



**THE DATASHEET OF
SMBJ13CA-13-F**



Features

- 600W Peak Pulse Power Dissipation
- 5.0V to 200V Standoff Voltages
- Glass Passivated Die Construction
- Uni- and Bi-Directional Versions Available
- Excellent Clamping Capability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: SMB
- Case Material: Molded Plastic.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead Free Plating (Matte Tin Finish).
Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.1 grams (Approximate)



Top View



Bottom View

Ordering Information (Note 4)

| Part Number | Qualification | Case | Packaging |
|------------------|---------------|------|-------------------|
| SMBJXXX(C)A-13-F | Commercial | SMB | 3,000/Tape & Reel |

*x = Device Voltage, e.g., SMBJ170A-13-F.

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

Bi-Directional Device



Cathode Band for Uni-Directional Device



xx = Product Type Marking Code (See Page 3)
 $\text{D}|||$ = Manufacturers' Code Marking
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 7 for 2017)
 WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit | |
|--|-------------|---------------------------|---------------------|---|
| Peak Pulse Power Dissipation (Non Repetitive Current Pulse Derated above $T_A = +25^\circ\text{C}$) (Note 5) | P_{PK} | 600 | W | |
| Peak Power Derating Above $+25^\circ\text{C}$ | P_{DER} | 4.8 | W/ $^\circ\text{C}$ | |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave Superimposed on Rated Load (Notes 5, 6 & 7) | I_{FSM} | 100 | A | |
| Steady State Power Dissipation @ $T_L = +75^\circ\text{C}$ | $PM_{(AV)}$ | 5.0 | W | |
| Instantaneous Forward Voltage @ $I_{PP} = 35\text{A}$ (Notes 5, 6 & 7) | V_F | $V_{BR < 100\text{V}}$ | 3.5 | V |
| | | $V_{BR \geq 100\text{V}}$ | 5.0 | V |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|-----------------------------|-----------|-------------|------------------|
| Operating Temperature Range | T_J | -55 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to +175 | $^\circ\text{C}$ |

- Notes:
5. Valid provided that terminals are kept at ambient temperature.
 6. Measured with 8.3ms single half sine-wave. Duty cycle = 4 pulses per minute maximum.
 7. Unidirectional units only.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Part Number Add C For Bi- Directional (Note 8) | Reverse Standoff Voltage | Breakdown Voltage V _{BR} @ I _T (Note 9) | | Test Current | Max. Reverse Leakage @ V _{RWM} (Note 10) | Max. Clamping Voltage @ I _{pp} | Max. Peak Pulse Current I _{pp} | Marking Code | |
|---|--------------------------------|---|---------|---------------------|---|--|---|--------------|------|
| | | Min (V) | Max (V) | | | | | BI- | UNI- |
| See Note 6 | V _{RWM} (V) | Min (V) | Max (V) | I _T (mA) | I _R (μA) | V _C (V) | (A) | BI- | UNI- |
| SMBJ5.0(C)A | 5.0 | 6.40 | 7.23 | 10 | 800 | 9.2 | 65.2 | AE | KE |
| SMBJ6.0(C)A | 6.0 | 6.67 | 7.67 | 10 | 800 | 10.3 | 58.3 | AG | KG |
| SMBJ6.5(C)A | 6.5 | 7.22 | 8.30 | 10 | 500 | 11.2 | 53.6 | AK | KK |
| SMBJ7.0(C)A | 7.0 | 7.78 | 8.95 | 10 | 200 | 12.0 | 50.0 | AM | KM |
| SMBJ7.5(C)A | 7.5 | 8.33 | 9.58 | 1.0 | 100 | 12.9 | 46.5 | AP | KP |
| SMBJ8.0(C)A | 8.0 | 8.89 | 10.23 | 1.0 | 50 | 13.6 | 44.1 | AR | KR |
| SMBJ8.5(C)A | 8.5 | 9.44 | 10.82 | 1.0 | 10 | 14.4 | 41.7 | AT | KT |
| SMBJ9.0(C)A | 9.0 | 10.00 | 11.50 | 1.0 | 5.0 | 15.4 | 39.0 | AV | KV |
| SMBJ10(C)A | 10.0 | 11.10 | 12.80 | 1.0 | 5.0 | 17.0 | 35.3 | AX | KX |
| SMBJ11(C)A | 11.0 | 12.20 | 14.40 | 1.0 | 5.0 | 18.2 | 33.0 | AZ | KZ |
| SMBJ12(C)A | 12.0 | 13.30 | 15.30 | 1.0 | 5.0 | 19.9 | 30.2 | BE | LE |
| SMBJ13(C)A | 13.0 | 14.40 | 16.50 | 1.0 | 5.0 | 21.5 | 27.9 | BG | LG |
| SMBJ14(C)A | 14.0 | 15.60 | 17.90 | 1.0 | 5.0 | 23.2 | 25.8 | BK | LK |
| SMBJ15(C)A | 15.0 | 16.70 | 19.20 | 1.0 | 5.0 | 24.4 | 24.0 | BM | LM |
| SMBJ16(C)A | 16.0 | 17.80 | 20.50 | 1.0 | 5.0 | 26.0 | 23.1 | BP | LP |
| SMBJ17(C)A | 17.0 | 18.90 | 21.70 | 1.0 | 5.0 | 27.6 | 21.7 | BR | LR |
| SMBJ18(C)A | 18.0 | 20.00 | 23.30 | 1.0 | 5.0 | 29.2 | 20.5 | BT | LT |
| SMBJ20(C)A | 20.0 | 22.20 | 25.50 | 1.0 | 5.0 | 32.4 | 18.5 | BV | LV |
| SMBJ22(C)A | 22.0 | 24.40 | 28.00 | 1.0 | 5.0 | 35.5 | 16.9 | BX | LX |
| SMBJ24(C)A | 24.0 | 26.70 | 30.70 | 1.0 | 5.0 | 38.9 | 15.4 | BZ | LZ |
| SMBJ26(C)A | 26.0 | 28.90 | 33.20 | 1.0 | 5.0 | 42.1 | 14.2 | CE | ME |
| SMBJ28(C)A | 28.0 | 31.10 | 35.80 | 1.0 | 5.0 | 45.4 | 13.2 | CG | MG |
| SMBJ30(C)A | 30.0 | 33.30 | 38.30 | 1.0 | 5.0 | 48.4 | 12.4 | CK | MK |
| SMBJ33(C)A | 33.0 | 36.70 | 42.20 | 1.0 | 5.0 | 53.3 | 11.3 | CM | MM |
| SMBJ36(C)A | 36.0 | 40.00 | 46.00 | 1.0 | 5.0 | 58.1 | 10.3 | CP | MP |
| SMBJ40(C)A | 40.0 | 44.40 | 51.10 | 1.0 | 5.0 | 64.5 | 9.3 | CR | MR |
| SMBJ43(C)A | 43.0 | 47.80 | 54.90 | 1.0 | 5.0 | 69.4 | 8.6 | CT | MT |
| SMBJ45(C)A | 45.0 | 50.00 | 57.50 | 1.0 | 5.0 | 72.7 | 8.3 | CV | MV |
| SMBJ48(C)A | 48.0 | 53.30 | 61.30 | 1.0 | 5.0 | 77.4 | 7.7 | CX | MX |
| SMBJ51(C)A | 51.0 | 56.70 | 65.20 | 1.0 | 5.0 | 82.4 | 7.3 | CZ | MZ |
| SMBJ54(C)A | 54.0 | 60.00 | 69.00 | 1.0 | 5.0 | 87.1 | 6.9 | DE | NE |
| SMBJ58(C)A | 58.0 | 64.40 | 74.60 | 1.0 | 5.0 | 93.6 | 6.4 | DG | NG |
| SMBJ60(C)A | 60.0 | 66.70 | 76.70 | 1.0 | 5.0 | 96.8 | 6.2 | DK | NK |
| SMBJ64(C)A | 64.0 | 71.10 | 81.80 | 1.0 | 5.0 | 103.0 | 5.8 | DM | NM |
| SMBJ70(C)A | 70.0 | 77.80 | 89.50 | 1.0 | 5.0 | 113.0 | 5.3 | DP | NP |
| SMBJ75(C)A | 75.0 | 83.30 | 95.80 | 1.0 | 5.0 | 121.0 | 4.9 | DR | NR |
| SMBJ78(C)A | 78.0 | 86.70 | 99.70 | 1.0 | 5.0 | 126.0 | 4.7 | DT | NT |
| SMBJ85(C)A | 85.0 | 94.40 | 108.20 | 1.0 | 5.0 | 137.0 | 4.4 | DV | NV |
| SMBJ90(C)A | 90.0 | 100.0 | 115.50 | 1.0 | 5.0 | 146.0 | 4.1 | DX | NX |
| SMBJ100(C)A | 100.0 | 111.0 | 128.00 | 1.0 | 5.0 | 162.0 | 3.7 | DZ | NZ |
| SMBJ110(C)A | 110.0 | 122.0 | 140.00 | 1.0 | 5.0 | 177.0 | 3.4 | EE | PE |
| SMBJ120(C)A | 120.0 | 133.0 | 153.00 | 1.0 | 5.0 | 193.0 | 3.1 | EG | PG |
| SMBJ130(C)A | 130.0 | 144.0 | 165.50 | 1.0 | 5.0 | 209.0 | 2.9 | EK | PK |
| SMBJ150(C)A | 150.0 | 167.0 | 192.50 | 1.0 | 5.0 | 243.0 | 2.5 | EM | PM |
| SMBJ160(C)A | 160.0 | 178.0 | 205.00 | 1.0 | 5.0 | 259.0 | 2.3 | EP | PP |
| SMBJ170(C)A | 170.0 | 189.0 | 217.50 | 1.0 | 5.0 | 275.0 | 2.2 | ER | PR |
| SMBJ180A | 180.0 | 200.00 | 220.00 | 1.0 | 1.0 | 291.6 | 2.06 | - | PT |
| SMBJ200A | 200.0 | 224.00 | 247.00 | 1.0 | 1.0 | 324.0 | 1.9 | - | PV |

Notes: 8. Suffix C denotes Bi-directional device.
9. V_{BR} measured with I_T current pulse = 10ms to 15ms.
10. For Bi-Directional devices having V_{RWM} of 10V and under, the I_R is doubled.

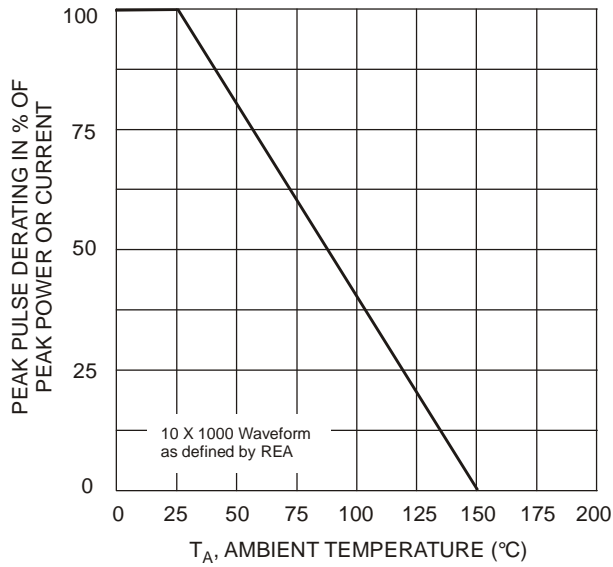


Fig. 1 Pulse Derating Curve

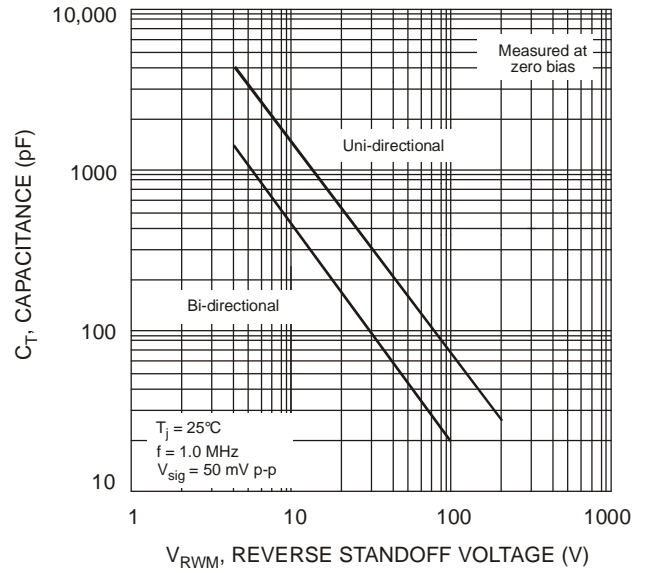


Fig. 2 Typical Total Capacitance

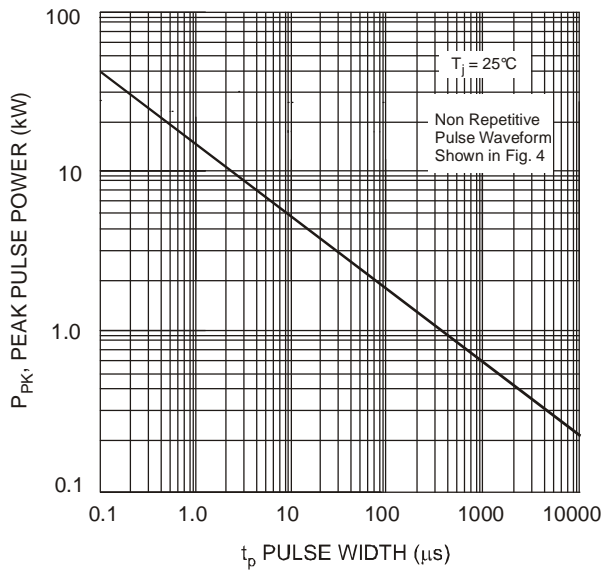


Fig. 3 Pulse Rating Curve

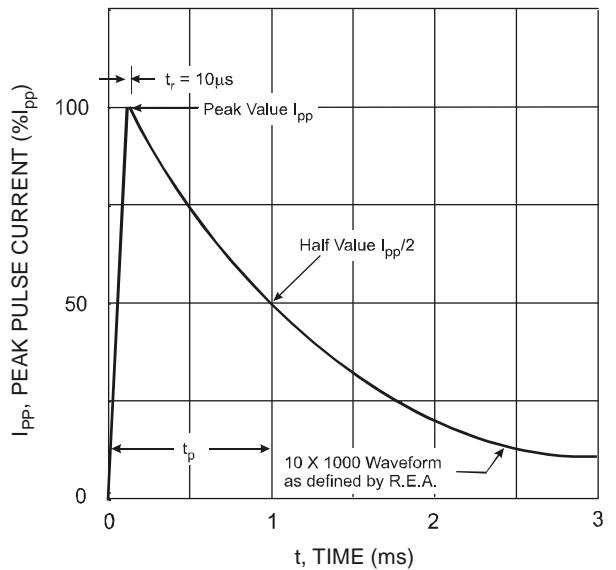


Fig. 4 Pulse Waveform



Fig. 5 Maximum Non-Repetitive Surge Current

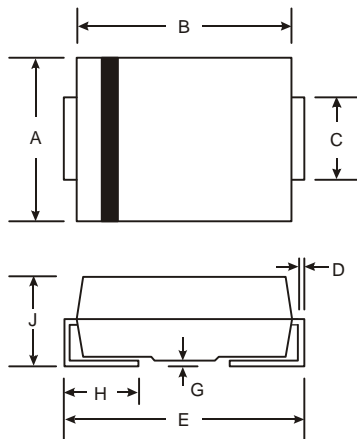


Fig. 6 Steady State Power Derating Curve

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SMB



| SMB | | |
|----------------------|------|------|
| Dim | Min | Max |
| A | 3.30 | 3.94 |
| B | 4.06 | 4.57 |
| C | 1.96 | 2.21 |
| D | 0.15 | 0.31 |
| E | 5.00 | 5.59 |
| G | 0.05 | 0.20 |
| H | 0.76 | 1.52 |
| J | 2.00 | 2.50 |
| All Dimensions in mm | | |

Note: 11. The bar in the upper drawing is polarity indicator for Cathode Band. It is for Uni-directional devices only. Bi-directional devices have no polarity Indicator.

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SMB



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 4.30 |
| G | 1.80 |
| X | 2.50 |
| X1 | 6.80 |
| Y | 2.30 |

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