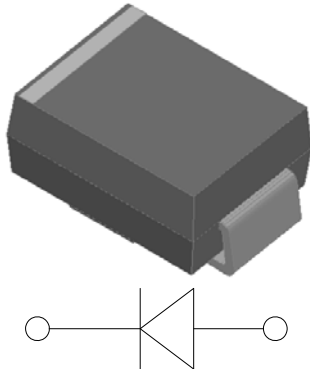


## Surface Mount Transient Voltage Suppressors

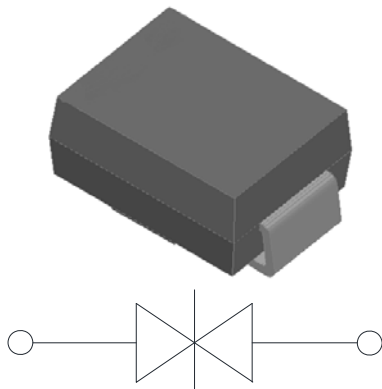
### Uni-directional



### 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  $\mu$ 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 pulse power dissipation, with a 10/1000us waveform <sup>(1) (2)</sup> (Fig.1)          | $P_{PPM}$ | W                | 600            |
| Peak pulse current, with a 10/1000us waveform <sup>(1)</sup>                                | $I_{PPM}$ | A                | See Next Table |
| Power dissipation, on infinite heat sink at $T_L=75^\circ\text{C}$                          | $P_D$     | W                | 5.0            |
| Peak forward surge current, 8.3 ms single half sine-wave unidirectional only <sup>(2)</sup> | $I_{FSM}$ | A                | 100            |
| Operating junction                                                                          | $T_J$     | $^\circ\text{C}$ | -55 to +175    |
| Storage temperature range                                                                   | $T_{STG}$ | $^\circ\text{C}$ | -55 to +175    |

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

| PARAMETER                                                                                | SYMBOL | UNIT | VALUE |
|------------------------------------------------------------------------------------------|--------|------|-------|
| Maximum instantaneous forward voltage<br>@ at 50A for unidirectional only <sup>(3)</sup> | $V_F$  | V    | 3.5   |



## SMBJ5.0AQ THRU SMBJ440CAQ

### ■Electrical Characteristics (T<sub>a</sub>=25℃ Unless otherwise specified)

| Part Number(Uni) | Part Number(Bi) | Breakdown Voltage V <sub>BR</sub> @I <sub>T</sub> |         |                                    | Maximum Reverse Leakage I <sub>R</sub> @ V <sub>RWM</sub> (μA) | Working Peak Reverse Voltage V <sub>RWM</sub> (V) | Maximum Reverse Surge Current I <sub>PP</sub> <sup>(5)</sup> (A) | Maximum Clamping Voltage V <sub>c</sub> @ I <sub>PP</sub> (V) |
|------------------|-----------------|---------------------------------------------------|---------|------------------------------------|----------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------|
|                  |                 | Min(V)                                            | Max (V) | I <sub>T</sub> <sup>(4)</sup> (mA) |                                                                |                                                   |                                                                  |                                                               |
| SMBJ5.0AQ        | SMBJ5.0CAQ      | 6.4                                               | 7.07    | 10                                 | 800                                                            | 5                                                 | 65.2                                                             | 9.2                                                           |
| SMBJ6.0AQ        | SMBJ6.0CAQ      | 6.67                                              | 7.37    | 10                                 | 800                                                            | 6                                                 | 58.3                                                             | 10.3                                                          |
| SMBJ6.5AQ        | SMBJ6.5CAQ      | 7.22                                              | 7.98    | 10                                 | 500                                                            | 6.5                                               | 53.6                                                             | 11.2                                                          |
| SMBJ7.0AQ        | SMBJ7.0CAQ      | 7.78                                              | 8.6     | 10                                 | 200                                                            | 7                                                 | 50                                                               | 12                                                            |
| SMBJ7.5AQ        | SMBJ7.5CAQ      | 8.33                                              | 9.21    | 1                                  | 100                                                            | 7.5                                               | 46.5                                                             | 12.9                                                          |
| SMBJ8.0AQ        | SMBJ8.0CAQ      | 8.89                                              | 9.83    | 1                                  | 50                                                             | 8                                                 | 44.1                                                             | 13.6                                                          |
| SMBJ8.5AQ        | SMBJ8.5CAQ      | 9.44                                              | 10.4    | 1                                  | 10                                                             | 8.5                                               | 41.7                                                             | 14.4                                                          |
| SMBJ9.0AQ        | SMBJ9.0CAQ      | 10                                                | 11.1    | 1                                  | 5                                                              | 9                                                 | 39.0                                                             | 15.4                                                          |
| 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                                                          |
| 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                                                         |



## SMBJ5.0AQ THRU SMBJ440CAQ

|           |            |     |     |   |   |     |      |     |
|-----------|------------|-----|-----|---|---|-----|------|-----|
| SMBJ200AQ | SMBJ200CAQ | 224 | 247 | 1 | 1 | 200 | 1.85 | 324 |
| SMBJ220AQ | SMBJ220CAQ | 246 | 272 | 1 | 1 | 220 | 1.69 | 356 |
| SMBJ250AQ | SMBJ250CAQ | 279 | 309 | 1 | 1 | 250 | 1.48 | 405 |
| SMBJ300AQ | SMBJ300CAQ | 335 | 371 | 1 | 1 | 300 | 1.23 | 486 |
| SMBJ350AQ | SMBJ350CAQ | 391 | 432 | 1 | 1 | 350 | 1.06 | 567 |
| SMBJ400AQ | SMBJ400CAQ | 447 | 494 | 1 | 1 | 400 | 0.93 | 648 |
| SMBJ440AQ | SMBJ440CAQ | 492 | 543 | 1 | 1 | 440 | 0.84 | 713 |

### ■ Thermal Characteristics (T<sub>a</sub>=25°C Unless otherwise specified)

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

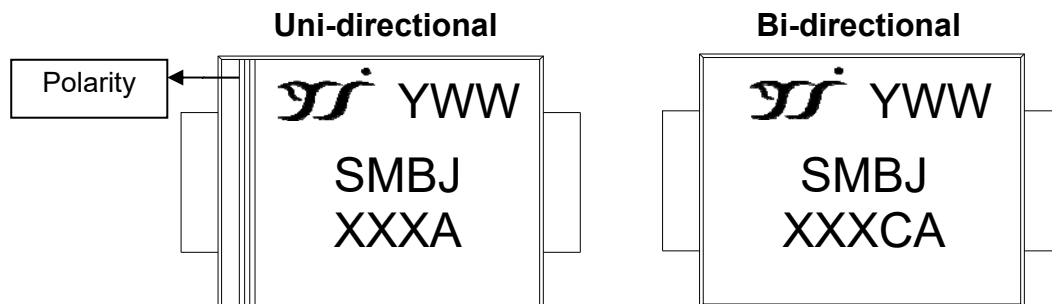
Notes:

- (1) Non-repetitive current pulse, per Fig.3 and derated above T<sub>J</sub>= 50°C per Fig.2.
- (2) Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal.
- (3) VF<3.5V for devices of VBR<440V.
- (4) Pulse test: t<sub>p</sub>≤50ms
- (5) Surge current waveform per Fig.3 and derated per Fig.2.

### ■ 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      |

### ■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. XXX is marking code, like 190A/190CA marking code is 190
4. Body color: Black
5. YWW is date code, "Y" is year. "WW" is week.

For instance:

The 17<sup>th</sup> week of 2021, date code is 117

The 17<sup>th</sup> week of 2022, date code is 217



# SMBJ5.0AQ THRU SMBJ440CAQ

## ■ Characteristics (Typical)

Fig.1 Peak Pulse Power Rating Curve

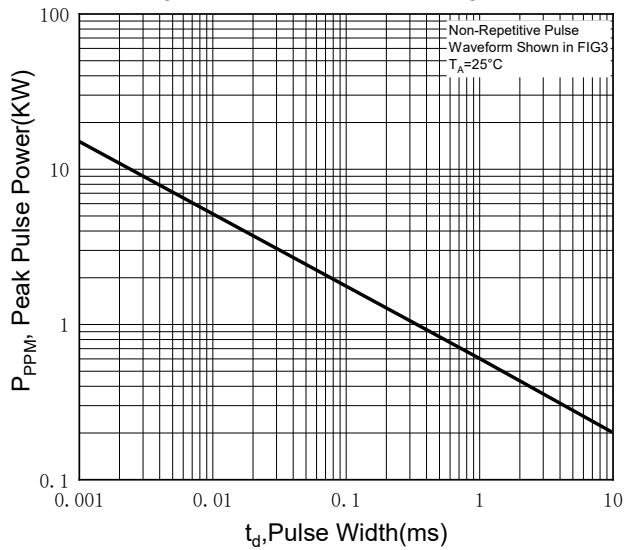


Fig.2 Pulse Power or Current vs. Initial Junction Temperature

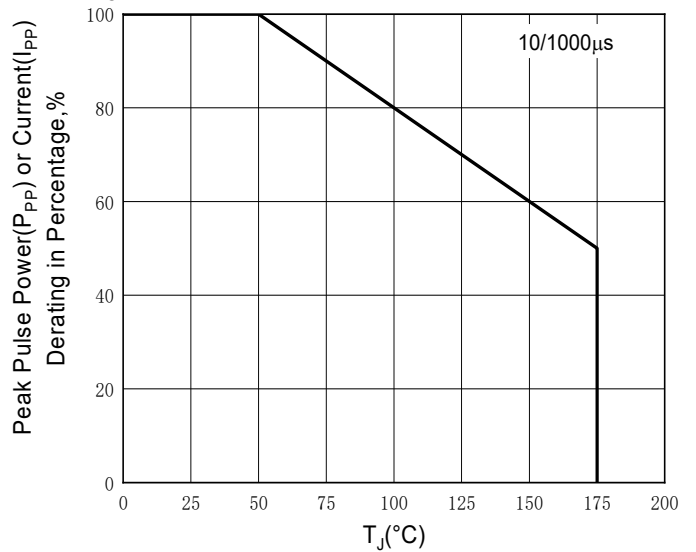


Fig.3 Pulse Waveform

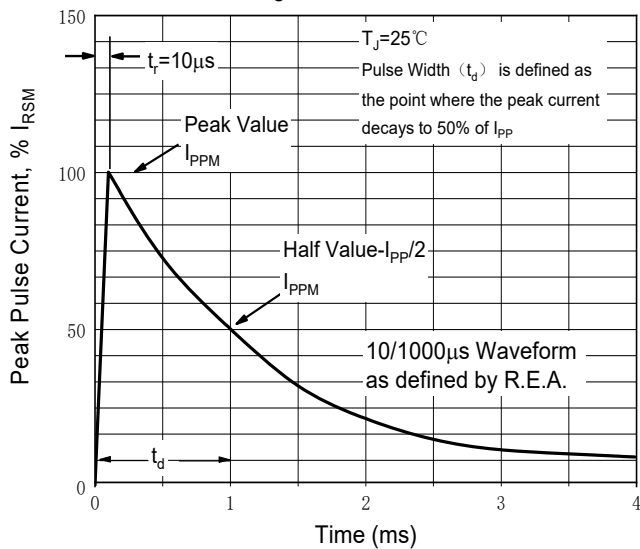


Fig.4 Typical Transient Thermal Impedance

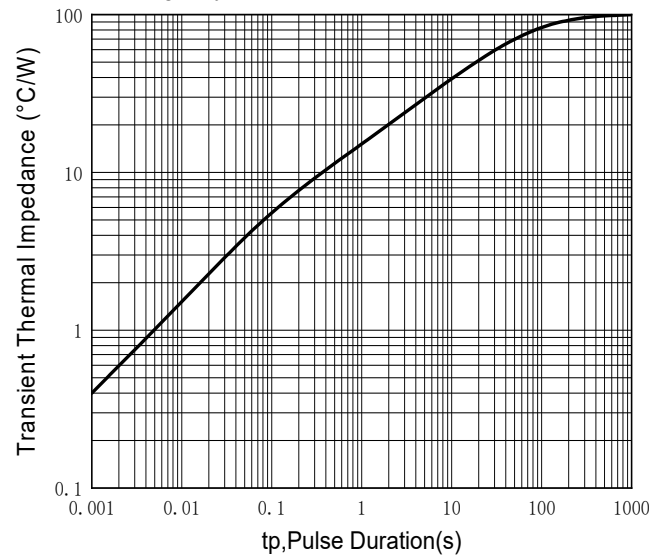


Fig.5 Maximum Non-Repetitive Forward Surge Current

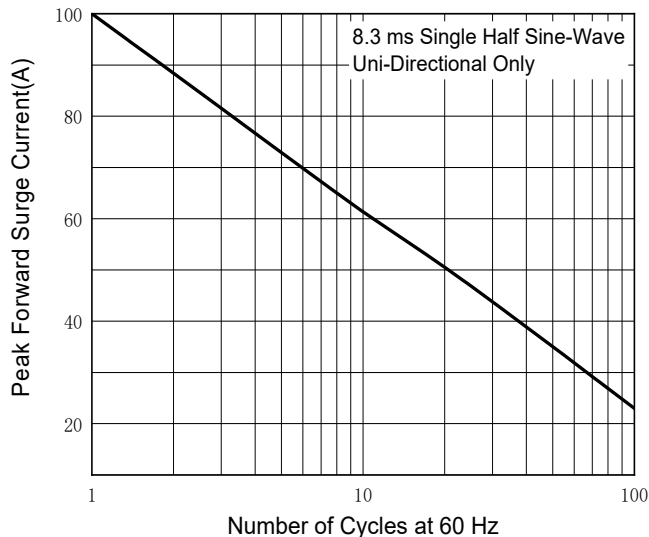
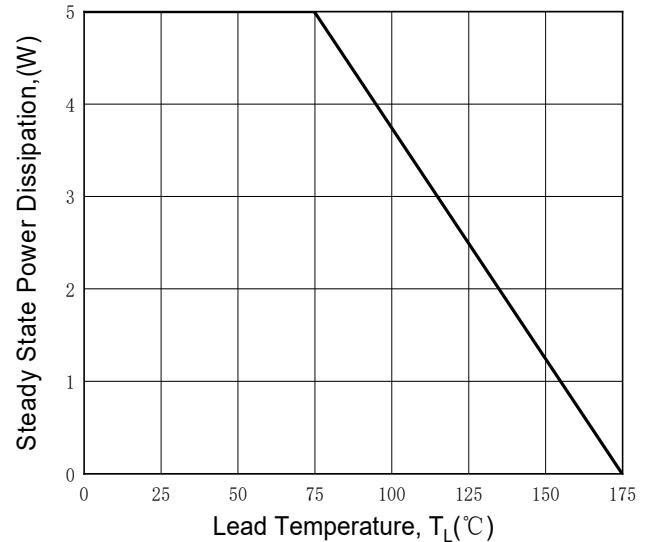


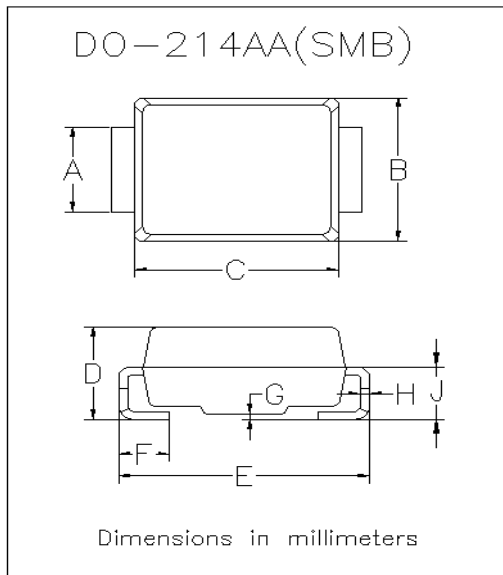
Fig.6 Steady State Power Derating Curve





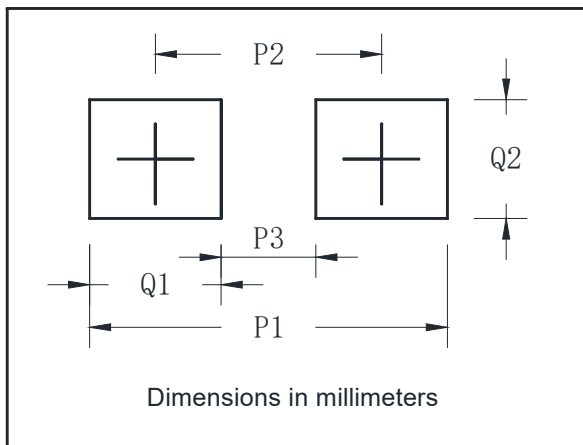
## SMBJ5.0AQ THRU SMBJ440CAQ

### ■ 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             | 0.05 | 0.20 |
| H             | 0.15 | 0.31 |
| J             | 1.05 | 1.55 |

### ■ Suggested pad layout



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



## SMBJ5.0AQ THRU SMBJ440CAQ

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### Disclaimer

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