

Surface Mount Transient Voltage Suppressors
Peak Pulse Power 600W Breakdown Voltage 6.8 to 550V

P6SMB6.8A thru P6SMB550CA

Features

- Low profile package with built-in strain relief for surface mounted applications
- Plastic package has UL flammability classification 94V-0
- Very-fast response time
- Excellent clamping capability
- Low incremental surge resistance
- Glass passivated junction
- High temperature soldering guaranteed: 250°C/10seconds at terminals
- 600W peak pulse power capability with a 10/1000µs waveform, repetition rate (duty cycle) : 0.01%

Outline

Mechanical Data

- Case : JEDEC DO-214AA(SMB) molded plastic body
- Terminals: Pure tin plated, solderable per MIL-STD-750 method 2026
- Polarity: For uni-directional types, the band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- Weight: 0.003 oz., 0.093 gram

Devices for bidirectional applications

For bi-directional devices, use suffix CA (e.g. P6SMB10CA). Electrical characteristics apply in both directions.

Maximum Ratings and Characteristics (TA=25°C, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---------|-------------------------|------|
| Peak power dissipation with a 10/1000µs waveform (Fig. 1) | PPPM | Minimum 600 (Note 1, 2) | W |
| Peak pulse current with a 10/1000µs waveform (Note 1) | IPPM | See next table | A |
| Power dissipation on infinite heatsink, TA=50°C | PM(AV) | 5 | W |
| Peak forward surge current, 8.3ms single half sine wave uni-directional only (Note 2) | IFSM | 100 | A |
| Typical thermal resistance, junction-to-leads | RθJL | 20 | °C/W |
| Typical thermal resistance, junction-to-ambient (Note 3) | RθJA | 100 | °C/W |
| Operating junction and storage temperature range | TJ;TSTG | -55 ~ +150 | °C |

Notes: 1.Non-repetitive current pulse, per Fig. 3 and derated above TA=25°C per Fig. 2

2.Mounted on 0.2"×0.2" (5mm×5mm) copper pads to each terminal

3.Mounted on minimum recommended pad layout



Electrical Characteristics Ratings at 25°C ambient temperature, unless otherwise noted. $V_F=3.5V$ at $I_F=50A$ (uni-directional only)

| Device | Device Marking Code | | Breakdown Voltage $V_{(BR)}$ (V) ¹ | | Test current at I_T (mA) | Standoff voltage V_{WM} (V) | Maximum reverse leakage at V_{WM} I_{D^3} (μA) | Maximum peak pulse Current I_{PPM^2} (A) | Maximum clamping voltage at I_{PPM} V_C (V) | Maximum temperature coefficient of $V_{(BR)}$ ($\%/^{\circ}C$) |
|-----------|---------------------|------|---|------|----------------------------|-------------------------------|---|--|---|--|
| | UNI | BI | Min | Max | | | | | | |
| P6SMB6.8A | 6V8A | 6V8C | 6.45 | 7.14 | 10 | 5.80 | 1000 | 57.1 | 10.5 | 0.057 |
| P6SMB7.5A | 7V5A | 7V5C | 7.13 | 7.88 | 10 | 6.40 | 500 | 53.1 | 11.3 | 0.061 |
| P6SMB8.2A | 8V2A | 8V2C | 7.79 | 8.61 | 10 | 7.02 | 200 | 49.6 | 12.1 | 0.065 |
| P6SMB9.1A | 9V1A | 9V1C | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 44.8 | 13.4 | 0.068 |
| P6SMB10A | 10A | 10C | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 41.4 | 14.5 | 0.073 |
| P6SMB11A | 11A | 11C | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 38.5 | 15.6 | 0.075 |
| P6SMB12A | 12A | 12C | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 35.9 | 16.7 | 0.078 |
| P6SMB13A | 13A | 13C | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 33.0 | 18.2 | 0.081 |
| P6SMB15A | 15A | 15C | 14.3 | 15.8 | 1.0 | 12.8 | 1.0 | 28.3 | 21.2 | 0.084 |
| P6SMB16A | 16A | 16C | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 26.7 | 22.5 | 0.086 |
| P6SMB18A | 18A | 18C | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 23.8 | 25.2 | 0.088 |
| P6SMB20A | 20A | 20C | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 21.7 | 27.7 | 0.090 |
| P6SMB22A | 22A | 22C | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 19.6 | 30.6 | 0.092 |
| P6SMB24A | 24A | 24C | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 18.1 | 33.2 | 0.094 |
| P6SMB27A | 27A | 27C | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 16.0 | 37.5 | 0.096 |
| P6SMB30A | 30A | 30C | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 14.5 | 41.4 | 0.097 |
| P6SMB33A | 33A | 33C | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 13.1 | 45.7 | 0.098 |
| P6SMB36A | 36A | 36C | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 12.0 | 49.9 | 0.099 |
| P6SMB39A | 39A | 39C | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 11.1 | 53.9 | 0.100 |
| P6SMB43A | 43A | 43C | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 10.1 | 59.3 | 0.101 |
| P6SMB47A | 47A | 47C | 44.7 | 49.4 | 1.0 | 40.2 | 1.0 | 9.3 | 64.8 | 0.101 |
| P6SMB51A | 51A | 51C | 48.5 | 53.6 | 1.0 | 43.6 | 1.0 | 8.6 | 70.1 | 0.102 |
| P6SMB56A | 56A | 56C | 53.2 | 58.8 | 1.0 | 47.8 | 1.0 | 7.8 | 77.0 | 0.103 |
| P6SMB62A | 62A | 62C | 58.9 | 65.1 | 1.0 | 53.0 | 1.0 | 7.1 | 85.0 | 0.104 |
| P6SMB68A | 68A | 68C | 64.6 | 71.4 | 1.0 | 58.1 | 1.0 | 6.5 | 92.0 | 0.104 |
| P6SMB75A | 75A | 75C | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 5.8 | 103 | 0.105 |
| P6SMB82A | 82A | 82C | 77.9 | 86.1 | 1.0 | 70.1 | 1.0 | 5.3 | 113 | 0.105 |
| P6SMB91A | 91A | 91C | 86.5 | 95.5 | 1.0 | 77.8 | 1.0 | 4.8 | 125 | 0.106 |
| P6SMB100A | 100A | 100C | 95.0 | 105 | 1.0 | 85.5 | 1.0 | 4.4 | 137 | 0.106 |
| P6SMB110A | 110A | 110C | 105 | 116 | 1.0 | 94.0 | 1.0 | 3.9 | 152 | 0.107 |
| P6SMB120A | 120A | 120C | 114 | 126 | 1.0 | 102 | 1.0 | 3.6 | 165 | 0.107 |
| P6SMB130A | 130A | 130C | 124 | 137 | 1.0 | 111 | 1.0 | 3.4 | 179 | 0.107 |
| P6SMB150A | 150A | 150C | 143 | 158 | 1.0 | 128 | 1.0 | 2.9 | 207 | 0.108 |
| P6SMB160A | 160A | 160C | 152 | 168 | 1.0 | 136 | 1.0 | 2.7 | 219 | 0.108 |
| P6SMB170A | 170A | 170C | 162 | 179 | 1.0 | 145 | 1.0 | 2.6 | 234 | 0.108 |
| P6SMB180A | 180A | 180C | 171 | 189 | 1.0 | 154 | 1.0 | 2.4 | 246 | 0.108 |
| P6SMB200A | 200A | 200C | 190 | 210 | 1.0 | 171 | 1.0 | 2.2 | 274 | 0.108 |



Electrical Characteristics(Cont.)

| Device | Device Marking Code | | Breakdown Voltage $V_{(BR)}$ (V) ¹ | | Test current at I_T (mA) | Standoff voltage V_{WM} (V) | Maximum reverse leakage at V_{WM} I_D^3 (μA) | Maximum peak pulse Current I_{PPM}^2 (A) | Maximum clamping voltage at I_{PPM} V_C (V) | Maximum temperature coefficient of $V_{(BR)}$ ($\%/^{\circ}C$) |
|-----------|---------------------|------|---|-------|----------------------------|-------------------------------|---|--|---|--|
| | UNI | BI | Min | Max | | | | | | |
| P6SMB220A | 220A | 220C | 209 | 231 | 1.0 | 185 | 1.0 | 1.8 | 328 | 0.108 |
| P6SMB250A | 250A | 250C | 237 | 263 | 1.0 | 214 | 1.0 | 1.7 | 344 | 0.108 |
| P6SMB300A | 300A | 300C | 285 | 315 | 1.0 | 256 | 1.0 | 1.4 | 414 | 0.108 |
| P6SMB350A | 350A | 350C | 333 | 368 | 1.0 | 300 | 1.0 | 1.2 | 482 | 0.108 |
| P6SMB400A | 400A | 400C | 380 | 420 | 1.0 | 342 | 1.0 | 1.1 | 548 | 0.108 |
| P6SMB440A | 440A | 440C | 418 | 462 | 1.0 | 376 | 1.0 | 1.0 | 602 | 0.108 |
| P6SMB480A | 480A | 480C | 456 | 504 | 1.0 | 408 | 1.0 | 0.9 | 658 | 0.108 |
| P6SMB510A | 510A | 510C | 485 | 535 | 1.0 | 434 | 1.0 | 0.9 | 698 | 0.108 |
| P6SMB530A | 530A | 530C | 503.5 | 556.5 | 1.0 | 450 | 1.0 | 0.8 | 725 | 0.108 |
| P6SMB540A | 540A | 540C | 513 | 567 | 1.0 | 459 | 1.0 | 0.8 | 740 | 0.108 |
| P6SMB550A | 550A | 550C | 522.5 | 577.5 | 1.0 | 495 | 1.0 | 0.8 | 760 | 0.108 |

Note: 1. $V_{(BR)}$ measured after I_T applied for 300 μs , I_T =square wave pulse or equivalent

2. Surge current waveform per Fig. 3 and derate per Fig.2

3. For bidirectional types with V_{WM} of 10 volts and less, the I_D limit is doubled

4. All terms and symbols are consistent with ANSI/IEEE C62.35

Characteristic Curves

Fig. 1 – Peak Pulse Power Rating Curve

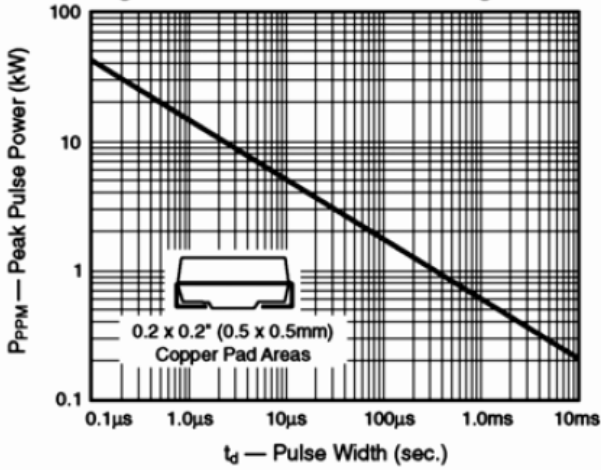


Fig. 2 – Pulse Derating Curve

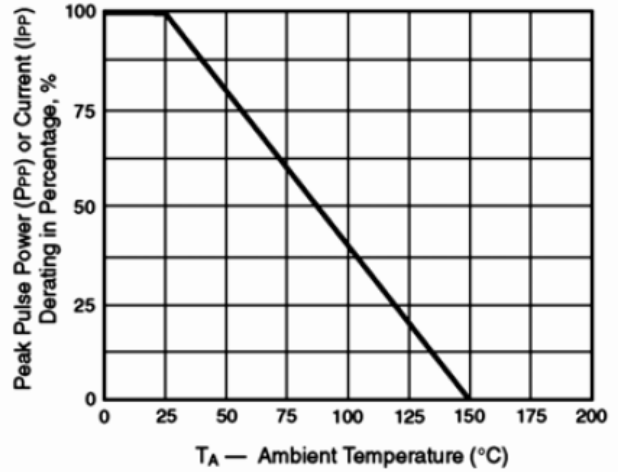


Fig. 3 – Pulse Waveform



Fig. 4 – Typical Junction Capacitance

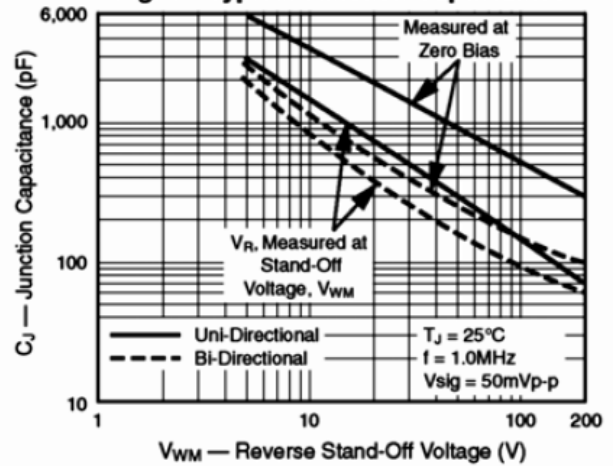


Fig. 5 – Typical Transient Thermal Impedance

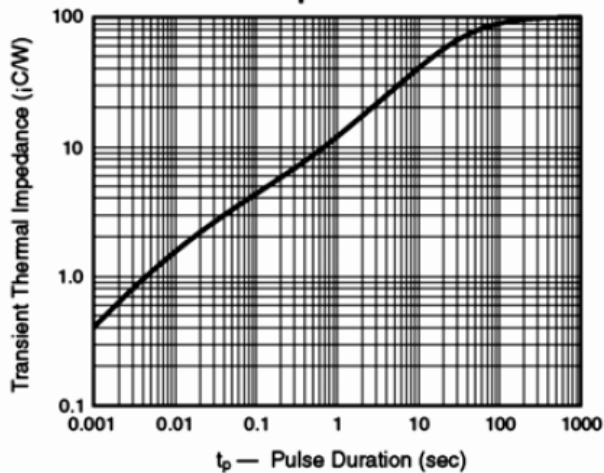
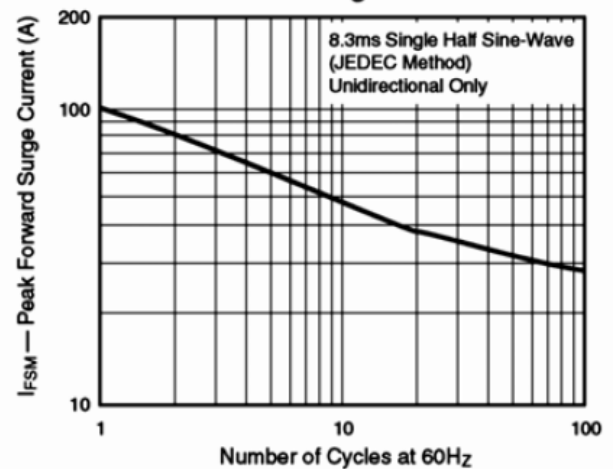
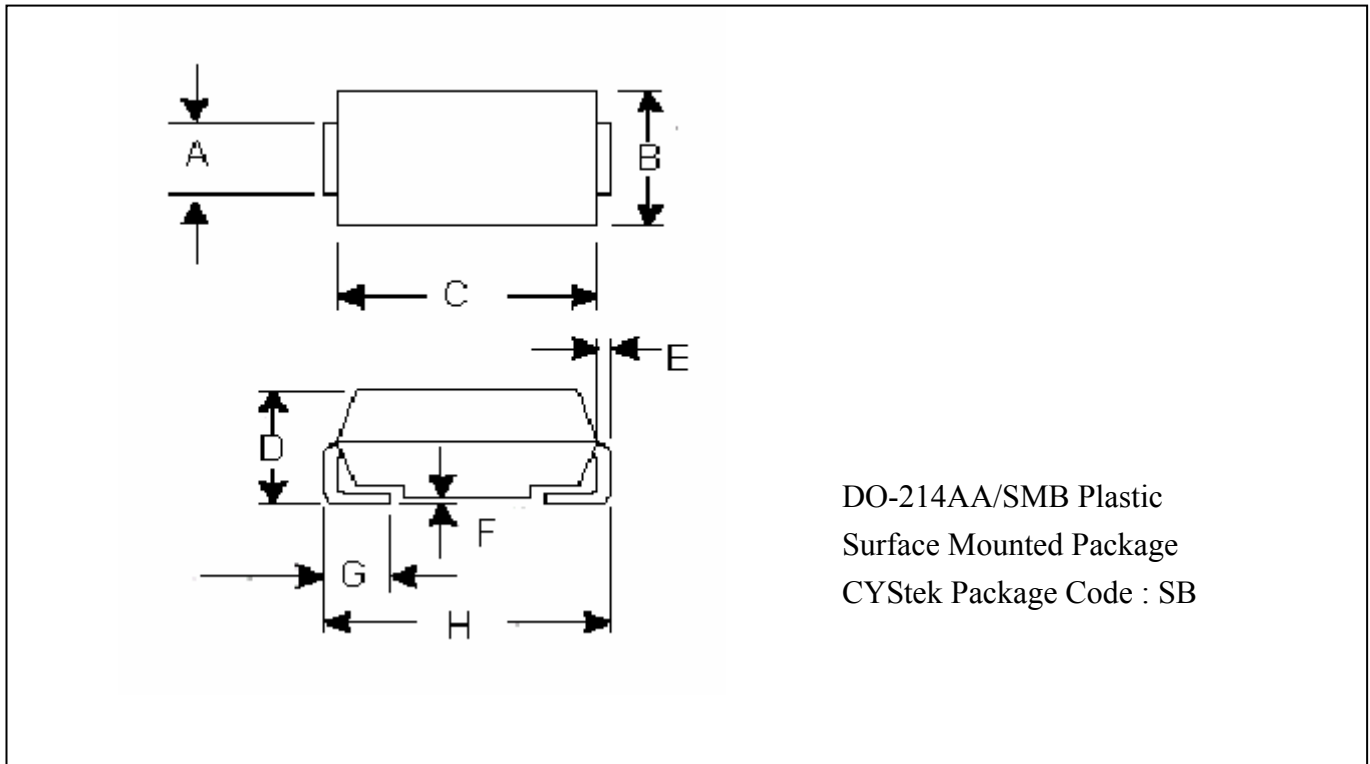


Fig. 6 – Maximum Non-Repetitive Peak Forward Surge Current



DO-214AA/SMB Dimension



DO-214AA/SMB Plastic
 Surface Mounted Package
 CYStek Package Code : SB

*:Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|------|-----|--------|-------|-------------|------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.076 | 0.082 | 1.93 | 2.08 | E | 0.006 | 0.012 | 0.15 | 0.31 |
| B | 0.137 | 0.147 | 3.48 | 3.73 | F | 0.004 | 0.008 | 0.10 | 0.20 |
| C | 0.167 | 0.187 | 4.25 | 4.75 | G | 0.035 | 0.056 | 0.90 | 1.41 |
| D | 0.078 | 0.103 | 1.99 | 2.61 | H | 0.207 | 0.215 | 5.26 | 5.46 |

Notes : 1.Controlling dimension : millimeters.
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0

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