

SMBJ10AQ THRU SMBJ190CAQ

Surface Mount Transient Voltage Suppressors

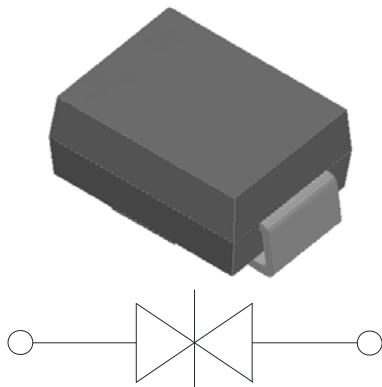
Uni-directional



Features

- Low profile package
- Ideal for automated placement
- Available in Uni-directional and Bi-directional
- 600 W peak pulse power capability with a 10/1000 μ s waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020C, LF maximum peak of 260 °C
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air),30kV (Contact)
- Part no. with suffix "Q" means AEC-Q101 qualified

Bi-directional



Typical Applications

For use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, automotive, and telecommunication.

Mechanical Data

- **Package:** DO-214AA (SMB)
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** For uni-directional types the band denotes cathode end, no marking on bi-directional types

■ Maximum Ratings ($T_a=25^\circ\text{C}$ Unless otherwise specified)

| PARAMETER | SYMBOL | UNIT | Max |
|--|----------------|------------------|----------------|
| Peak power dissipation, with a 10/1000us waveform (1) (2) (Fig.1) | P_{PPM} | W | 600 |
| Peak pulse current, with a 10/1000us waveform(1) | I_{PPM} | A | See Next Table |
| Peak forward surge current, 8.3 ms single half sine-wave unidirectional only (2) | I_{FSM} | A | 100 |
| Operating junction and storage temperature range | T_J, T_{STG} | $^\circ\text{C}$ | -55 to +150 |

■ Electrical Characteristics ($T_a=25^\circ\text{C}$ Unless otherwise specified)

| PARAMETER | SYMBOL | UNIT | VALUE |
|---|--------|------|-------|
| Maximum instantaneous forward voltage @ at 50A for unidirectional only (3) | V_F | V | 3.5 |



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■ Thermal Characteristics (T_a=25°C Unless otherwise specified)

| PARAMETER | SYMBOL | UNIT | Conditions | VALUE |
|-----------------------------|------------------|------|---------------------|-------|
| Thermal resistance(Typical) | R _{θJL} | °C/W | junction to lead | 20 |
| | R _{θJA} | °C/W | junction to ambient | 100 |

Notes:

- (1) Non-repetitive current pulse, per Fig. 3 and derated above T_A= 25°C per Fig.2.
- (2) Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal.
- (3) V_F<3.5V for devices of V_{BR}<190V.

■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | UNIT WEIGHT(g) | MINIMUM PACKAGE(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|--------------------|----------------------|----------------------------|---------------|
| SMBJ SERIES | F1 | Approximate 0.1003 | 3000 | 48000 | 13" reel |

■ Electrical Characteristics (T_a=25°C Unless otherwise specified)

| Part Number(Uni) | Part Number(Bi) | Breakdown Voltage V _{BR} @I _T | | | Maximum Reverse Leakage I _R @ V _{RWM} ⁽⁶⁾ (μA) | Working Peak Reverse Voltage V _{RWM} (V) | Maximum Reverse Surge Current I _{PP} ⁽⁵⁾ (A) | Maximum Clamping Voltage V _c @ I _{PP} (V) |
|------------------|-----------------|---|---------|------------------------------------|---|---|--|---|
| | | Min(V) | Max (V) | I _T ⁽⁴⁾ (mA) | | | | |
| SMBJ10AQ | SMBJ10CAQ | 11.10 | 12.30 | 1 | 5 | 10.0 | 35.3 | 17.0 |
| SMBJ11AQ | SMBJ11CAQ | 12.20 | 13.50 | 1 | 5 | 11.0 | 33.0 | 18.2 |
| SMBJ12AQ | SMBJ12CAQ | 13.30 | 14.70 | 1 | 5 | 12.0 | 30.2 | 19.9 |
| SMBJ13AQ | SMBJ13CAQ | 14.40 | 15.90 | 1 | 1 | 13.0 | 27.9 | 21.5 |
| SMBJ14AQ | SMBJ14CAQ | 15.60 | 17.20 | 1 | 1 | 14.0 | 25.9 | 23.2 |
| SMBJ15AQ | SMBJ15CAQ | 16.70 | 18.50 | 1 | 1 | 15.0 | 24.6 | 24.4 |
| SMBJ16AQ | SMBJ16CAQ | 17.80 | 19.70 | 1 | 1 | 16.0 | 23.1 | 26.0 |
| SMBJ17AQ | SMBJ17CAQ | 18.90 | 20.90 | 1 | 1 | 17.0 | 21.7 | 27.6 |
| SMBJ18AQ | SMBJ18CAQ | 20.00 | 22.10 | 1 | 1 | 18.0 | 20.6 | 29.2 |
| SMBJ19AQ | SMBJ19CAQ | 21.10 | 23.30 | 1 | 1 | 19.0 | 19.5 | 30.8 |
| SMBJ20AQ | SMBJ20CAQ | 22.20 | 24.50 | 1 | 1 | 20.0 | 18.5 | 32.4 |
| SMBJ22AQ | SMBJ22CAQ | 24.40 | 26.90 | 1 | 1 | 22.0 | 16.9 | 35.5 |
| SMBJ24AQ | SMBJ24CAQ | 26.70 | 29.50 | 1 | 1 | 24.0 | 15.4 | 38.9 |
| SMBJ26AQ | SMBJ26CAQ | 28.90 | 31.90 | 1 | 1 | 26.0 | 14.3 | 42.1 |
| SMBJ28AQ | SMBJ28CAQ | 31.10 | 34.40 | 1 | 1 | 28.0 | 13.2 | 45.4 |
| SMBJ30AQ | SMBJ30CAQ | 33.30 | 36.80 | 1 | 1 | 30.0 | 12.4 | 48.4 |
| SMBJ33AQ | SMBJ33CAQ | 36.70 | 40.60 | 1 | 1 | 33.0 | 11.3 | 53.3 |



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| | | | | | | | | |
|-----------|------------|--------|--------|---|---|-------|------|-------|
| SMBJ36AQ | SMBJ36CAQ | 40.00 | 44.20 | 1 | 1 | 36.0 | 10.3 | 58.1 |
| SMBJ40AQ | SMBJ40CAQ | 44.40 | 49.10 | 1 | 1 | 40.0 | 9.3 | 64.5 |
| SMBJ43AQ | SMBJ43CAQ | 47.80 | 52.80 | 1 | 1 | 43.0 | 8.7 | 69.4 |
| SMBJ45AQ | SMBJ45CAQ | 50.00 | 55.30 | 1 | 1 | 45.0 | 8.3 | 72.7 |
| SMBJ48AQ | SMBJ48CAQ | 53.30 | 58.90 | 1 | 1 | 48.0 | 7.8 | 77.4 |
| SMBJ51AQ | SMBJ51CAQ | 56.70 | 62.70 | 1 | 1 | 51.0 | 7.3 | 82.4 |
| SMBJ54AQ | SMBJ54CAQ | 60.00 | 66.30 | 1 | 1 | 54.0 | 6.9 | 87.1 |
| SMBJ58AQ | SMBJ58CAQ | 64.40 | 71.20 | 1 | 1 | 58.0 | 6.4 | 93.6 |
| SMBJ60AQ | SMBJ60CAQ | 66.70 | 73.70 | 1 | 1 | 60.0 | 6.2 | 96.8 |
| SMBJ64AQ | SMBJ64CAQ | 71.10 | 78.60 | 1 | 1 | 64.0 | 5.8 | 103.0 |
| SMBJ70AQ | SMBJ70CAQ | 77.80 | 86.00 | 1 | 1 | 70.0 | 5.3 | 113.0 |
| SMBJ75AQ | SMBJ75CAQ | 83.30 | 92.10 | 1 | 1 | 75.0 | 5.0 | 121.0 |
| SMBJ78AQ | SMBJ78CAQ | 86.70 | 95.80 | 1 | 1 | 78.0 | 4.8 | 126.0 |
| SMBJ80AQ | SMBJ80CAQ | 88.80 | 97.60 | 1 | 1 | 80.0 | 4.6 | 129.6 |
| SMBJ85AQ | SMBJ85CAQ | 94.40 | 104.00 | 1 | 1 | 85.0 | 4.4 | 137.0 |
| SMBJ90AQ | SMBJ90CAQ | 100.00 | 111.00 | 1 | 1 | 90.0 | 4.1 | 146.0 |
| SMBJ100AQ | SMBJ100CAQ | 111.00 | 123.00 | 1 | 1 | 100.0 | 3.7 | 162.0 |
| SMBJ110AQ | SMBJ110CAQ | 122.00 | 135.00 | 1 | 1 | 110.0 | 3.4 | 177.0 |
| SMBJ120AQ | SMBJ120CAQ | 133.00 | 147.00 | 1 | 1 | 120.0 | 3.1 | 193.0 |
| SMBJ130AQ | SMBJ130CAQ | 144.00 | 159.00 | 1 | 1 | 130.0 | 2.9 | 209.0 |
| SMBJ140AQ | SMBJ140CAQ | 155.00 | 171.00 | 1 | 1 | 140.0 | 2.7 | 226.8 |
| SMBJ150AQ | SMBJ150CAQ | 167.00 | 185.00 | 1 | 1 | 150.0 | 2.5 | 243.0 |
| SMBJ160AQ | SMBJ160CAQ | 178.00 | 197.00 | 1 | 1 | 160.0 | 2.3 | 259.0 |
| SMBJ170AQ | SMBJ170CAQ | 189.00 | 209.00 | 1 | 1 | 170.0 | 2.2 | 275.0 |
| SMBJ180AQ | SMBJ180CAQ | 200.00 | 220.00 | 1 | 1 | 180.0 | 2.1 | 291.6 |
| SMBJ190AQ | SMBJ190CAQ | 211.00 | 232.00 | 1 | 1 | 190.0 | 2.0 | 307.8 |

Notes:

(4) Pulse test: $t_p \leq 50\text{ms}$

(5) Surge current waveform per Fig. 3 and derated per Fig.2.



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■ Characteristics (Typical)

FIG1: Peak Pulse Power Rating Curve

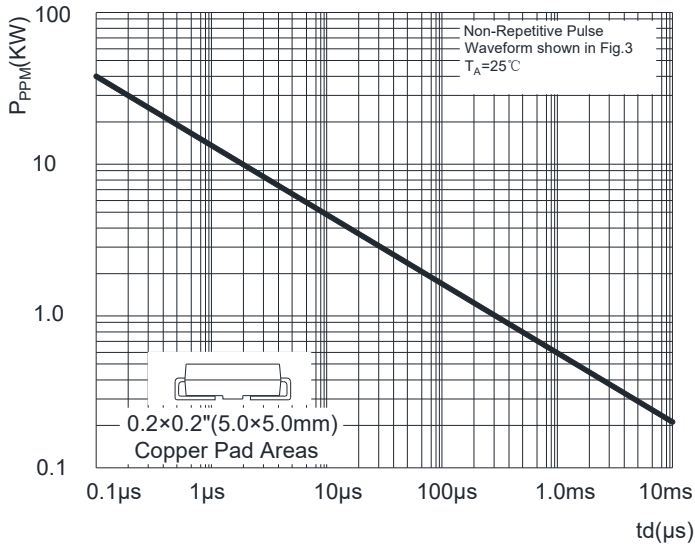


FIG2: Pulse Power or Current vs. Initial Junction Temperature

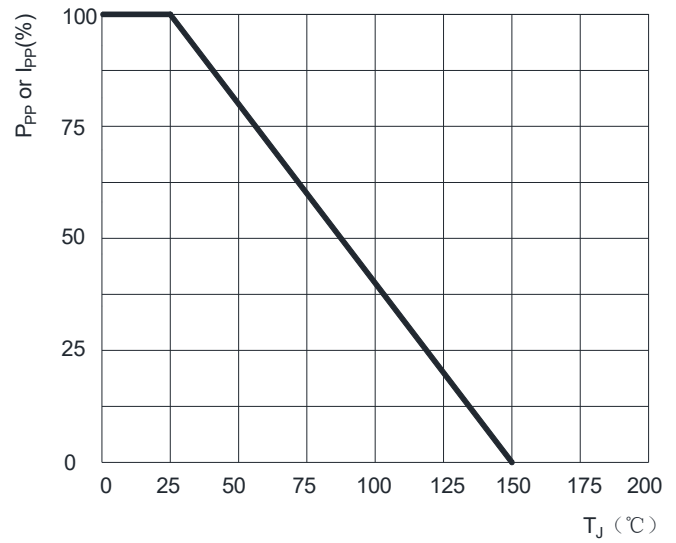


FIG3: Pulse Waveform

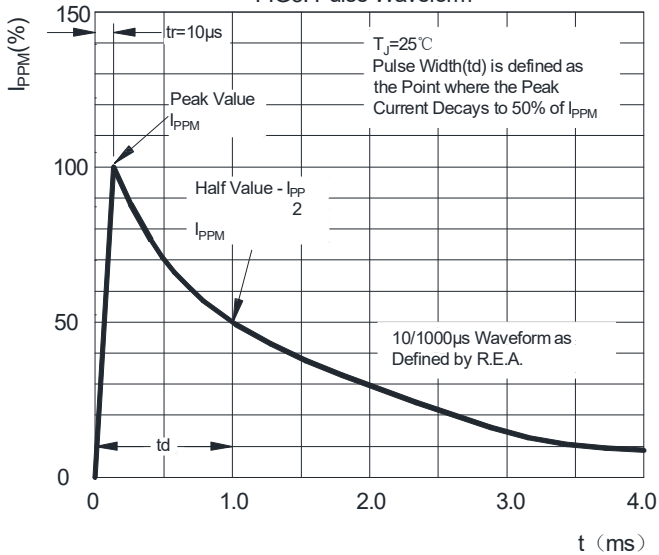


FIG4: Typical Transient Thermal Impedance

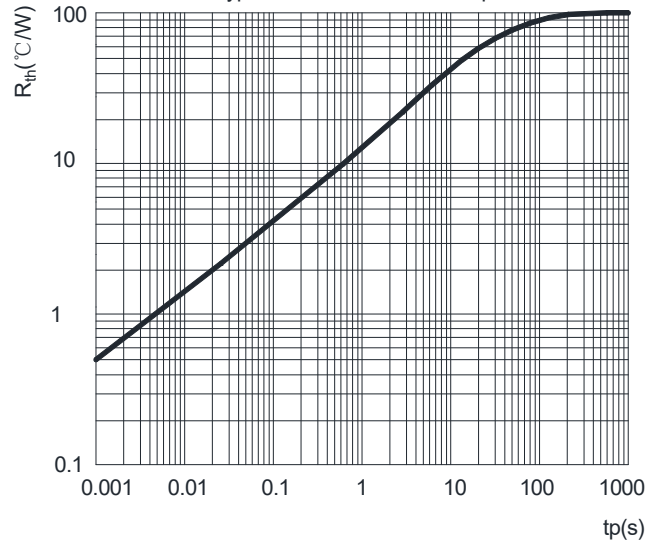
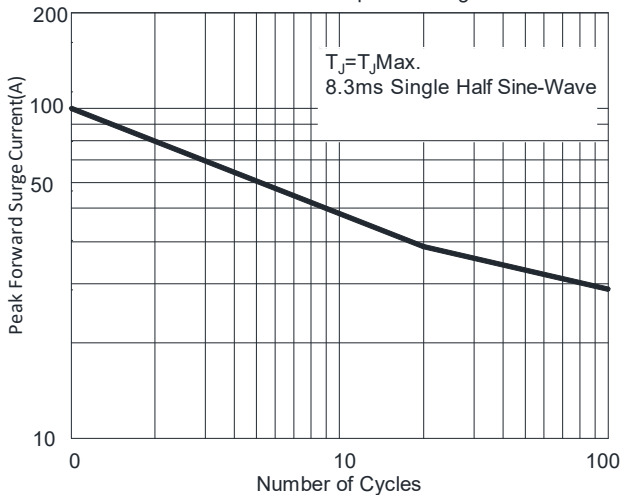


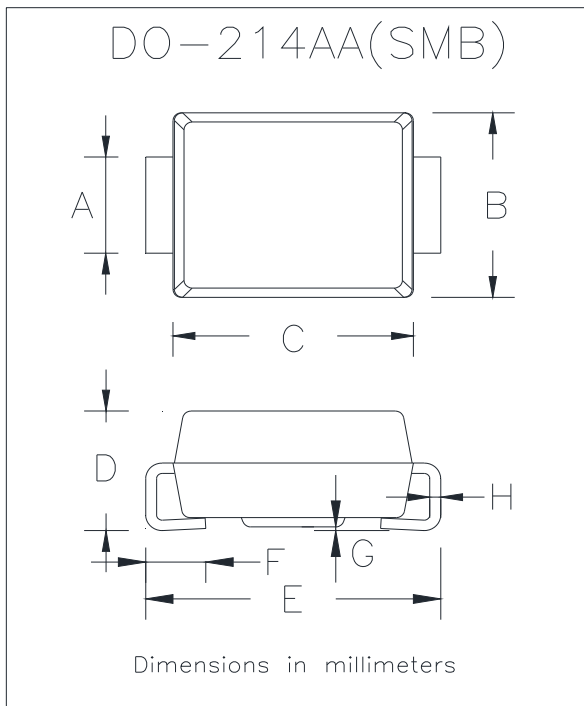
FIG5: Maximum Non-Repetitive Surge Current





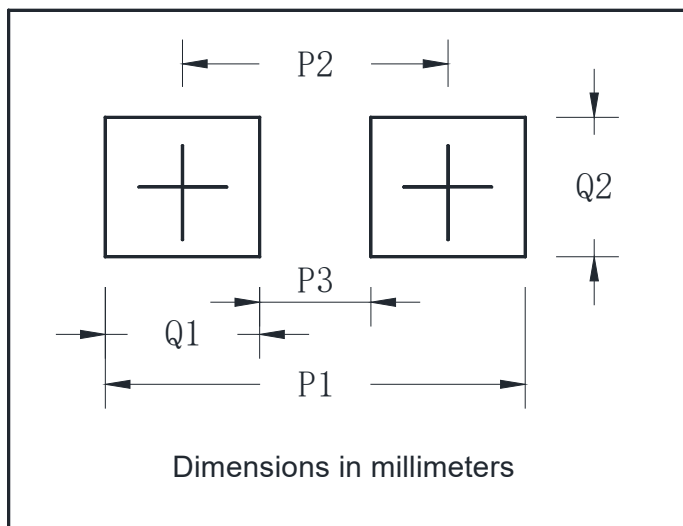
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■ Outline Dimensions



| DO-214AA(SMB) | | |
|---------------|------|------|
| Dim | Min | Max |
| A | 1.85 | 2.15 |
| B | 3.30 | 3.94 |
| C | 4.05 | 4.75 |
| D | 1.99 | 2.61 |
| E | 5.21 | 5.59 |
| F | 0.90 | 1.41 |
| G | 0.10 | 0.20 |
| H | 0.15 | 0.31 |

■ Suggested pad layout



| DO-214AA(SMB) | |
|---------------|-------------|
| Dim | Millimeters |
| P1 | 6.8 |
| P2 | 4.3 |
| P3 | 1.8 |
| Q1 | 2.5 |
| Q2 | 2.3 |



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