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# SMAJ Series

## 400W Surface Mount Transient Voltage Suppressors

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## Features

- Peak power disspation
  400W@10 x 1000 us Pluse
- Low incremental surge resistance
- Excellent clamping capability
- Fast response time
- Low leakage current
- Halogen free and RoHS compliant

## Applications

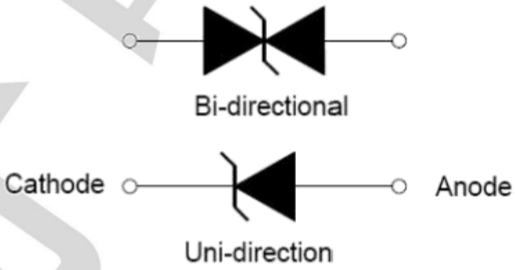
- Personal digital assistants (PDA)
- Cellular handsets & Accessories
- Handhelds and notebooks
- Portable instrumentation

## Mechanical Characteristics

- DO-214AC(SMA) surface mount package

## Dimensions and Pin Configuration

DO-214AC(SMA)




Pin Configuration

## Maximum Ratings& Thermal Characteristics

**(Tamb=25°C unless otherwise specified)**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak pulse power (tp=10/1000μs waveform) | $P_{PPM}$ | 400 | W |
| Steady state power dissipation at $T_A$=50℃ | $P_{M(AV)}$ | 3.0 | W |
| Peak Pulse Current of on 10/1000us Waveform | IPPM | See Table | A |
| Typical thermal resistance junction to ambient | $R_{\theta JA}$ | 120 | ℃/W |
| Storage & operating temperature range | $T_{STG}$ ,$T_J$ | -55~+150 | ℃ |



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## Electrical Characteristics (TA=25°C unless otherwise specified)

| MCC PART NUMBER | | REVERSE STAND-OFF VOLTAGE $V_{WM}$ | BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_T$ (VOLTS) | | | MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$ | PEAK PULSE CURRENT $I_{PP}$ | MAXIMUM REVERSE LEAKAGE @$V_{WM}$ $I_D$ |
|---|---|---|---|---|---|---|---|---|
| UNI-POLAR | BI-POLAR | (VOLTS) | MIN | MAX | $I_T$ (mA) | (VOLTS) | (AMPS) | (μA) |
| 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 | 10.4 | 1 | 14.4 | 27.7 | 20 |
| SMAJ9.0A | SMAJ9.0CA | 9.0 | 10.0 | 11.1 | 1 | 15.4 | 26.0 | 10 |
| SMAJ10A | SMAJ10CA | 10 | 11.1 | 12.3 | 1 | 17.0 | 23.5 | 5 |
| 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 | 15.3 | 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 | 11.2 | 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 |
| SMAJ36A | SMAJ36CA | 36 | 40.0 | 44.2 | 1 | 58.1 | 6.9 | 1 |
| SMAJ40A | SMAJ40CA | 40 | 44.4 | 49.1 | 1 | 64.5 | 6.2 | 1 |
| SMAJ43A | SMAJ43CA | 43 | 47.8 | 52.8 | 1 | 69.4 | 5.7 | 1 |
| SMAJ45A | SMAJ45CA | 45 | 50.0 | 55.3 | 1 | 72.7 | 5.5 | 1 |
| SMAJ48A | SMAJ48CA | 48 | 53.3 | 58.9 | 1 | 77.4 | 5.2 | 1 |

## Electrical Characteristics (TA=25°C unless otherwise specified)

| MCC PART NUMBER | | REVERSE STAND-OFF VOLTAGE $V_{WM}$ | BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_T$ (VOLTS) | | | MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$ | PEAK PULSE CURRENT $I_{PP}$ | MAXIMUM REVERSE LEAKAGE @$V_{WM}$ $I_D$ |
|---|---|---|---|---|---|---|---|---|
| UNI-POLAR | BI-POLAR | (VOLTS) | MIN | MAX | $I_T$ (mA) | (VOLTS) | (AMPS) | (μA) |
| SMAJ51A | SMAJ51CA | 51 | 56.7 | 62.7 | 1 | 82.4 | 4.9 | 1 |
| SMAJ54A | SMAJ54CA | 54 | 60.0 | 66.3 | 1 | 87.1 | 4.6 | 1 |
| SMAJ58A | SMAJ58CA | 58 | 64.4 | 71.2 | 1 | 93.6 | 4.3 | 1 |
| SMAJ60A | SMAJ60CA | 60 | 66.7 | 73.7 | 1 | 96.8 | 4.1 | 1 |
| SMAJ64A | SMAJ64CA | 64 | 71.1 | 78.6 | 1 | 103 | 3.9 | 1 |
| SMAJ70A | SMAJ70CA | 70 | 77.8 | 86.0 | 1 | 113 | 3.5 | 1 |
| SMAJ75A | SMAJ75CA | 75 | 83.3 | 92.1 | 1 | 121 | 3.3 | 1 |
| SMAJ78A | SMAJ78CA | 78 | 86.7 | 95.8 | 1 | 126 | 2.2 | 1 |
| SMAJ85A | SMAJ85CA | 85 | 94.4 | 104 | 1 | 137 | 2.9 | 1 |
| SMAJ90A | SMAJ90CA | 90 | 100 | 111 | 1 | 146 | 2.7 | 1 |
| SMAJ100A | SMAJ100CA | 100 | 111 | 123 | 1 | 162 | 2.5 | 1 |
| SMAJ110A | SMAJ110CA | 110 | 122 | 135 | 1 | 177 | 2.3 | 1 |
| SMAJ120A | SMAJ120CA | 120 | 133 | 147 | 1 | 193 | 2.1 | 1 |
| SMAJ130A | SMAJ130CA | 130 | 144 | 159 | 1 | 209 | 1.9 | 1 |
| SMAJ150A | SMAJ150CA | 150 | 167 | 185 | 1 | 243 | 1.6 | 1 |
| SMAJ160A | SMAJ160CA | 160 | 178 | 197 | 1 | 259 | 1.5 | 1 |
| SMAJ170A | SMAJ170CA | 170 | 189 | 209 | 1 | 275 | 1.5 | 1 |
| SMAJ180A | SMAJ180CA | 180 | 201 | 222 | 1 | 292 | 1.4 | 1 |
| SMAJ200A | SMAJ200CA | 200 | 224 | 247 | 1 | 324 | 1.2 | 1 |
| SMAJ220A | SMAJ220CA | 220 | 246 | 272 | 1 | 356 | 1.1 | 1 |
| SMAJ250A | SMAJ250CA | 250 | 279 | 309 | 1 | 405 | 1.0 | 1 |
| SMAJ300A | SMAJ300CA | 300 | 335 | 371 | 1 | 486 | 0.8 | 1 |
| SMAJ350A | SMAJ350CA | 350 | 391 | 432 | 1 | 567 | 0.7 | 1 |
| SMAJ400A | SMAJ400CA | 400 | 447 | 494 | 1 | 648 | 0.6 | 1 |
| SMAJ440A | SMAJ440CA | 440 | 492 | 543 | 1 | 713 | 0.6 | 1 |

For bi-directional type having Vrwm of 10 Volts and less, the IR limit is double.

For parts without A, the VBR is +10%.

## Typical Characteristics Curves

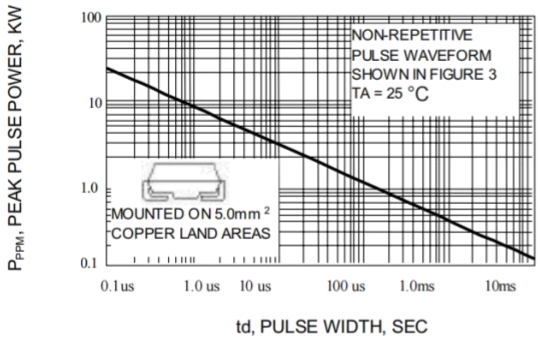



Fig. 1-PEAK PULSE POWER RATING CURVE

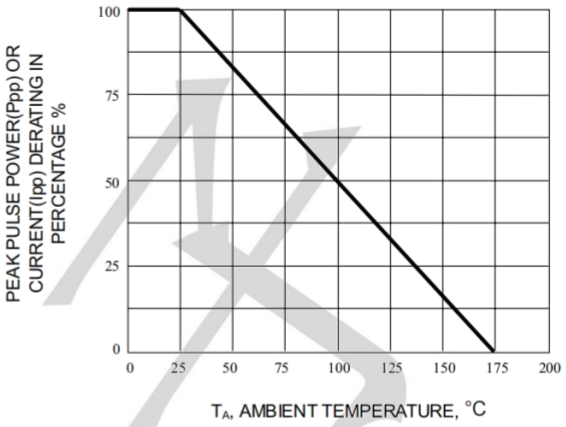



Fig. 2-PULSE RATING CURVE

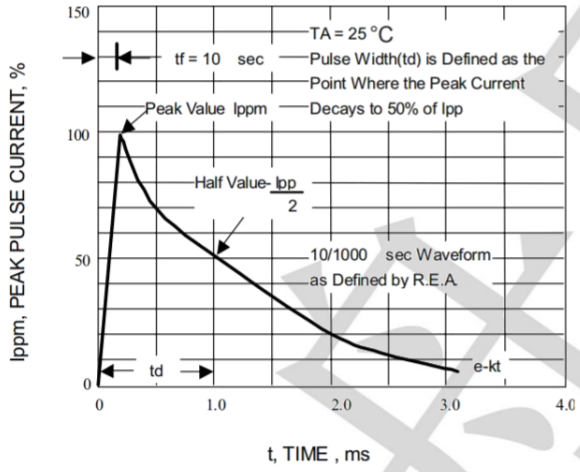



Fig. 3-PULSE WAVEFORM

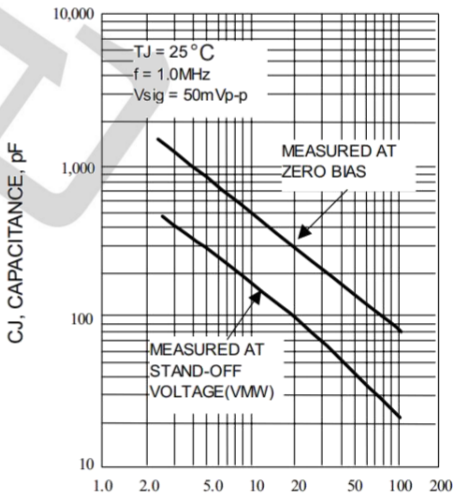



Fig. 4-TYPICAL JUNCTION CAPACITANCE

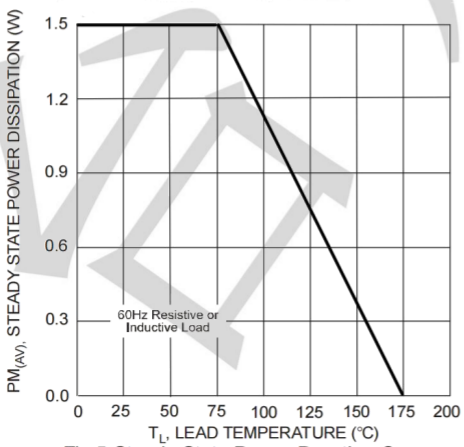
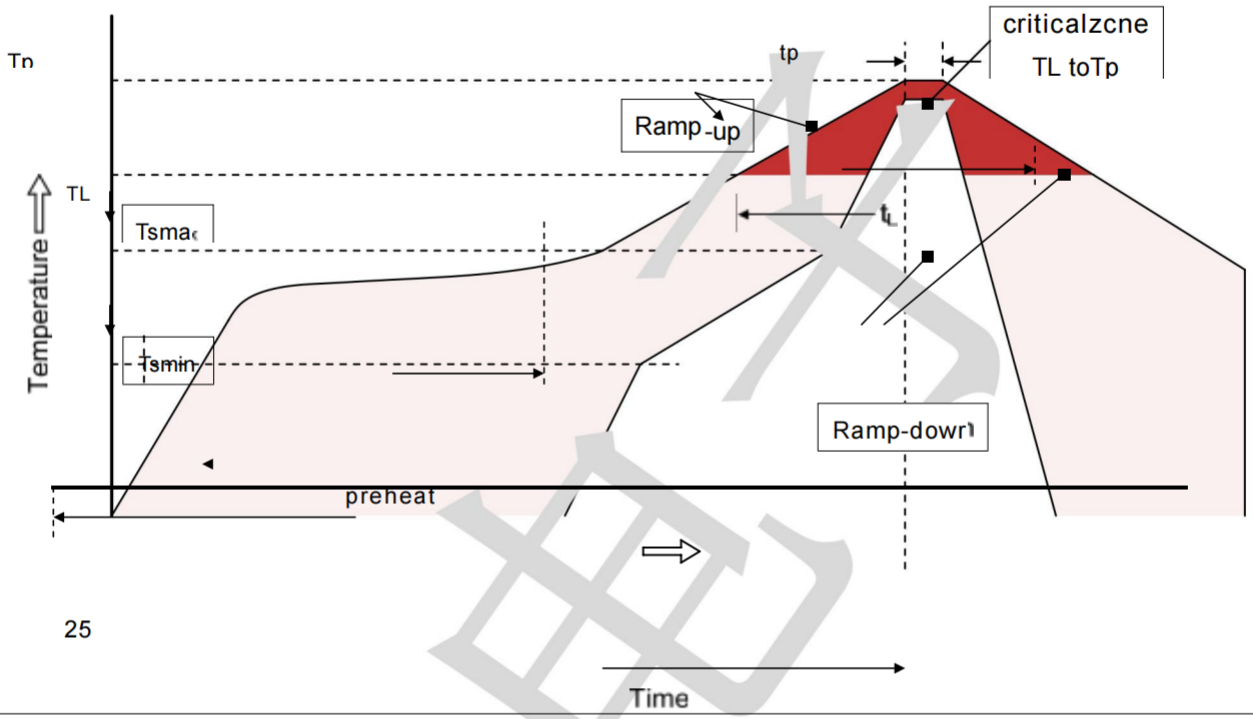



Fig.5-Steady State Power Derating Curve

## Recommended Soldering Conditions

Reflow Soldering

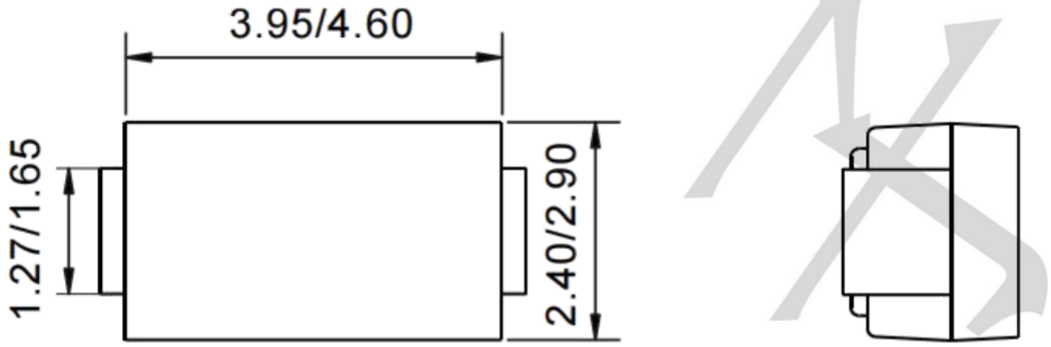


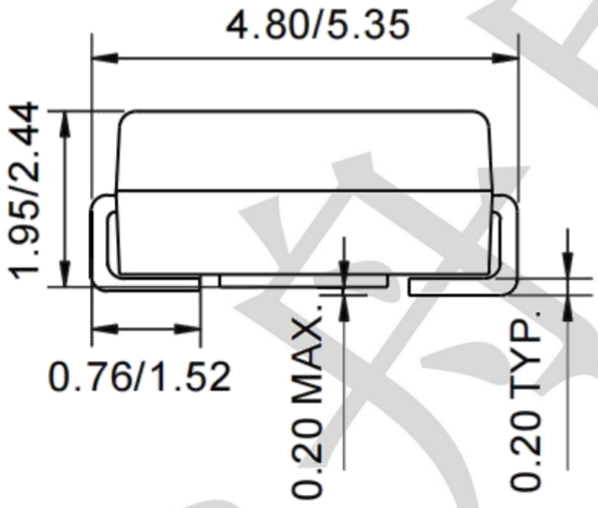

Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|---|---|
| Average ramp-up rate ($T_L$ to $T_P$) | 3℃/second max. |
| Preheat<br>-Temperature Min ($T_{S\ min}$)<br>-Temperature Max ($T_{S\ max}$)<br>-Time (minto max) (ts) | <br>150℃<br>200℃<br>60-180 seconds |
| $T_{S\ max}$ to $T_L$<br>-Ramp-up Rate | <br>3℃/second max. |
| Time maintained above:<br>-Temperature ($T_L$)<br>-Time ($t_L$) | <br>217℃<br>60-150 seconds |
| Peak Temperature ($T_P$) | 260℃ |
| Time within 5℃ of actual Peak Temperature ($t_P$) | 20-40 seconds |
| Ramp-down Rate | 6℃/second max. |
| Time 25℃ to Peak Temperature | 8 minutes max. |

## Package Outline Dimensions (unit: mm)

### SMA




## Mounting Pad Layout (unit: mm)