs) |
|-----------------------|---------|----------------------|---------|---|------|-----------------------|------------------------------|--|---|---|--|--------------------------------------|
| Part No. | Marking | Part No. | Marking | Min. | Max. | @ I _T (mA) | V _{RWM} (V) | I _R (μA) | V _C (V) | I _{pp} (A) | V _C (V) | I _{pp} (A) |
| SMAJ5.0A | HE | SMAJ5.0CA | TE | 6.40 | 7.00 | 10 | 5.0 | 800 | 9.2 | 43.5 | 12.0 | 217.5 |
| SMAJ6.0A | HG | SMAJ6.0CA | TG | 6.67 | 7.37 | 10 | 6.0 | 800 | 10.3 | 38.8 | 13.4 | 194.0 |
| SMAJ6.5A | HK | SMAJ6.5CA | TK | 7.22 | 7.98 | 10 | 6.5 | 500 | 11.2 | 35.7 | 14.6 | 178.5 |
| SMAJ7.0A | HM | SMAJ7.0CA | TM | 7.78 | 8.60 | 10 | 7.0 | 200 | 12.0 | 33.3 | 15.6 | 166.5 |
| SMAJ7.5A | HP | SMAJ7.5CA | TP | 8.33 | 9.21 | 1.0 | 7.5 | 100 | 12.9 | 31.0 | 16.8 | 155.0 |
| SMAJ8.0A | HR | SMAJ8.0CA | TR | 8.89 | 9.83 | 1.0 | 8.0 | 50 | 13.6 | 29.4 | 17.7 | 147.0 |
| SMAJ8.5A | HT | SMAJ8.5CA | TT | 9.44 | 10.4 | 1.0 | 8.5 | 20 | 14.4 | 27.8 | 18.7 | 139.0 |
| SMAJ9.0A | HV | SMAJ9.0CA | TV | 10.0 | 11.1 | 1.0 | 9.0 | 10 | 15.4 | 26.0 | 20.0 | 130.0 |
| SMAJ10A | HX | SMAJ10CA | TX | 11.1 | 12.3 | 1.0 | 10 | 5 | 17.0 | 23.5 | 22.1 | 117.5 |
| SMAJ11A | HZ | SMAJ11CA | TZ | 12.2 | 13.5 | 1.0 | 11 | 1.0 | 18.2 | 22.0 | 23.7 | 110.0 |
| SMAJ12A | IE | SMAJ12CA | UE | 13.3 | 14.7 | 1.0 | 12 | 1.0 | 19.9 | 20.1 | 25.9 | 100.5 |
| SMAJ13A | IG | SMAJ13CA | UG | 14.4 | 15.9 | 1.0 | 13 | 1.0 | 21.5 | 18.6 | 28.0 | 93.0 |
| SMAJ14A | IK | SMAJ14CA | UK | 15.6 | 17.2 | 1.0 | 14 | 1.0 | 23.2 | 17.2 | 30.2 | 86.0 |
| SMAJ15A | IM | SMAJ15CA | UM | 16.7 | 18.5 | 1.0 | 15 | 1.0 | 24.4 | 16.4 | 31.7 | 82.0 |
| SMAJ16A | IP | SMAJ16CA | UP | 17.8 | 19.7 | 1.0 | 16 | 1.0 | 26.0 | 15.4 | 33.8 | 77.0 |
| SMAJ17A | IR | SMAJ17CA | UR | 18.9 | 20.9 | 1.0 | 17 | 1.0 | 27.6 | 14.5 | 35.9 | 72.5 |
| SMAJ18A | IT | SMAJ18CA | UT | 20.0 | 22.1 | 1.0 | 18 | 1.0 | 29.2 | 13.7 | 38.0 | 68.5 |
| SMAJ20A | IV | SMAJ20CA | UV | 22.2 | 24.5 | 1.0 | 20 | 1.0 | 32.4 | 12.3 | 42.1 | 61.5 |
| SMAJ22A | IX | SMAJ22CA | UX | 24.4 | 26.9 | 1.0 | 22 | 1.0 | 35.5 | 11.3 | 46.2 | 56.5 |
| SMAJ24A | IZ | SMAJ24CA | UZ | 26.7 | 29.5 | 1.0 | 24 | 1.0 | 38.9 | 10.3 | 50.6 | 51.5 |
| SMAJ26A | JE | SMAJ26CA | VE | 28.9 | 31.9 | 1.0 | 26 | 1.0 | 42.1 | 9.5 | 54.7 | 47.5 |
| SMAJ28A | JG | SMAJ28CA | VG | 31.1 | 34.4 | 1.0 | 28 | 1.0 | 45.4 | 8.8 | 59.0 | 44.0 |
| SMAJ30A | JK | SMAJ30CA | VK | 33.3 | 36.8 | 1.0 | 30 | 1.0 | 48.4 | 8.3 | 62.9 | 41.5 |
| SMAJ33A | JM | SMAJ33CA | VM | 36.7 | 40.6 | 1.0 | 33 | 1.0 | 53.3 | 7.5 | 69.3 | 37.5 |
| SMAJ36A | JP | SMAJ36CA | VP | 40 | 44.2 | 1.0 | 36 | 1.0 | 58.1 | 6.9 | 75.5 | 34.5 |
| SMAJ40A | JR | SMAJ40CA | VR | 44.4 | 49.1 | 1.0 | 40 | 1.0 | 64.5 | 6.2 | 83.9 | 31.0 |
| SMAJ43A | JT | SMAJ43CA | VT | 47.8 | 52.8 | 1.0 | 43 | 1.0 | 69.4 | 5.8 | 90.2 | 29.0 |
| SMAJ45A | JV | SMAJ45CA | VV | 50 | 55.3 | 1.0 | 45 | 1.0 | 72.7 | 5.5 | 94.5 | 27.5 |
| SMAJ48A | JX | SMAJ48CA | VX | 53.3 | 58.9 | 1.0 | 48 | 1.0 | 77.4 | 5.2 | 100.6 | 26.0 |
| SMAJ51A | JZ | SMAJ51CA | VZ | 56.7 | 62.7 | 1.0 | 51 | 1.0 | 82.4 | 4.9 | 107.1 | 24.5 |
| SMAJ54A | RE | SMAJ54CA | WE | 60 | 66.3 | 1.0 | 54 | 1.0 | 87.1 | 4.6 | 113.2 | 23.0 |
| SMAJ58A | RG | SMAJ58CA | WG | 64.4 | 71.2 | 1.0 | 58 | 1.0 | 93.6 | 4.3 | 121.7 | 21.5 |
| SMAJ60A | RK | SMAJ60CA | WK | 66.7 | 73.7 | 1.0 | 60 | 1.0 | 96.8 | 4.1 | 125.8 | 20.5 |
| SMAJ64A | RM | SMAJ64CA | WM | 71.1 | 78.6 | 1.0 | 64 | 1.0 | 103 | 3.9 | 133.9 | 19.5 |
| SMAJ70A | RP | SMAJ70CA | WP | 77.8 | 86.0 | 1.0 | 70 | 1.0 | 113 | 3.5 | 146.9 | 17.5 |
| SMAJ75A | RR | SMAJ75CA | WR | 83.3 | 92.1 | 1.0 | 75 | 1.0 | 121 | 3.3 | 157.3 | 16.5 |
| SMAJ78A | RT | SMAJ78CA | WT | 86.7 | 95.8 | 1.0 | 78 | 1.0 | 126 | 3.2 | 163.8 | 16.0 |
| SMAJ85A | RV | SMAJ85CA | VV | 94.4 | 104 | 1.0 | 85 | 1.0 | 137 | 2.9 | 178.1 | 14.5 |
| SMAJ90A | RX | SMAJ90CA | WX | 100 | 111 | 1.0 | 90 | 1.0 | 146 | 2.7 | 189.8 | 13.5 |
| SMAJ100A | RZ | SMAJ100CA | WZ | 111 | 123 | 1.0 | 100 | 1.0 | 162 | 2.5 | 210.6 | 12.5 |
| SMAJ110A | SE | SMAJ110CA | XE | 122 | 135 | 1.0 | 110 | 1.0 | 177 | 2.3 | 230.1 | 11.5 |
| SMAJ120A | SG | SMAJ120CA | XG | 133 | 147 | 1.0 | 120 | 1.0 | 193 | 2.1 | 250.9 | 10.5 |
| SMAJ130A | SK | SMAJ130CA | XK | 144 | 159 | 1.0 | 130 | 1.0 | 209 | 1.9 | 271.7 | 9.5 |
| SMAJ150A | SM | SMAJ150CA | XM | 167 | 185 | 1.0 | 150 | 1.0 | 243 | 1.6 | 315.9 | 8.0 |
| SMAJ160A | SP | SMAJ160CA | XP | 178 | 197 | 1.0 | 160 | 1.0 | 259 | 1.5 | 336.7 | 7.5 |
| SMAJ170A | SR | SMAJ170CA | XR | 189 | 209 | 1.0 | 170 | 1.0 | 275 | 1.5 | 357.5 | 7.5 |
| SMAJ180A | ST | SMAJ180CA | XT | 201 | 222 | 1.0 | 180 | 1.0 | 292 | 1.4 | 379.6 | 7.0 |
| SMAJ200A | SV | SMAJ200CA | XV | 224 | 247 | 1.0 | 200 | 1.0 | 324 | 1.2 | 421.2 | 6.0 |
| SMAJ220A | SX | SMAJ220CA | XX | 246 | 272 | 1.0 | 220 | 1.0 | 356 | 1.1 | 462.8 | 5.5 |
| SMAJ250A | SZ | SMAJ250CA | XZ | 279 | 309 | 1.0 | 250 | 1.0 | 405 | 1.0 | 526.5 | 5.0 |
| SMAJ300A | FE | SMAJ300CA | GE | 335 | 371 | 1.0 | 300 | 1.0 | 486 | 0.8 | 631.8 | 4.0 |
| SMAJ350A | FG | SMAJ350CA | GG | 391 | 432 | 1.0 | 350 | 1.0 | 567 | 0.7 | 737.1 | 3.5 |
| SMAJ400A | FK | SMAJ400CA | GK | 447 | 494 | 1.0 | 400 | 1.0 | 648 | 0.6 | 842.4 | 3.0 |
| SMAJ434A | 434U | SMAJ434CA | 434D | 485 | 535 | 1.0 | 434 | 1.0 | 698 | 0.6 | 907.4 | 2.9 |
| SMAJ440A | FM | SMAJ440CA | GM | 492 | 543 | 1.0 | 440 | 1.0 | 713 | 0.6 | 926.9 | 3.0 |
| SMAJ495A | 495U | SMAJ495CA | 495D | 522 | 578 | 1.0 | 495 | 1.0 | 760 | 0.5 | 988.0 | 2.6 |

Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device. 3. For bidirectional devices with a V_R of 10 volts or less, the I_R limit is double.
 2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

Specifications are subject to change without notice.

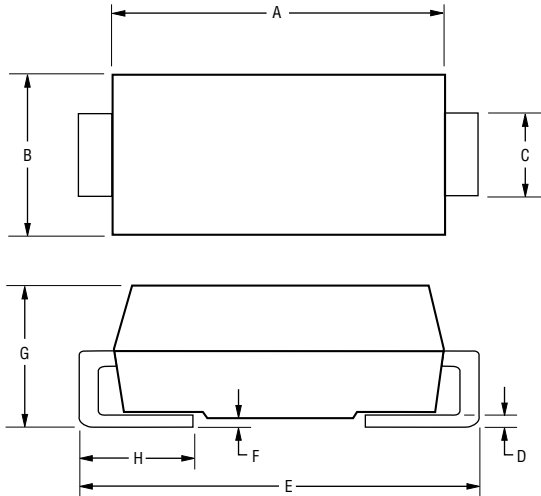
Users should verify actual device performance in their specific applications.

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SMAJ Transient Voltage Suppressor Diode Series

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Product Dimensions



| Dimension | SMA (DO-214AC) |
|-----------|---------------------------------------|
| A | $\frac{3.99 - 4.50}{(0.157 - 0.177)}$ |
| B | $\frac{2.54 - 2.79}{(0.100 - 0.110)}$ |
| C | $\frac{1.25 - 1.65}{(0.049 - 0.065)}$ |
| D | $\frac{0.15 - 0.31}{(0.006 - 0.012)}$ |
| E | $\frac{4.93 - 5.28}{(0.194 - 0.208)}$ |
| F | $\frac{0.203}{(0.008)}$ MAX. |
| G | $\frac{1.98 - 2.29}{(0.078 - 0.090)}$ |
| H | $\frac{0.76 - 1.52}{(0.030 - 0.060)}$ |

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

Recommended Footprint



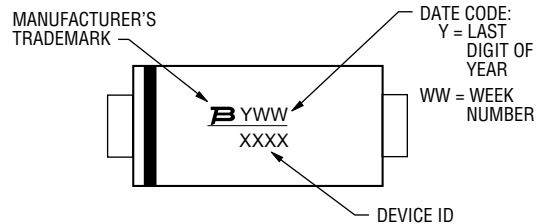
| Dimension | SMA (DO-214AC) |
|-----------|------------------------|
| A (Max.) | $\frac{2.70}{(0.106)}$ |
| B (Min.) | $\frac{2.10}{(0.083)}$ |
| C (Min.) | $\frac{1.27}{(0.050)}$ |

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

Physical Specifications

CaseMolded plastic per UL Class 94V-0
 Polarity..... Cathode band indicates unidirectional device
 No cathode band indicates bidirectional device
 Weight0.064 grams

Typical Part Marking



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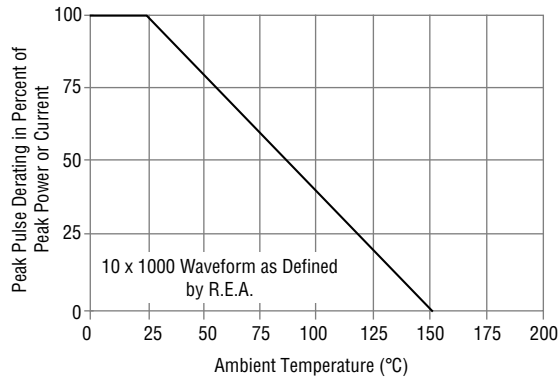
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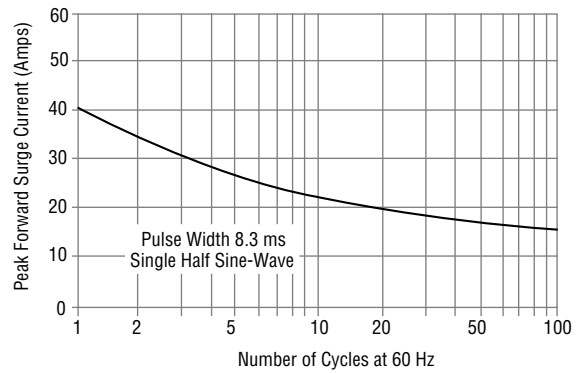
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Rating & Characteristic Curves

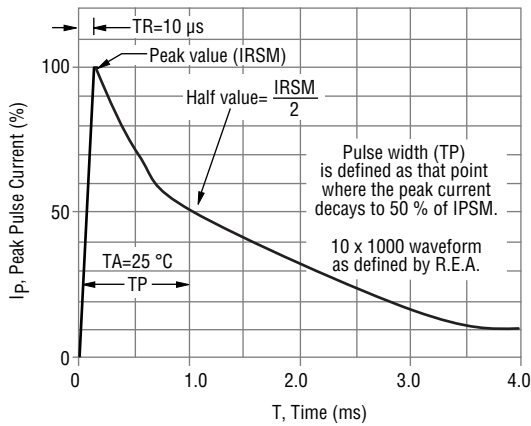
Pulse Derating Curve



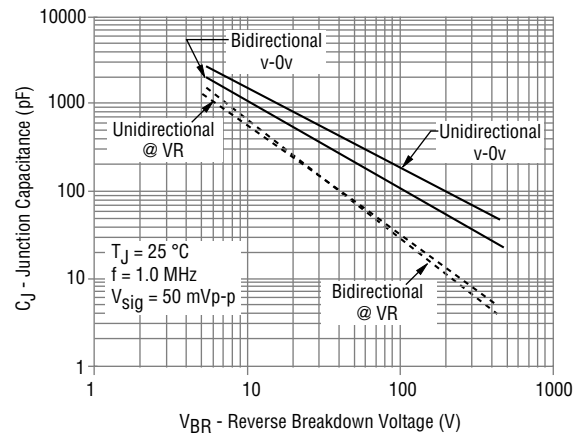
Maximum Non-Repetitive Surge Current



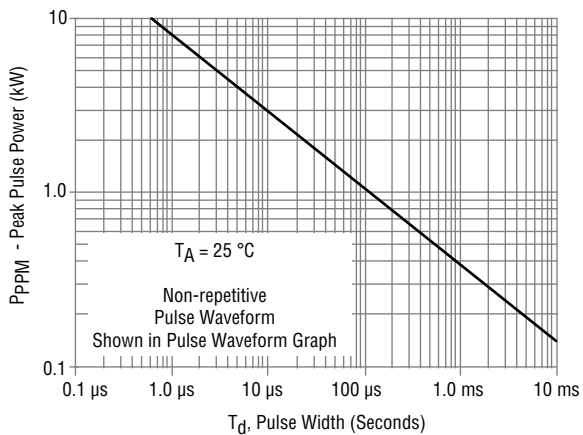
Pulse Waveform



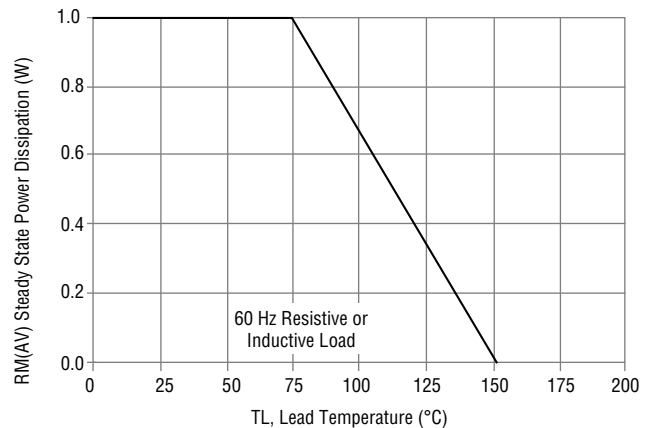
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



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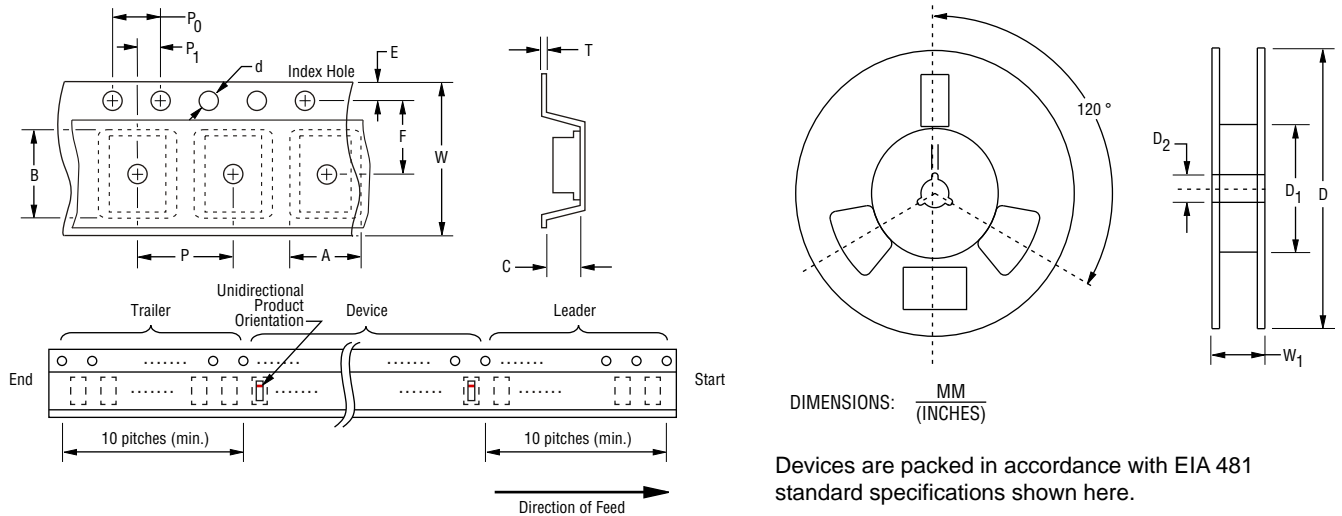
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SMAJ Transient Voltage Suppressor Diode Series

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Packaging Information

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



| Item | Symbol | SMA (DO-214AC) | |
|------------------------|----------------|--|------------------------|
| | | 7 Inch Reel | 13 Inch Reel |
| Carrier Width | A | $\frac{2.90 \pm 0.20}{(0.114 \pm 0.008)}$ | |
| Carrier Length | B | $\frac{5.50 \pm 0.20}{(0.217 \pm 0.008)}$ | |
| Carrier Depth | C | $\frac{2.26 \pm 0.20}{(0.089 \pm 0.008)}$ | |
| Sprocket Hole | d | $\frac{1.50 \pm 0.10}{(0.061 \pm 0.004)}$ | |
| Reel Outside Diameter | D | $\frac{178}{(7.008)}$ | $\frac{330}{(12.992)}$ |
| Reel Inner Diameter | D ₁ | $\frac{50.0}{(1.969)}$ MIN. | |
| Feed Hole Diameter | D ₂ | $\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$ | |
| Sprocket Hole Position | E | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$ | |
| Punch Hole Position | F | $\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$ | |
| Punch Hole Pitch | P | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | |
| Sprocket Hole Pitch | P ₀ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | |
| Embossment Center | P ₁ | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$ | |
| Overall Tape Thickness | T | $\frac{0.30 \pm 0.10}{(0.012 \pm 0.004)}$ | |
| Tape Width | W | $\frac{12.00 \pm 0.30}{(0.472 \pm 0.012)}$ | |
| Reel Width | W ₁ | $\frac{18.4}{(0.724)}$ MAX. | |
| Quantity per Reel | -- | 1,000 | 5,000 |

REV. 09/20

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-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management