

## 1. General description

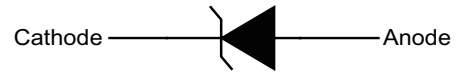
P6SMBJ series, 600W transient voltage suppressor (TVS) in SMB package, designed to protect electronic circuits against damage induced by lightning surges or other transient voltage events.

## 2. Features and benefits

- Peak pulse power 600W @ 10/1000 $\mu$ s waveform
- Excellent clamping capability
- Low incremental surge resistance
- Surface mount package for easy assembly and PCB space-saving
- Typical  $I_R < 1\mu$ A when  $V_{BR\ min} > 12$ V
- Fast response time: typically  $< 1.0$ ps from 0V to  $V_{BR}$  minimum
- IEC 61000-4-2 ESD 30kV (Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Guaranteed high temperature for reflow soldering: 260 $^{\circ}$ C/10sec
- Mold compound complies to UL94V-0 flammability classification
- Meets MSL level 1, per J-STD-020
- Pb-free lead finish
- Halogen free and RoHS compliant



Bi-directional



Uni-directional

## 3. Applications

- Power supplies
- Industrial applications
- Power management circuits
- I/O interfaces



## 4. Ordering information

| Type number     | Package name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|-----------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| P6SMBJxxxXX     | SMB          | P6SMBJxxxXXJ          | Tape and reel  | 3000                   | SMBJ            | 18-Oct-2020        |
| eg. P6SMBJ5.0CA | SMB          | P6SMBJ5.0CAJ          | Tape and reel  | 3000                   | SMBJ            | 18-Oct-2020        |

## 5. Absolute maximum ratings

In accordance with the Absolute Maximum Rating System (IEC 60134).

$T_j = 25^{\circ}$ C unless otherwise specified.

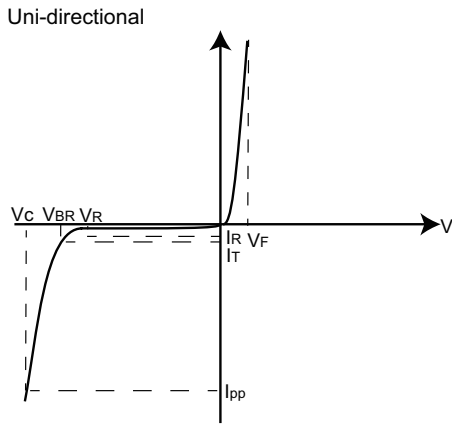
| Symbol                         | Parameter                      | Conditions   | Values     | Unit         |
|--------------------------------|--------------------------------|--|------------|--------------|
| <b>Absolute maximum rating</b> |                                |  |            |              |
| $P_{PPM}$                      | peak pulse power               | [1]  | 600        | W            |
| $P_{M(AV)}$                    | steady state power dissipation | on infinite heatsink at $T_a = 50^{\circ}$ C   | 5          | W            |
| $I_{FSM}$                      | peak forward surge current     | $t_p = 8.3$ ms; single half sine-wave pulse; duty cycle = 4 pulses per minute maximum; unidirectional units only | 100        | A            |
| $V_F$                          | forward on-state voltage       | $I_F = 50$ A; unidirectional units only  | 3.5        | V            |
| $T_{stg}$                      | storage temperature range      |  | -65 to 150 | $^{\circ}$ C |
| $T_j$                          | operating temperature range    |  | -65 to 150 | $^{\circ}$ C |

[1] In accordance with IEC 61643-321 (10/1000  $\mu$ s current waveform).

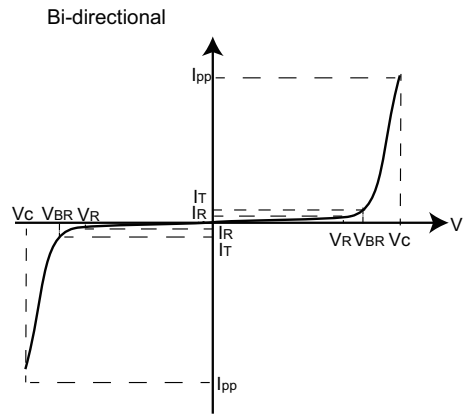
## 6. Characteristics

$T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified.

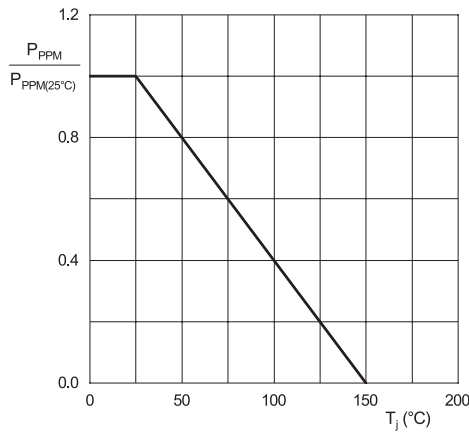
| PN<br>(Uni) | PN<br>(Bi)  | Reverse<br>Stand off<br>Voltage<br>$V_R$<br>(V) | Breakdown<br>Voltage<br>$V_{BR} @ I_T$<br>(V) |       | Test<br>current<br>$I_T$<br>(mA) | Max.<br>Clamping<br>Voltage<br>$V_C @ I_{pp}$<br>(V) | Max. Peak<br>Pulse<br>Current<br>$I_{pp}$<br>(A) | Maximum<br>Reverse<br>Leakage<br>$I_R @ V_R$<br>( $\mu$ A) | Marking |        |        |
|-------------|-------------|---|---|-------|----------------------------------|--|--|--|---------|--------|--------|
|             |             |   | Min   | Max   |                                  |  |  |  | Uni     | Bi     |        |
| P6SMBJ5.0A  | P6SMBJ5.0CA | 5   | 6.45  | 6.98  | 10                               | 9.2  | 65.3   | 400  |         | 6B005J | 6B005J |
| P6SMBJ6.0A  | P6SMBJ6.0CA | 6   | 6.8   | 7.32  | 10                               | 10.3   | 58.3   | 400  |         | 6B006J | 6B006J |
| P6SMBJ6.5A  | P6SMBJ6.5CA | 6.5   | 7.27  | 7.92  | 10                               | 11.2   | 53.6   | 250  |         | 6B06FJ | 6B06FJ |
| P6SMBJ7.0A  | P6SMBJ7.0CA | 7   | 7.82  | 8.57  | 10                               | 12   | 50   | 100  |         | 6B007J | 6B007J |
| P6SMBJ8.0A  | P6SMBJ8.0CA | 8   | 8.95  | 9.76  | 1                                | 13.6   | 44.2   | 50   |         | 6B008J | 6B008J |
| P6SMBJ9.0A  | P6SMBJ9.0CA | 9   | 10.1  | 11    | 1                                | 15.4   | 39   | 10   |         | 6B009J | 6B009J |
| P6SMBJ10A   | P6SMBJ10CA  | 10  | 11.21   | 12.19 | 1                                | 17   | 35.3   | 5  |         | 6B010J | 6B010J |
| P6SMBJ11A   | P6SMBJ11CA  | 11  | 12.32   | 13.38 | 1                                | 18.2   | 33   | 1  |         | 6B011J | 6B011J |
| P6SMBJ12A   | P6SMBJ12CA  | 12  | 13.43   | 14.57 | 1                                | 19.9   | 30.2   | 1  |         | 6B012J | 6B012J |
| P6SMBJ13A   | P6SMBJ13CA  | 13  | 14.54   | 15.76 | 1                                | 21.5   | 28   | 1  |         | 6B013J | 6B013J |
| P6SMBJ14A   | P6SMBJ14CA  | 14  | 15.75   | 17.04 | 1                                | 23.2   | 25.9   | 1  |         | 6B014J | 6B014J |
| P6SMBJ15A   | P6SMBJ15CA  | 15  | 16.86   | 18.34 | 1                                | 24.4   | 24.6   | 1  |         | 6B015J | 6B015J |
| P6SMBJ16A   | P6SMBJ16CA  | 16  | 17.97   | 19.52 | 1                                | 26   | 23.1   | 1  |         | 6B016J | 6B016J |
| P6SMBJ17A   | P6SMBJ17CA  | 17  | 19.08   | 20.72 | 1                                | 27.6   | 21.8   | 1  |         | 6B017J | 6B017J |
| P6SMBJ18A   | P6SMBJ18CA  | 18  | 20.19   | 21.9  | 1                                | 29.2   | 20.6   | 1  |         | 6B018J | 6B018J |
| P6SMBJ20A   | P6SMBJ20CA  | 20  | 22.41   | 24.28 | 1                                | 32.4   | 18.6   | 1  |         | 6B020J | 6B020J |
| P6SMBJ22A   | P6SMBJ22CA  | 22  | 24.63   | 26.66 | 1                                | 35.5   | 16.9   | 1  |         | 6B022J | 6B022J |
| P6SMBJ24A   | P6SMBJ24CA  | 24  | 26.95   | 29.23 | 1                                | 38.9   | 15.5   | 1  |         | 6B024J | 6B024J |
| P6SMBJ26A   | P6SMBJ26CA  | 26  | 29.12   | 31.67 | 1                                | 42.1   | 14.3   | 1  |         | 6B026J | 6B026J |
| P6SMBJ28A   | P6SMBJ28CA  | 28  | 31.33   | 34.16 | 1                                | 45.4   | 13.3   | 1  |         | 6B028J | 6B028J |
| P6SMBJ30A   | P6SMBJ30CA  | 30  | 33.55   | 36.54 | 1                                | 48.4   | 12.4   | 1  |         | 6B030J | 6B030J |
| P6SMBJ33A   | P6SMBJ33CA  | 33  | 36.98   | 40.3  | 1                                | 53.3   | 11.3   | 1  |         | 6B033J | 6B033J |
| P6SMBJ36A   | P6SMBJ36CA  | 36  | 40.3  | 43.9  | 1                                | 58.1   | 10.4   | 1  |         | 6B036J | 6B036J |
| P6SMBJ40A   | P6SMBJ40CA  | 40  | 44.7  | 48.8  | 1                                | 64.5   | 9.3  | 1  |         | 6B040J | 6B040J |
| P6SMBJ43A   | P6SMBJ43CA  | 43  | 48.2  | 52.4  | 1                                | 69.4   | 8.7  | 1  |         | 6B043J | 6B043J |
| P6SMBJ45A   | P6SMBJ45CA  | 45  | 50.4  | 54.9  | 1                                | 72.7   | 8.3  | 1  |         | 6B045J | 6B045J |
| P6SMBJ48A   | P6SMBJ48CA  | 48  | 53.7  | 58.5  | 1                                | 77.4   | 7.8  | 1  |         | 6B048J | 6B048J |
| P6SMBJ51A   | P6SMBJ51CA  | 51  | 57.1  | 62.3  | 1                                | 82.4   | 7.3  | 1  |         | 6B051J | 6B051J |
| P6SMBJ54A   | P6SMBJ54CA  | 54  | 60.5  | 65.8  | 1                                | 87.1   | 6.9  | 1  |         | 6B054J | 6B054J |
| P6SMBJ58A   | P6SMBJ58CA  | 58  | 64.9  | 70.7  | 1                                | 93.6   | 6.5  | 1  |         | 6B058J | 6B058J |
| P6SMBJ60A   | P6SMBJ60CA  | 60  | 67.2  | 73.2  | 1                                | 96.8   | 6.2  | 1  |         | 6B060J | 6B060J |
| P6SMBJ64A   | P6SMBJ64CA  | 64  | 71.6  | 78    | 1                                | 103  | 5.9  | 1  |         | 6B064J | 6B064J |
| P6SMBJ70A   | P6SMBJ70CA  | 70  | 78.4  | 85.4  | 1                                | 113  | 5.3  | 1  |         | 6B070J | 6B070J |
| P6SMBJ75A   | P6SMBJ75CA  | 75  | 83.9  | 91.5  | 1                                | 121  | 5  | 1  |         | 6B075J | 6B075J |
| P6SMBJ78A   | P6SMBJ78CA  | 78  | 87.4  | 95.1  | 1                                | 126  | 4.8  | 1  |         | 6B078J | 6B078J |
| P6SMBJ85A   | P6SMBJ85CA  | 85  | 95.1  | 103.3 | 1                                | 137  | 4.4  | 1  |         | 6B085J | 6B085J |



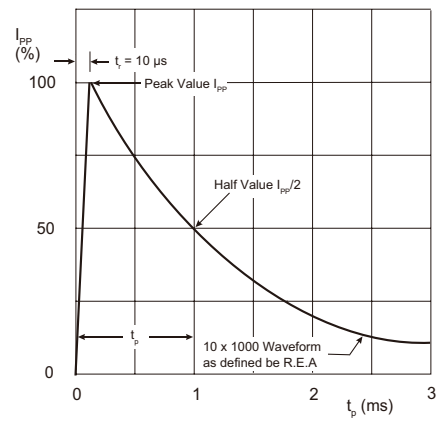
**Fig. 1. I-V curve characteristics; Uni-directional**



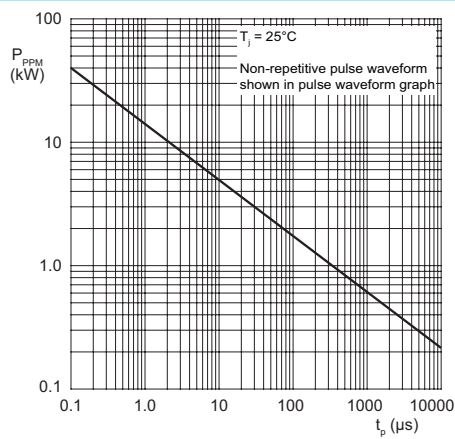
**Fig. 2. I-V curve characteristics; Bi-directional**



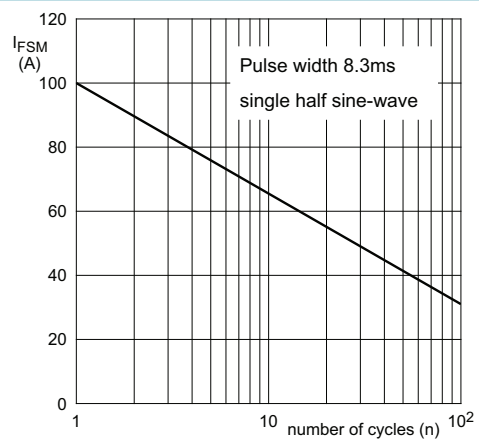
**Fig. 3. Peak pulse power derating curve**



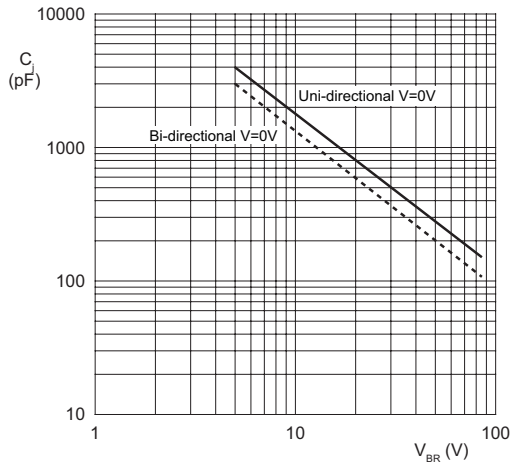
**Fig. 4. Pulse waveform**



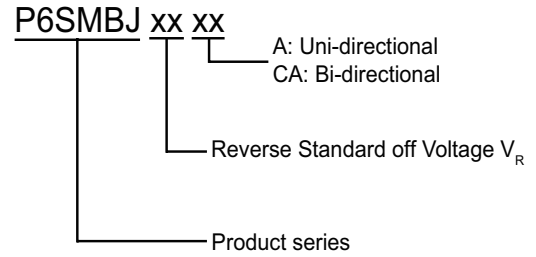
**Fig. 5. Peak pulse power rating curve**



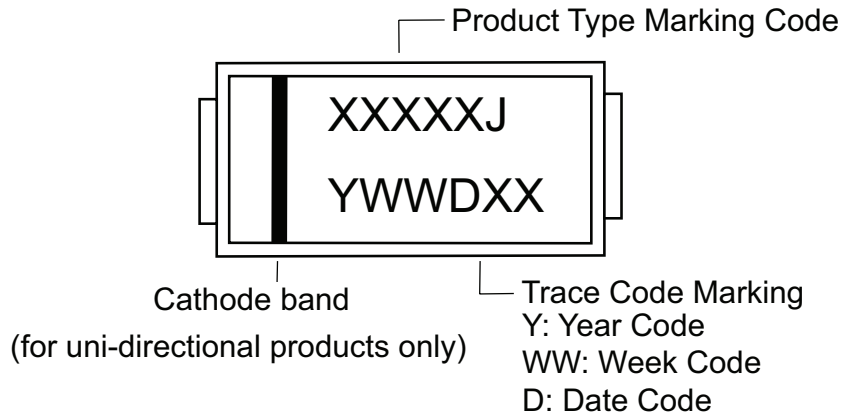
**Fig. 6. Maximum non-repetitive surge current Uni-directional only**



**Fig. 7. Typical junction capacitance**



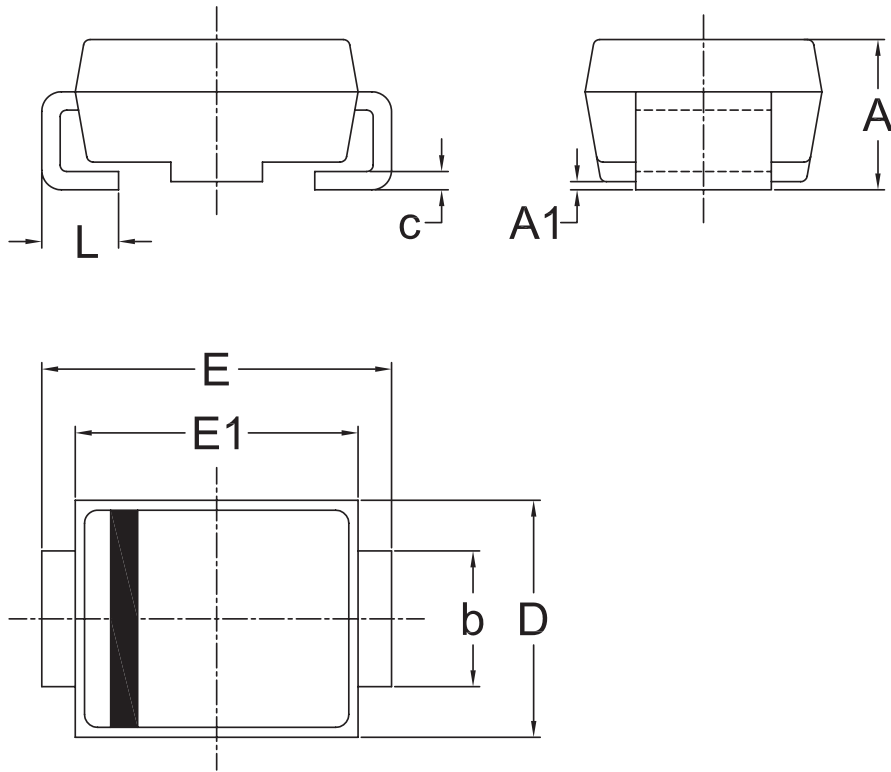
**Fig. 8. Part numbering**



**Fig. 9. Part marking**

**7. Package outline**

SMB



| UNIT | A   | A1   | b    | c    | D    | E    | E1   | L    |      |
|------|-----|------|------|------|------|------|------|------|------|
| mm   | Max | 2.50 | 0.30 | 2.15 | 0.25 | 3.75 | 5.54 | 4.65 | 1.50 |
|      | Min | 2.00 | 0.00 | 1.85 | 0.15 | 3.45 | 5.04 | 4.35 | 0.80 |

Remark: Dimensions D and E1 do not include mold flash & gate remain.

## 8. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition  |
|--------------------------------|--------------------|---|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.ween-semi.com>.

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