

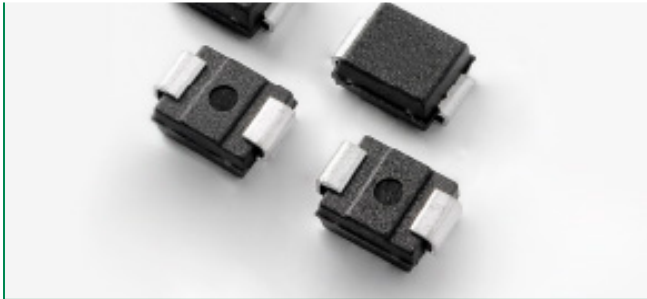
P6SMB11AT3G Series



OBSOLETE/EOL

DATE June/30/2018 **PCN/ECN#** LFPCN41246

REPLACED BY P6SMB Series



Maximum Ratings and Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|--|----------------|-------------|---------------------------|
| Peak Power Dissipation (Note 1) @ $T_L = 25^\circ\text{C}$, Pulse Width = 1 ms | P_{PK} | 600 | W |
| DC Power Dissipation @ $T_L = 75^\circ\text{C}$ Measured Zero Lead Length (Note 2) Derate Above 75°C | PD | 3.0 40 | W mW/ $^\circ\text{C}$ |
| Thermal Resistance from Junction-to-Lead | R_{JL} | 25 | $^\circ\text{C}/\text{W}$ |
| DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above 25°C | PD | 0.55 4.4 | W mW/ $^\circ\text{C}$ |
| Thermal Resistance from Junction-to-Ambient | R_{OJA} | 226 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{stg} | -65 to +150 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- 10 X 1000 μs , non-repetitive.
- 1" square copper pad, FR-4 board.
- FR-4 board, using Littelfuse minimum recommended footprint, as shown in 403A-03 case outline dimensions spec.
- 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

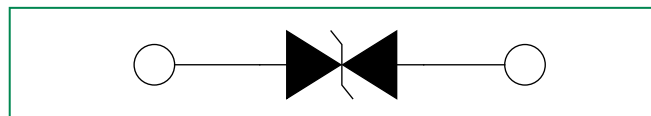
Description

The P6SMB11AT3G series is designed to protect voltage sensitive components from high voltage, high energy transients. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The P6SMB11AT3G series is supplied in the Littelfuse exclusive, cost-effective, highly reliable package and is ideally suited for use in communication systems, automotive, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.

Features

- Working Peak Reverse Voltage Range – 9.4 to 77.8 V
- Standard Zener Breakdown Voltage Range – 11 to 91 V
- Peak Power – 600 W @ 1 ms
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 5 μA Above 10 V
- UL 497B for Isolated Loop Circuit Protection
- Response Time is Typically < 1 ns
- These are Pb-Free Devices

Functional Diagram



Additional Information



Datasheet



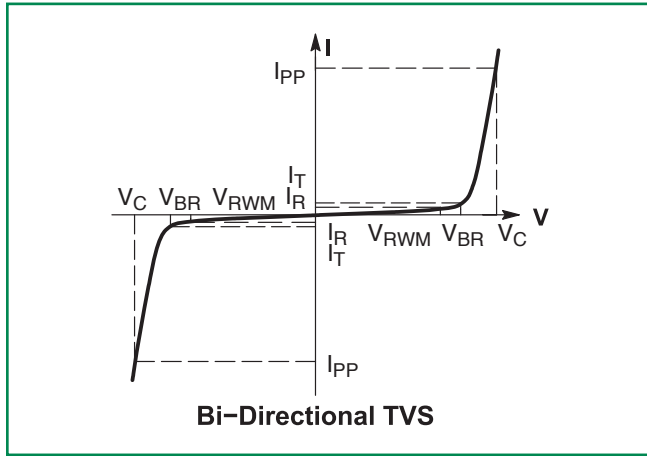
Resources



Samples

*Please see P6SMB6.8AT3 to P6SMB200AT3 for Unidirectional devices.

I-V Curve Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)



| Symbol | Parameter |
|-----------|---|
| I_{PP} | Maximum Reverse Peak Pulse Current |
| V_C | Clamping Voltage @ I_{PP} |
| V_{RWM} | Working Peak Reverse Voltage |
| I_R | Maximum Reverse Leakage Current @ V_{RWM} |
| V_{BR} | Breakdown Voltage @ I_T |
| I_T | Test Current |
| eV_{BR} | Maximum Temperature Coefficient of V_{BR} |

Electrical Characteristics (Devices listed in bold, italic are Littelfuse Preferred devices)

| Device* | Device Marking | V _{RWM} (Note 6) | I _R @ V _{RWM} | Breakdown Voltage | | | | V _C @ I _{PP} (Note 6) | | V _{BR} | C _{Typ.} (Note 7) |
|--------------|----------------|------------------------------|--------------------------------------|---|-------|------|------------------|--|-----------------|-----------------|-------------------------------|
| | | | | V _{BR} @ I _T (V) (Note 5) | | | @ I _T | V _C | I _{PP} | | |
| | | | | MIN | NOM | MAX | mA | Volts | Amps | | |
| P6SMB11CAT3G | 11C | 9.4 | 5 | 10.5 | 11.05 | 11.6 | 1 | 15.6 | 38 | 0.075 | 865 |
| P6SMB12CAT3G | 12C | 10.2 | 5 | 11.4 | 12 | 12.6 | 1 | 16.7 | 36 | 0.078 | 800 |
| P6SMB15CAT3G | 15C | 12.8 | 5 | 14.3 | 15.05 | 15.8 | 1 | 21.2 | 28 | 0.084 | 645 |
| P6SMB16CAT3G | 16C | 13.6 | 5 | 15.2 | 16 | 16.8 | 1 | 22.5 | 27 | 0.086 | 610 |
| P6SMB18CAT3G | 18C | 15.3 | 5 | 17.1 | 18 | 18.9 | 1 | 25.2 | 24 | 0.088 | 545 |
| P6SMB20CAT3G | 20C | 17.1 | 5 | 19 | 20 | 21 | 1 | 27.7 | 22 | 0.09 | 490 |
| P6SMB22CAT3G | 22C | 18.8 | 5 | 20.9 | 22 | 23.1 | 1 | 30.6 | 20 | 0.09 | 450 |
| P6SMB24CAT3G | 24C | 20.5 | 5 | 22.8 | 24 | 25.2 | 1 | 33.2 | 18 | 0.094 | 415 |
| P6SMB27CAT3G | 27C | 23.1 | 5 | 25.7 | 27.05 | 28.4 | 1 | 37.5 | 16 | 0.096 | 370 |
| P6SMB30CAT3G | 30C | 25.6 | 5 | 28.5 | 30 | 31.5 | 1 | 41.4 | 14.4 | 0.097 | 335 |
| P6SMB33CAT3G | 33C | 28.2 | 5 | 31.4 | 33.05 | 34.7 | 1 | 45.7 | 13.2 | 0.098 | 305 |
| P6SMB36CAT3G | 36C | 30.8 | 5 | 34.2 | 36 | 37.8 | 1 | 49.9 | 12 | 0.099 | 280 |
| P6SMB39CAT3G | 39C | 33.3 | 5 | 37.1 | 39.05 | 41 | 1 | 53.9 | 11.2 | 0.1 | 260 |
| P6SMB43CAT3G | 43C | 36.8 | 5 | 40.9 | 43.05 | 45.2 | 1 | 59.3 | 10.1 | 0.101 | 240 |
| P6SMB47CAT3G | 47C | 40.2 | 5 | 44.7 | 47.05 | 49.4 | 1 | 64.8 | 9.3 | 0.101 | 220 |
| P6SMB51CAT3G | 51C | 43.6 | 5 | 48.5 | 51.05 | 53.6 | 1 | 70.1 | 8.6 | 0.102 | 205 |
| P6SMB56CAT3G | 56C | 47.8 | 5 | 53.2 | 56 | 58.8 | 1 | 77 | 7.8 | 0.103 | 185 |
| P6SMB62CAT3G | 62C | 53 | 5 | 58.9 | 62 | 65.1 | 1 | 85 | 7.1 | 0.104 | 170 |
| P6SMB68CAT3G | 68C | 58.1 | 5 | 64.6 | 68 | 71.4 | 1 | 92 | 6.5 | 0.104 | 155 |
| P6SMB82CAT3G | 82C | 70.1 | 5 | 77.9 | 82 | 86.1 | 1 | 113 | 5.3 | 0.105 | 130 |

4. A transient suppressor is normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal to or greater than the DC or continuous peak operating voltage level.

5. V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C.

6. Surge current waveform per Figure 2 and derate per Figure 3 of the General Data – 600 Watt at the beginning of this group.

7. Bias Voltage = 0 V, F = 1 MHz, T_J = 25°C

Ratings and Characteristic Curves

Figure 1. Pulse Rating Curve

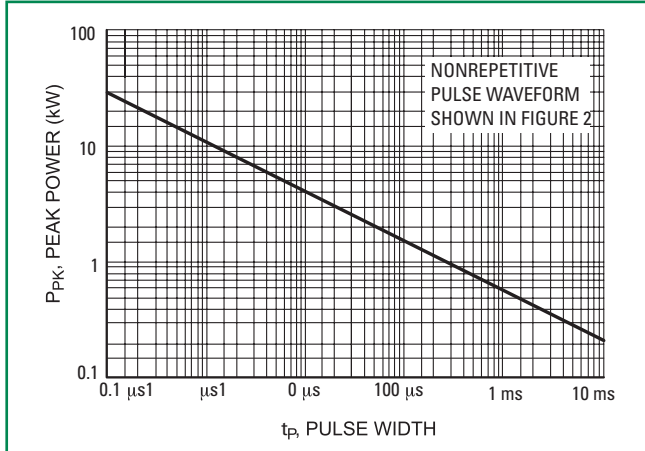


Figure 2. Pulse Waveform

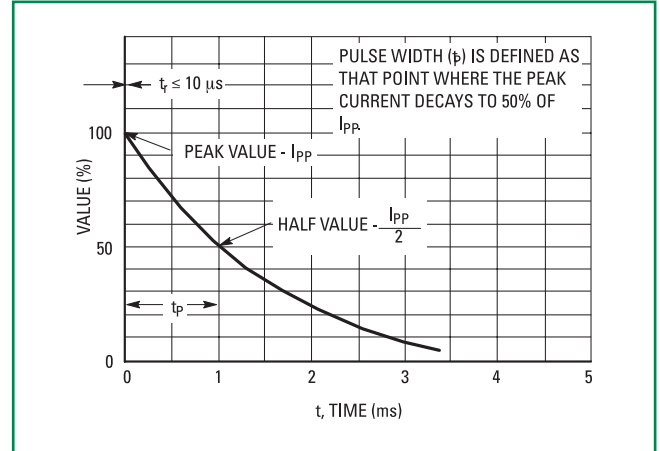


Figure 3 - Pulse Derating Curve

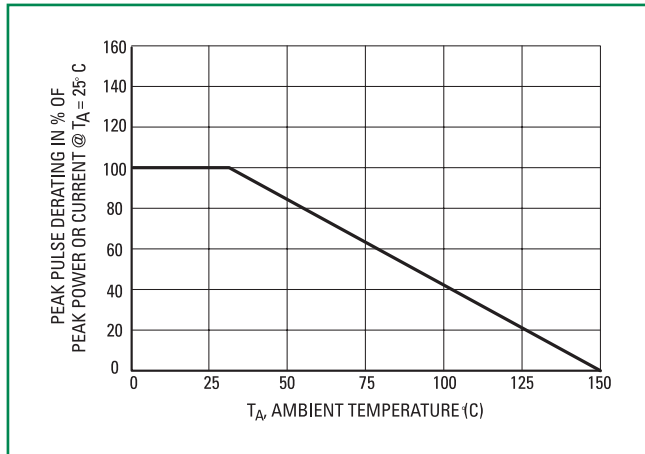


Figure 4. Typical Junction Capacitance vs. Bias Voltage

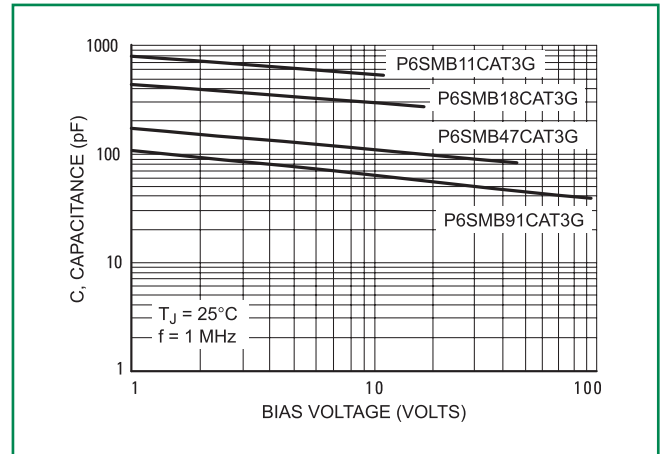
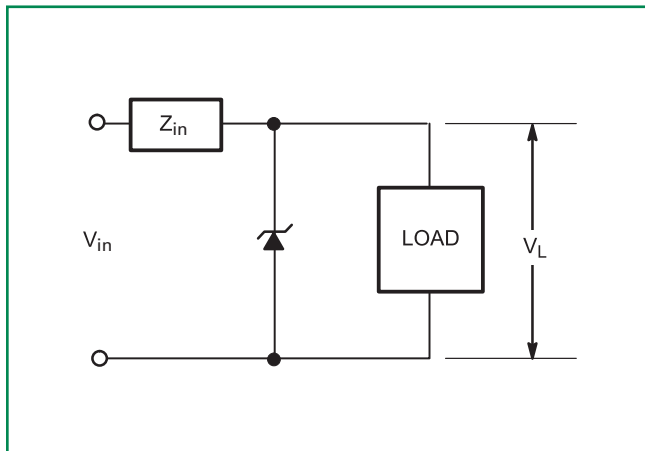
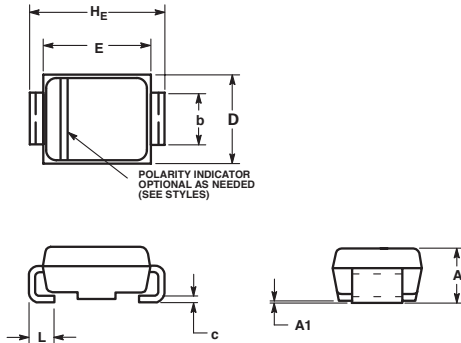


Figure 5. Typical Protection Circuit



Dimensions

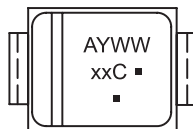


| Dim | Inches | | | Millimeters | | |
|-----|-----------|-------|-------|-------------|------|------|
| | Min | Nom | Max | Min | Nom | Max |
| A | 0.077 | 0.091 | 0.097 | 1.95 | 2.30 | 2.47 |
| A1 | 0.002 | 0.004 | 0.008 | 0.05 | 0.10 | 0.20 |
| b | 0.077 | 0.080 | 0.087 | 1.96 | 2.03 | 2.20 |
| c | 0.006 | 0.009 | 0.012 | 0.15 | 0.23 | 0.31 |
| D | 0.130 | 0.140 | 0.156 | 3.30 | 3.56 | 3.95 |
| E | 0.160 | 0.170 | 0.181 | 4.06 | 4.32 | 4.60 |
| HE | 0.205 | 0.214 | 0.220 | 5.21 | 5.44 | 5.60 |
| L | 0.030 | 0.040 | 0.063 | 0.76 | 1.02 | 1.60 |
| L1 | 0.020 REF | | | 0.51 REF | | |

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.

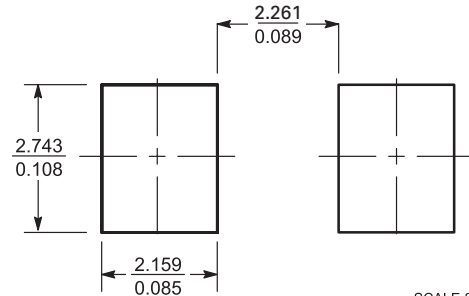
Part Marking System



- xxC = Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

Soldering Footprint



SCALE 8:1 (mm/inches)

ORDERING INFORMATION

| Device | Package | Shipping |
|--------------|---------------|---------------------|
| P6SMBxxxAT3G | SMB (Pb-Free) | 2,500 / Tape & Reel |

Flow/Wave Soldering (Solder Dipping)

| | |
|--------------------|------------|
| Peak Temperature : | 260°C |
| Dipping Time : | 10 seconds |

Physical Specifications

| | |
|-------------------|--|
| Case | Void-free, transfer-molded, thermosetting plastic |
| Polarity | Cathode indicated by polarity band |
| Mounting Position | Any |
| Finish | All external surfaces are corrosion resistant and leads are readily solderable |
| Leads | Modified L-Bend providing more contact area to bond pads |

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