

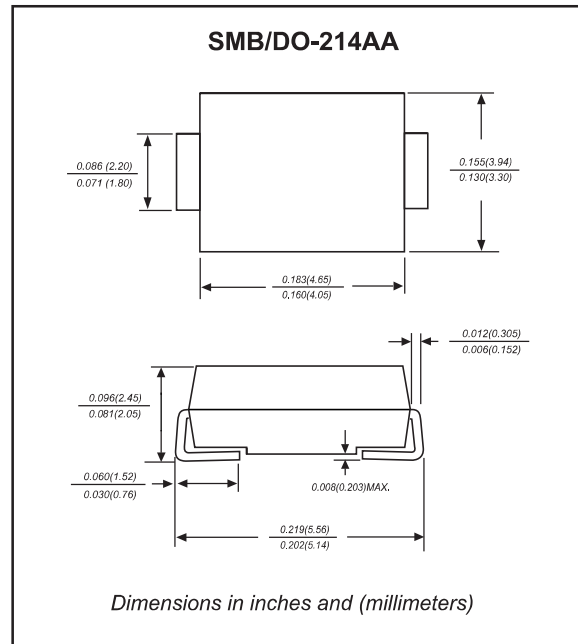
Features

- 600W peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.01%.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to V_{BR} , typically less than 1 pS for uni-directional & 5 nS for bi-directional types.
- Ultra high-speed switching.
- Glass passivated chip junction.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Compliant to Halogen-free
- Suffix "-Q1" for AEC-Q101

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AA /SMB
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any

Package outline



Maximum ratings (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT |
|---------------------------------------|---|-------------|-------------|------|---------|--------------------|
| Peak power dissipation | with a 10/1000 us waveform, Note 1 & Fig. 1 | P_{PPM} | | | 600 | W |
| Peak pulse current | with a 10/1000 us waveform | I_{PPM} | See table 1 | | | A |
| Steady state power dissipation | at $T_L=75^{\circ}\text{C}$ lead length 0.375" (9.5 mm) | $P_{M(AV)}$ | | | 5.0 | W |
| Peak forward surge current | 8.3ms single half sine-wave superimposed on rated load (jedec method), note 2 | I_{FSM} | | | 100 | A |
| Maximum instantaneous forward voltage | for uni-directional types only, at 50A, see note 3 | V_F | | | 3.5/5.0 | V |
| Operating junction temperature range | | T_J | -55 | | +150 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{STG} | -55 | | +150 | $^{\circ}\text{C}$ |

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

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

3. $V_F < 3.5\text{V}$. for devices of $V_{BR} < 200\text{V}$, and $V_F < 5.0\text{V}$. for devices of $V_{BR} > 201\text{V}$

Electrical Specification @ Tamb 25°C

| Type Number | | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I _T | Breakdown Voltage Max. @ I _T | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RMW} |
|--------------|---------------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| (Uni) | (Bi) | V _{RMW} (V) | V _{BR MIN} (V) | V _{BR MAX} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (uA) |
| P6SMB6.8-Q1 | P6SMB6.8C-Q1 | 5.50 | 6.12 | 7.48 | 10.0 | 10.8 | 55.6 | 1000.0 |
| P6SMB6.8A-Q1 | P6SMB6.8CA-Q1 | 5.80 | 6.45 | 7.14 | 10.0 | 10.5 | 58.1 | 1000.0 |
| P6SMB7.5-Q1 | P6SMB7.5C-Q1 | 6.05 | 6.75 | 8.25 | 10.0 | 11.7 | 51.3 | 500.0 |
| P6SMB7.5A-Q1 | P6SMB7.5CA-Q1 | 6.40 | 7.13 | 7.88 | 10.0 | 11.3 | 54.0 | 500.0 |
| P6SMB8.2-Q1 | P6SMB8.2C-Q1 | 6.63 | 7.38 | 9.02 | 10.0 | 12.5 | 48.0 | 200.0 |
| P6SMB8.2A-Q1 | P6SMB8.2CA-Q1 | 7.02 | 7.79 | 8.61 | 10.0 | 12.1 | 50.4 | 200.0 |
| P6SMB9.1-Q1 | P6SMB9.1C-Q1 | 7.37 | 8.19 | 10.0 | 1.0 | 13.8 | 43.5 | 50.0 |
| P6SMB9.1A-Q1 | P6SMB9.1CA-Q1 | 7.78 | 8.65 | 9.55 | 1.0 | 13.4 | 45.5 | 50.0 |
| P6SMB10-Q1 | P6SMB10C-Q1 | 8.10 | 9.00 | 11.0 | 1.0 | 15.0 | 40.0 | 10.0 |
| P6SMB10A-Q1 | P6SMB10CA-Q1 | 8.55 | 9.50 | 10.5 | 1.0 | 14.5 | 42.1 | 10.0 |
| P6SMB11-Q1 | P6SMB11C-Q1 | 8.92 | 9.90 | 12.1 | 1.0 | 16.2 | 37.0 | 5.0 |
| P6SMB11A-Q1 | P6SMB11CA-Q1 | 9.40 | 10.5 | 11.6 | 1.0 | 15.6 | 39.1 | 5.0 |
| P6SMB12-Q1 | P6SMB12C-Q1 | 9.72 | 10.8 | 13.2 | 1.0 | 17.3 | 34.7 | 5.0 |
| P6SMB12A-Q1 | P6SMB12CA-Q1 | 10.2 | 11.4 | 12.6 | 1.0 | 16.7 | 36.5 | 5.0 |
| P6SMB13-Q1 | P6SMB13C-Q1 | 10.5 | 11.7 | 14.3 | 1.0 | 19.0 | 31.6 | 5.0 |
| P6SMB13A-Q1 | P6SMB13CA-Q1 | 11.1 | 12.4 | 13.7 | 1.0 | 18.2 | 33.5 | 5.0 |
| P6SMB15-Q1 | P6SMB15C-Q1 | 12.1 | 13.5 | 16.5 | 1.0 | 22.0 | 27.3 | 5.0 |
| P6SMB15A-Q1 | P6SMB15CA-Q1 | 12.8 | 14.3 | 15.8 | 1.0 | 21.2 | 28.8 | 5.0 |
| P6SMB16-Q1 | P6SMB16C-Q1 | 12.9 | 14.4 | 17.6 | 1.0 | 23.5 | 25.5 | 5.0 |
| P6SMB16A-Q1 | P6SMB16CA-Q1 | 13.6 | 15.2 | 16.8 | 1.0 | 22.5 | 27.1 | 5.0 |
| P6SMB18-Q1 | P6SMB18C-Q1 | 14.5 | 16.2 | 19.8 | 1.0 | 26.5 | 22.6 | 5.0 |
| P6SMB18A-Q1 | P6SMB18CA-Q1 | 15.3 | 17.1 | 18.9 | 1.0 | 25.2 | 24.2 | 5.0 |
| P6SMB20-Q1 | P6SMB20C-Q1 | 16.2 | 18.0 | 22.0 | 1.0 | 29.1 | 20.6 | 5.0 |
| P6SMB20A-Q1 | P6SMB20CA-Q1 | 17.1 | 19.0 | 21.0 | 1.0 | 27.7 | 22.0 | 5.0 |
| P6SMB22-Q1 | P6SMB22C-Q1 | 17.8 | 19.8 | 24.2 | 1.0 | 31.9 | 18.8 | 5.0 |
| P6SMB22A-Q1 | P6SMB22CA-Q1 | 18.8 | 20.9 | 23.1 | 1.0 | 30.6 | 19.9 | 5.0 |
| P6SMB24-Q1 | P6SMB24C-Q1 | 19.4 | 21.6 | 26.4 | 1.0 | 34.7 | 17.3 | 5.0 |
| P6SMB24A-Q1 | P6SMB24CA-Q1 | 20.5 | 22.8 | 25.2 | 1.0 | 33.2 | 18.4 | 5.0 |
| P6SMB27-Q1 | P6SMB27C-Q1 | 21.8 | 24.3 | 29.7 | 1.0 | 39.1 | 15.3 | 5.0 |
| P6SMB27A-Q1 | P6SMB27CA-Q1 | 23.1 | 25.7 | 28.4 | 1.0 | 37.5 | 16.3 | 5.0 |
| P6SMB30-Q1 | P6SMB30C-Q1 | 24.3 | 27.0 | 33.0 | 1.0 | 43.5 | 13.8 | 5.0 |
| P6SMB30A-Q1 | P6SMB30CA-Q1 | 25.6 | 28.5 | 31.5 | 1.0 | 41.4 | 14.7 | 5.0 |

※ For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double

Electrical characteristics (at T =25°C unless otherwise noted)

| Type Number | | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I _T | Breakdown Voltage Max. @ I _T | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RMW} |
|--------------|---------------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| (Uni) | (Bi) | V _{RMW} (V) | V _{BR MIN} (V) | V _{BR MAX} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (uA) |
| P6SMB33-Q1 | P6SMB33C-Q1 | 26.8 | 29.7 | 36.3 | 1.0 | 47.7 | 12.6 | 5.0 |
| P6SMB33A-Q1 | P6SMB33CA-Q1 | 28.2 | 31.4 | 34.7 | 1.0 | 45.7 | 13.3 | 5.0 |
| P6SMB36-Q1 | P6SMB36C-Q1 | 29.1 | 32.4 | 39.6 | 1.0 | 52.0 | 11.5 | 5.0 |
| P6SMB36A-Q1 | P6SMB36CA-Q1 | 30.8 | 34.2 | 37.8 | 1.0 | 49.9 | 12.2 | 5.0 |
| P6SMB39-Q1 | P6SMB39C-Q1 | 31.6 | 35.1 | 42.9 | 1.0 | 56.4 | 10.6 | 5.0 |
| P6SMB39A-Q1 | P6SMB39CA-Q1 | 33.3 | 37.1 | 41.0 | 1.0 | 53.9 | 11.3 | 5.0 |
| P6SMB43-Q1 | P6SMB43C-Q1 | 34.8 | 38.7 | 47.3 | 1.0 | 61.9 | 9.7 | 5.0 |
| P6SMB43A-Q1 | P6SMB43CA-Q1 | 36.8 | 40.9 | 45.2 | 1.0 | 59.3 | 10.3 | 5.0 |
| P6SMB47-Q1 | P6SMB47C-Q1 | 38.1 | 42.3 | 51.7 | 1.0 | 67.8 | 8.8 | 5.0 |
| P6SMB47A-Q1 | P6SMB47CA-Q1 | 40.2 | 44.7 | 49.4 | 1.0 | 64.8 | 9.4 | 5.0 |
| P6SMB51-Q1 | P6SMB51C-Q1 | 41.3 | 45.9 | 56.1 | 1.0 | 73.5 | 8.2 | 5.0 |
| P6SMB51A-Q1 | P6SMB51CA-Q1 | 43.6 | 48.5 | 53.6 | 1.0 | 70.1 | 8.7 | 5.0 |
| P6SMB56-Q1 | P6SMB56C-Q1 | 45.4 | 50.4 | 61.6 | 1.0 | 80.5 | 7.5 | 5.0 |
| P6SMB56A-Q1 | P6SMB56CA-Q1 | 47.8 | 53.2 | 58.8 | 1.0 | 77.0 | 7.9 | 5.0 |
| P6SMB62-Q1 | P6SMB62C-Q1 | 50.2 | 55.8 | 68.2 | 1.0 | 89.0 | 6.7 | 5.0 |
| P6SMB62A-Q1 | P6SMB62CA-Q1 | 53.0 | 58.9 | 65.1 | 1.0 | 85.0 | 7.2 | 5.0 |
| P6SMB68-Q1 | P6SMB68C-Q1 | 55.1 | 61.2 | 74.8 | 1.0 | 98.0 | 6.1 | 5.0 |
| P6SMB68A-Q1 | P6SMB68CA-Q1 | 58.1 | 64.6 | 71.4 | 1.0 | 92.0 | 6.6 | 5.0 |
| P6SMB75-Q1 | P6SMB75C-Q1 | 60.7 | 67.5 | 82.5 | 1.0 | 108 | 5.6 | 5.0 |
| P6SMB75A-Q1 | P6SMB75CA-Q1 | 64.1 | 71.3 | 78.8 | 1.0 | 103 | 5.9 | 5.0 |
| P6SMB82-Q1 | P6SMB82C-Q1 | 66.4 | 73.8 | 90.2 | 1.0 | 118 | 5.1 | 5.0 |
| P6SMB82A-Q1 | P6SMB82CA-Q1 | 70.1 | 77.9 | 86.1 | 1.0 | 113 | 5.4 | 5.0 |
| P6SMB91-Q1 | P6SMB91C-Q1 | 73.7 | 81.9 | 100 | 1.0 | 131 | 4.6 | 5.0 |
| P6SMB91A-Q1 | P6SMB91CA-Q1 | 77.8 | 86.5 | 95.5 | 1.0 | 125 | 4.9 | 5.0 |
| P6SMB100-Q1 | P6SMB100C-Q1 | 81.0 | 90.0 | 110 | 1.0 | 144 | 4.2 | 5.0 |
| P6SMB100A-Q1 | P6SMB100CA-Q1 | 85.5 | 95.0 | 105 | 1.0 | 137 | 4.5 | 5.0 |
| P6SMB110-Q1 | P6SMB110C-Q1 | 89.2 | 99.0 | 121 | 1.0 | 158 | 3.8 | 5.0 |
| P6SMB110A-Q1 | P6SMB110CA-Q1 | 94.0 | 105 | 116 | 1.0 | 152 | 4.0 | 5.0 |
| P6SMB120-Q1 | P6SMB120C-Q1 | 97.2 | 108 | 132 | 1.0 | 173 | 3.5 | 5.0 |
| P6SMB120A-Q1 | P6SMB120CA-Q1 | 102 | 114 | 126 | 1.0 | 165 | 3.7 | 5.0 |
| P6SMB130-Q1 | P6SMB130C-Q1 | 105 | 117 | 143 | 1.0 | 187 | 3.2 | 5.0 |
| P6SMB130A-Q1 | P6SMB130CA-Q1 | 111 | 124 | 137 | 1.0 | 179 | 3.4 | 5.0 |
| P6SMB150-Q1 | P6SMB150C-Q1 | 121 | 135 | 165 | 1.0 | 215 | 2.8 | 5.0 |
| P6SMB150A-Q1 | P6SMB150CA-Q1 | 128 | 143 | 158 | 1.0 | 207 | 2.9 | 5.0 |
| P6SMB160-Q1 | P6SMB160C-Q1 | 130 | 144 | 176 | 1.0 | 230 | 2.6 | 5.0 |
| P6SMB160A-Q1 | P6SMB160CA-Q1 | 136 | 152 | 168 | 1.0 | 219 | 2.8 | 5.0 |

※ For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double

Electrical characteristics (at T =25°C unless otherwise noted)

| Type Number | | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I _T | Breakdown Voltage Max. @ I _T | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RMW} |
|--------------|---------------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| (Uni) | (Bi) | V _{RMW} (V) | V _{BR MIN} (V) | V _{BR MAX} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (uA) |
| P6SMB170-Q1 | P6SMB170C-Q1 | 138 | 153 | 187 | 1.0 | 244 | 2.5 | 5.0 |
| P6SMB170A-Q1 | P6SMB170CA-Q1 | 145 | 162 | 179 | 1.0 | 234 | 2.6 | 5.0 |
| P6SMB180-Q1 | P6SMB180C-Q1 | 146 | 162 | 198 | 1.0 | 258 | 2.3 | 5.0 |
| P6SMB180A-Q1 | P6SMB180CA-Q1 | 154 | 171 | 189 | 1.0 | 246 | 2.5 | 5.0 |
| P6SMB200-Q1 | P6SMB200C-Q1 | 162 | 180 | 220 | 1.0 | 287 | 2.1 | 5.0 |
| P6SMB200A-Q1 | P6SMB200CA-Q1 | 171 | 190 | 210 | 1.0 | 274 | 2.2 | 5.0 |
| P6SMB220-Q1 | P6SMB220C-Q1 | 175 | 198 | 242 | 1.0 | 344 | 1.7 | 5.0 |
| P6SMB220A-Q1 | P6SMB220CA-Q1 | 185 | 209 | 231 | 1.0 | 328 | 1.9 | 5.0 |
| P6SMB250-Q1 | P6SMB250C-Q1 | 202 | 225 | 275 | 1.0 | 360 | 1.7 | 5.0 |
| P6SMB250A-Q1 | P6SMB250CA-Q1 | 214 | 237 | 263 | 1.0 | 344 | 1.8 | 5.0 |
| P6SMB300-Q1 | P6SMB300C-Q1 | 243 | 270 | 330 | 1.0 | 430 | 1.4 | 5.0 |
| P6SMB300A-Q1 | P6SMB300CA-Q1 | 256 | 285 | 315 | 1.0 | 414 | 1.5 | 5.0 |
| P6SMB350-Q1 | P6SMB350C-Q1 | 284 | 315 | 385 | 1.0 | 504 | 1.2 | 5.0 |
| P6SMB350A-Q1 | P6SMB350CA-Q1 | 300 | 333 | 368 | 1.0 | 482 | 1.3 | 5.0 |
| P6SMB400-Q1 | P6SMB400C-Q1 | 324 | 360 | 440 | 1.0 | 574 | 1.0 | 5.0 |
| P6SMB400A-Q1 | P6SMB400CA-Q1 | 342 | 380 | 420 | 1.0 | 548 | 1.1 | 5.0 |
| P6SMB440-Q1 | P6SMB440C-Q1 | 356 | 396 | 484 | 1.0 | 631 | 0.95 | 5.0 |
| P6SMB440A-Q1 | P6SMB440CA-Q1 | 376 | 418 | 462 | 1.0 | 602 | 1.0 | 5.0 |

※ For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double

Rating and characteristic curves (P6SMB-Q1 Series)

Fig.1 - PEAK PULSE POWER RATING CURVE

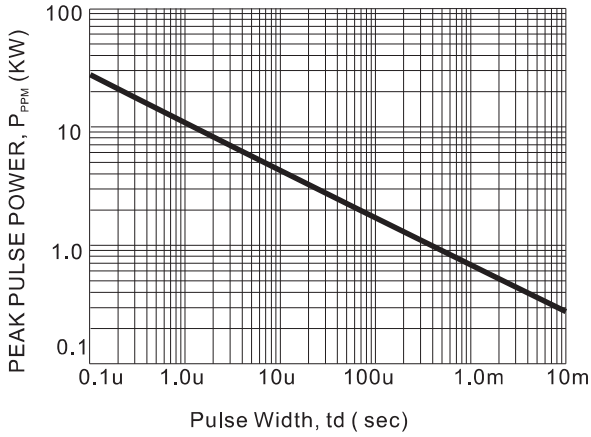


Fig.2 - PULSE DERATING CURVE

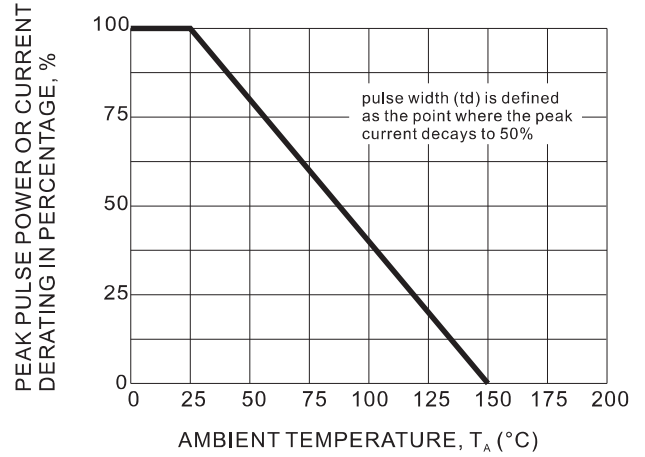


Fig.3 - PULSE WAVEFORM

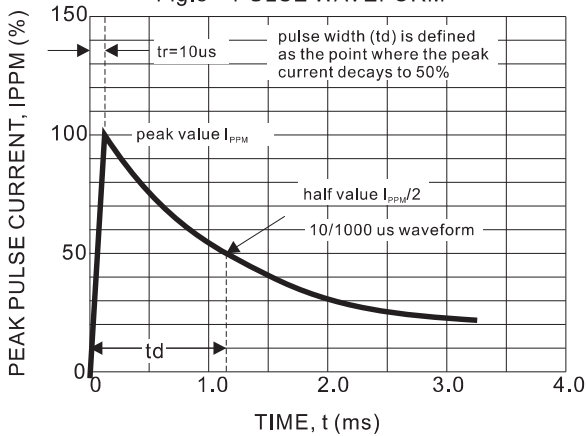


Fig.4 - TYPICAL JUNCTION CAPACITANCE

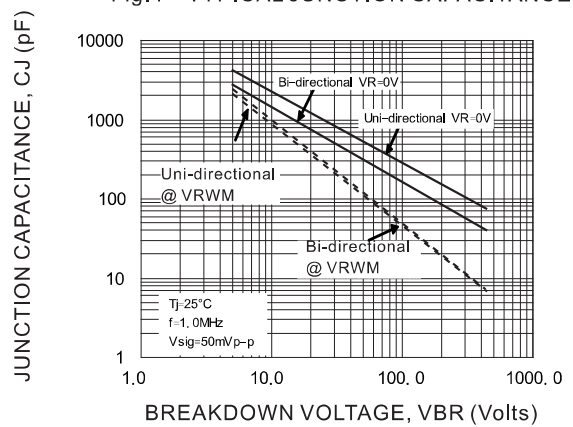


Fig.5 - STEADY STATE POWER DERATING CURVE

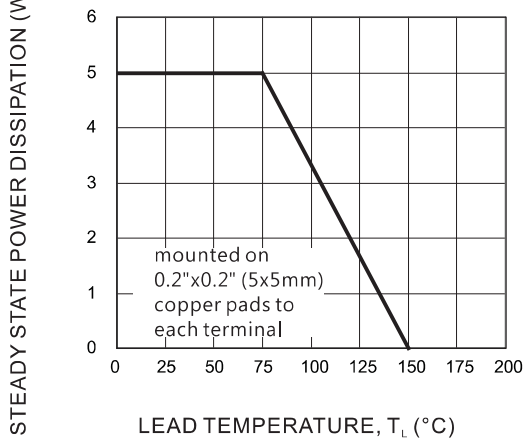
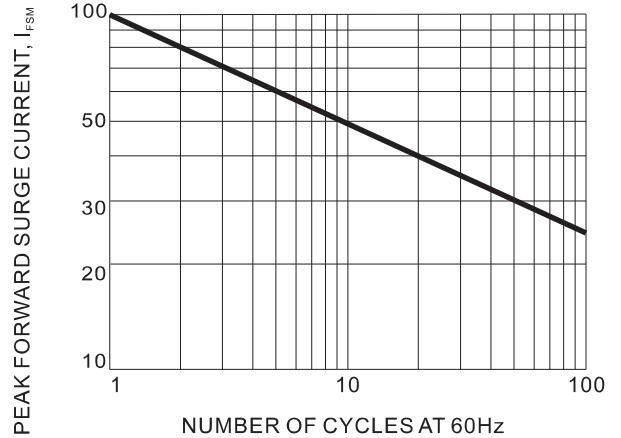






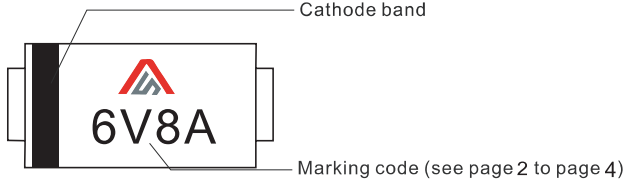
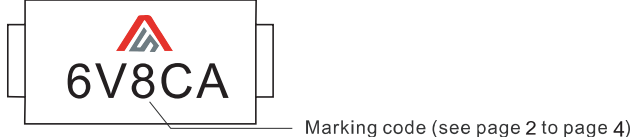
Fig.6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT



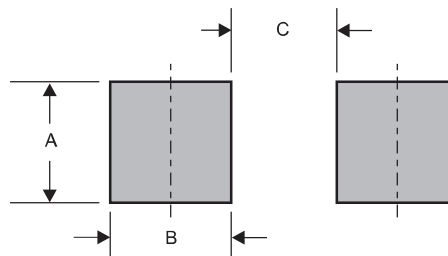
Pinning information

| Pin | Simplified outline | Symbol |
|---|--|---|
| Uni-Directional Pin1 cathode Pin2 anode |  |  |
| Bi-Directional |  |  |

Marking

| Type number | Example |
|-----------------|--|
| Uni-Directional |  |
| Bi-Directional |  |

Suggested solder pad layout



Dimensions in inches and (millimeters)

| PACKAGE | A | B | C |
|---------|--------------|--------------|--------------|
| SMB | 0.078 (2.00) | 0.059 (1.50) | 0.110 (2.80) |