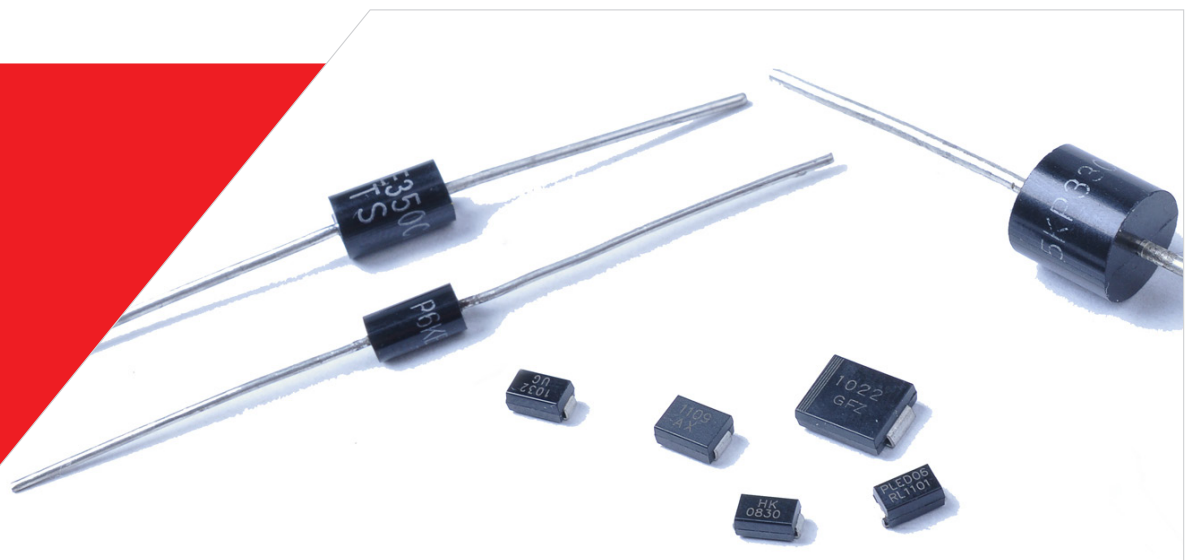


ELECTRONICS



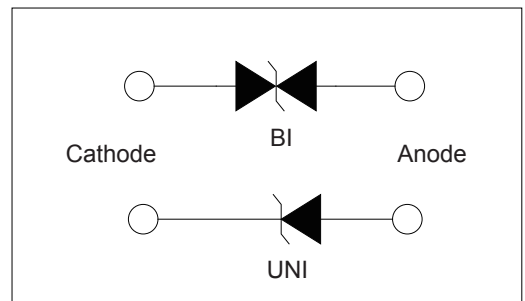
Transient Voltage Suppressors

SMCJ Series

Transient Voltage Suppressors - SMCJ Series

Features

1. Halogen-free
2. Rohs compliant
3. Typical maximum temperature coefficient
4. $\Delta V_{BR} = 0.1\% \times V_{BR@25^{\circ}\text{C}} \times \Delta T$
5. Glass passivated Chip junction in DO-214AB package
6. 1500W peak pulse capability at $10 \times 1000\mu\text{s}$ waveform, repetition rate (duty cycles):0.01%
7. Fast response time: typically less than 1.0ps from 0 Volts to BV min
8. Excellent clamping capability
9. Low incremental surge resistance
10. Typical IR less than $5\mu\text{A}$ above 12V
11. High temperature soldering guaranteed: $260^{\circ}\text{C}/40$ seconds / 0.375",
12. (9.5mm) lead length, 5lbs., (2.3kg) tension
13. Plastic package has underwriters laboratory flammability classification 94v-0



Applications

TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

Mechanical Characteristics

| Rating | Symbol | Value | Units |
|--|-----------------|--|-----------------------------|
| Peak Pulse Power Dissipation at $T_A=25^{\circ}\text{C}$ by $10 \times 1000\mu\text{s}$ waveform (Fig.1)(Note 1), (Note 2) | P_{PPM} | 1500 | Watts |
| Power Dissipation on infinite heat sink at $T_A=50^{\circ}\text{C}$ | P_D | 6.5 | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | I_{FSM} | 200 | Amps |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional only (Note 4) | V_F | 3.5V/5.0 | V |
| Operating junction and Storage Temperature Range. | T_J, T_{STG} | -55°C to 150°C | $^{\circ}\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 15 | $^{\circ}\text{C}/\text{W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75 | $^{\circ}\text{C}/\text{W}$ |

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^{\circ}\text{C}$ per Fig. 2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 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 Characteristics

| Type Number | | Device Marking Code | | Reverse Stand-Off Voltage | Breakdown Voltage@IT | | Test Current | Maximum Clamping Voltage@Ipp | Peak Pulse Current | Reverse Leakage @VRWM |
|-------------|-----------|---------------------|-----|---------------------------|----------------------|-------------|--------------|------------------------------|--------------------|-----------------------|
| (UNI) | (BI) | UNI | BI | VRWM(V) | VBR MIN.(V) | VBR MAX.(V) | IT(mA) | VC(V) | Ipp(A) | IR(μA) |
| SMCJ5.0A | SMCJ5.0CA | GDE | BDE | 5.0 | 6.40 | 7.25 | 10 | 9.2 | 163.0 | 800 |
| SMCJ6.0A | SMCJ6.0CA | GDG | BDG | 6.0 | 6.67 | 7.67 | 10 | 10.3 | 145.7 | 800 |
| SMCJ6.5A | SMCJ6.5CA | GDK | BDK | 6.5 | 7.22 | 8.30 | 10 | 11.2 | 134.0 | 500 |
| SMCJ7.0A | SMCJ7.0CA | GDM | BDM | 7.0 | 7.78 | 8.95 | 10 | 12.0 | 125.0 | 200 |
| SMCJ7.5A | SMCJ7.5CA | GDP | BDP | 7.5 | 8.33 | 9.58 | 1 | 12.9 | 116.3 | 100 |
| SMCJ8.0A | SMCJ8.0CA | GDR | BDR | 8.0 | 8.89 | 10.23 | 1 | 13.6 | 110.3 | 50 |
| SMCJ8.5A | SMCJ8.5CA | GDT | BDT | 8.5 | 9.44 | 10.82 | 1 | 14.4 | 104.2 | 20 |
| SMCJ9.0A | SMCJ9.0CA | GDV | BDV | 9.0 | 10.00 | 11.50 | 1 | 15.4 | 97.4 | 10 |
| SMCJ10A | SMCJ10CA | GDX | BDX | 10.0 | 11.10 | 12.80 | 1 | 17.0 | 88.3 | 5 |
| SMCJ11A | SMCJ11CA | GDZ | BDZ | 11.0 | 12.20 | 14.00 | 1 | 18.2 | 82.5 | 5 |
| SMCJ12A | SMCJ12CA | GEE | BEE | 12.0 | 13.30 | 15.30 | 1 | 19.9 | 75.4 | 5 |
| SMCJ13A | SMCJ13CA | GEG | BEG | 13.0 | 14.40 | 16.50 | 1 | 21.5 | 69.8 | 5 |
| SMCJ14A | SMCJ14CA | GEK | BEK | 14.0 | 15.60 | 17.90 | 1 | 23.2 | 64.7 | 5 |
| SMCJ15A | SMCJ15CA | GEM | BEM | 15.0 | 16.70 | 19.20 | 1 | 24.4 | 61.5 | 5 |
| SMCJ16A | SMCJ16CA | GEP | BEP | 16.0 | 17.80 | 20.50 | 1 | 26.0 | 57.7 | 5 |
| SMCJ17A | SMCJ17CA | GER | BER | 17.0 | 18.90 | 21.70 | 1 | 27.6 | 54.4 | 5 |
| SMCJ18A | SMCJ18CA | GET | BET | 18.0 | 20.00 | 23.30 | 1 | 29.2 | 51.4 | 5 |
| SMCJ20A | SMCJ20CA | GEV | BEV | 20.0 | 22.20 | 25.50 | 1 | 32.4 | 46.3 | 5 |
| SMCJ22A | SMCJ22CA | GEX | BEX | 22.0 | 24.40 | 28.00 | 1 | 35.5 | 42.3 | 5 |
| SMCJ24A | SMCJ24CA | GEZ | BEZ | 24.0 | 26.70 | 30.70 | 1 | 38.9 | 38.6 | 5 |
| SMCJ26A | SMCJ26CA | GFE | BFE | 26.0 | 28.90 | 33.20 | 1 | 42.1 | 35.7 | 5 |
| SMCJ28A | SMCJ28CA | GFG | BFG | 28.0 | 31.10 | 35.80 | 1 | 45.4 | 33.1 | 5 |
| SMCJ30A | SMCJ30CA | GFK | BFK | 30.0 | 33.30 | 38.30 | 1 | 48.4 | 31.0 | 5 |
| SMCJ33A | SMCJ33CA | GFM | BFM | 33.0 | 36.70 | 42.20 | 1 | 53.3 | 28.2 | 5 |
| SMCJ36A | SMCJ36CA | GFP | BFP | 36.0 | 40.00 | 46.00 | 1 | 58.1 | 25.9 | 5 |
| SMCJ40A | SMCJ40CA | GFR | BFR | 40.0 | 44.40 | 51.10 | 1 | 64.5 | 23.3 | 5 |
| SMCJ43A | SMCJ43CA | GFT | BFT | 43.0 | 47.80 | 54.90 | 1 | 69.4 | 21.7 | 5 |
| SMCJ45A | SMCJ45CA | GFV | BFV | 45.0 | 50.00 | 57.50 | 1 | 72.7 | 20.6 | 5 |
| SMCJ48A | SMCJ48CA | GJT | BJT | 48.0 | 53.30 | 61.30 | 1 | 77.4 | 19.4 | 5 |
| SMCJ51A | SMCJ51CA | GJV | BJV | 51.0 | 56.70 | 65.20 | 1 | 82.4 | 18.2 | 5 |
| SMCJ54A | SMCJ54CA | GFX | BFX | 54.0 | 60.00 | 69.00 | 1 | 87.1 | 17.3 | 5 |
| SMCJ58A | SMCJ58CA | GFZ | BFZ | 58.0 | 64.40 | 74.10 | 1 | 93.6 | 16.1 | 5 |
| SMCJ60A | SMCJ60CA | GGE | BGE | 60.0 | 66.70 | 76.70 | 1 | 96.8 | 15.5 | 5 |
| SMCJ64A | SMCJ64CA | GGG | BGG | 64.0 | 71.10 | 81.80 | 1 | 103.0 | 14.6 | 5 |
| SMCJ70A | SMCJ70CA | GGK | BGK | 70.0 | 77.80 | 89.50 | 1 | 113.0 | 13.3 | 5 |
| SMCJ75A | SMCJ75CA | GGM | BGM | 75.0 | 83.30 | 95.80 | 1 | 121.0 | 12.4 | 5 |
| SMCJ78A | SMCJ78CA | GGP | BGP | 78.0 | 86.70 | 99.70 | 1 | 126.0 | 11.9 | 5 |
| SMCJ85A | SMCJ85CA | GGR | BGR | 85.0 | 94.40 | 108.20 | 1 | 137.0 | 11.0 | 5 |
| SMCJ90A | SMCJ90CA | GGT | BGT | 90.0 | 100.00 | 115.50 | 1 | 146.0 | 10.3 | 5 |
| SMCJ100A | SMCJ100CA | GGV | BGV | 100.0 | 111.00 | 128.00 | 1 | 162.0 | 9.3 | 5 |
| SMCJ110A | SMCJ110CA | GGX | BGX | 110.0 | 122.00 | 140.50 | 1 | 177.0 | 8.5 | 5 |
| SMCJ120A | SMCJ120CA | GGZ | BGZ | 120.0 | 133.00 | 153.00 | 1 | 193.0 | 7.8 | 5 |
| SMCJ130A | SMCJ130CA | GHE | BHK | 130.0 | 144.00 | 165.50 | 1 | 209.0 | 7.2 | 5 |
| SMCJ150A | SMCJ150CA | GHG | BHG | 150.0 | 167.00 | 192.60 | 1 | 243.0 | 6.2 | 5 |
| SMCJ160A | SMCJ160CA | GHK | BHK | 160.0 | 178.00 | 197.00 | 1 | 259.0 | 5.8 | 5 |
| SMCJ170A | SMCJ170CA | GHM | BHM | 170.0 | 189.00 | 209.00 | 1 | 275.0 | 5.5 | 5 |
| SMCJ180A | SMCJ180CA | GHP | BHP | 180.0 | 198.00 | 222.00 | 1 | 292.0 | 5.1 | 5 |
| SMCJ190A | SMCJ190CA | GHR | BHR | 190.0 | 209.00 | 243.20 | 1 | 308.0 | 4.8 | 5 |
| SMCJ200A | SMCJ200CA | GHX | BHX | 200.0 | 220.00 | 247.00 | 1 | 324.0 | 4.6 | 5 |
| SMCJ220A | SMCJ220CA | GJE | BJE | 220.0 | 242.00 | 272.00 | 1 | 356.0 | 4.2 | 5 |
| SMCJ250A | SMCJ250CA | GJG | BJG | 250.0 | 279.00 | 309.00 | 1 | 405.0 | 3.7 | 5 |
| SMCJ300A | SMCJ300CA | GJK | BJK | 300.0 | 335.00 | 371.00 | 1 | 486.0 | 3.1 | 5 |

Transient Voltage Suppressors - SMCJ Series

Ratings and Characteristic Curves

Figure 1 - Peak Pulse Power Rating

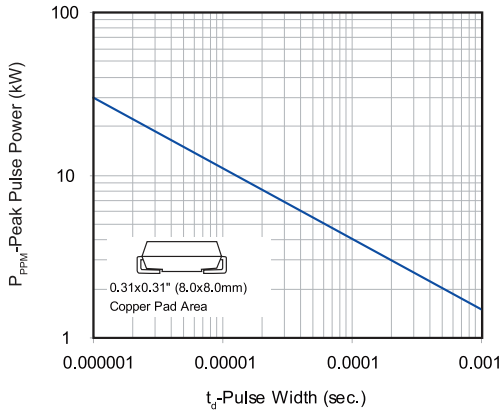


Figure 2 - Pulse Derating Curve

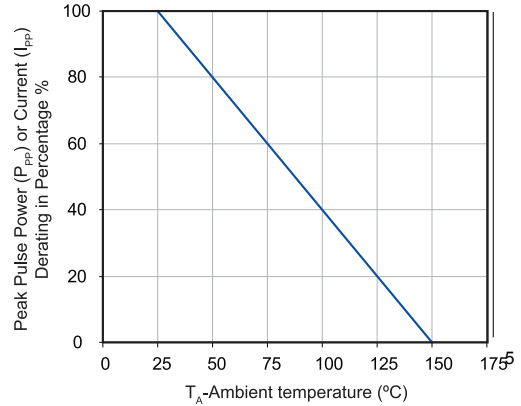


Figure 3 - Pulse Waveform

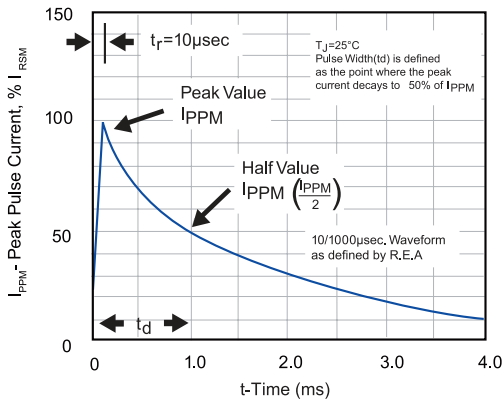


Figure 4 - Typical Junction Capacitance

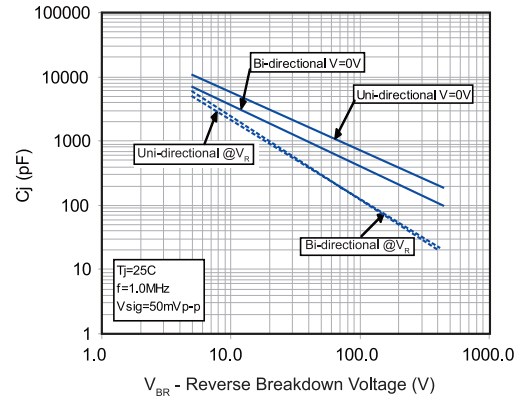


Figure 5 - Steady State Power Derating Curve

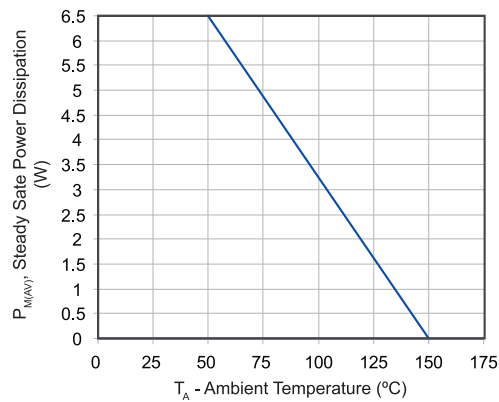
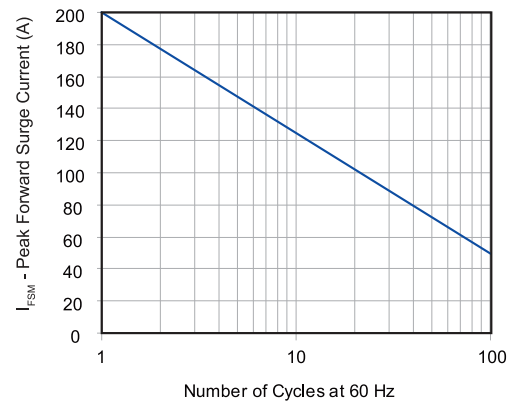


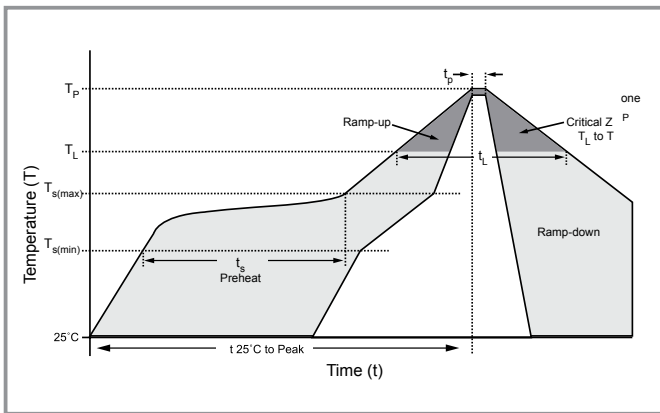
Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



Transient Voltage Suppressors - SMCJ Series

Soldering Parameters

| | Reflow Condition | Lead-free assembly |
|--|------------------------------------|-------------------------|
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60-180 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Time (min to max) (t_s) | 60-150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 20-40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 280°C |



Physical Specifications

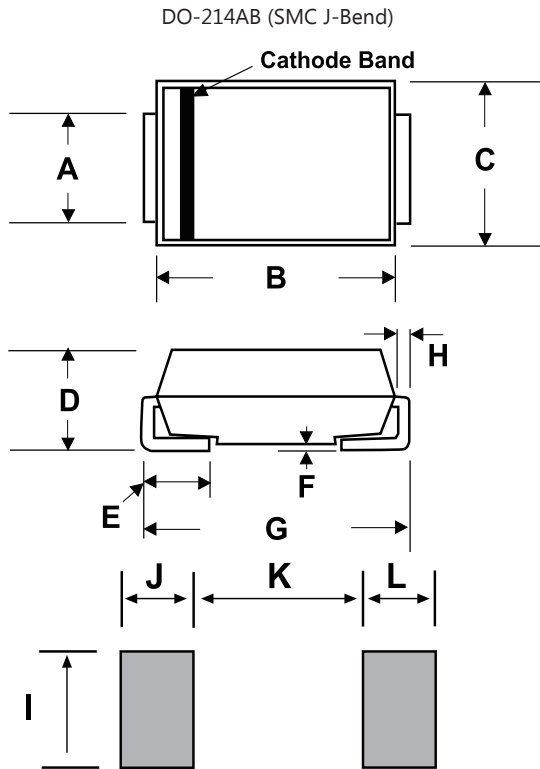
| | |
|-----------|---|
| Weight | 0.007 ounce, 0.21 grams |
| Case | JEDEC DO214AA. Molded plastic body over glass passivated junction |
| Polarity | Color band denotes cathode except Bidirectional. |
| Terminals | Matte Tin-plated leads, Solderable per JESD22-B102D |

Environmental Specifications

| | |
|--------------------|--------------|
| Temperature Cycle | JESD22-A104 |
| Pressure Cooker | JESD 22-A102 |
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Thermal Shock | JESD22-A106 |

Transient Voltage Suppressors - SMCJ Series

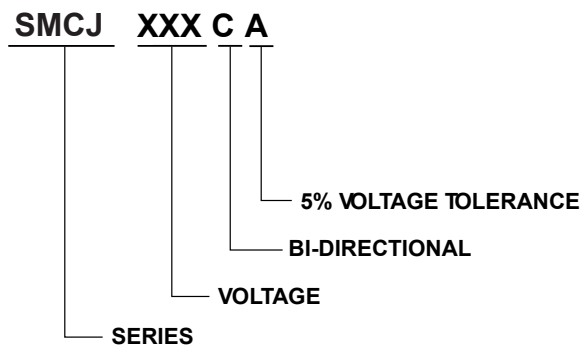
Dimensions



Unit:mm

| DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.114 | 0.126 | 2.900 | 3.200 |
| B | 0.260 | 0.280 | 6.600 | 7.110 |
| C | 0.220 | 0.245 | 5.590 | 6.220 |
| D | 0.079 | 0.103 | 2.060 | 2.620 |
| E | 0.030 | 0.060 | 0.760 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.305 | 0.320 | 7.750 | 8.130 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.129 | - | 3.300 | - |
| J | 0.094 | - | 24.00 | - |
| K | - | 0.165 | - | 4.200 |
| L | 0.094 | - | 2.400 | - |

Part Numbering System



Packaging

| Part Number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|--------------------------|-------------------------|
| SMCJxxxXX | DO-214AB | 500 | Tape & Reel-16mm/13"tape | EIA STD RS-481 |

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