



THE DATASHEET OF SMBJ45A-QH





Features

- Surface Mount SMB package
- Standoff Voltage: 5 to 220 volts
- Power Dissipation: 600 watts
- RoHS compliant*
- AEC-Q101 compliant**

Applications

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

SMBJ-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-214AA (SMB) size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 5 V up to 220 V. Typical fast response times are less than 1.0 picosecond 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

Click these links for more information:



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} | 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 |
| 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. Mounted on 5.0 mm² (0.03 mm thick) copper pads to each terminal.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).

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

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

**Q" part number suffix indicates AEC-Q101 compliance.

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SMBJ-Q Transient Voltage Suppressor Diode Series

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) |
| SMBJ5.0A-Q | KEQ | SMBJ5.0CA-Q | AEQ | 6.40 | 7.00 | 10 | 5.0 | 800 | 9.2 | 65.3 | 12.0 | 326.5 |
| SMBJ6.0A-Q | KGQ | SMBJ6.0CA-Q | AGQ | 6.67 | 7.37 | 10 | 6.0 | 800 | 10.3 | 58.3 | 13.4 | 291.5 |
| SMBJ6.5A-Q | KKQ | SMBJ6.5CA-Q | AKQ | 7.22 | 7.98 | 10 | 6.5 | 500 | 11.2 | 53.6 | 14.6 | 268.0 |
| SMBJ7.0A-Q | KMQ | SMBJ7.0CA-Q | AMQ | 7.78 | 8.60 | 10 | 7.0 | 200 | 12.0 | 50.0 | 15.6 | 250.0 |
| SMBJ7.5A-Q | KPQ | SMBJ7.5CA-Q | APQ | 8.33 | 9.21 | 1.0 | 7.5 | 100 | 12.9 | 46.6 | 16.8 | 233.0 |
| SMBJ8.0A-Q | KRQ | SMBJ8.0CA-Q | ARQ | 8.89 | 9.83 | 1.0 | 8.0 | 50 | 13.6 | 44.2 | 17.7 | 221.0 |
| SMBJ8.5A-Q | KTQ | SMBJ8.5CA-Q | ATQ | 9.44 | 10.4 | 1.0 | 8.5 | 20 | 14.4 | 41.7 | 18.7 | 208.5 |
| SMBJ9.0A-Q | KVQ | SMBJ9.0CA-Q | AVQ | 10.0 | 11.1 | 1.0 | 9.0 | 10 | 15.4 | 39.0 | 20.0 | 195.0 |
| SMBJ10A-Q | KXQ | SMBJ10CA-Q | AXQ | 11.1 | 12.3 | 1.0 | 10 | 5.0 | 17.0 | 35.3 | 22.1 | 176.5 |
| SMBJ11A-Q | KZQ | SMBJ11CA-Q | AZQ | 12.2 | 13.5 | 1.0 | 11 | 1.0 | 18.2 | 33.0 | 23.7 | 165.0 |
| SMBJ12A-Q | LEQ | SMBJ12CA-Q | BEQ | 13.3 | 14.7 | 1.0 | 12 | 1.0 | 19.9 | 30.2 | 25.9 | 151.0 |
| SMBJ13A-Q | LGQ | SMBJ13CA-Q | BGQ | 14.4 | 15.9 | 1.0 | 13 | 1.0 | 21.5 | 28.0 | 28.0 | 140.0 |
| SMBJ14A-Q | LKQ | SMBJ14CA-Q | BKQ | 15.6 | 17.2 | 1.0 | 14 | 1.0 | 23.2 | 25.9 | 30.2 | 129.5 |
| SMBJ15A-Q | LMQ | SMBJ15CA-Q | BMQ | 16.7 | 18.5 | 1.0 | 15 | 1.0 | 24.4 | 24.6 | 31.7 | 123.0 |
| SMBJ16A-Q | LPQ | SMBJ16CA-Q | BPQ | 17.8 | 19.7 | 1.0 | 16 | 1.0 | 26.0 | 23.1 | 33.8 | 115.5 |
| SMBJ17A-Q | LRQ | SMBJ17CA-Q | BRQ | 18.9 | 20.9 | 1.0 | 17 | 1.0 | 27.6 | 21.8 | 35.9 | 109.0 |
| SMBJ18A-Q | LTQ | SMBJ18CA-Q | BTQ | 20.0 | 22.1 | 1.0 | 18 | 1.0 | 29.2 | 20.6 | 38.0 | 103.0 |
| SMBJ20A-Q | LVQ | SMBJ20CA-Q | BVQ | 22.2 | 24.5 | 1.0 | 20 | 1.0 | 32.4 | 18.6 | 42.1 | 93.0 |
| SMBJ22A-Q | LXQ | SMBJ22CA-Q | BXQ | 24.4 | 26.9 | 1.0 | 22 | 1.0 | 35.5 | 16.9 | 46.2 | 84.5 |
| SMBJ24A-Q | LZQ | SMBJ24CA-Q | BZQ | 26.7 | 29.5 | 1.0 | 24 | 1.0 | 38.9 | 15.5 | 50.6 | 77.5 |
| SMBJ26A-Q | MEQ | SMBJ26CA-Q | CEQ | 28.9 | 31.9 | 1.0 | 26 | 1.0 | 42.1 | 14.3 | 54.7 | 71.5 |
| SMBJ28A-Q | MGQ | SMBJ28CA-Q | CGQ | 31.1 | 34.4 | 1.0 | 28 | 1.0 | 45.4 | 13.3 | 59.0 | 66.5 |
| SMBJ30A-Q | MKQ | SMBJ30CA-Q | CKQ | 33.3 | 36.8 | 1.0 | 30 | 1.0 | 48.4 | 12.4 | 62.9 | 62.0 |
| SMBJ33A-Q | MMQ | SMBJ33CA-Q | CMQ | 36.7 | 40.6 | 1.0 | 33 | 1.0 | 53.3 | 11.3 | 69.3 | 56.5 |
| SMBJ36A-Q | MPQ | SMBJ36CA-Q | CPQ | 40 | 44.2 | 1.0 | 36 | 1.0 | 58.1 | 10.4 | 75.5 | 52.0 |
| SMBJ40A-Q | MRQ | SMBJ40CA-Q | CRQ | 44.4 | 49.1 | 1.0 | 40 | 1.0 | 64.5 | 9.3 | 83.9 | 46.5 |
| SMBJ43A-Q | MTQ | SMBJ43CA-Q | CTQ | 47.8 | 52.8 | 1.0 | 43 | 1.0 | 69.4 | 8.7 | 90.2 | 43.5 |
| SMBJ45A-Q | MVQ | SMBJ45CA-Q | CVQ | 50 | 55.3 | 1.0 | 45 | 1.0 | 72.7 | 8.3 | 94.5 | 41.5 |
| SMBJ48A-Q | MXQ | SMBJ48CA-Q | CXQ | 53.3 | 58.9 | 1.0 | 48 | 1.0 | 77.4 | 7.8 | 100.6 | 39.0 |
| SMBJ51A-Q | MZQ | SMBJ51CA-Q | CZQ | 56.7 | 62.7 | 1.0 | 51 | 1.0 | 82.4 | 7.3 | 107.1 | 36.5 |
| SMBJ54A-Q | NEQ | SMBJ54CA-Q | DEQ | 60 | 66.3 | 1.0 | 54 | 1.0 | 87.1 | 6.9 | 113.2 | 34.5 |
| SMBJ58A-Q | NGQ | SMBJ58CA-Q | DGQ | 64.4 | 71.2 | 1.0 | 58 | 1.0 | 93.6 | 6.5 | 121.7 | 32.5 |
| SMBJ60A-Q | NKQ | SMBJ60CA-Q | DKQ | 66.7 | 73.7 | 1.0 | 60 | 1.0 | 96.8 | 6.2 | 125.8 | 31.0 |
| SMBJ64A-Q | NMQ | SMBJ64CA-Q | DMQ | 71.1 | 78.6 | 1.0 | 64 | 1.0 | 103 | 5.9 | 133.9 | 29.5 |
| SMBJ70A-Q | NPQ | SMBJ70CA-Q | DPQ | 77.8 | 86.0 | 1.0 | 70 | 1.0 | 113 | 5.3 | 146.9 | 26.5 |
| SMBJ75A-Q | NRQ | SMBJ75CA-Q | DRQ | 83.3 | 92.1 | 1.0 | 75 | 1.0 | 121 | 5.0 | 157.3 | 25.0 |
| SMBJ78A-Q | NTQ | SMBJ78CA-Q | DTQ | 86.7 | 95.8 | 1.0 | 78 | 1.0 | 126 | 4.8 | 163.8 | 24.0 |
| SMBJ85A-Q | NVQ | SMBJ85CA-Q | DVQ | 94.4 | 104 | 1.0 | 85 | 1.0 | 137 | 4.4 | 178.1 | 22.0 |
| SMBJ90A-Q | NXQ | SMBJ90CA-Q | DXQ | 100 | 111 | 1.0 | 90 | 1.0 | 146 | 4.1 | 189.8 | 20.5 |
| SMBJ100A-Q | NZQ | SMBJ100CA-Q | DZQ | 111 | 123 | 1.0 | 100 | 1.0 | 162 | 3.7 | 210.6 | 18.5 |
| SMBJ110A-Q | PEQ | SMBJ110CA-Q | EEQ | 122 | 135 | 1.0 | 110 | 1.0 | 177 | 3.4 | 230.1 | 17.0 |
| SMBJ120A-Q | PGQ | SMBJ120CA-Q | EGQ | 133 | 147 | 1.0 | 120 | 1.0 | 193 | 3.1 | 250.9 | 15.5 |
| SMBJ130A-Q | PKQ | SMBJ130CA-Q | EKQ | 144 | 159 | 1.0 | 130 | 1.0 | 209 | 2.9 | 271.7 | 14.5 |
| SMBJ150A-Q | PMQ | SMBJ150CA-Q | EMQ | 167 | 185 | 1.0 | 150 | 1.0 | 243 | 2.5 | 315.9 | 12.5 |
| SMBJ160A-Q | PPQ | SMBJ160CA-Q | EPQ | 178 | 197 | 1.0 | 160 | 1.0 | 259 | 2.3 | 336.7 | 11.5 |
| SMBJ170A-Q | PRQ | SMBJ170CA-Q | ERQ | 189 | 209 | 1.0 | 170 | 1.0 | 275 | 2.2 | 357.5 | 11.0 |
| SMBJ180A-Q | PTQ | SMBJ180CA-Q | ETQ | 201 | 222 | 1.0 | 180 | 1.0 | 292 | 2.1 | 379.6 | 10.5 |
| SMBJ200A-Q | PVQ | SMBJ200CA-Q | EVQ | 224 | 247 | 1.0 | 200 | 1.0 | 324 | 1.9 | 421.2 | 9.5 |
| SMBJ220A-Q | PXQ | SMBJ220CA-Q | EXQ | 246 | 272 | 1.0 | 220 | 1.0 | 356 | 1.7 | 462.8 | 8.5 |

Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device.
 2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

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Users should verify actual device performance in their specific applications.

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Performance Graphs

Peak Pulse Power Derating Curve



Maximum Non-Repetitive Surge Current



Pulse Waveform



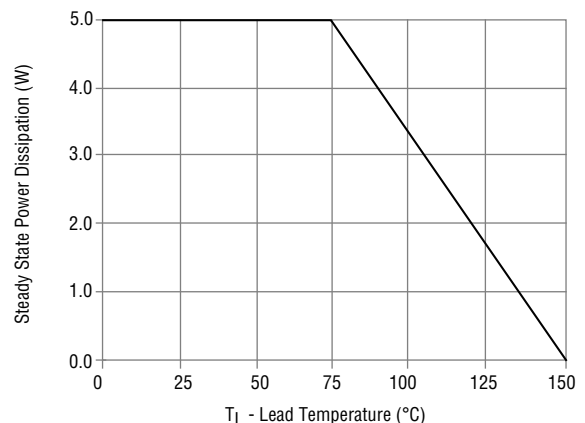
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



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SMBJ-Q Transient Voltage Suppressor Diode Series



Product Dimensions



| Dimension | SMB (DO-214AA) |
|-----------|--------------------------------|
| A | 4.06 - 4.57 (0.160 - 0.180) |
| B | 3.30 - 3.94 (0.130 - 0.155) |
| C | 1.95 - 2.20 (0.077 - 0.087) |
| D | 0.15 - 0.31 (0.006 - 0.012) |
| E | 5.21 - 5.59 (0.205 - 0.220) |
| F | 0.203 MAX. (0.008) |
| G | 2.13 - 2.44 (0.084 - 0.096) |
| H | 0.76 - 1.52 (0.030 - 0.060) |

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

Typical Part Marking



Recommended Footprint



| Dimension | SMB (DO-214AA) |
|-----------|-----------------|
| A (Max.) | 2.69 (0.106) |
| B (Min.) | 2.10 (0.083) |
| C (Min.) | 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

How to Order

Package **SMBJ 12 CA - Q**
 SMBJ = SMB/DO-214AA
 Working Peak Reverse Voltage
 5 ~ 220 = 5 ~ 220 V_{RWM} (Volts)
 Suffix
 A = 5 % Tolerance Unidirectional Device
 CA = 5 % Tolerance Bidirectional Device
 AEC-Q101 Suffix
 Q = AEC-Q101 Compliant, 13-inch Reel
 QH = AEC-Q101 Compliant, 7-inch Reel

Environmental Specifications

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

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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 481 standard specifications shown here.

| Item | Symbol | SMB (DO-214AA) | |
|------------------------|----------------|--|------------------------|
| | | 7-Inch Reel | 13-Inch Reel |
| Carrier Width | A | $\frac{3.67 \pm 0.20}{(0.144 \pm 0.008)}$ | |
| Carrier Length | B | $\frac{5.60 \pm 0.20}{(0.220 \pm 0.008)}$ | |
| Carrier Depth | C | $\frac{2.57 \pm 0.20}{(0.101 \pm 0.008)}$ | |
| Sprocket Hole | d | $\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$ | |
| 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 | $\frac{8.00 \pm 0.10}{(0.315 \pm 0.004)}$ | |
| 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 | -- | 500 | 3,000 |

REV. 10/20

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