# P6SMB SERIES

## Surface Mount Transient Voltage Suppressor

Voltage Range
6.8 to 200 Volts
600 Watts Peak Power

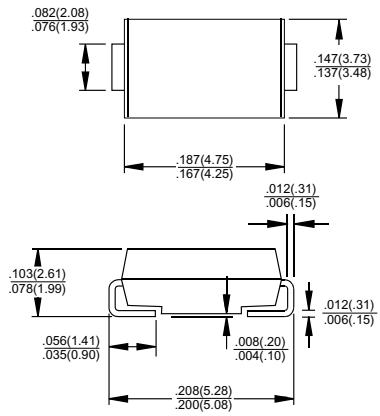
## Features

- ✧ For surface mounted application in order to optimize board space
- ✧ Low profile package
- ✧ Built-in strain relief
- ✧ Glass passivated junction
- ✧ Excellent clamping capability
- ✧ Fast response time: Typically less than 1.0ps from 0 volt to BV min.
- ✧ Typical $I_R$ less than 1 $\mu$A above 10V
- ✧ High temperature soldering guaranteed: 250$^{O}$C / 10 seconds at terminals
- ✧ Plastic material used carries Underwriters Laboratory Flammability Classification 94V-0
- ✧ 600 watts peak pulse power capability with a 10 x 1000 us waveform by 0.01% duty cycle

## Mechanical Data

- ✧ Case: Molded plastic
- ✧ Terminals: Solder plated
- ✧ Polarity: Indicated by cathode band
- ✧ Standard packaging: 12mm tape (EIA STD RS-481)
- ✧ Weight: 0.093gram

**SMB/DO-214AA**




**Dimensions in inches and (millimeters)**

## Maximum Ratings and Electrical Characteristics

Rating at 25℃ ambient temperature unless otherwise specified.

| Type Number | Symbol | Value | Units |
|---|---|---|---|
| Peak Power Dissipation at $T_A$=25$^{O}$C, Tp=1ms(Note 1) | $P_{PK}$ | Minimum 600 | Watts |
| Peak Forward Surge Current, 8.3 ms Single Half Sine-wave Superimposed on Rated Load (JEDEC method) (Note 2, 3) - Unidirectional Only | $I_{FSM}$ | 100 | Amps |
| Maximum Instantaneous Forward Voltage at 50.0A for Unidirectional Only (Note 4) | $V_F$ | 3.5 | Volts |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to + 150 | $^{O}$C |

Notes: 1. Non-repetitive Current Pulse Per Fig. 3 and Derated above $T_A$=25$^{O}$C Per Fig. 2.
2. Mounted on 5.0mm$^2$ (.013 mm Thick) Copper Pads to Each Terminal.
3. 8.3ms Single Half Sine-wave or Equivalent Square Wave, Duty Cycle=4 pulses Per Minute Maximum.

Devices for Bipolar Applications
1. For Bidirectional Use C or CA Suffix for Types P6SMB6.8 through Types P6SMB200A.
2. Electrical Characteristics Apply in Both Directions.

## ELECTRICAL CHARACTERISTICS (TA=25$^{O}$C unless otherwise noted)

| Device | Device Marking Code | Breakdown Voltage $V_{BR}$ (Volts) (Note 1) Min | Breakdown Voltage $V_{BR}$ (Volts) (Note 1) Max | Test Current @$I_T$ (mA) | Stand-Off Voltage $V_{WM}$ (Volts) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ (uA) | Maximum Peak Pulse Current $I_{RSM}$ (Note 2)(Amps) | Maximum Clamping Voltage at $I_{PPM}$ $V_C$(Volts) | Maximum Temperature Coefficient of $V_{BR}$(% / $^{O}$C) |
|---|---|---|---|---|---|---|---|---|---|
| P6SMB6.8 | KDJ | 6.12 | 7.48 | 10 | 5.50 | 1000 | 58 | 10.8 | 0.057 |
| P6SMB6.8A | KEJ | 6.45 | 7.14 | 10 | 5.80 | 1000 | 60 | 10.5 | 0.057 |
| P6SMB7.5 | KFJ | 6.75 | 8.25 | 10 | 6.05 | 500 | 53 | 11.7 | 0.061 |
| P6SMB7.5A | KGJ | 7.13 | 7.88 | 10 | 6.40 | 500 | 55 | 11.3 | 0.061 |
| P6SMB8.2 | KHJ | 7.38 | 9.02 | 1.0 | 6.63 | 200 | 50 | 12.5 | 0.065 |
| P6SMB8.2A | KKJ | 7.79 | 8.61 | 1.0 | 7.02 | 200 | 52 | 12.1 | 0.065 |
| P6SMB9.1 | KLJ | 8.19 | 10.0 | 1.0 | 7.37 | 50 | 45 | 13.8 | 0.068 |
| P6SMB9.1A | KMJ | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 47 | 13.4 | 0.068 |
| P6SMB10 | KNJ | 9.00 | 11.0 | 1.0 | 8.10 | 10 | 42 | 15.0 | 0.073 |
| P6SMB10A | KPJ | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 43 | 14.5 | 0.073 |
| P6SMB11 | KQJ | 9.90 | 12.1 | 1.0 | 8.92 | 5.0 | 38 | 16.2 | 0.075 |
| P6SMB11A | KRJ | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 40 | 15.6 | 0.075 |
| P6SMB12 | KSJ | 10.8 | 13.2 | 1.0 | 9.72 | 5.0 | 36 | 17.3 | 0.078 |
| P6SMB12A | KTJ | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 37 | 16.7 | 0.078 |
| P6SMB13 | KUJ | 11.7 | 14.3 | 1.0 | 10.5 | 5.0 | 33 | 19.0 | 0.081 |
| P6SMB13A | KVJ | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 34 | 18.2 | 0.081 |
| P6SMB15 | KWJ | 13.5 | 16.5 | 1.0 | 12.1 | 5.0 | 28 | 22.0 | 0.084 |
| P6SMB15A | KXJ | 14.3 | 15.8 | 1.0 | 12.8 | 5.0 | 29 | 21.2 | 0.084 |
| P6SMB16 | KYJ | 14.4 | 17.6 | 1.0 | 12.9 | 5.0 | 26 | 23.5 | 0.086 |
| P6SMB16A | KZJ | 15.2 | 16.8 | 1.0 | 13.6 | 5.0 | 28 | 22.5 | 0.086 |
| P6SMB18 | LDJ | 16.2 | 19.8 | 1.0 | 14.5 | 5.0 | 23 | 26.5 | 0.088 |
| P6SMB18A | LEJ | 17.1 | 18.9 | 1.0 | 15.3 | 5.0 | 25 | 25.2 | 0.088 |
| P6SMB20 | LFJ | 18.0 | 22.0 | 1.0 | 16.2 | 5.0 | 21 | 29.1 | 0.090 |
| P6SMB20A | LGJ | 19.0 | 21.0 | 1.0 | 17.1 | 5.0 | 22 | 27.7 | 0.090 |
| P6SMB22 | LHJ | 19.8 | 24.2 | 1.0 | 17.8 | 5.0 | 19 | 31.9 | 0.092 |
| P6SMB22A | LKJ | 20.9 | 23.1 | 1.0 | 18.8 | 5.0 | 20 | 30.6 | 0.092 |
| P6SMB24 | LLJ | 21.6 | 26.4 | 1.0 | 19.4 | 5.0 | 18 | 34.7 | 0.094 |
| P6SMB24A | LMJ | 22.8 | 25.2 | 1.0 | 20.5 | 5.0 | 19 | 33.2 | 0.094 |
| P6SMB27 | LNJ | 24.3 | 29.7 | 1.0 | 21.8 | 5.0 | 16 | 39.1 | 0.096 |
| P6SMB27A | LPJ | 25.7 | 28.4 | 1.0 | 23.1 | 5.0 | 16.8 | 37.5 | 0.096 |
| P6SMB30 | LQJ | 27.0 | 33.0 | 1.0 | 24.3 | 5.0 | 14 | 43.5 | 0.097 |
| P6SMB30A | LRJ | 28.5 | 31.5 | 1.0 | 25.6 | 5.0 | 15 | 41.4 | 0.097 |
| P6SMB33 | LSJ | 29.7 | 36.3 | 1.0 | 26.8 | 5.0 | 13.0 | 47.7 | 0.098 |
| P6SMB33A | LTJ | 31.4 | 34.7 | 1.0 | 28.2 | 5.0 | 13.8 | 45.7 | 0.098 |
| P6SMB36 | LUJ | 32.4 | 39.6 | 1.0 | 29.1 | 5.0 | 12 | 52.0 | 0.099 |
| P6SMB36A | LVJ | 34.2 | 37.8 | 1.0 | 30.8 | 5.0 | 12.6 | 49.9 | 0.099 |
| P6SMB39 | LWJ | 35.1 | 42.9 | 1.0 | 31.6 | 5.0 | 11.1 | 56.4 | 0.100 |
| P6SMB39A | LXJ | 37.1 | 41.0 | 1.0 | 33.3 | 5.0 | 11.6 | 53.9 | 0.100 |
| P6SMB43 | LYJ | 38.7 | 47.3 | 1.0 | 34.8 | 5.0 | 10.0 | 61.9 | 0.101 |
| P6SMB43A | LZJ | 40.9 | 45.2 | 1.0 | 36.8 | 5.0 | 10.6 | 59.3 | 0.101 |
| P6SMB47 | MDJ | 42.3 | 51.7 | 1.0 | 38.1 | 5.0 | 9.2 | 67.8 | 0.101 |
| P6SMB47A | MEJ | 44.7 | 49.4 | 1.0 | 40.2 | 5.0 | 9.7 | 64.8 | 0.101 |
| P6SMB51 | MFJ | 45.9 | 56.1 | 1.0 | 41.3 | 5.0 | 8.5 | 73.5 | 0.102 |
| P6SMB51A | MGJ | 48.5 | 53.6 | 1.0 | 43.6 | 5.0 | 8.9 | 70.1 | 0.102 |
| P6SMB56 | MHJ | 50.4 | 61.6 | 1.0 | 45.4 | 5.0 | 7.8 | 80.5 | 0.103 |
| P6SMB56A | MKJ | 53.2 | 58.8 | 1.0 | 47.8 | 5.0 | 8.1 | 77.0 | 0.103 |
| P6SMB62 | MLJ | 55.8 | 68.2 | 1.0 | 50.2 | 5.0 | 7.0 | 89.0 | 0.104 |
| P6SMB62A | MMJ | 58.9 | 65.1 | 1.0 | 53.0 | 5.0 | 7.4 | 85.0 | 0.104 |
| P6SMB68 | MNJ | 61.2 | 74.8 | 1.0 | 55.1 | 5.0 | 6.4 | 98.0 | 0.104 |
| P6SMB68A | MPJ | 64.6 | 71.4 | 1.0 | 58.1 | 5.0 | 6.8 | 92.0 | 0.104 |
| P6SMB75 | MQJ | 67.5 | 82.5 | 1.0 | 60.7 | 5.0 | 5.8 | 108.0 | 0.105 |
| P6SMB75A | MRJ | 71.3 | 78.8 | 1.0 | 64.1 | 5.0 | 6.1 | 103.0 | 0.105 |
| P6SMB82 | MSJ | 73.8 | 90.2 | 1.0 | 66.4 | 5.0 | 5.3 | 118.0 | 0.105 |
| P6SMB82A | MTJ | 77.9 | 86.1 | 1.0 | 70.1 | 5.0 | 5.5 | 113.0 | 0.105 |

## ELECTRICAL CHARACTERISTICS (TA=25$^{O}$C unless otherwise noted)

| Device | Device Marking Code | Breakdown Volta $V_{BR}$ (Volts) (Note 1 | | Test Current @$I_T$ (mA) | Stand-Off Voltage $V_{WM}$ (Volts) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ (uA) | Maximum Peak Pulse Current $I_{RSM}$ (Note 2)(Amps) | Maximum Clamping Voltage at $I_{PPM}$ $V_C$(Volts) | Maximum Temperature Coefficient of $V_{BR}$(% / $^{O}$C) |
|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | | |
| P6SMB91 | MUJ | 81.9 | 100.0 | 1.0 | 73.7 | 5.0 | 4.8 | 131.0 | 0.106 |
| P6SMB91A | MVJ | 86.5 | 95.5 | 1.0 | 77.8 | 5.0 | 5.0 | 125.0 | 0.106 |
| P6SMB100 | MWJ | 90.0 | 110.0 | 1.0 | 81.0 | 5.0 | 4.3 | 144.0 | 0.106 |
| P6SMB100A | MXJ | 95.0 | 105.0 | 1.0 | 85.5 | 5.0 | 4.5 | 137.0 | 0.106 |
| P6SMB110 | MYJ | 99.0 | 121.0 | 1.0 | 89.2 | 5.0 | 3.9 | 158.0 | 0.107 |
| P6SMB110A | MZJ | 105.0 | 116.0 | 1.0 | 94.0 | 5.0 | 4.1 | 152.0 | 0.107 |
| P6SMB120 | NDJ | 108.0 | 132.0 | 1.0 | 97.2 | 5.0 | 3.6 | 173.0 | 0.107 |
| P6SMB120A | NEJ | 114.0 | 126.0 | 1.0 | 102.0 | 5.0 | 3.8 | 165.0 | 0.107 |
| P6SMB130 | NFJ | 117.0 | 143.0 | 1.0 | 105.0 | 5.0 | 3.3 | 187.0 | 0.107 |
| P6SMB130A | NGJ | 124.0 | 137.0 | 1.0 | 111.0 | 5.0 | 3.5 | 179.0 | 0.107 |
| P6SMB150 | NHJ | 135.0 | 165.0 | 1.0 | 121.0 | 5.0 | 2.9 | 215.0 | 0.108 |
| P6SMB150A | NKJ | 143.0 | 158.0 | 1.0 | 128.0 | 5.0 | 3.0 | 207.0 | 0.108 |
| P6SMB160 | NLJ | 144.0 | 176.0 | 1.0 | 130.0 | 5.0 | 2.7 | 230.0 | 0.108 |
| P6SMB160A | NMJ | 152.0 | 168.0 | 1.0 | 136.0 | 5.0 | 2.8 | 219.0 | 0.108 |
| P6SMB170 | NNJ | 153.0 | 187.0 | 1.0 | 138.0 | 5.0 | 2.5 | 244.0 | 0.108 |
| P6SMB170A | NPJ | 162.0 | 179.0 | 1.0 | 145.0 | 5.0 | 2.6 | 234.0 | 0.108 |
| P6SMB180 | NQJ | 162.0 | 198.0 | 1.0 | 146.0 | 5.0 | 2.4 | 258.0 | 0.108 |
| P6SMB180A | NRJ | 171.0 | 189.0 | 1.0 | 154.0 | 5.0 | 2.5 | 246.0 | 0.108 |
| P6SMB200 | NSJ | 180.0 | 220.0 | 1.0 | 162.0 | 5.0 | 2.1 | 287.0 | 0.108 |
| P6SMB200A | NTJ | 190.0 | 210.0 | 1.0 | 171.0 | 5.0 | 2.2 | 274.0 | 0.108 |

**Notes:**

1. $V_{BR}$ measured after $I_T$ applied for 300us, $I_T$=square wave pulse or equivalent.
2. Surge current waveform per Figure 3 and derate per Figure 2.
3. For bipolar types having $V_{WM}$ of 10 volts and under, the $I_D$ limit is doubled.
4. For bidirectional use C or Ca suffix for types P6SMB6.8 through P6SMB200A.
5. All terms and symbols are consistent with ANSI/IEEE C62.35.

## RATINGS AND CHARACTERISTIC CURVES (P6SMB SERIES)

FIG.1- PEAK PULSE POWER RATING CURVE

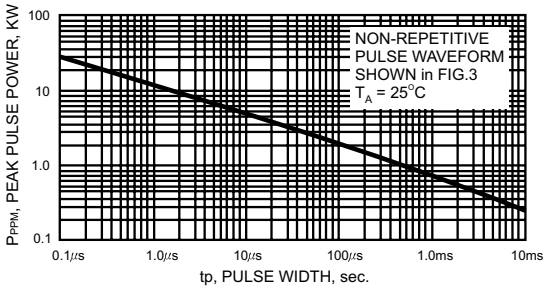



FIG.2- PULSE DERATING CURVE

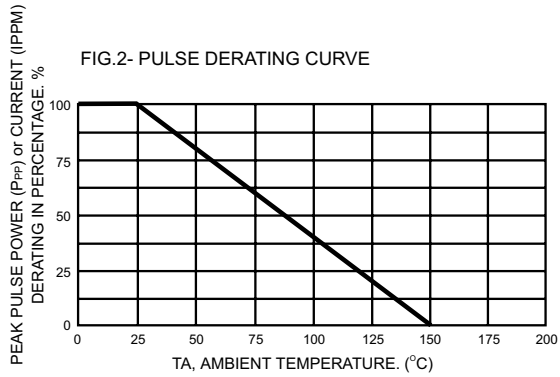



FIG.3- PULSE WAVEFORM

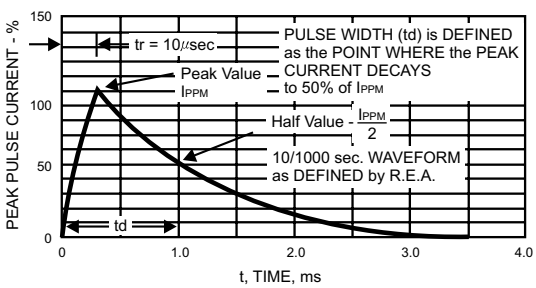



FIG.4- MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

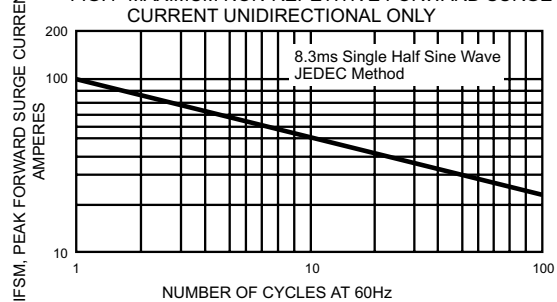
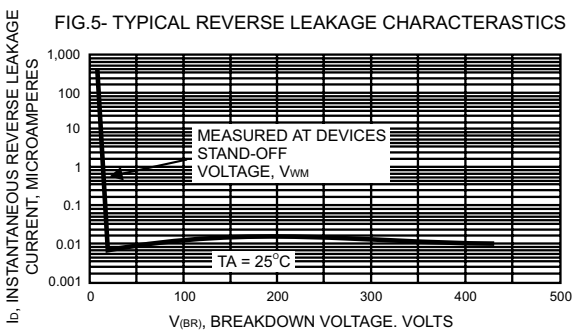



FIG.5- TYPICAL REVERSE LEAKAGE CHARACTERASTICS



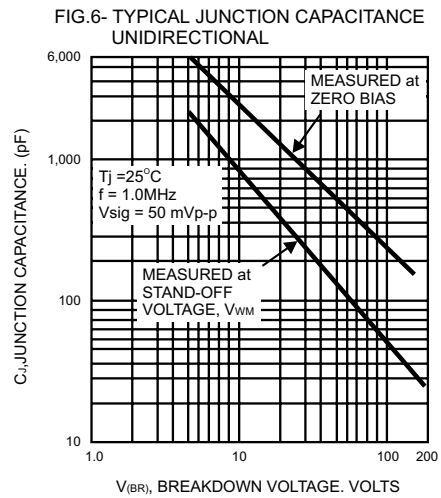


FIG.6- TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL