



# THINKING ELECTRONIC INDUSTRIAL CO., LTD.

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## SPECIFICATION FOR APPROVAL

|                      |                   |
|----------------------|-------------------|
| CUSTOMER             | 立創電子              |
| CERTIFIED MODEL/TYPE | SMBJ10            |
| PART NO.             | SMBJ10A (RoHS+HF) |
| APPLICATION          |                   |
| CUSTOMER P/N         |                   |
| ISSUE DATE           | Dec.05,2020       |
| REV. NO.             |                   |
| REV. DATE            |                   |

| FOR CUSTOMER APPROVAL | CHECKED BY            |
|-----------------------|-----------------------|
|                       | <i>Dan Zhang</i>      |
|                       | APPROVED BY           |
|                       | <i>Huaifang Zhang</i> |





**REVISED RECORD SHEET**

| REV. NO | REV. DATE | REVISED CONTENT |
|---------|-----------|-----------------|
|         |           |                 |



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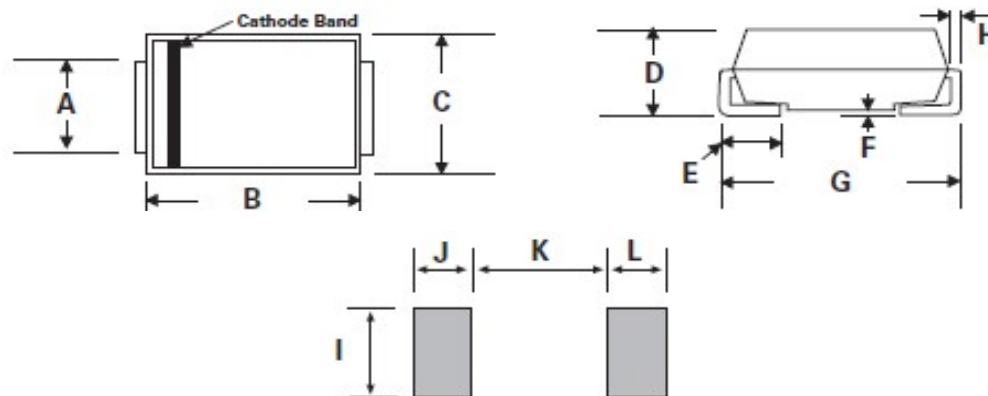
Part Number Code

Example :

**SMBJ**    **10**    **A**  
 (1)            (2)    (3)

| No. | Item                                    | Digit | Specification                               |
|-----|---|-------|---|
| (1) | Product Type                            | SMBJ  | Thinking Power TVS SMD Type                 |
| (2) | Reverse Stand off Voltage ( $V_{RWM}$ ) | 10    | 10=10 $V_{RWM}$                             |
| (3) | Type Code                               | A     | Uni-directional<br>5% VBR Voltage Tolerance |

## Structure and Dimensions



\*The Cathode bend for Uni-directional product only.

| Item | Millimeters |       | Inches |       |
|------|-------------|-------|--------|-------|
|      | Min.        | Max.  | Min.   | Max.  |
| A    | 1.91        | 2.2   | 0.075  | 0.086 |
| B    | 4.06        | 4.7   | 0.16   | 0.185 |
| C    | 3.3         | 3.94  | 0.13   | 0.155 |
| D    | 2.13        | 2.70  | 0.083  | 0.096 |
| E    | 0.76        | 1.52  | 0.03   | 0.06  |
| F    | -           | 0.203 | -      | 0.008 |
| G    | 5.08        | 5.59  | 0.2    | 0.22  |
| H    | 0.152       | 0.305 | 0.006  | 0.012 |
| I    | 2.26        | -     | 0.089  | -     |
| J/L  | 2.16        | -     | 0.085  | -     |
| K    | -           | 2.74  | -      | 0.107 |

## Electrical Characteristics

Peak power dissipation with a 10/1000 $\mu$ s waveform : 600W

Operating junction and storage temperature range : -55~+150 °C

| Part No.<br>(Uni) | Part No.<br>(Bi) | Reverse<br>Stand off<br>Voltage | Breakage<br>Voltage<br>VBR @ IT |          | Test<br>Current | Maximum<br>Clamping<br>Voltage<br>VC @ Ipp | Maximum<br>Peak Pulse<br>Current | Maximum<br>Reverse<br>Leakage<br>IR<br>@VRWM | Marking<br>Code |          |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------|--|----------------------------------|--|-----------------|----------|
|                   |                  |                                 | VRWM ( V )                      | Min( V ) |                 |  |                                  |  | Max( V )        | IT( mA ) |
| SMBJ5.0A          | SMBJ5.0CA        | 5                               | 6.4                             | 7        | 10              | 9.2  | 65.3                             | 800  | KE.             | AE.      |
| SMBJ6.0A          | SMBJ6.0CA        | 6                               | 6.67                            | 7.37     | 10              | 10.3                                       | 58.3                             | 800  | KG.             | AG.      |
| SMBJ6.5A          | SMBJ6.5CA        | 6.5                             | 7.22                            | 7.98     | 10              | 11.2                                       | 53.6                             | 500  | KK.             | AK.      |
| SMBJ7.0A          | SMBJ7.0CA        | 7                               | 7.78                            | 8.6      | 10              | 12   | 50                               | 200  | KM.             | AM.      |
| SMBJ7.5A          | SMBJ7.5CA        | 7.5                             | 8.33                            | 9.21     | 1               | 12.9                                       | 46.6                             | 100  | KP.             | AP.      |
| SMBJ8.0A          | SMBJ8.0CA        | 8                               | 8.89                            | 9.83     | 1               | 13.6                                       | 44.2                             | 50   | KR.             | AR.      |
| SMBJ8.5A          | SMBJ8.5CA        | 8.5                             | 9.44                            | 10.4     | 1               | 14.4                                       | 41.7                             | 20   | KT.             | AT.      |
| SMBJ9.0A          | SMBJ9.0CA        | 9                               | 10                              | 11.1     | 1               | 15.4                                       | 39                               | 10   | KV.             | AV.      |
| SMBJ10A           | SMBJ10CA         | 10                              | 11.1                            | 12.3     | 1               | 17   | 35.3                             | 5  | KX.             | AX.      |
| SMBJ11A           | SMBJ11CA         | 11                              | 12.2                            | 13.5     | 1               | 18.2                                       | 33                               | 1  | KZ.             | AZ.      |
| SMBJ12A           | SMBJ12CA         | 12                              | 13.3                            | 14.7     | 1               | 19.9                                       | 30.2                             | 1  | LE.             | BE.      |
| SMBJ13A           | SMBJ13CA         | 13                              | 14.4                            | 15.9     | 1               | 21.5                                       | 28                               | 1  | LG.             | BG.      |
| SMBJ14A           | SMBJ14CA         | 14                              | 15.6                            | 17.2     | 1               | 23.2                                       | 25.9                             | 1  | LK.             | BK.      |
| SMBJ15A           | SMBJ15CA         | 15                              | 16.7                            | 18.5     | 1               | 24.4                                       | 24.6                             | 1  | LM.             | BM.      |
| SMBJ16A           | SMBJ16CA         | 16                              | 17.8                            | 19.7     | 1               | 26   | 23.1                             | 1  | LP.             | BP.      |
| SMBJ17A           | SMBJ17CA         | 17                              | 18.9                            | 20.9     | 1               | 27.6                                       | 21.8                             | 1  | LR.             | BR.      |
| SMBJ18A           | SMBJ18CA         | 18                              | 20                              | 22.1     | 1               | 29.2                                       | 20.6                             | 1  | LT.             | BT.      |
| SMBJ20A           | SMBJ20CA         | 20                              | 22.2                            | 24.5     | 1               | 32.4                                       | 18.6                             | 1  | LV.             | BV.      |
| SMBJ22A           | SMBJ22CA         | 22                              | 24.4                            | 26.9     | 1               | 35.5                                       | 16.9                             | 1  | LX.             | BX.      |
| SMBJ24A           | SMBJ24CA         | 24                              | 26.7                            | 29.5     | 1               | 38.9                                       | 15.5                             | 1  | LZ.             | BZ.      |
| SMBJ26A           | SMBJ26CA         | 26                              | 28.9                            | 31.9     | 1               | 42.1                                       | 14.3                             | 1  | ME.             | CE.      |
| SMBJ28A           | SMBJ28CA         | 28                              | 31.1                            | 34.4     | 1               | 45.4                                       | 13.3                             | 1  | MG.             | CG.      |
| SMBJ30A           | SMBJ30CA         | 30                              | 33.3                            | 36.8     | 1               | 48.4                                       | 12.4                             | 1  | MK.             | CK.      |
| SMBJ33A           | SMBJ33CA         | 33                              | 36.7                            | 40.6     | 1               | 53.3                                       | 11.3                             | 1  | MM.             | CM.      |
| SMBJ36A           | SMBJ36CA         | 36                              | 40                              | 44.2     | 1               | 58.1                                       | 10.4                             | 1  | MP.             | CP.      |
| SMBJ40A           | SMBJ40CA         | 40                              | 44.4                            | 49.1     | 1               | 64.5                                       | 9.3                              | 1  | MR.             | CR.      |
| SMBJ43A           | SMBJ43CA         | 43                              | 47.8                            | 52.8     | 1               | 69.4                                       | 8.7                              | 1  | MT.             | CT.      |
| SMBJ45A           | SMBJ45CA         | 45                              | 50                              | 55.3     | 1               | 72.7                                       | 8.3                              | 1  | MV.             | CV.      |
| SMBJ48A           | SMBJ48CA         | 48                              | 53.3                            | 58.9     | 1               | 77.4                                       | 7.8                              | 1  | MX.             | CX.      |
| SMBJ51A           | SMBJ51CA         | 51                              | 56.7                            | 62.7     | 1               | 82.4                                       | 7.3                              | 1  | MZ.             | CZ.      |
| SMBJ54A           | SMBJ54CA         | 54                              | 60                              | 66.3     | 1               | 87.1                                       | 6.9                              | 1  | NE.             | DE.      |
| SMBJ58A           | SMBJ58CA         | 58                              | 64.4                            | 71.2     | 1               | 93.6                                       | 6.5                              | 1  | NG.             | DG.      |
| SMBJ60A           | SMBJ60CA         | 60                              | 66.7                            | 73.7     | 1               | 96.8                                       | 6.2                              | 1  | NK.             | DK.      |

Electrical CharacteristicsPeak power dissipation with a 10/1000 $\mu$ s waveform : 600W

Operating junction and storage temperature range : -55~+150 °C

| Part No.<br>(Uni) | Part No.<br>(Bi) | Reverse<br>Stand off<br>Voltage | Breakage<br>Voltage<br>VBR @ IT |          | Test<br>Current | Maximum<br>Clamping<br>Voltage<br>VC @ Ipp | Maximum<br>Peak Pulse<br>Current | Maximum<br>Reverse<br>Leakage<br>IR<br>@VRWM | Marking<br>Code |          |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------|--|----------------------------------|--|-----------------|----------|
|                   |                  |                                 | VRWM ( V )                      | Min( V ) |                 |  |                                  |  | Max( V )        | IT( mA ) |
| SMBJ64A           | SMBJ64CA         | 64                              | 71.1                            | 78.6     | 1               | 103  | 5.9                              | 1  | NM.             | DM.      |
| SMBJ70A           | SMBJ70CA         | 70                              | 77.8                            | 86       | 1               | 113  | 5.3                              | 1  | NP.             | DP.      |
| SMBJ75A           | SMBJ75CA         | 75                              | 83.3                            | 92.1     | 1               | 121  | 5                                | 1  | NR.             | DR.      |
| SMBJ78A           | SMBJ78CA         | 78                              | 86.7                            | 95.8     | 1               | 126  | 4.8                              | 1  | NT.             | DT.      |
| SMBJ85A           | SMBJ85CA         | 85                              | 94.4                            | 104      | 1               | 137  | 4.4                              | 1  | NV.             | DV.      |
| SMBJ90A           | SMBJ90CA         | 90                              | 100                             | 111      | 1               | 146  | 4.1                              | 1  | NX.             | DX.      |
| SMBJ100A          | SMBJ100CA        | 100                             | 111                             | 123      | 1               | 162  | 3.7                              | 1  | NZ.             | DZ.      |
| SMBJ110A          | SMBJ110CA        | 110                             | 122                             | 135      | 1               | 177  | 3.4                              | 1  | PE.             | EE.      |
| SMBJ120A          | SMBJ120CA        | 120                             | 133                             | 147      | 1               | 193  | 3.1                              | 1  | PG.             | EG.      |
| SMBJ130A          | SMBJ130CA        | 130                             | 144                             | 159      | 1               | 209  | 2.9                              | 1  | PK.             | EK.      |
| SMBJ150A          | SMBJ150CA        | 150                             | 167                             | 185      | 1               | 243  | 2.5                              | 1  | PM.             | EM.      |
| SMBJ160A          | SMBJ160CA        | 160                             | 178                             | 197      | 1               | 259  | 2.3                              | 1  | PP.             | EP.      |
| SMBJ170A          | SMBJ170CA        | 170                             | 189                             | 209      | 1               | 275  | 2.2                              | 1  | PR.             | ER.      |
| SMBJ180A          | SMBJ180CA        | 180                             | 201                             | 222      | 1               | 292  | 2.1                              | 1  | PT.             | ET.      |
| SMBJ190A          | SMBJ190CA        | 190                             | 209                             | 243      | 1               | 308  | 2                                | 1  | PV.             | EV.      |
| SMBJ200A          | SMBJ200CA        | 200                             | 224                             | 247      | 1               | 324  | 1.9                              | 1  | PW.             | EW.      |
| SMBJ220A          | SMBJ220CA        | 220                             | 246                             | 272      | 1               | 356  | 1.7                              | 1  | PX.             | EX.      |
| SMBJ250A          | SMBJ250CA        | 250                             | 279                             | 309      | 1               | 405  | 1.5                              | 1  | PZ.             | EZ.      |
| SMBJ300A          | SMBJ300CA        | 300                             | 335                             | 371      | 1               | 486  | 1.3                              | 1  | QE.             | FE.      |
| SMBJ350A          | SMBJ350CA        | 350                             | 391                             | 432      | 1               | 567  | 1.1                              | 1  | QG.             | FG.      |
| SMBJ400A          | SMBJ400CA        | 400                             | 447                             | 494      | 1               | 648  | 0.9                              | 1  | QK.             | FK.      |
| SMBJ440A          | SMBJ440CA        | 440                             | 492                             | 543      | 1               | 713  | 0.9                              | 1  | QM.             | FM.      |

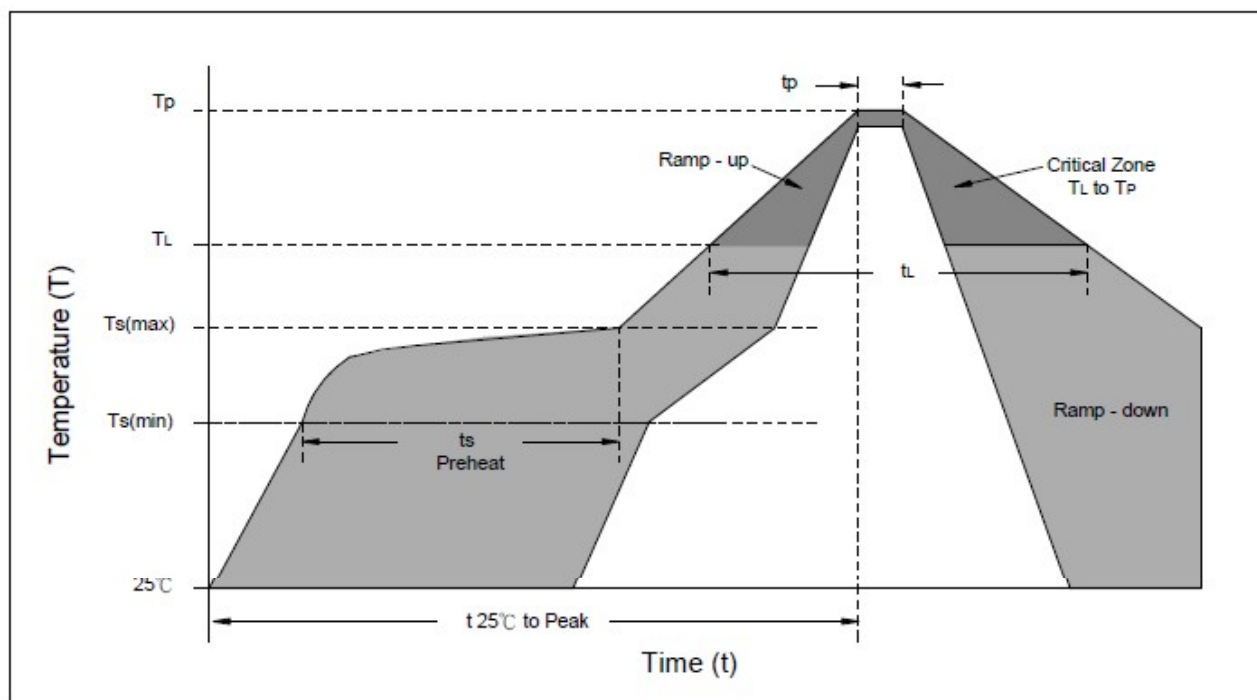
**Reliability**

| Item   | Standard                                    | Test conditions / Methods   | Specifications                                  |
|--|---|---|---|
| HTRB<br>(High Temp.<br>Reverse Bias<br>Test) | MIL-STD-750D<br>METHOD 1038.3<br>Method 103 | Test Temp. : 150°C<br>Duration 168 hrs with rated VRWM  | Electrical<br>properties meet<br>Specifications |
| PCT<br>(Pressure<br>Cooker Test)             | MIL-STD-19500<br>EAPPENDIX C                | Test Temp. : 121 °C<br>Pressure:1.2Kg<br>Duration: 96 hrs   | Electrical<br>properties meet<br>Specifications |
| TCT  | MIL-STD-750D<br>METHOD 1051.5               | Test Temp. : -55°C ~+150°C<br>20 cycles   | Electrical<br>properties meet<br>Specifications |
| Forward<br>Surge                             | MIL-STD-750D<br>METHOD 4066.3               | Sine half wave 8.3mS 1 shot<br>IFSM:20A forSMF<br>40A for SMA/ P4SMA & SMAF<br>100A for SMB/P6SMB<br>200A for SMC/1.5SMC<br>For Uni-directional product only. | Electrical<br>properties meet<br>Specifications |
| Soldering<br>Heat                            | MIL-STD-750D<br>METHOD 2031.2               | Test Temp. : 260°C<br>Duration:10 sec<br>1cycle   | Electrical<br>properties meet<br>Specifications |



## Soldering Recommendation

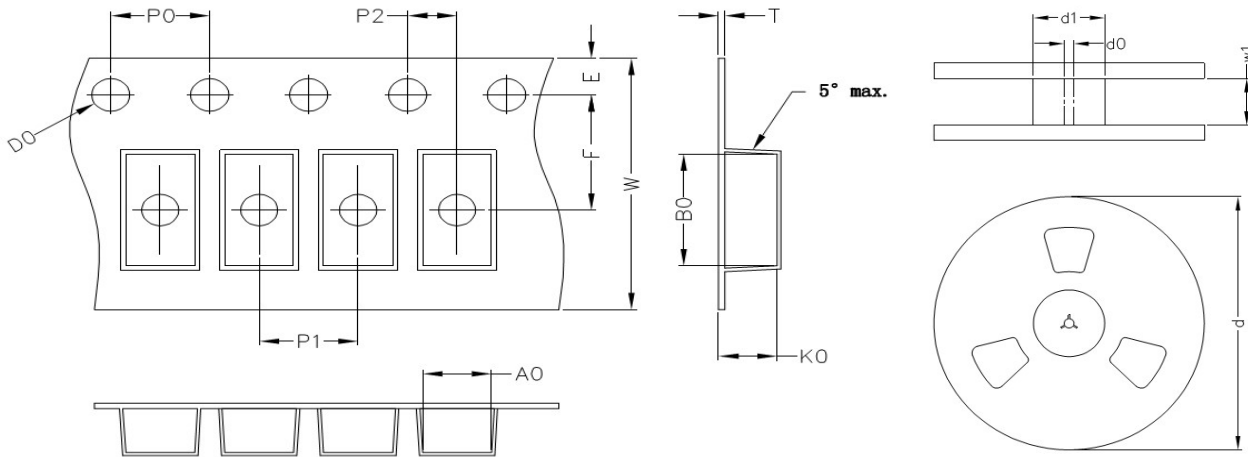
### ■ IR-reflow soldering profile



| Reflow Condition  | Lead-free assembly                 |
|---|------------------------------------|
| <b>Preheat</b><br>-Temperature Min(Ts min)<br>-Temperature Min(Ts max)<br>-Time (min to max) (ts) | 150°C<br>200°C<br>60 – 180 seconds |
| <b>Average ramp up rate</b><br>-Temperature Liquidus (TL) to peak                                 | 3°C/second max                     |
| <b>Ts(max) to TL</b><br>-Ramp-up Rate   | 3°C/second max.                    |
| <b>Reflow</b><br>-Temperature Liquidus (TL)<br>-Time (tl)   | 217°C<br>60 – 150 seconds          |
| <b>Peak Temperature (TP)</b>  | 260°C                              |
| <b>Time within 5°C of actual peak Temperature(tp)</b>   | 20 – 40 seconds                    |
| <b>Ramp-down Rate</b>   | 6°C/second max.                    |
| <b>Time 25°C to peak Temperature(TP)</b>  | 8 minutes max.                     |
| <b>Do not exceed</b>  | 260°C                              |

## Packaging

### ■ Taping Specification



(Unit : mm)

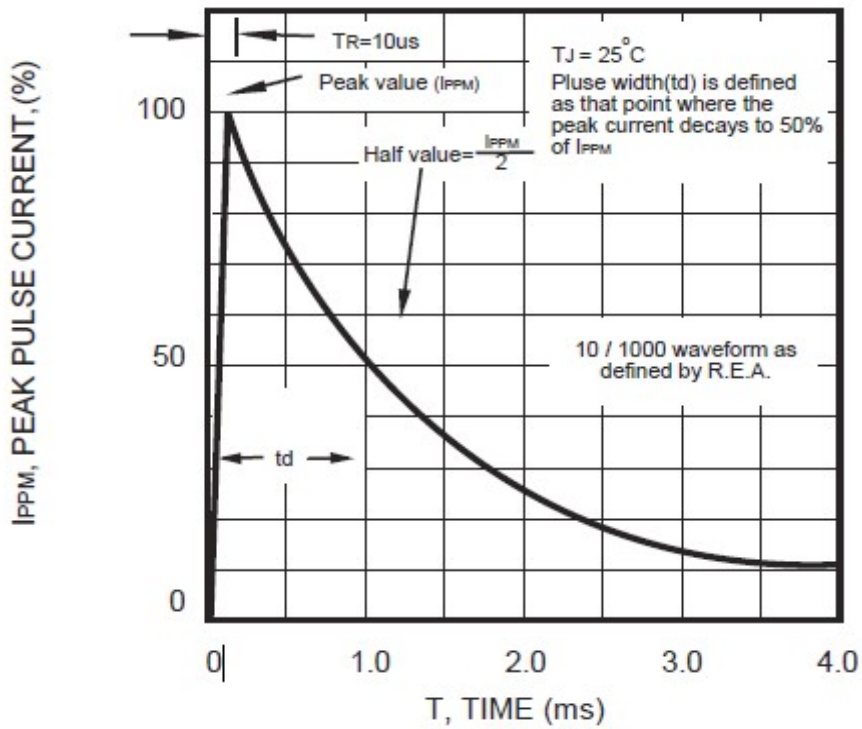
| Index | A0       | B0      | K0       | D0   | E    | F   | P0 | P1 | P2 | T    | W  | d(13") | d1 | d0   | w1   |
|-------|----------|---------|----------|------|------|-----|----|----|----|------|----|--------|----|------|------|
| SMBJ  | 3.65±0.1 | 5.6±0.1 | 2.57±0.1 | 1.55 | 1.75 | 5.5 | 4  | 8  | 2  | 0.25 | 12 | 330    | 75 | 13.5 | 13.5 |

Notes: The tolerance of carrier tape and top cover is ±0.1mm, the tolerance of reel is ±2mm

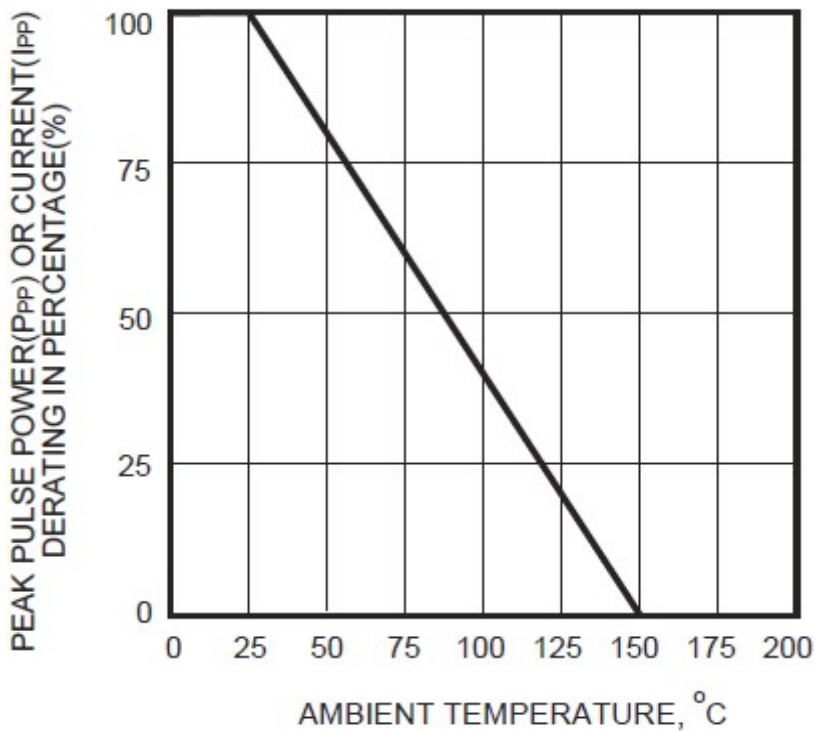
### ■ Quantity

| Series Type | Reel size | Quantity (pcs/reel) |
|-------------|-----------|---------------------|
| SMBJ        | 13"       | 3,000               |

Pulse Waveform

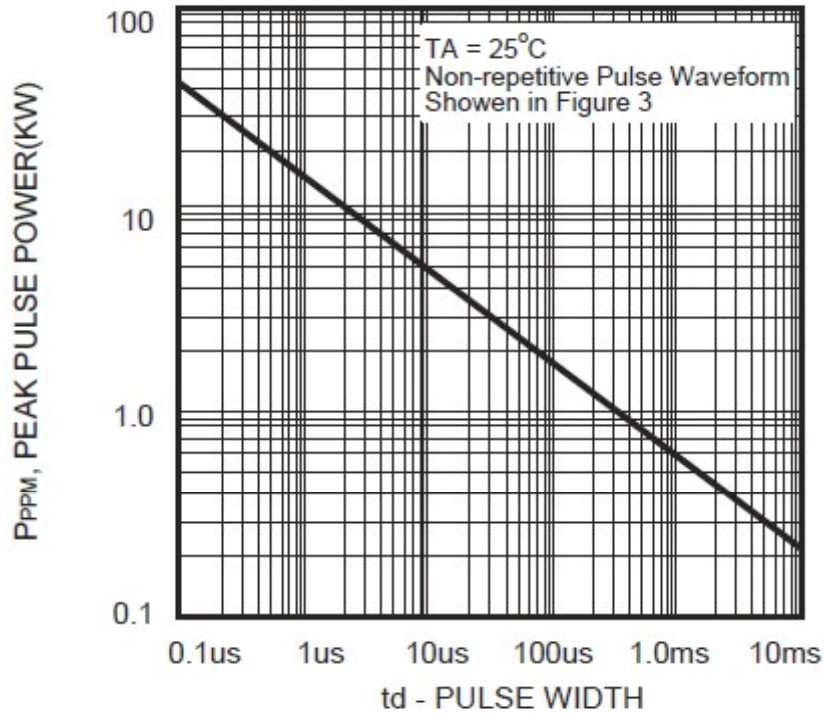


Pulse Derating Curve



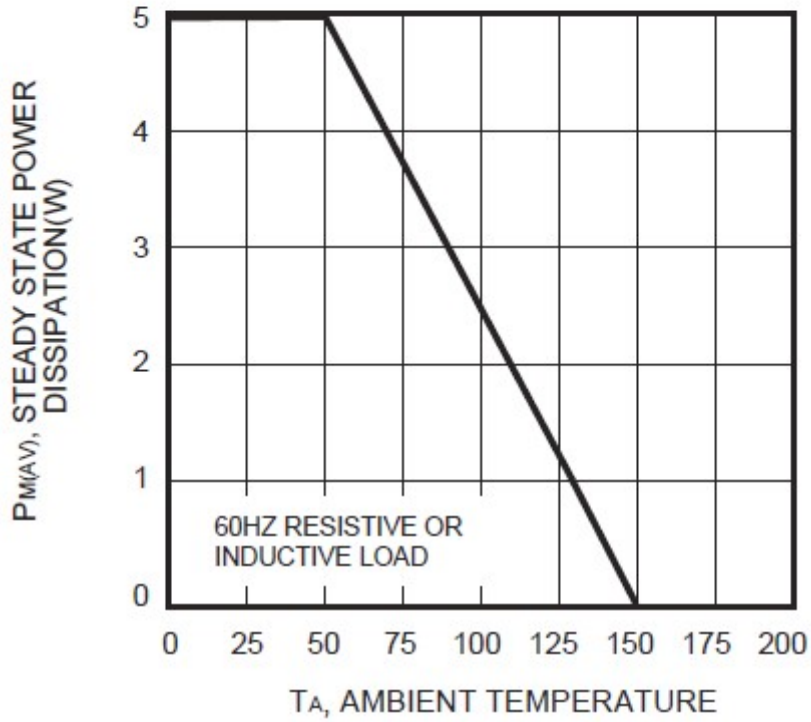
Peak Pulse Power Rating Curve

SMBJ series



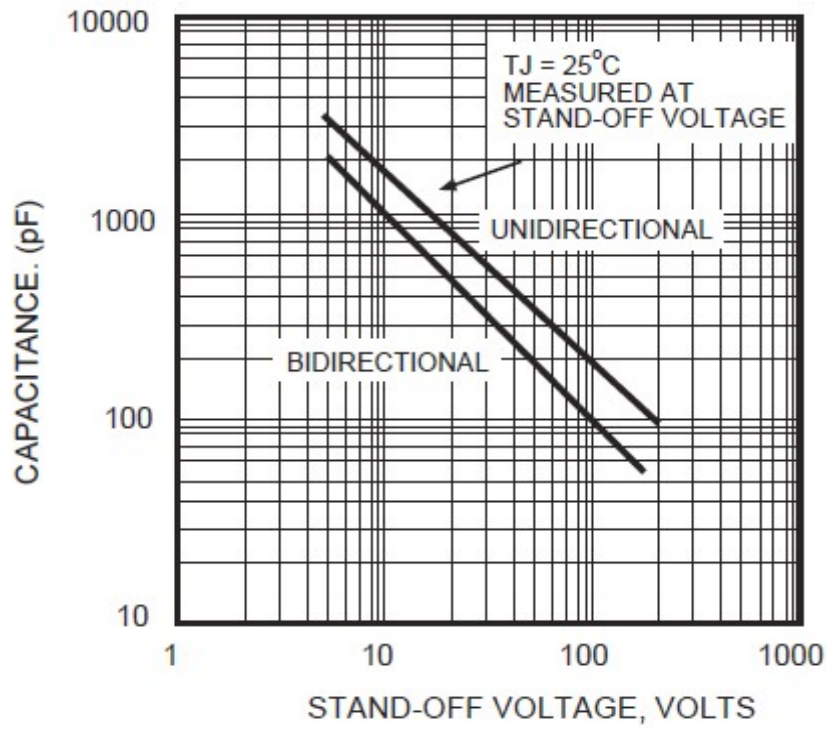
Steady State Power Derating Curve

SMBJ series



Typical Junction Capacitance

SMBJ series



### RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2015/863/EU.

### Warehouse Storage Conditions of Products

(I) Storage Conditions :

- 1.Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- 2.Relative Humidity :  $\leq 75\% \text{RH}$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

## Safety Approvals



\* UL 497B recognized (File # E229991)

## Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

## Test Report

- (1) RoHS test report
- (2) Halogen-free test report