



Features

- RoHS compliant*
- Surface Mount SMB package
- Standoff Voltage: 5.0 to 170 volts
- Power Dissipation: 600 watts

Applications

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

SMBJ 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-214AA (SMB) 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 200 V. Typical fast response times are less than 1.0 ns for unidirectional devices and less than 5.0 ns 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 °C Unless Otherwise Noted)

| Parameter | Symbol | Value | Unit |
|--|--------------------|-------------|-------|
| Minimum Peak Pulse Power Dissipation (T _p = 1 ms) (Note 1,2) | P _{PK} | 600 | Watts |
| Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3) | I _{FSM} | 100 | Amps |
| Steady State Power Dissipation @ T _L = 75 °C | P _{M(AV)} | 5.0 | Watts |
| Maximum Instantaneous Forward Voltage @ I _{PP} = 50 A (For Unidirectional Units Only) | V _F | (Note 5) | Volts |
| Operating Temperature Range | T _J | -55 to +150 | °C |
| Storage Temperature Range | T _{STG} | -55 to +175 | °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).
4. Single Phase, Half Wave, 60 Hz, resistive or inductive load. For capacitive load, derate current by 20 %.
5. V_F = 3.5 V on SMBJ5.0A through SMBJ90A and V_F = 5.0 V on SMBJ100A through SMBJ170A.



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How to Order

SMBJ 5.0 CA

Package _____
SMBJ = SMA/DO-214AA

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

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

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex.
Specifications are subject to change without notice.

Customers should verify actual device performance in their specific applications.

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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 Reverse Voltage @ I _{RSM} | Maximum Reverse Surge Current |
|-----------------------|--------------|----------------------|--------------|--|------|-----------------------|------------------------------|--|--|-------------------------------|
| Part Number | Part Marking | Part Number | Part Marking | Min. | Max. | @ I _T (mA) | V _{RWM} (Volts) | I _R (μA) | V _{RSM} (Volts) | I _{RSM} (Amps) |
| SMBJ5.0A | KE | SMBJ5.0CA | AE | 6.40 | 7.25 | 10 | 5.0 | 800 | 9.2 | 65.2 |
| SMBJ6.0A | KG | SMBJ6.0CA | AG | 6.67 | 7.67 | 10 | 6.0 | 800 | 10.3 | 58.3 |
| SMBJ6.5A | KK | SMBJ6.5CA | AK | 7.22 | 8.30 | 10 | 6.5 | 500 | 11.2 | 53.6 |
| SMBJ7.0A | KM | SMBJ7.0CA | AM | 7.78 | 8.95 | 10 | 7.0 | 200 | 12.0 | 50.0 |
| SMBJ7.5A | KP | SMBJ7.5CA | AP | 8.33 | 9.58 | 1.0 | 7.5 | 100 | 12.9 | 46.5 |
| SMBJ8.0A | KR | SMBJ8.0CA | AR | 8.89 | 10.2 | 1.0 | 8.0 | 50 | 13.6 | 44.1 |
| SMBJ8.5A | KT | SMBJ8.5CA | AT | 9.44 | 10.8 | 1.0 | 8.5 | 20 | 14.4 | 41.7 |
| SMBJ9.0A | KV | SMBJ9.0CA | AV | 10.0 | 11.5 | 1.0 | 9.0 | 10 | 15.4 | 39.0 |
| SMBJ10A | KX | SMBJ10CA | AX | 11.1 | 12.8 | 1.0 | 10 | 5.0 | 17.0 | 35.3 |
| SMBJ11A | KZ | SMBJ11CA | AZ | 12.2 | 14.4 | 1.0 | 11 | 5.0 | 18.2 | 33.0 |
| SMBJ12A | LE | SMBJ12CA | BE | 13.3 | 15.3 | 1.0 | 12 | 5.0 | 19.9 | 30.2 |
| SMBJ13A | LG | SMBJ13CA | BG | 14.4 | 16.5 | 1.0 | 13 | 5.0 | 21.5 | 27.9 |
| SMBJ14A | LK | SMBJ14CA | BK | 15.6 | 17.9 | 1.0 | 14 | 5.0 | 23.2 | 25.8 |
| SMBJ15A | LM | SMBJ15CA | BM | 16.7 | 19.2 | 1.0 | 15 | 5.0 | 24.4 | 24.0 |
| SMBJ16A | LP | SMBJ16CA | BP | 17.8 | 20.5 | 1.0 | 16 | 5.0 | 26.0 | 23.1 |
| SMBJ17A | LR | SMBJ17CA | BR | 18.9 | 21.7 | 1.0 | 17 | 5.0 | 27.6 | 21.7 |
| SMBJ18A | LT | SMBJ18CA | BT | 20.0 | 23.3 | 1.0 | 18 | 5.0 | 29.2 | 20.5 |
| SMBJ20A | LV | SMBJ20CA | BV | 22.2 | 25.5 | 1.0 | 20 | 5.0 | 32.4 | 18.5 |
| SMBJ22A | LX | SMBJ22CA | BX | 24.4 | 28.0 | 1.0 | 22 | 5.0 | 35.5 | 16.9 |
| SMBJ24A | LZ | SMBJ24CA | BZ | 26.7 | 30.7 | 1.0 | 24 | 5.0 | 38.9 | 15.4 |
| SMBJ26A | ME | SMBJ26CA | CE | 28.9 | 32.2 | 1.0 | 26 | 5.0 | 42.1 | 14.2 |
| SMBJ28A | MG | SMBJ28CA | CG | 31.1 | 35.8 | 1.0 | 28 | 5.0 | 45.4 | 13.2 |
| SMBJ30A | MK | SMBJ30CA | CK | 33.3 | 38.3 | 1.0 | 30 | 5.0 | 48.4 | 12.4 |
| SMBJ33A | MM | SMBJ33CA | CM | 36.7 | 42.2 | 1.0 | 33 | 5.0 | 53.3 | 11.3 |
| SMBJ36A | MP | SMBJ36CA | CP | 40 | 46.0 | 1.0 | 36 | 5.0 | 58.1 | 10.3 |
| SMBJ40A | MR | SMBJ40CA | CR | 44.4 | 51.1 | 1.0 | 40 | 5.0 | 64.5 | 9.3 |
| SMBJ43A | MT | SMBJ43CA | CT | 47.8 | 54.9 | 1.0 | 43 | 5.0 | 69.4 | 8.6 |
| SMBJ45A | MV | SMBJ45CA | CV | 50 | 57.5 | 1.0 | 45 | 5.0 | 72.7 | 8.3 |
| SMBJ48A | MX | SMBJ48CA | CX | 53.3 | 61.3 | 1.0 | 48 | 5.0 | 77.4 | 7.7 |
| SMBJ51A | MZ | SMBJ51CA | CZ | 56.7 | 65.2 | 1.0 | 51 | 5.0 | 82.4 | 7.3 |
| SMBJ54A | NE | SMBJ54CA | DE | 60 | 69 | 1.0 | 54 | 5.0 | 87.1 | 6.9 |
| SMBJ58A | NG | SMBJ58CA | DG | 64.4 | 74.6 | 1.0 | 58 | 5.0 | 93.6 | 6.4 |
| SMBJ60A | NK | SMBJ60CA | DK | 66.7 | 76.7 | 1.0 | 60 | 5.0 | 96.8 | 6.2 |
| SMBJ64A | NM | SMBJ64CA | DM | 71.1 | 81.8 | 1.0 | 64 | 5.0 | 103 | 5.8 |
| SMBJ70A | NP | SMBJ70CA | DP | 77.8 | 89.5 | 1.0 | 70 | 5.0 | 113 | 5.3 |
| SMBJ75A | NR | SMBJ75CA | DR | 83.3 | 95.8 | 1.0 | 75 | 5.0 | 121 | 4.9 |
| SMBJ78A | NT | SMBJ78CA | DT | 86.7 | 99.7 | 1.0 | 78 | 5.0 | 126 | 4.7 |
| SMBJ85A | NV | SMBJ85CA | DV | 94.4 | 109 | 1.0 | 85 | 5.0 | 137 | 4.4 |
| SMBJ90A | NX | SMBJ90CA | DX | 100 | 116 | 1.0 | 90 | 5.0 | 146 | 4.1 |
| SMBJ100A | NZ | SMBJ100CA | DZ | 111 | 128 | 1.0 | 100 | 5.0 | 162 | 3.7 |
| SMBJ110A | PE | SMBJ110CA | EE | 122 | 140 | 1.0 | 110 | 5.0 | 177 | 3.4 |
| SMBJ120A | PG | SMBJ120CA | EG | 133 | 153 | 1.0 | 120 | 5.0 | 193 | 3.1 |
| SMBJ130A | PK | SMBJ130CA | EK | 144 | 165 | 1.0 | 130 | 5.0 | 209 | 2.9 |
| SMBJ150A | PM | SMBJ150CA | EM | 167 | 192 | 1.0 | 150 | 5.0 | 243 | 2.5 |
| SMBJ160A | PP | SMBJ160CA | EP | 178 | 205 | 1.0 | 160 | 5.0 | 259 | 2.3 |
| SMBJ170A | PR | SMBJ170CA | ER | 189 | 218 | 1.0 | 170 | 5.0 | 275 | 2.2 |

Notes:

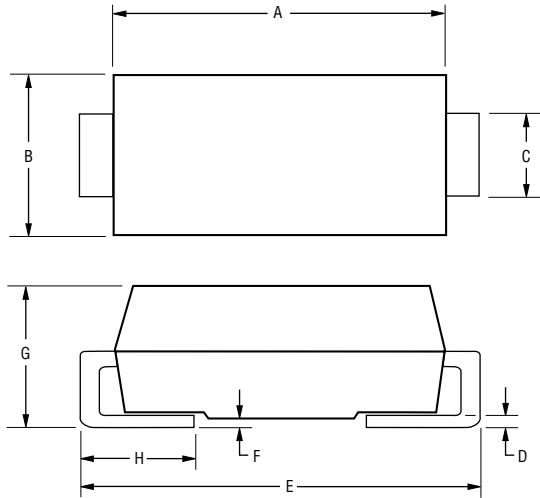
- Suffix 'A' denotes a 5 % tolerance unidirectional device.
- Suffix 'CA' denotes a 5 % tolerance bidirectional device.
- For bidirectional devices with a V_R of 10 volts or less, the I_R limit is double.
- For unidirectional devices with a V_F max. of 3.5 V at an I_F of 35 A, 0.5 Sine Wave of 8.3 ms Pulse Width.

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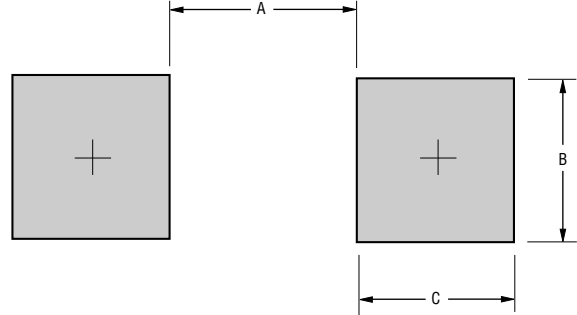
Product Dimensions



| Dimension | SMB (DO-214AA) |
|-----------|---------------------------------------|
| A | $\frac{4.06 - 4.57}{(0.160 - 0.180)}$ |
| B | $\frac{3.30 - 3.94}{(0.130 - 0.155)}$ |
| C | $\frac{1.96 - 2.21}{(0.077 - 0.087)}$ |
| D | $\frac{0.15 - 0.31}{(0.006 - 0.112)}$ |
| E | $\frac{5.21 - 5.59}{(0.205 - 0.220)}$ |
| F | $\frac{0.05 - 0.20}{(0.002 - 0.008)}$ |
| 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 | SMB (DO-214AA) |
|-----------|------------------------|
| A (Max.) | $\frac{2.69}{(0.106)}$ |
| B (Min.) | $\frac{2.10}{(0.083)}$ |
| C (Min.) | $\frac{1.27}{(0.050)}$ |

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

Physical Specifications

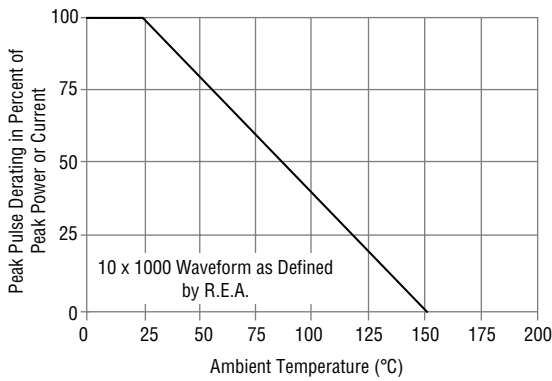
CaseMolded plastic per UL Class 94V-0
 Polarity Cathode band indicates unidirectional device
 No cathode band indicates bidirectional device
 Weight0.003 ounces / 0.093 grams

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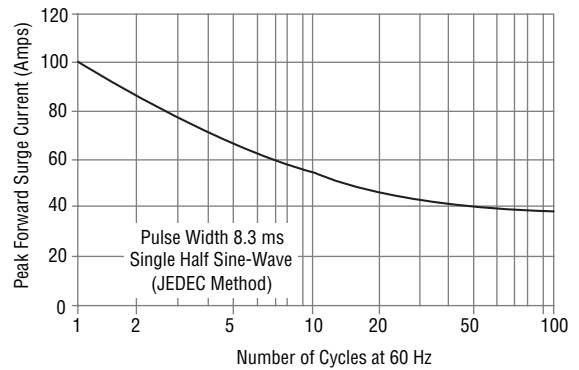


Rating & Characteristic Curves

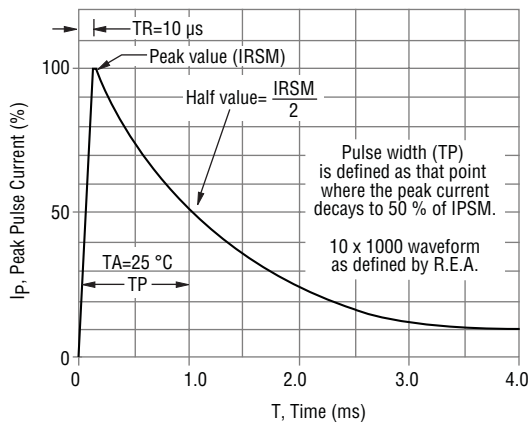
Pulse Derating Curve



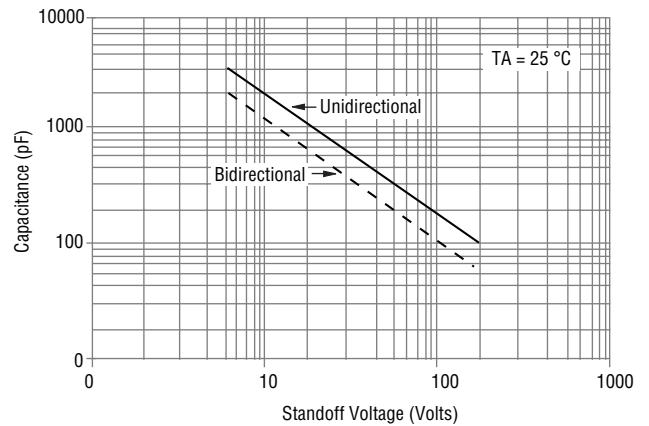
Maximum Non-Repetitive Surge Current



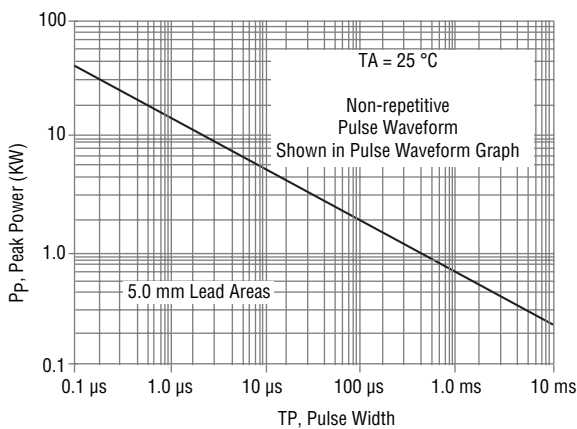
Pulse Waveform



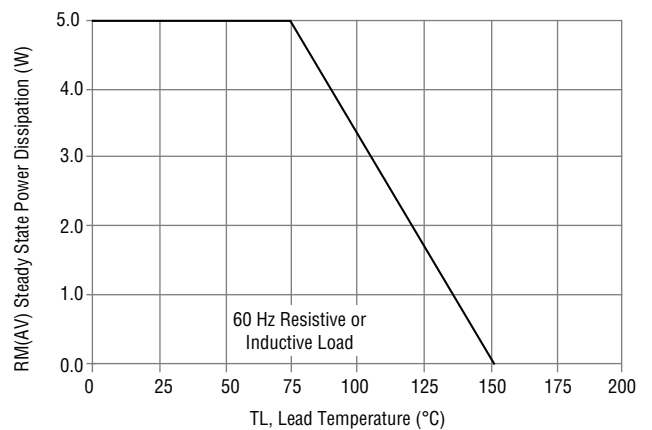
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



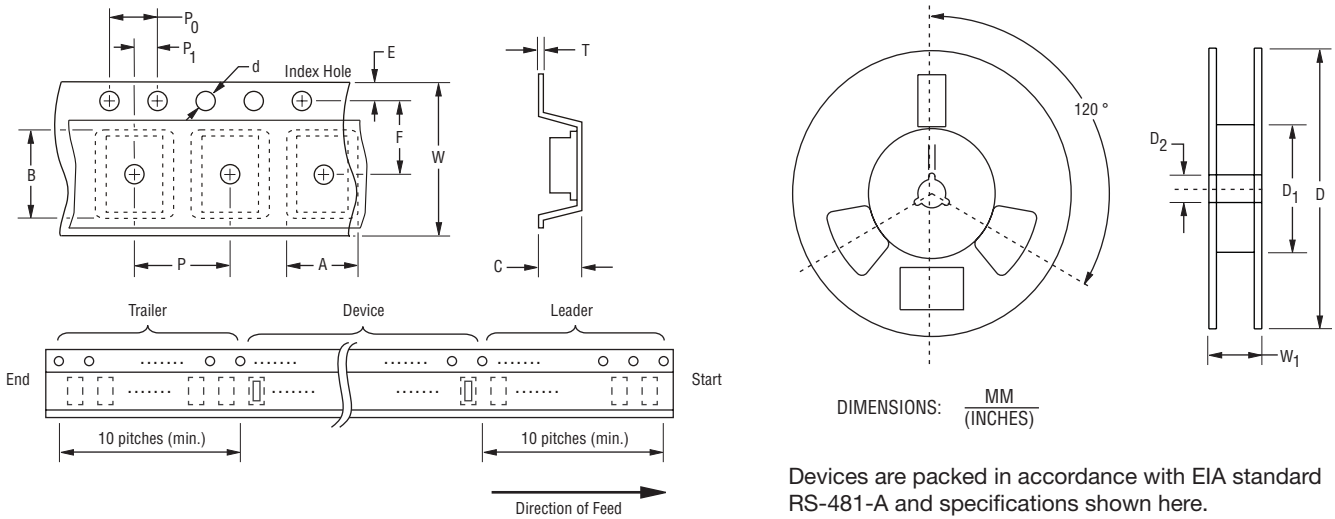
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Packaging Information

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



Devices are packed in accordance with EIA standard RS-481-A and specifications shown here.

| Item | Symbol | SMB (DO-214AA) |
|------------------------|----------------|--|
| Carrier Width | A | $\frac{4.94 \pm 0.10}{(0.194 - 0.004)}$ |
| Carrier Length | B | $\frac{5.57 \pm 0.10}{(0.210 \pm 0.004)}$ |
| Carrier Depth | C | $\frac{2.36 \pm 0.10}{(0.093 \pm 0.004)}$ |
| Sprocket Hole | d | $\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$ |
| Reel Outside Diameter | D | $\frac{330}{(12.992)}$ |
| 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 | $\frac{12.00 \pm 0.20}{(0.472 \pm 0.008)}$ |
| Reel Width | W ₁ | $\frac{18.4}{(0.724)}$ MAX. |
| Quantity per Reel | -- | 3,000 |