



**THE DATASHEET OF
SMCJ51A-13-F**



Features

- 1500W Peak Pulse Power Dissipation
- 5.0V - 170V Standoff Voltages
- Glass Passivated Die Construction
- Unidirectional and Bidirectional Versions Available
- Excellent Clamping Capability
- Fast Response Time
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Notes 3 & 4)**

Mechanical Data

- Case: SMC
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Terminals: Lead-Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208②③
- Polarity Indicator: Cathode Band (Note: Bidirectional devices have no polarity indicator.)
- Weight: 0.21 grams (Approximate)

SMC



Top View



Bottom View

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|------------------|------|------------------|
| SMCJXXX(C)A-13-F | SMC | 3000/Tape & Reel |

*x = Device Voltage, e.g., SMCJ170A-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. Product manufactured with Date Code 0924 (week 24, 2009) and newer are built with Green Molding Compound.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



- xxx = Product Type Marking Code (See Page 2)
- D: = Manufacturers' Code Marking
- YWW = Date Code Marking
- Y = Last Digit of Year (ex: 4 for 2014)
- WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|--------------------|------------|------|
| Peak Pulse Power Dissipation (Non repetitive current pulse derated above T _A = +25°C) (Note 6) | P _{PK} | 1500 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (Notes 6, 7, & 8) | I _{FSM} | 200 | A |
| Steady State Power Dissipation @ T _L = +75°C | PM _(AV) | 5.0 | W |
| Instantaneous Forward Voltage @ I _{FP} = 100A (Notes 6 & 8) | V _F | See Note 9 | V |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|-----------------------------|------------------|-------------|------|
| Operating Temperature Range | T _J | -55 to +150 | °C |
| Storage Temperature Range | T _{STG} | -55 to +175 | °C |

- Notes:
6. Valid provided that terminals are kept at ambient temperature.
 7. Measured with 8.3ms single half sine-wave. Duty cycle = 4 pulses per minute maximum.
 8. Unidirectional units only.
 9. V_F = 3.5V for SMCJ5.0A through SMCJ90A, and V_F = 5.0V for SMCJ100A through SMCJ170A.

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

| Part Number Add C For Bidirectional (Note 10) | Reverse Standoff Voltage V _{RWM} (V) | Breakdown Voltage V _{BR} @ I _T (Note 11) | | Test Current I _T (mA) | Max. Reverse Leakage @ V _{RWM} (Note 12) | Max. Clamping Voltage @ I _{pp} V _C (V) | Max. Peak Pulse Current I _{pp} (A) | Marking Code | |
|--|--|--|---------|--|---|--|---|--------------|-----|
| | | Min (V) | Max (V) | | | | | BI | UNI |
| SMCJ5.0(C)A | 5.0 | 6.40 | 7.07 | 10 | 1000 | 9.2 | 163.0 | BDE | GDE |
| SMCJ6.0(C)A | 6.0 | 6.67 | 7.37 | 10 | 1000 | 10.3 | 145.6 | BDG | GDG |
| SMCJ6.5(C)A | 6.5 | 7.22 | 7.98 | 10 | 500 | 11.2 | 133.9 | BDK | GDK |
| SMCJ7.0(C)A | 7.0 | 7.78 | 8.60 | 10 | 200 | 12.0 | 125.0 | BDM | GDM |
| SMCJ7.5(C)A | 7.5 | 8.33 | 9.21 | 1.0 | 100 | 12.9 | 116.3 | BDP | GDP |
| SMCJ8.0(C)A | 8.0 | 8.89 | 9.83 | 1.0 | 50 | 13.6 | 110.3 | BDR | GDR |
| SMCJ8.5(C)A | 8.5 | 9.44 | 10.4 | 1.0 | 20 | 14.4 | 104.2 | BDT | GDT |
| SMCJ9.0(C)A | 9.0 | 10.00 | 11.1 | 1.0 | 10 | 15.4 | 97.4 | BDV | GDV |
| SMCJ10(C)A | 10.0 | 11.10 | 12.3 | 1.0 | 5.0 | 17.0 | 88.2 | BDX | GDY |
| SMCJ11(C)A | 11.0 | 12.20 | 13.5 | 1.0 | 5.0 | 18.2 | 82.4 | BDZ | GDZ |
| SMCJ12(C)A | 12.0 | 13.30 | 14.7 | 1.0 | 5.0 | 19.9 | 75.3 | BEE | GEE |
| SMCJ13(C)A | 13.0 | 14.40 | 15.9 | 1.0 | 5.0 | 21.5 | 69.7 | BEG | GEG |
| SMCJ14(C)A | 14.0 | 15.60 | 17.2 | 1.0 | 5.0 | 23.2 | 64.7 | BEK | GEK |
| SMCJ15(C)A | 15.0 | 16.70 | 18.5 | 1.0 | 5.0 | 24.4 | 61.5 | BEM | GEM |
| SMCJ16(C)A | 16.0 | 17.80 | 19.7 | 1.0 | 5.0 | 26.0 | 57.7 | BEP | GEP |
| SMCJ17(C)A | 17.0 | 18.90 | 20.9 | 1.0 | 5.0 | 27.6 | 53.3 | BER | GER |
| SMCJ18(C)A | 18.0 | 20.00 | 22.1 | 1.0 | 5.0 | 29.2 | 51.4 | BET | GET |
| SMCJ20(C)A | 20.0 | 22.20 | 24.5 | 1.0 | 5.0 | 32.4 | 46.3 | BEV | GEV |
| SMCJ22(C)A | 22.0 | 24.40 | 27.0 | 1.0 | 5.0 | 35.5 | 42.2 | BEX | GEX |
| SMCJ24(C)A | 24.0 | 26.70 | 29.5 | 1.0 | 5.0 | 38.9 | 38.6 | BEZ | GEZ |
| SMCJ26(C)A | 26.0 | 28.90 | 31.9 | 1.0 | 5.0 | 42.1 | 35.6 | BFE | GFE |
| SMCJ28(C)A | 28.0 | 31.10 | 34.4 | 1.0 | 5.0 | 45.4 | 33.0 | BFG | GFG |
| SMCJ30(C)A | 30.0 | 33.30 | 36.8 | 1.0 | 5.0 | 48.4 | 31.0 | BFK | GFK |
| SMCJ33(C)A | 33.0 | 36.70 | 40.6 | 1.0 | 5.0 | 53.3 | 28.1 | BFM | GFM |
| SMCJ36(C)A | 36.0 | 40.00 | 44.2 | 1.0 | 5.0 | 58.1 | 25.8 | BFP | GFP |
| SMCJ40(C)A | 40.0 | 44.40 | 49.1 | 1.0 | 5.0 | 64.5 | 23.2 | BFR | GFR |
| SMCJ43(C)A | 43.0 | 47.80 | 52.8 | 1.0 | 5.0 | 69.4 | 21.6 | BFT | GFT |
| SMCJ45(C)A | 45.0 | 50.00 | 55.3 | 1.0 | 5.0 | 72.7 | 20.6 | BFV | GFV |
| SMCJ48(C)A | 48.0 | 53.30 | 58.9 | 1.0 | 5.0 | 77.4 | 19.4 | BFX | GFY |
| SMCJ51(C)A | 51.0 | 56.70 | 62.7 | 1.0 | 5.0 | 82.4 | 18.2 | BFZ | GFZ |
| SMCJ54(C)A | 54.0 | 60.00 | 66.3 | 1.0 | 5.0 | 87.1 | 17.2 | BGE | GGE |
| SMCJ58(C)A | 58.0 | 64.40 | 71.2 | 1.0 | 5.0 | 93.6 | 16.0 | BGG | GGG |
| SMCJ60(C)A | 60.0 | 66.70 | 73.7 | 1.0 | 5.0 | 96.8 | 15.5 | BGK | GGK |
| SMCJ64(C)A | 64.0 | 71.10 | 78.6 | 1.0 | 5.0 | 103.0 | 14.6 | BGM | GGM |
| SMCJ70(C)A | 70.0 | 77.80 | 86.0 | 1.0 | 5.0 | 113.0 | 13.3 | BGP | GGP |
| SMCJ75(C)A | 75.0 | 83.30 | 92.1 | 1.0 | 5.0 | 121.0 | 12.4 | BGR | GGR |
| SMCJ78(C)A | 78.0 | 86.70 | 95.8 | 1.0 | 5.0 | 126.0 | 11.4 | BGT | GGT |
| SMCJ85(C)A | 85.0 | 94.40 | 104 | 1.0 | 5.0 | 137.0 | 10.4 | BGV | GGV |
| SMCJ90(C)A | 90.0 | 100.00 | 111 | 1.0 | 5.0 | 146.0 | 10.3 | BGX | GGX |
| SMCJ100(C)A | 100.0 | 111.00 | 123 | 1.0 | 5.0 | 162.0 | 9.3 | BGZ | GGZ |
| SMCJ110(C)A | 110.0 | 122.00 | 135 | 1.0 | 5.0 | 177.0 | 8.4 | BHE | GHE |
| SMCJ120(C)A | 120.0 | 133.00 | 147 | 1.0 | 5.0 | 193.0 | 7.9 | BHG | GHG |
| SMCJ130(C)A | 130.0 | 144.00 | 159 | 1.0 | 5.0 | 209.0 | 7.2 | BHK | GHK |
| SMCJ150(C)A | 150.0 | 167.00 | 185 | 1.0 | 5.0 | 243.0 | 6.2 | BHM | GHM |
| SMCJ160(C)A | 160.0 | 178.00 | 197 | 1.0 | 5.0 | 259.0 | 5.8 | BHP | GHP |
| SMCJ170(C)A | 170.0 | 189.00 | 209 | 1.0 | 5.0 | 275.0 | 5.5 | BHR | GHR |

Notes: 10. Suffix C denotes bidirectional device.
11. V_{BR} measured with I_T current pulse = 10 ~ 15 ms.
12. For bidirectional 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 AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SMC | | |
|----------------------|------|------|
| Dim | Min | Max |
| A | 5.59 | 6.22 |
| B | 6.60 | 7.11 |
| C | 2.75 | 3.18 |
| D | 0.15 | 0.31 |
| E | 7.75 | 8.13 |
| G | 0.10 | 0.20 |
| H | 0.76 | 1.52 |
| J | 2.00 | 2.50 |
| All Dimensions in mm | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 6.90 |
| G | 4.40 |
| X | 2.50 |
| X1 | 9.40 |
| Y | 3.30 |

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