

Transient Voltage Suppressors (TVS) Data Sheet

Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycle):0.01%
- Fast response time
- Typical I_R less than 1µA above 11V.
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020.

Mechanical Data

- Case: JEDEC DO-214AAMoulded plastic
- Terminal:solderplated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any

Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating | Symbol | Value | Units |
|--|-----------------|-------------|-------|
| Peak pulse power dissipation at 10/1000µs waveform (Note1, Fig.1) | P_{PPM} | Minimum 600 | Watts |
| Peak pulse current of at 10/1000µs waveform (Note 1, Fig.3) | I_{PPM} | See Table | Amps |
| Steady state power dissipation at $T_L=75^\circ\text{C}$ (Fig.4) | $P_{M(AV)}$ | 5.0 | Watts |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2) | I_{FSM} | 100 | Amps |
| Operating junction and Storage Temperature Range. | T_J, T_{STG} | -55 to +150 | °C |
| Typical thermal resistance junction to lead | $R_{\theta JL}$ | 20 | °C/W |
| Typical thermal resistance junction to ambient | $R_{\theta JA}$ | 100 | °C/W |

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^\circ\text{C}$ per Fig.2.

2. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

Dimensions (DO-214AA/SMB)

| Symbol | Millimeters | | Inches | |
|--------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| L | 4.06 | 4.75 | 0.160 | 0.187 |
| D | 3.30 | 3.94 | 0.130 | 0.155 |
| D1 | 1.95 | 2.20 | 0.077 | 0.086 |
| T | 5.18 | 5.59 | 0.204 | 0.220 |
| T1 | 0.76 | 1.52 | 0.030 | 0.060 |
| d | - | 0.203 | - | 0.008 |
| H | 1.99 | 2.61 | 0.078 | 0.103 |

Electrical Characteristics ($T_A=25^{\circ}\text{C}$)

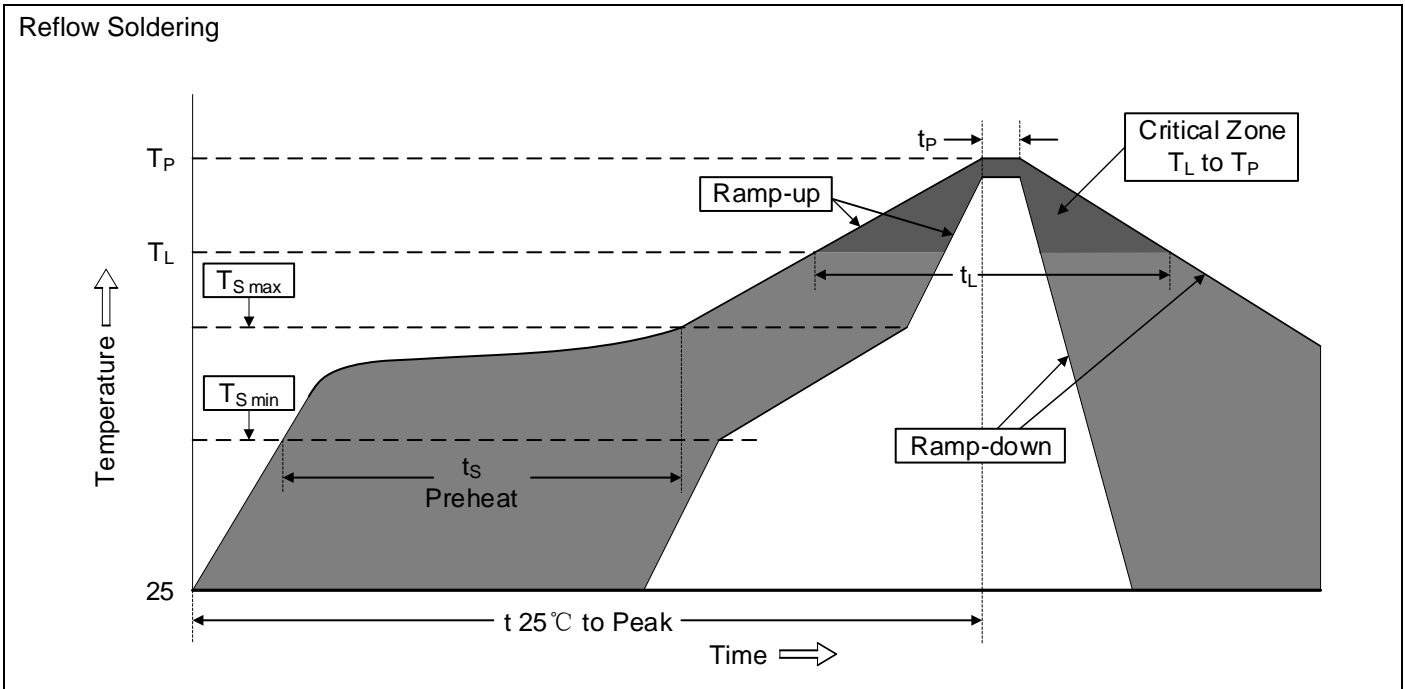
| Part Number | | Device Marking Code | | Reverse Stand-Of f Voltage | Breakdown Voltage @ I_T | Test Current | Maximum Clamping Voltage @ I_{PP} | Peak Pulse Current | Reverse Leakage @ V_{RWM} |
|----------------|---------------|---------------------|------|----------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | UNI | BI | $V_{RWM}(V)$ | $V_{BR}(V)$ | $I_T(mA)$ | $V_C(V)$ | $I_{PP}(A)$ | $I_R(\mu A)$ |
| P6SMB6.8A | P6SMB6.8CA | 6V8A | 6V8C | 5.80 | 6.45~7.14 | 10 | 10.5 | 57.1 | 1000 |
| P6SMB7.5A | P6SMB7.5CA | 7V5A | 7V5C | 6.40 | 7.13~7.88 | 10 | 11.3 | 53.1 | 500 |
| P6SMB8.2A | P6SMB8.2CA | 8V2A | 8V2C | 7.02 | 7.79~8.61 | 10 | 12.1 | 49.6 | 200 |
| P6SMB9.1A | P6SMB9.1CA | 9V1A | 9V1C | 7.78 | 8.65~9.55 | 1 | 13.4 | 44.8 | 50 |
| P6SMB10A | P6SMB10CA | 10A | 10C | 8.55 | 9.5~10.5 | 1 | 14.5 | 41.1 | 10 |
| P6SMB11A | P6SMB11CA | 11A | 11C | 9.40 | 10.5~11.6 | 1 | 15.6 | 38.5 | 5 |
| P6SMB12A | P6SMB12CA | 12A | 12C | 10.2 | 11.4~12.6 | 1 | 16.7 | 35.9 | 5 |
| P6SMB13A | P6SMB13CA | 13A | 13C | 11.1 | 12.4~13.7 | 1 | 18.2 | 33.0 | 1 |
| P6SMB15A | P6SMB15CA | 15A | 15C | 12.8 | 14.3~15.8 | 1 | 21.2 | 28.3 | 1 |
| P6SMB16A | P6SMB16CA | 16A | 16C | 13.6 | 15.2~16.8 | 1 | 22.5 | 26.7 | 1 |
| P6SMB18A | P6SMB18CA | 18A | 18C | 15.3 | 17.1~18.9 | 1 | 25.2 | 23.8 | 1 |
| P6SMB20A | P6SMB20CA | 20A | 20C | 17.1 | 19.0~21.0 | 1 | 27.7 | 21.7 | 1 |
| P6SMB22A | P6SMB22CA | 22A | 22C | 18.8 | 20.9~23.1 | 1 | 30.6 | 19.6 | 1 |
| P6SMB24A | P6SMB24CA | 24A | 24C | 20.5 | 22.8~25.2 | 1 | 33.2 | 18.1 | 1 |
| P6SMB27A | P6SMB27CA | 27A | 27C | 23.1 | 25.7~28.4 | 1 | 37.5 | 16.0 | 1 |
| P6SMB30A | P6SMB30CA | 30A | 30C | 25.6 | 28.5~31.5 | 1 | 41.4 | 14.5 | 1 |
| P6SMB33A | P6SMB33CA | 33A | 33C | 28.2 | 31.4~34.7 | 1 | 45.7 | 13.1 | 1 |
| P6SMB36A | P6SMB36CA | 36A | 36C | 30.8 | 34.2~37.8 | 1 | 49.9 | 12 | 1 |
| P6SMB39A | P6SMB39CA | 39A | 39C | 33.3 | 37.1~41.0 | 1 | 53.9 | 11.1 | 1 |
| P6SMB43A | P6SMB43CA | 43A | 43C | 36.8 | 40.9~45.2 | 1 | 59.3 | 10.1 | 1 |
| P6SMB47A | P6SMB47CA | 47A | 47C | 40.2 | 44.7~49.4 | 1 | 64.8 | 9.4 | 1 |
| P6SMB51A | P6SMB51CA | 51A | 51C | 43.6 | 48.5~53.6 | 1 | 70.1 | 8.6 | 1 |

Electrical Characteristics ($T_A=25^\circ\text{C}$)

| Part Number | | Device Marking Code | | Reverse Stand-Off Voltage | Breakdown Voltage @ I_T | Test Current | Maximum Clamping Voltage @ I_{PP} | Peak Pulse Current | Reverse Leakage @ V_{RWM} |
|----------------|---------------|---------------------|------|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | UNI | BI | $V_{RWM}(V)$ | $V_{BR}(V)$ | $I_T(mA)$ | $V_C(V)$ | $I_{PP}(A)$ | $I_R(\mu A)$ |
| P6SMB56A | P6SMB56CA | 56A | 56C | 47.8 | 53.2~58.8 | 1 | 77.0 | 7.8 | 1 |
| P6SMB62A | P6SMB62CA | 62A | 62C | 53.0 | 58.9~65.1 | 1 | 85.0 | 7.1 | 1 |
| P6SMB68A | P6SMB68CA | 68A | 68C | 58.1 | 64.6~71.4 | 1 | 92.0 | 6.5 | 1 |
| P6SMB75A | P6SMB75CA | 75A | 75C | 64.1 | 71.3~78.8 | 1 | 103.0 | 5.8 | 1 |
| P6SMB82A | P6SMB82CA | 82A | 82C | 70.1 | 77.9~86.1 | 1 | 113.0 | 5.3 | 1 |
| P6SMB91A | P6SMB91CA | 91A | 91C | 77.8 | 86.5~95.5 | 1 | 125.0 | 4.8 | 1 |
| P6SMB100A | P6SMB100CA | 100A | 100C | 85.5 | 95~105 | 1 | 137.0 | 4.4 | 1 |
| P6SMB110A | P6SMB110CA | 110A | 110C | 94.0 | 105~116 | 1 | 152.0 | 3.9 | 1 |
| P6SMB120A | P6SMB120CA | 120A | 120C | 102 | 114~126 | 1 | 165.0 | 3.6 | 1 |
| P6SMB130A | P6SMB130CA | 130A | 130C | 111 | 124~137 | 1 | 179.0 | 3.4 | 1 |
| P6SMB150A | P6SMB150CA | 150A | 150C | 128 | 143~158 | 1 | 207.0 | 2.9 | 1 |
| P6SMB160A | P6SMB160CA | 160A | 160C | 136 | 152~168 | 1 | 219.0 | 2.7 | 1 |
| P6SMB170A | P6SMB170CA | 170A | 170C | 145 | 162~179 | 1 | 234.0 | 2.6 | 1 |
| P6SMB180A | P6SMB180CA | 180A | 180C | 154 | 171~189 | 1 | 246.0 | 2.4 | 1 |
| P6SMB200A | P6SMB200CA | 200A | 200C | 171 | 190~210 | 1 | 274.0 | 2.2 | 1 |
| P6SMB220A | P6SMB220CA | 220A | 220C | 185 | 209~231 | 1 | 328.0 | 1.8 | 1 |
| P6SMB250A | P6SMB250CA | 250A | 250C | 214 | 237~263 | 1 | 344.0 | 1.7 | 1 |
| P6SMB300A | P6SMB300CA | 300A | 300C | 256 | 285~315 | 1 | 414.0 | 1.4 | 1 |
| P6SMB350A | P6SMB350CA | 350A | 350C | 300 | 333~368 | 1 | 482.0 | 1.2 | 1 |
| P6SMB400A | P6SMB400CA | 400A | 400C | 342 | 380~420 | 1 | 548.0 | 1.1 | 1 |
| P6SMB440A | P6SMB440CA | 440A | 440C | 376 | 418~462 | 1 | 602.0 | 1.0 | 1 |
| P6SMB480A | P6SMB480CA | 480A | 480C | 408 | 456~504 | 1 | 658 | 0.9 | 1 |
| P6SMB510A | P6SMB510CA | 510A | 510C | 434 | 485~535 | 1 | 698 | 0.9 | 1 |
| P6SMB530A | P6SMB530CA | 530A | 530C | 477 | 503~557 | 1 | 725 | 0.8 | 1 |
| P6SMB550A | P6SMB550CA | 550A | 550C | 495 | 522~578 | 1 | 760 | 0.8 | 1 |

Notes: For bidirectional type having VRWM of 10V and less, the IR limit is double.

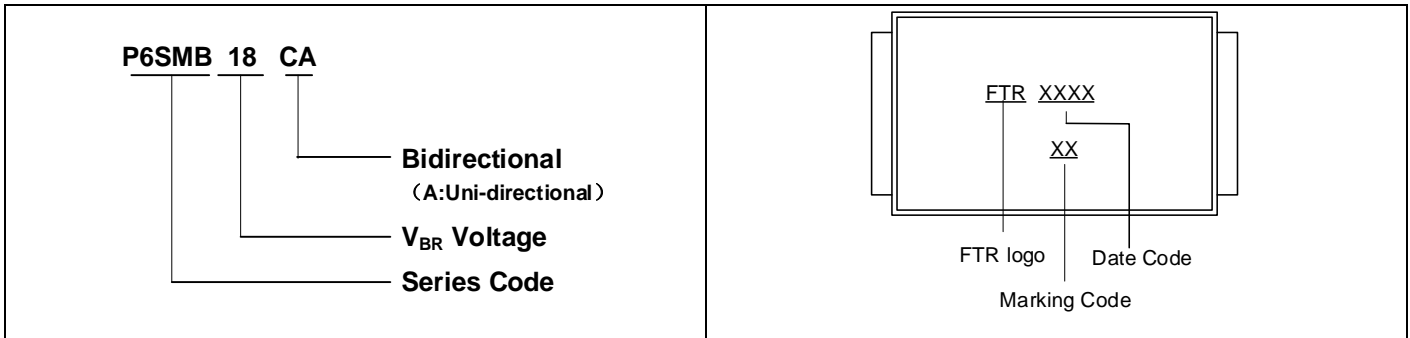
Recommended Soldering Conditions



Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|---|----------------------------------|
| Average ramp-up rate (T_L to T_P) | 3°C/second max. |
| Preheat <ul style="list-style-type: none"> -Temperature Min ($T_{S\min}$) -Temperature Max ($T_{S\max}$) -Time (min to max) (t_s) | 150°C 200°C 60-180 seconds |
| $T_{S\max}$ to T_L <ul style="list-style-type: none"> -Ramp-up Rate | 3°C/second max. |
| Time maintained above: <ul style="list-style-type: none"> -Temperature (T_L) -Time (t_L) | 217°C 60-150 seconds |
| Peak Temperature (T_P) | 260°C |
| Time within 5°C of actual Peak Temperature (t_p) | 20-40 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to Peak Temperature | 8 minutes max. |

Partnumbercode



Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

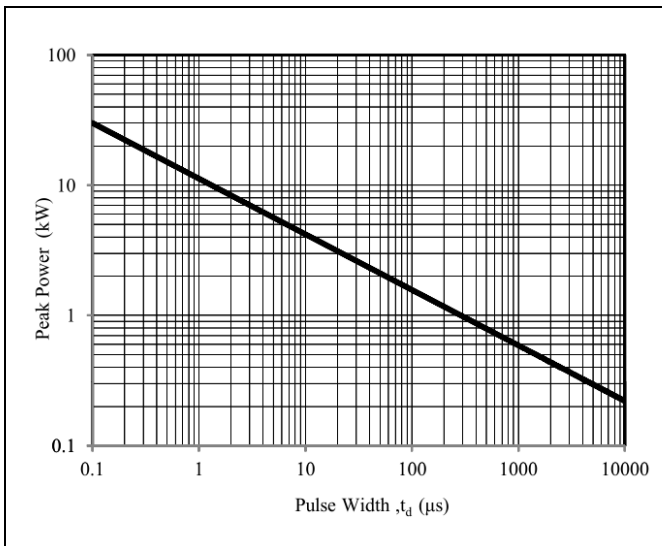


Figure 2. Pulse Derating Curve

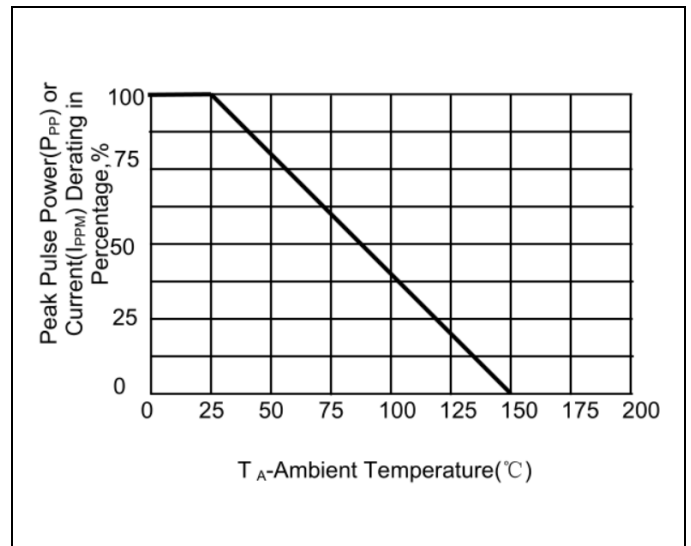


Figure 3. Pulse Waveform

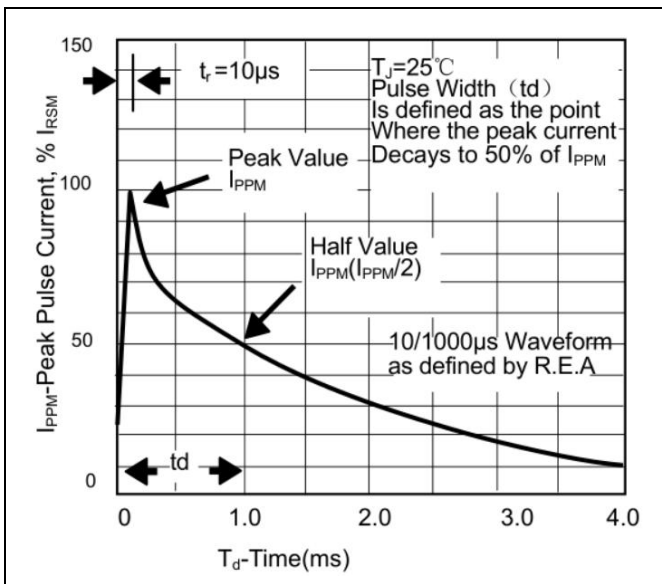
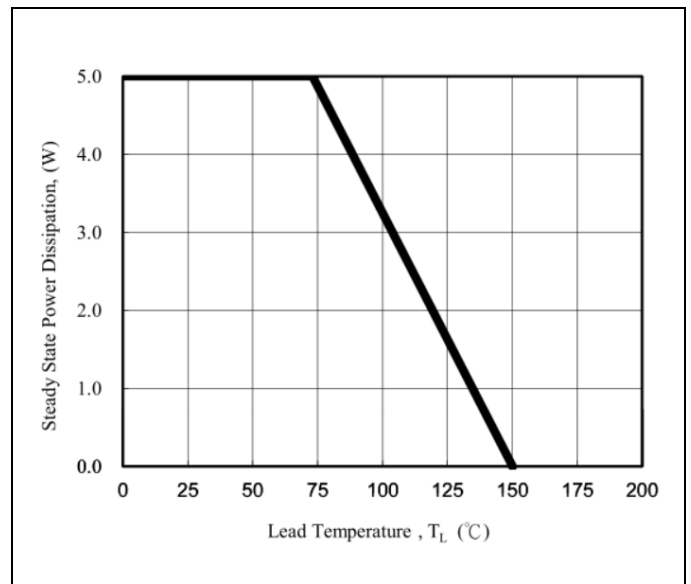


Figure 4. Steady State Power Dissipation Derating Curve



Packaging

| Tape | | Symbol | Dimension (mm) |
|-------------------|----------|--------|----------------|
| | | W | 12.00±0.10 |
| | | P0 | 4.00±0.10 |
| | | P1 | 8.00±0.10 |
| | | P2 | 2.00±0.10 |
| | | D0 | Φ1.55±0.10 |
| | | D1 | Φ1.5±0.10 |
| | | E | 1.75±0.10 |
| | | F | 5.50±0.10 |
| | | A0 | 3.80±0.1 |
| | | B0 | 5.40±0.1 |
| | | K0 | 2.45±0.1 |
| | | T | 0.25±0.1 |
| | | D5 | Φ330.0±2.0 |
| | | D6 | Φ13.5±0.5 |
| H | 2.5±1.0 | | |
| W2 | 16.0±2.0 | | |
| Quantity: 3000PCS | | | |
| Reel | | | |
| | | | |
| | | | |
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