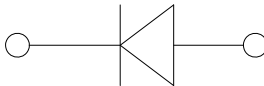
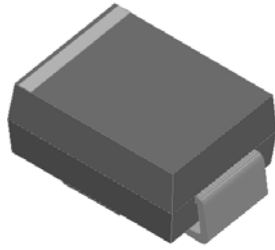


## Surface Mount Transient Voltage Suppressors

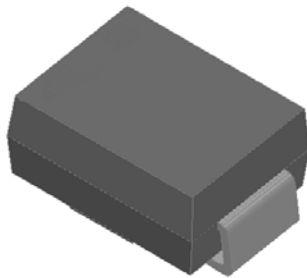
### Uni-directional



### 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
- Low incremental surge resistance
- Very fast response time
- Meets MSL level 1, per J-STD-020, 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-002B and JESD22-B102D
- **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 <sup>(1)</sup> <sup>(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   |



# P6SMB6.8AQ THRU P6SMB220CAQ

## ■Electrical Characteristics (T<sub>a</sub>=25°C 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> <sup>(6)</sup> @ 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) |   |   |  |   |
| P6SMB6.8AQ        | P6SMB6.8CAQ      | 6.46  | 7.14    | 10                                 | 1000  | 5.8   | 57.1   | 10.5  |
| P6SMB7.5AQ        | P6SMB7.5CAQ      | 7.13  | 7.88    | 10                                 | 500   | 6.4   | 53.1   | 11.3  |
| P6SMB8.2AQ        | P6SMB8.2CAQ      | 7.79  | 8.61    | 10                                 | 200   | 7.0   | 49.6   | 12.1  |
| P6SMB9.1AQ        | P6SMB9.1CAQ      | 8.65  | 9.56    | 1                                  | 50  | 7.8   | 44.8   | 13.4  |
| P6SMB10AQ         | P6SMB10CAQ       | 9.50  | 10.50   | 1                                  | 10  | 8.6   | 41.4   | 14.5  |
| P6SMB11AQ         | P6SMB11CAQ       | 10.45   | 11.55   | 1                                  | 5   | 9.4   | 38.5   | 15.6  |
| P6SMB12AQ         | P6SMB12CAQ       | 11.40   | 12.60   | 1                                  | 5   | 10.2  | 35.9   | 16.7  |
| P6SMB13AQ         | P6SMB13CAQ       | 12.35   | 13.65   | 1                                  | 5   | 11.1  | 33.0   | 18.2  |
| P6SMB15AQ         | P6SMB15CAQ       | 14.25   | 15.75   | 1                                  | 1   | 12.8  | 28.3   | 21.2  |
| P6SMB16AQ         | P6SMB16CAQ       | 15.20   | 16.80   | 1                                  | 1   | 13.6  | 26.7   | 22.5  |
| P6SMB18AQ         | P6SMB18CAQ       | 17.10   | 18.90   | 1                                  | 1   | 15.3  | 23.8   | 25.2  |
| P6SMB20AQ         | P6SMB20CAQ       | 19.00   | 21.00   | 1                                  | 1   | 17.1  | 21.7   | 27.7  |
| P6SMB22AQ         | P6SMB22CAQ       | 20.90   | 23.10   | 1                                  | 1   | 18.8  | 19.6   | 30.6  |
| P6SMB24AQ         | P6SMB24CAQ       | 22.80   | 25.20   | 1                                  | 1   | 20.5  | 18.1   | 33.2  |
| P6SMB27AQ         | P6SMB27CAQ       | 25.65   | 28.35   | 1                                  | 1   | 23.1  | 16.0   | 37.5  |
| P6SMB30AQ         | P6SMB30CAQ       | 28.50   | 31.50   | 1                                  | 1   | 25.6  | 14.5   | 41.4  |
| P6SMB33AQ         | P6SMB33CAQ       | 31.35   | 34.65   | 1                                  | 1   | 28.2  | 13.1   | 45.7  |
| P6SMB36AQ         | P6SMB36CAQ       | 34.20   | 37.80   | 1                                  | 1   | 30.8  | 12.0   | 49.9  |
| P6SMB39AQ         | P6SMB39CAQ       | 37.05   | 40.95   | 1                                  | 1   | 33.3  | 11.1   | 53.9  |
| P6SMB43AQ         | P6SMB43CAQ       | 40.85   | 45.15   | 1                                  | 1   | 36.8  | 10.1   | 59.3  |
| P6SMB47AQ         | P6SMB47CAQ       | 44.65   | 49.35   | 1                                  | 1   | 40.2  | 9.3  | 64.8  |
| P6SMB51AQ         | P6SMB51CAQ       | 48.45   | 53.55   | 1                                  | 1   | 43.6  | 8.6  | 70.1  |
| P6SMB56AQ         | P6SMB56CAQ       | 53.20   | 58.80   | 1                                  | 1   | 47.8  | 7.8  | 77.0  |
| P6SMB62AQ         | P6SMB62CAQ       | 58.90   | 65.10   | 1                                  | 1   | 53.0  | 7.1  | 85.0  |
| P6SMB68AQ         | P6SMB68CAQ       | 64.60   | 71.40   | 1                                  | 1   | 58.1  | 6.5  | 92.0  |
| P6SMB75AQ         | P6SMB75CAQ       | 71.25   | 78.75   | 1                                  | 1   | 64.1  | 5.8  | 103.0   |
| P6SMB82AQ         | P6SMB82CAQ       | 77.90   | 86.10   | 1                                  | 1   | 70.1  | 5.3  | 113.0   |
| P6SMB91AQ         | P6SMB91CAQ       | 86.45   | 95.35   | 1                                  | 1   | 77.8  | 4.8  | 125.0   |
| P6SMB100AQ        | P6SMB100CAQ      | 95.00   | 105.00  | 1                                  | 1   | 85.5  | 4.4  | 137.0   |
| P6SMB110AQ        | P6SMB110CAQ      | 104.50  | 115.50  | 1                                  | 1   | 94.0  | 4.0  | 152.0   |
| P6SMB120AQ        | P6SMB120CAQ      | 114.00  | 126.00  | 1                                  | 1   | 102.0   | 3.6  | 165.0   |
| P6SMB130AQ        | P6SMB130CAQ      | 123.50  | 136.50  | 1                                  | 1   | 111.0   | 3.4  | 179.0   |
| P6SMB150AQ        | P6SMB150CAQ      | 142.50  | 157.50  | 1                                  | 1   | 128.0   | 2.9  | 207.0   |
| P6SMB160AQ        | P6SMB160CAQ      | 152.00  | 168.00  | 1                                  | 1   | 136.0   | 2.7  | 219.0   |
| P6SMB170AQ        | P6SMB170CAQ      | 161.50  | 178.50  | 1                                  | 1   | 145.0   | 2.6  | 234.0   |
| P6SMB180AQ        | P6SMB180CAQ      | 171.00  | 189.00  | 1                                  | 1   | 154.0   | 2.4  | 246.0   |
| P6SMB200AQ        | P6SMB200CAQ      | 190.00  | 210.00  | 1                                  | 1   | 171.0   | 2.2  | 274.0   |
| P6SMB220AQ        | P6SMB220CAQ      | 209.00  | 231.00  | 1                                  | 1   | 185.0   | 1.8  | 328.0   |



# P6SMB6.8AQ THRU P6SMB220CAQ

## ■ 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   |

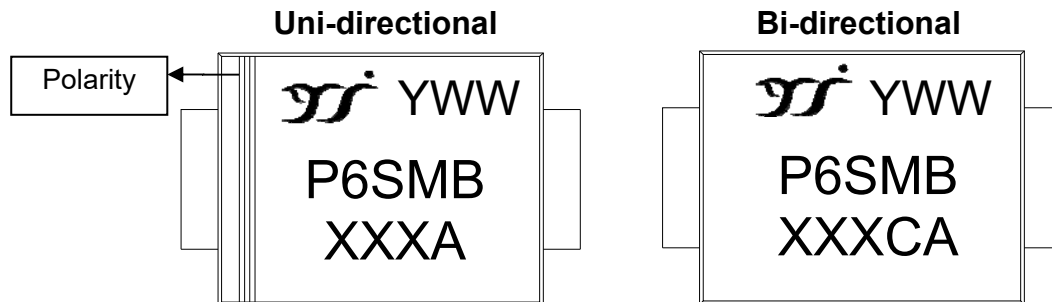
Notes:

- (1) Non-repetitive current pulse, per Fig.3 and derated above T<sub>A</sub>= 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<sub>F</sub><3.5V for devices of V<sub>BR</sub><190V
- (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 |
|---------------|--------------|----------------|----------------------|----------------------------|---------------|
| P6SMB SERIES  | F1           | 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 220A/220CA marking code is 220
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



# P6SMB6.8AQ THRU P6SMB220CAQ

## ■ Characteristics (Typical)

Fig.1 Peak Pulse Power Rating Curve

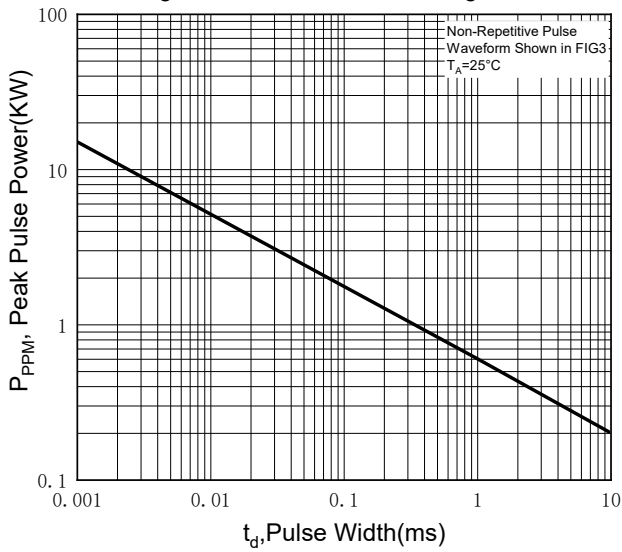


Fig.2 Pulse Power or Current vs. Initial Junction Temperature

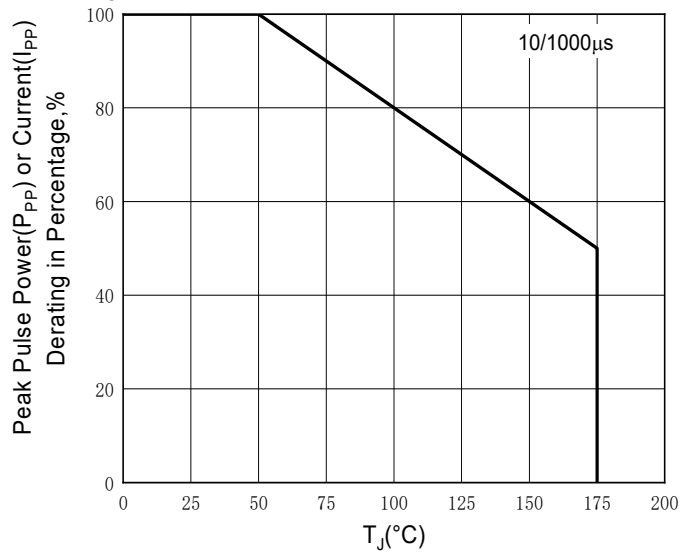


Fig.3 Pulse Waveform

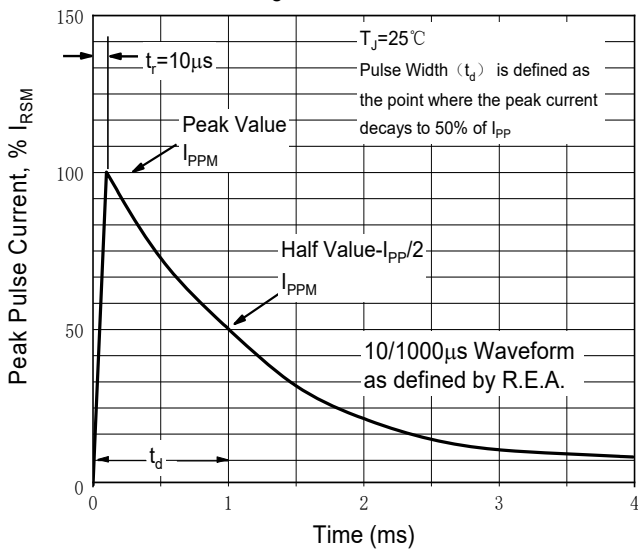


Fig.4 Typical Transient Thermal Impedance

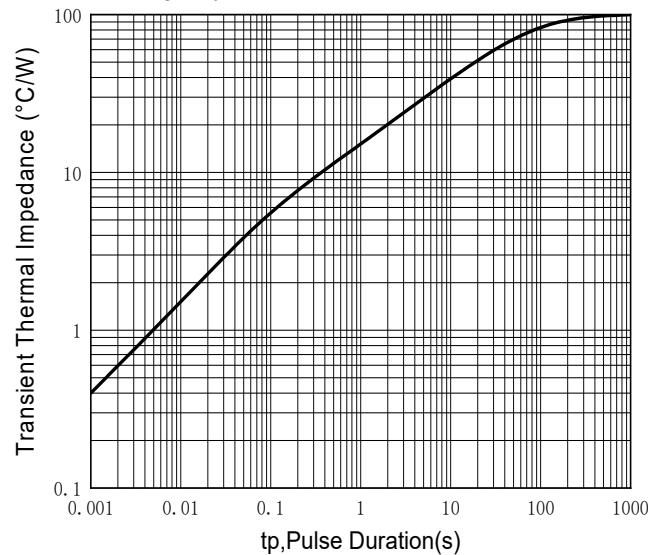


Fig.5 Maximum Non-Repetitive Forward Surge Current

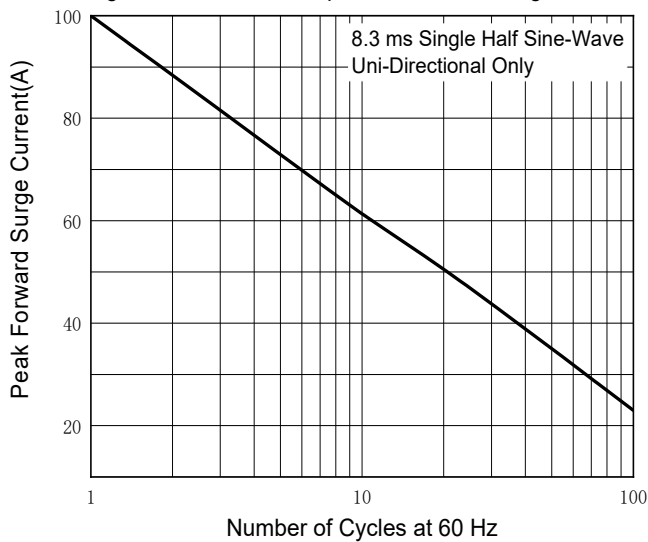
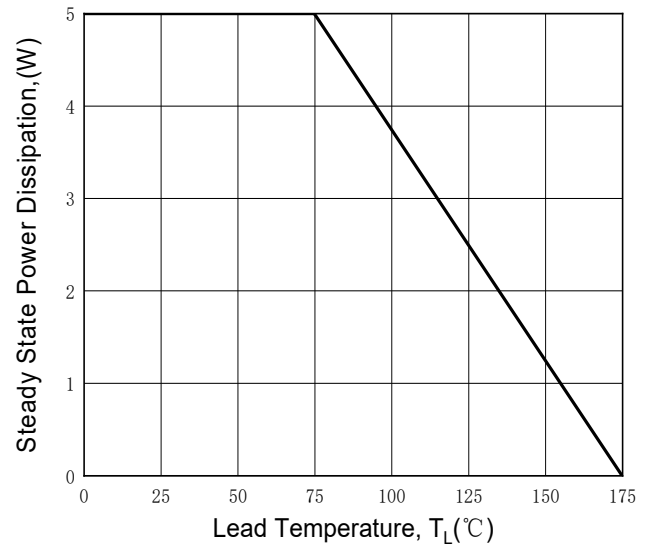


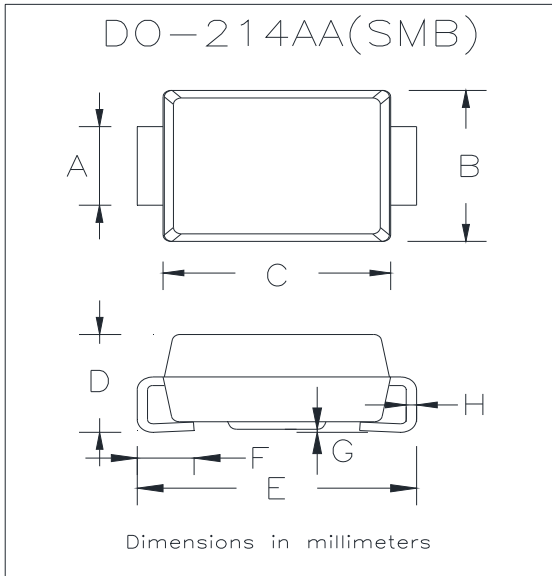
Fig.6 Steady State Power Derating Curve





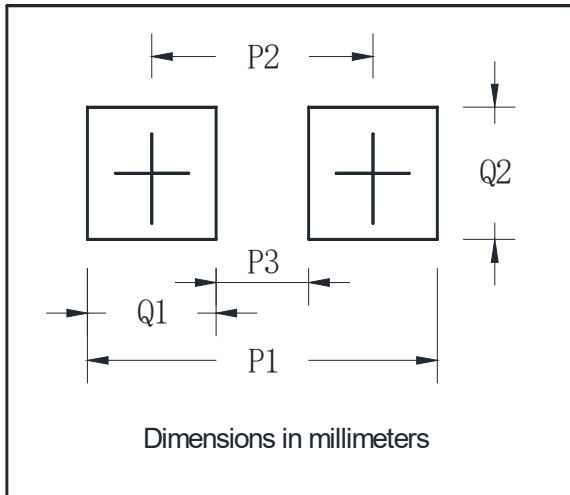
# P6SMB6.8AQ THRU P6SMB220CAQ

## ■ 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 |

## ■ Suggested pad layout



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



## P6SMB6.8AQ THRU P6SMB220CAQ

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