

Transient Voltage Suppressors


TVS Diodes - 400W > SMAJ Series

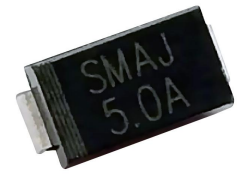


Description

The SMBJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- For surface mounted applications in order to optimize board space
- Reliable low cost construction utilizing molded plastic technique
- Plastic material has UL flammability classification 94V-0
- Typical IR less than 1uA above 10V
- Fast response time: typically less than 1.0ps from 0 Volts to VBR min
- Glass passivated junction
- Low inductance
- Agency recognition: 



Package: DO-214AC / SMA

Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

Electrical Characteristics

| Parameter | Symbol | Value | Unit |
|---|----------|------------|------|
| Peak Pulse Power Dissipation at TA=25°C by 10x1000µs waveform (Fig.1)(Note 1), (Note 2) | PPPM | 400 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | IFSM | 40 | A |
| Operating Junction and Storage Temperature Range | TJ, TSTG | -55 to 150 | °C |
| Typical Thermal Resistance Junction to Lead | RθJL | 20 | °C/W |
| Typical Thermal Resistance Junction to Ambient | RθJA | 100 | °C/W |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above TA=25°C per Fig. 2.
2. Mounted on 5.0x5.0mm copper pad to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.

Electrical Characteristics (TA=25°C)



| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage VBR(Volts)@IT | | Test Current | Maximum Clamping Voltage@IPP | Peak Pulse Current | Reverse Leakage @VRWM | Safety Certification |
|----------------|---------------|---------------------------|------------------------------------|-------|--------------|------------------------------|--------------------|-----------------------|----------------------|
| Unidirectional | Bidirectional | VRWM(V) | Min | Max | IT(mA) | VC(V) | IPP(A) | IR(μA) | UL |
| SMAJ5.0A | SMAJ5.0CA | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 43.5 | 800 | √ |
| SMAJ6.0A | SMAJ6.0CA | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 38.8 | 800 | √ |
| SMAJ6.5A | SMAJ6.5CA | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 35.7 | 500 | √ |
| SMAJ7.0A | SMAJ7.0CA | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 33.3 | 200 | √ |
| SMAJ7.5A | SMAJ7.5CA | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 31.0 | 100 | √ |
| SMAJ8.0A | SMAJ8.0CA | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 29.4 | 50 | √ |
| SMAJ8.5A | SMAJ8.5CA | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 27.8 | 20 | √ |
| SMAJ9.0A | SMAJ9.0CA | 9.0 | 10.0 | 11.10 | 1 | 15.4 | 26.0 | 10 | √ |
| SMAJ10A | SMAJ10CA | 10 | 11.1 | 12.3 | 1 | 17.0 | 23.5 | 1 | √ |
| SMAJ11A | SMAJ11CA | 11 | 12.2 | 13.5 | 1 | 18.2 | 22.0 | 1 | √ |
| SMAJ12A | SMAJ12CA | 12 | 13.3 | 14.7 | 1 | 19.9 | 20.1 | 1 | √ |
| SMAJ13A | SMAJ13CA | 13 | 14.4 | 15.9 | 1 | 21.5 | 18.6 | 1 | √ |
| SMAJ14A | SMAJ14CA | 14 | 15.6 | 17.2 | 1 | 23.2 | 17.2 | 1 | √ |
| SMAJ15A | SMAJ15CA | 15 | 16.7 | 18.5 | 1 | 24.4 | 16.4 | 1 | √ |
| SMAJ16A | SMAJ16CA | 16 | 17.8 | 19.7 | 1 | 26.0 | 15.4 | 1 | √ |
| SMAJ17A | SMAJ17CA | 17 | 18.9 | 20.9 | 1 | 27.6 | 14.5 | 1 | √ |
| SMAJ18A | SMAJ18CA | 18 | 20.0 | 22.1 | 1 | 29.2 | 13.7 | 1 | √ |
| SMAJ20A | SMAJ20CA | 20 | 22.2 | 24.5 | 1 | 32.4 | 12.3 | 1 | √ |
| SMAJ22A | SMAJ22CA | 22 | 24.4 | 26.9 | 1 | 35.5 | 11.3 | 1 | √ |
| SMAJ24A | SMAJ24CA | 24 | 26.7 | 29.5 | 1 | 38.9 | 10.3 | 1 | √ |
| SMAJ26A | SMAJ26CA | 26 | 28.9 | 31.9 | 1 | 42.1 | 9.5 | 1 | √ |
| SMAJ28A | SMAJ28CA | 28 | 31.1 | 34.4 | 1 | 45.4 | 8.8 | 1 | √ |
| SMAJ30A | SMAJ30CA | 30 | 33.3 | 36.8 | 1 | 48.4 | 8.3 | 1 | √ |
| SMAJ33A | SMAJ33CA | 33 | 36.7 | 40.6 | 1 | 53.3 | 7.5 | 1 | √ |

Electrical Characteristics (TA=25°C)

continued



| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage V _{BR} (Volts)@I _T | | Test Current | Maximum Clamping Voltage@I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} | Safety Certification |
|----------------|---------------|---------------------------|---|-------|---------------------|--|---------------------|-----------------------------------|----------------------|
| Unidirectional | Bidirectional | V _{RWM} (V) | Min | Max | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μA) | UL |
| SMAJ36A | SMAJ36CA | 36.0 | 40.0 | 44.2 | 1 | 58.1 | 6.9 | 1 | √ |
| SMAJ40A | SMAJ40CA | 40.0 | 44.4 | 49.1 | 1 | 64.5 | 6.2 | 1 | √ |
| SMBJ43A | SMAJ43CA | 43.0 | 47.8 | 52.8 | 1 | 69.4 | 5.8 | 1 | √ |
| SMAJ45A | SMAJ45CA | 45.0 | 50.0 | 55.3 | 1 | 72.7 | 5.5 | 1 | √ |
| SMAJ48A | SMAJ48CA | 48.0 | 53.3 | 58.9 | 1 | 77.4 | 5.2 | 1 | √ |
| SMAJ51A | SMAJ51CA | 51.0 | 56.7 | 62.7 | 1 | 82.4 | 4.9 | 1 | √ |
| SMAJ54A | SMAJ54CA | 54.0 | 60.0 | 66.3 | 1 | 87.1 | 4.6 | 1 | √ |
| SMAJ58A | SMAJ58CA | 58.0 | 64.4 | 71.2 | 1 | 93.6 | 4.3 | 1 | √ |
| SMAJ60A | SMAJ60CA | 60.0 | 66.7 | 73.7 | 1 | 96.8 | 4.1 | 1 | √ |
| SMAJ64A | SMAJ64CA | 64.0 | 71.1 | 78.6 | 1 | 103.0 | 3.9 | 1 | √ |
| SMAJ70A | SMAJ70CA | 70.0 | 77.8 | 86.0 | 1 | 113.0 | 3.5 | 1 | √ |
| SMAJ75A | SMAJ75CA | 75.0 | 83.3 | 92.1 | 1 | 121.0 | 3.3 | 1 | √ |
| SMAJ78A | SMAJ78CA | 78.0 | 86.7 | 95.8 | 1 | 126.0 | 3.2 | 1 | √ |
| SMAJ85A | SMAJ85CA | 85.0 | 94.4 | 104.0 | 1 | 137.0 | 2.9 | 1 | √ |
| SMAJ90A | SMAJ90CA | 90.0 | 100.0 | 111.0 | 1 | 146.0 | 2.7 | 1 | √ |
| SMAJ100A | SMAJ100CA | 100.0 | 111.0 | 123.0 | 1 | 162.0 | 2.5 | 1 | √ |
| SMAJ110A | SMAJ110CA | 110.0 | 122.0 | 135.0 | 1 | 177.0 | 2.3 | 1 | √ |
| SMAJ120A | SMAJ120CA | 120.0 | 133.0 | 147.0 | 1 | 193.0 | 2.1 | 1 | √ |
| SMAJ130A | SMAJ130CA | 130.0 | 144.0 | 159.0 | 1 | 209.0 | 1.9 | 1 | √ |
| SMAJ150A | SMAJ150CA | 150.0 | 167.0 | 185.0 | 1 | 243.0 | 1.6 | 1 | √ |
| SMAJ160A | SMAJ160CA | 160.0 | 178.0 | 197.0 | 1 | 259.0 | 1.5 | 1 | √ |
| SMAJ170A | SMAJ170CA | 170.0 | 189.0 | 209.0 | 1 | 275.0 | 1.5 | 1 | √ |
| SMAJ180A | SMAJ180CA | 180.0 | 201.0 | 222.0 | 1 | 292.0 | 1.4 | 1 | √ |
| SMAJ190A | SMAJ190CA | 190.0 | 209.0 | 243.2 | 1 | 308.0 | 1.3 | 1 | √ |

Electrical Characteristics (TA=25°C)

continued

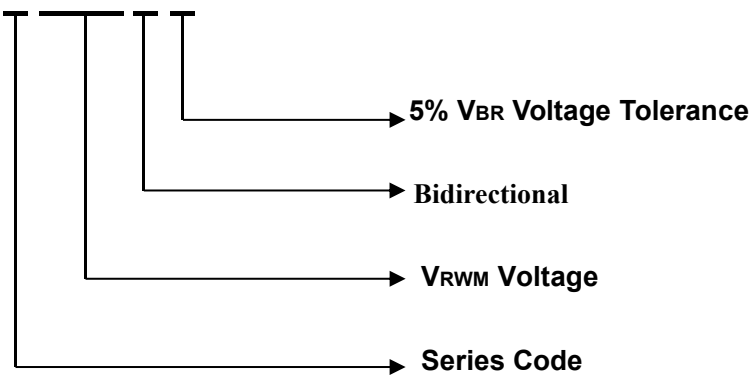


| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage V _{BR} (Volts) _{@IT} | | Test Current | Maximum Clamping Voltage@I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} | Safety Certification |
|----------------|---------------|---------------------------|---|-------|---------------------|--|---------------------|-----------------------------------|----------------------|
| Unidirectional | Bidirectional | V _{RWM} (V) | Min | Max | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μA) | UL |
| SMAJ200A | SMAJ200CA | 200.0 | 220.0 | 247.0 | 1 | 324.0 | 1.2 | 1 | √ |
| SMAJ210A | SMAJ210CA | 210.0 | 231.0 | 268.8 | 1 | 340.0 | 1.2 | 1 | √ |
| SMAJ220A | SMAJ220CA | 220.0 | 246.0 | 281.6 | 1 | 356.0 | 1.1 | 1 | √ |
| SMAJ250A | SMAJ250CA | 250.0 | 279.0 | 309.0 | 1 | 405.0 | 1.0 | 1 | √ |
| SMAJ300A | SMAJ300CA | 300.0 | 335.0 | 371.0 | 1 | 486.0 | 0.8 | 1 | √ |
| SMAJ350A | SMAJ350CA | 350.0 | 391.0 | 432.0 | 1 | 567.0 | 0.7 | 1 | √ |
| SMAJ400A | SMAJ400CA | 400.0 | 447.0 | 494.0 | 1 | 648.0 | 0.6 | 1 | √ |
| SMAJ440A | SMAJ440CA | 440.0 | 492.0 | 543.0 | 1 | 713.0 | 0.6 | 1 | √ |


Notes: For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.

Description of Part Number

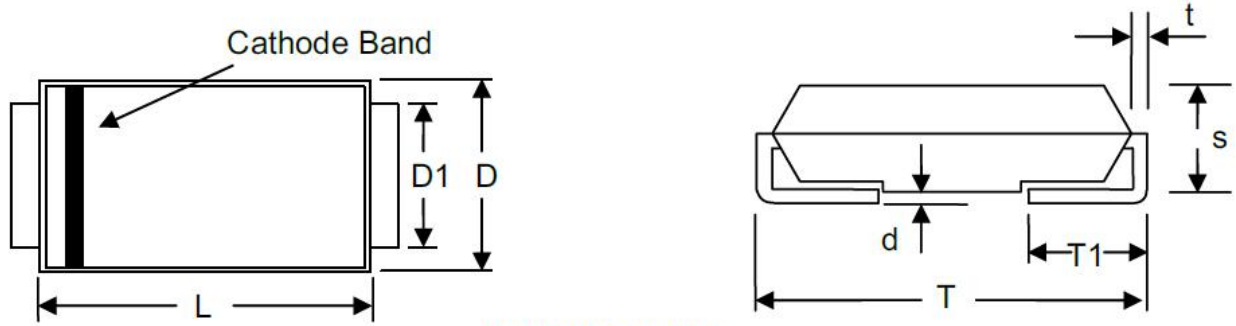
SMAJ XXX C A



Packing Options

| Package Type | Description | Packing Quantity | Industry Standard |
|--|----------------------------|-------------------|-------------------|
|  DO-214AC | Embossed Carrier Reel Pack | 1800PCS / 2000PCS | EIA STD RS-481 |

Dimensions - DO-214AC



SMA/DO-214AC

| Item | Millimeters | | Inches | |
|------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| L | 3.99 | 4.50 | 0.157 | 0.177 |
| D | 2.54 | 2.79 | 0.100 | 0.110 |
| D1 | 1.25 | 1.65 | 0.049 | 0.065 |
| T | 4.93 | 5.28 | 0.194 | 0.208 |
| T1 | 0.78 | 1.52 | 0.030 | 0.060 |
| d | - | 0.203 | - | 0.008 |
| s | 1.98 | 2.29 | 0.078 | 0.090 |
| t | 0.152 | 0.305 | 0.006 | 0.012 |

Ratings and Characteristics Curve



Figure 1 - Peak Pulse Power Rating Curve

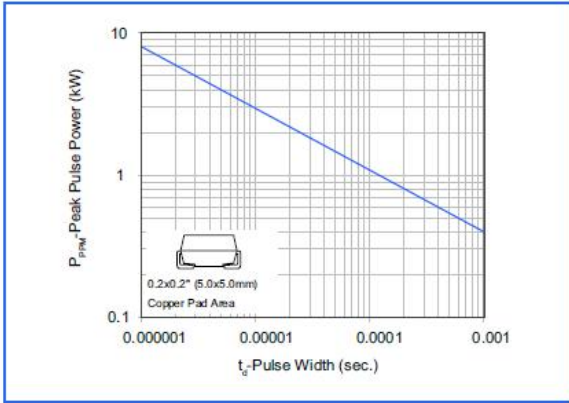


Figure 2 - Pulse Derating Curve

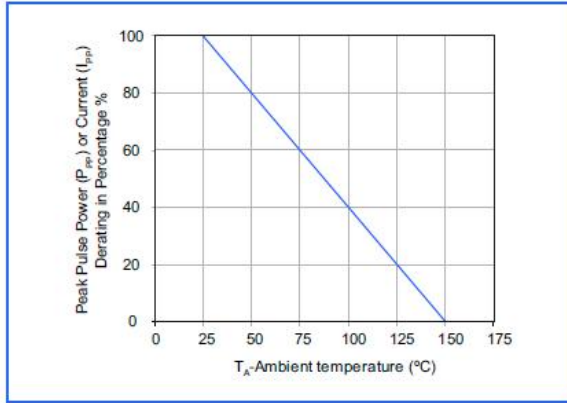


Figure 3 - Pulse Waveform

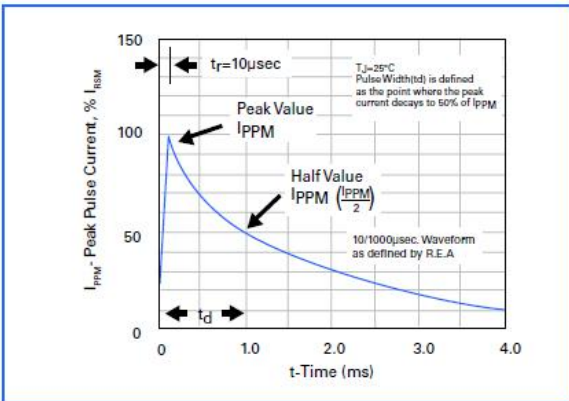


Figure 4 - Typical Junction Capacitance

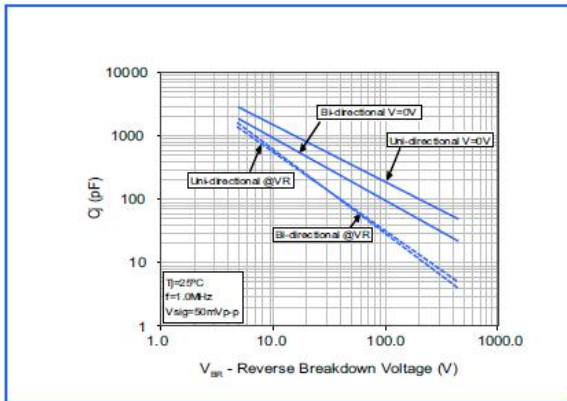


Figure 5 - Steady State Power Dissipation Derating Curve

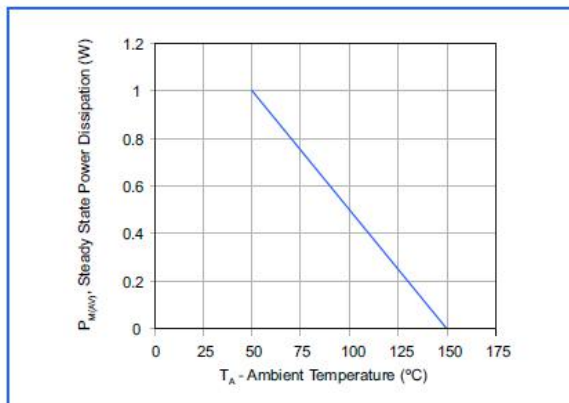
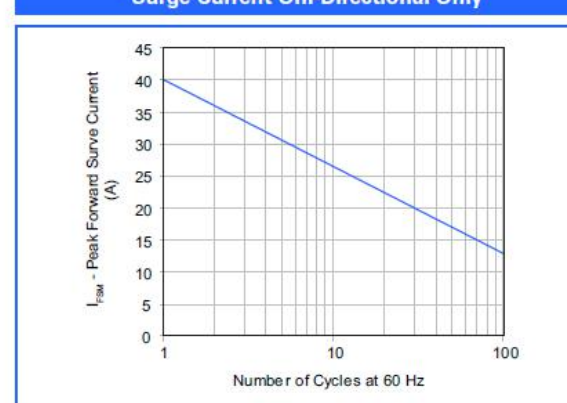


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



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