

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

SMAJXXXA(CA)

Product specification

Description

Transient voltage suppression diodes, also known as TVS diodes, are protective electronic parts that protect electrical equipment from voltage spikes introduced by wires.

Applications

- computer system
- domestic appliance
- video input


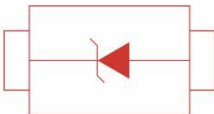


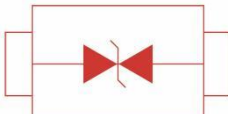

Features

- For surface mounted applications
- Excellent clamping capability
- 400 W peak pulse power capability with a 10/1000 μ s Waveform.
- V_{RWM} 3.3-550V
- Low profile package and low inductance
- Typical IR less than 1 μ A above 10V
- Fast response time: typically less than 1.0ps from 0V to V_{BRmin} .

Mechanical Characteristics

- Package: SMA/DO-214AC
- Case Material: Molded Plastic. UL Flammability
- Classification Rating 94V-0
- Moisture Sensitivity: Meet MSL 1
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Weight: 0.07g(Approximate)

Reference News

| PACKAGE OUTLINE | PIN CONFIGURATION | Marking Information |
|---|---|--|
|  |  |  |
| Unipolar | | |
|  |  |  |
| Bipolar | | |

Electrical Characteristics (T=25°C)

| Part Number | | Marking | | V _R | I _R @ V _R | V _{BR} @ I _T | | I _T | V _C @ I _{PP} | I _{PP} Ⓞ |
|-------------|-----------|----------|-----------|----------------|---------------------------------|----------------------------------|--------|----------------|----------------------------------|-------------------|
| Uni- Polar | Bi- Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| SMAJ3.3A | / | SMAJ3.3A | / | 3.3 | 200 | 5.2 | 6 | 10 | 8.0 | 50.00 |
| SMAJ5.0A | SMAJ5.0CA | SMAJ5.0A | SMAJ5.0CA | 5.0 | 800 | 6.40 | 7.00 | 10 | 9.2 | 43.48 |
| SMAJ6.0A | SMAJ6.0CA | SMAJ6.0A | SMAJ6.0CA | 6.0 | 800 | 6.67 | 7.37 | 10 | 10.3 | 38.84 |
| SMAJ6.5A | SMAJ6.5CA | SMAJ6.5A | SMAJ6.5CA | 6.5 | 500 | 7.22 | 7.98 | 10 | 11.2 | 35.72 |
| SMAJ7.0A | SMAJ7.0CA | SMAJ7.0A | SMAJ7.0CA | 7.0 | 200 | 7.78 | 8.60 | 10 | 12.0 | 33.34 |
| SMAJ7.5A | SMAJ7.5CA | SMAJ7.5A | SMAJ7.5CA | 7.5 | 100 | 8.33 | 9.21 | 1 | 12.9 | 31.01 |
| SMAJ8.0A | SMAJ8.0CA | SMAJ8.0A | SMAJ8.0CA | 8.0 | 50 | 8.89 | 9.83 | 1 | 13.6 | 29.42 |
| SMAJ8.5A | SMAJ8.5CA | SMAJ8.5A | SMAJ8.5CA | 8.5 | 20 | 9.44 | 10.40 | 1 | 14.4 | 27.78 |
| SMAJ9.0A | SMAJ9.0CA | SMAJ9.0A | SMAJ9.0CA | 9.0 | 10 | 10.00 | 11.10 | 1 | 15.4 | 25.98 |
| SMAJ10A | SMAJ10CA | SMAJ10A | SMAJ10CA | 10.0 | 5 | 11.10 | 12.30 | 1 | 17.0 | 23.53 |
| SMAJ11A | SMAJ11CA | SMAJ11A | SMAJ11CA | 11.0 | 1 | 12.20 | 13.50 | 1 | 18.2 | 21.98 |
| SMAJ12A | SMAJ12CA | SMAJ12A | SMAJ12CA | 12.0 | 1 | 13.30 | 14.70 | 1 | 19.9 | 20.11 |
| SMAJ13A | SMAJ13CA | SMAJ13A | SMAJ13CA | 13.0 | 1 | 14.40 | 15.90 | 1 | 21.5 | 18.61 |
| SMAJ14A | SMAJ14CA | SMAJ14A | SMAJ14CA | 14.0 | 1 | 15.60 | 17.20 | 1 | 23.2 | 17.25 |
| SMAJ15A | SMAJ15CA | SMAJ15A | SMAJ15CA | 15.0 | 1 | 16.70 | 18.50 | 1 | 24.4 | 16.40 |
| SMAJ16A | SMAJ16CA | SMAJ16A | SMAJ16CA | 16.0 | 1 | 17.80 | 19.70 | 1 | 26.0 | 15.39 |
| SMAJ17A | SMAJ17CA | SMAJ17A | SMAJ17CA | 17.0 | 1 | 18.90 | 20.90 | 1 | 27.6 | 14.50 |
| SMAJ18A | SMAJ18CA | SMAJ18A | SMAJ18CA | 18.0 | 1 | 20.00 | 22.10 | 1 | 29.2 | 13.70 |
| SMAJ20A | SMAJ20CA | SMAJ20A | SMAJ20CA | 20.0 | 1 | 22.20 | 24.50 | 1 | 32.4 | 12.35 |
| SMAJ22A | SMAJ22CA | SMAJ22A | SMAJ22CA | 22.0 | 1 | 24.40 | 26.90 | 1 | 35.5 | 11.27 |
| SMAJ24A | SMAJ24CA | SMAJ24A | SMAJ24CA | 24.0 | 1 | 26.70 | 29.50 | 1 | 38.9 | 10.29 |
| SMAJ26A | SMAJ26CA | SMAJ26A | SMAJ26CA | 26.0 | 1 | 28.90 | 31.90 | 1 | 42.1 | 9.51 |
| SMAJ28A | SMAJ28CA | SMAJ28A | SMAJ28CA | 28.0 | 1 | 31.10 | 34.40 | 1 | 45.4 | 8.82 |
| SMAJ30A | SMAJ30CA | SMAJ30A | SMAJ30CA | 30.0 | 1 | 33.30 | 36.80 | 1 | 48.4 | 8.27 |
| SMAJ33A | SMAJ33CA | SMAJ33A | SMAJ33CA | 33.0 | 1 | 36.70 | 40.60 | 1 | 53.3 | 7.51 |
| SMAJ36A | SMAJ36CA | SMAJ36A | SMAJ36CA | 36.0 | 1 | 40.00 | 44.20 | 1 | 58.1 | 6.89 |
| SMAJ40A | SMAJ40CA | SMAJ40A | SMAJ40CA | 40.0 | 1 | 44.40 | 49.10 | 1 | 64.5 | 6.21 |
| SMAJ43A | SMAJ43CA | SMAJ43A | SMAJ43CA | 43.0 | 1 | 47.80 | 52.80 | 1 | 69.4 | 5.77 |
| SMAJ45A | SMAJ45CA | SMAJ45A | SMAJ45CA | 45.0 | 1 | 50.00 | 55.30 | 1 | 72.7 | 5.51 |
| SMAJ48A | SMAJ48CA | SMAJ48A | SMAJ48CA | 48.0 | 1 | 53.30 | 58.90 | 1 | 77.4 | 5.17 |
| SMAJ51A | SMAJ51CA | SMAJ51A | SMAJ51CA | 51.0 | 1 | 56.70 | 62.70 | 1 | 82.4 | 4.86 |
| SMAJ54A | SMAJ54CA | SMAJ54A | SMAJ54CA | 54.0 | 1 | 60.00 | 66.30 | 1 | 87.1 | 4.60 |
| SMAJ58A | SMAJ58CA | SMAJ58A | SMAJ58CA | 58.0 | 1 | 64.40 | 71.20 | 1 | 93.6 | 4.28 |
| SMAJ60A | SMAJ60CA | SMAJ60A | SMAJ60CA | 60.0 | 1 | 66.70 | 73.70 | 1 | 96.8 | 4.14 |
| SMAJ64A | SMAJ64CA | SMAJ64A | SMAJ64CA | 64.0 | 1 | 71.10 | 78.60 | 1 | 103.0 | 3.89 |
| SMAJ70A | SMAJ70CA | SMAJ70A | SMAJ70CA | 70.0 | 1 | 77.80 | 86.00 | 1 | 113.0 | 3.54 |
| SMAJ75A | SMAJ75CA | SMAJ75A | SMAJ75CA | 75.0 | 1 | 83.30 | 92.10 | 1 | 121.0 | 3.31 |
| SMAJ78A | SMAJ78CA | SMAJ78A | SMAJ78CA | 78.0 | 1 | 86.70 | 95.80 | 1 | 126.0 | 3.18 |
| SMAJ85A | SMAJ85CA | SMAJ85A | SMAJ85CA | 85.0 | 1 | 94.40 | 104.0 | 1 | 137.0 | 2.92 |

Electrical Characteristics (T=25°C)

| Part Number | | Marking | | V _R | I _R @ V _R | V _{BR} @ I _T | | I _T | V _C @ I _{PP} | I _{PP} ^① |
|-------------|-----------|----------|-----------|----------------|---------------------------------|----------------------------------|--------|----------------|----------------------------------|------------------------------|
| Uni- Polar | Bi- Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| SMAJ90A | SMAJ90CA | SMAJ90A | SMAJ90CA | 90.0 | 1 | 100.0 | 111.0 | 1 | 146.0 | 2.74 |
| SMAJ100A | SMAJ100CA | SMAJ100A | SMAJ100CA | 100.0 | 1 | 111.0 | 123.0 | 1 | 162.0 | 2.47 |
| SMAJ110A | SMAJ110CA | SMAJ110A | SMAJ110CA | 110.0 | 1 | 122.0 | 135.0 | 1 | 177.0 | 2.26 |
| SMAJ120A | SMAJ120CA | SMAJ120A | SMAJ120CA | 120.0 | 1 | 133.0 | 147.0 | 1 | 193.0 | 2.08 |
| SMAJ130A | SMAJ130CA | SMAJ130A | SMAJ130CA | 130.0 | 1 | 144.0 | 159.0 | 1 | 209.0 | 1.92 |
| SMAJ150A | SMAJ150CA | SMAJ150A | SMAJ150CA | 150.0 | 1 | 167.0 | 185.0 | 1 | 243.0 | 1.65 |
| SMAJ160A | SMAJ160CA | SMAJ160A | SMAJ160CA | 160.0 | 1 | 178.0 | 197.0 | 1 | 259.0 | 1.55 |
| SMAJ170A | SMAJ170CA | SMAJ170A | SMAJ170CA | 170.0 | 1 | 189.0 | 209.0 | 1 | 275.0 | 1.46 |
| SMAJ180A | SMAJ180CA | SMAJ180A | SMAJ180CA | 180.0 | 1 | 201.0 | 222.0 | 1 | 292.0 | 1.37 |
| SMAJ190A | SMAJ190CA | SMAJ190A | SMAJ190CA | 190.0 | 1 | 209.0 | 233.0 | 1 | 308.0 | 1.30 |
| SMAJ200A | SMAJ200CA | SMAJ200A | SMAJ200CA | 200.0 | 1 | 224.0 | 247.0 | 1 | 324.0 | 1.24 |
| SMAJ210A | SMAJ210CA | SMAJ210A | SMAJ210CA | 210.0 | 1 | 237.0 | 263.0 | 1 | 340.0 | 1.18 |
| SMAJ220A | SMAJ220CA | SMAJ220A | SMAJ220CA | 220.0 | 1 | 246.0 | 272.0 | 1 | 356.0 | 1.13 |
| SMAJ250A | SMAJ250CA | SMAJ250A | SMAJ250CA | 250.0 | 1 | 279.0 | 309.0 | 1 | 405.0 | 0.99 |
| SMAJ300A | SMAJ300CA | SMAJ300A | SMAJ300CA | 300.0 | 1 | 335.0 | 371.0 | 1 | 486.0 | 0.83 |
| SMAJ350A | SMAJ350CA | SMAJ350A | SMAJ350CA | 350.0 | 1 | 391.0 | 432.0 | 1 | 567.0 | 0.71 |
| SMAJ400A | SMAJ400CA | SMAJ400A | SMAJ400CA | 400.0 | 1 | 447.0 | 494.0 | 1 | 648.0 | 0.62 |
| SMAJ440A | SMAJ440CA | SMAJ440A | SMAJ440CA | 440.0 | 1 | 492.0 | 543.0 | 1 | 713.0 | 0.57 |
| SMAJ550A | SMAJ550CA | SMAJ550A | SMAJ550CA | 550.0 | 1 | 614.7 | 679.4 | 1 | 972.0 | 0.42 |

Notes:

① Surge waveform: 10/1000μs

 V_R : Stand-off Voltage -- Maximum voltage that can be applied

 V_{BR}: Breakdown Voltage

 V_C: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I_{pp}

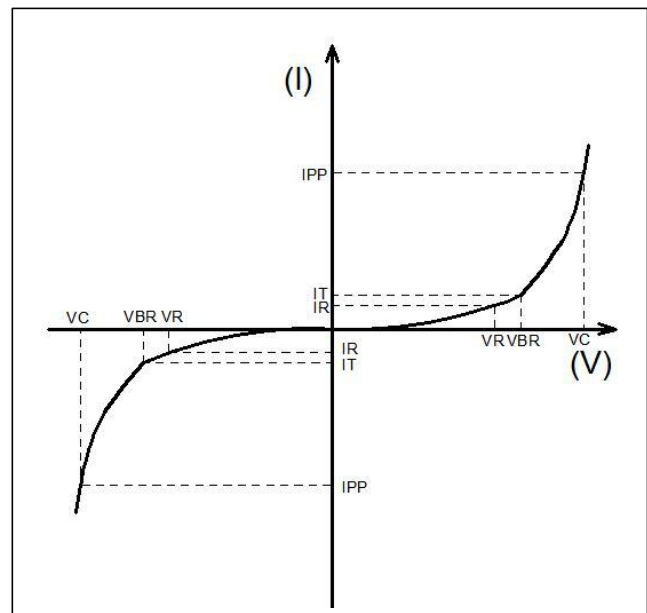
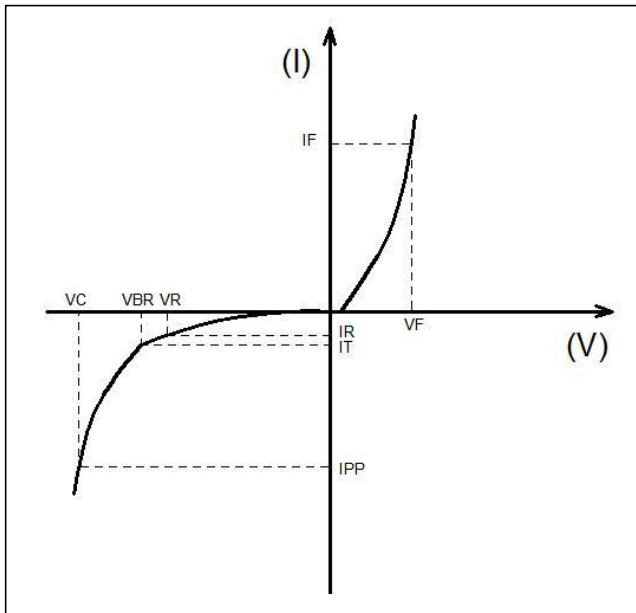
 I_R: Reverse Leakage Current

Absolute Maximum Ratings(T=25°C, RH=45%-75%, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|--------------------|-------------|------|
| Peak pulse power dissipation on 10/ 1000µs waveform | P _{PP} | 400 | W |
| Steady state power dissipation at T _L =75°C | P _{M(AV)} | 1.0 | W |
| Operating junction temperature range | T _j | -55 to +125 | °C |
| Storage temperature range | T _{stg} | -55 to +150 | °C |

Ratings And V-I Characteristics Curves (T=25°C, unless otherwise noted)

FIG1: V-I cure characteristics



| Symbol | Parameter |
|-----------------|--|
| I _F | Mean Forward Current |
| V _F | Maximum Forward Voltage @ I _F |
| V _R | Peak Reverse Working Voltage |
| I _R | Reverse Leakage Current @ V _R |
| V _{BR} | Breakdown Voltage @ I _T |
| I _T | Test Current |
| I _{PP} | Maximum Reverse Peak Pulse Current |
| V _C | Clamping Voltage @ I _{PP} |

Typical Characteristics

FIG2: Pulse Derating Curve

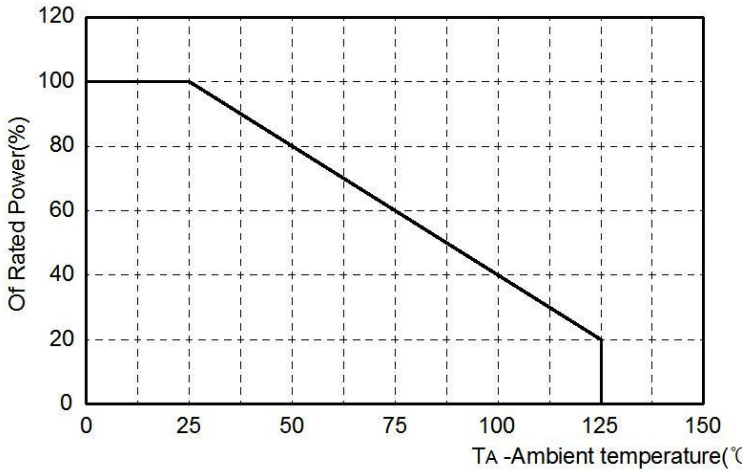


FIG3: Pulse Waveform

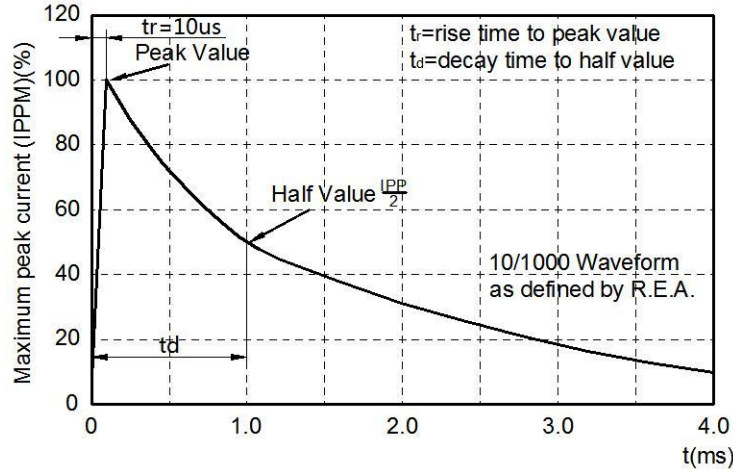


FIG4: Peak Pulse Power Rating Curve

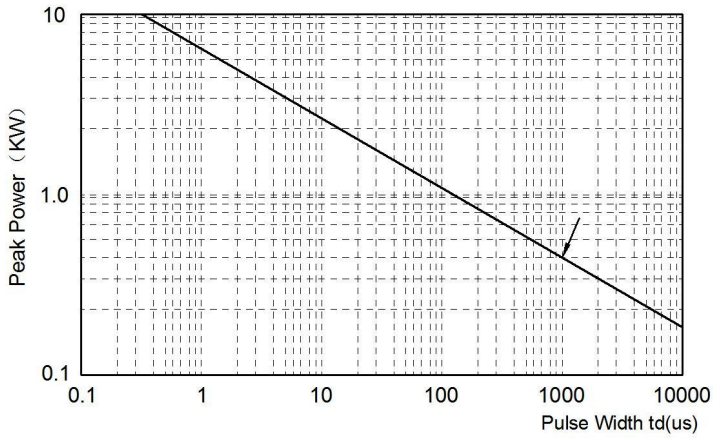
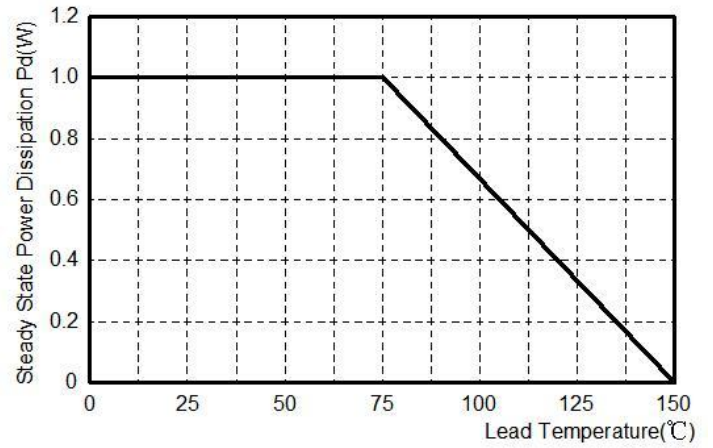
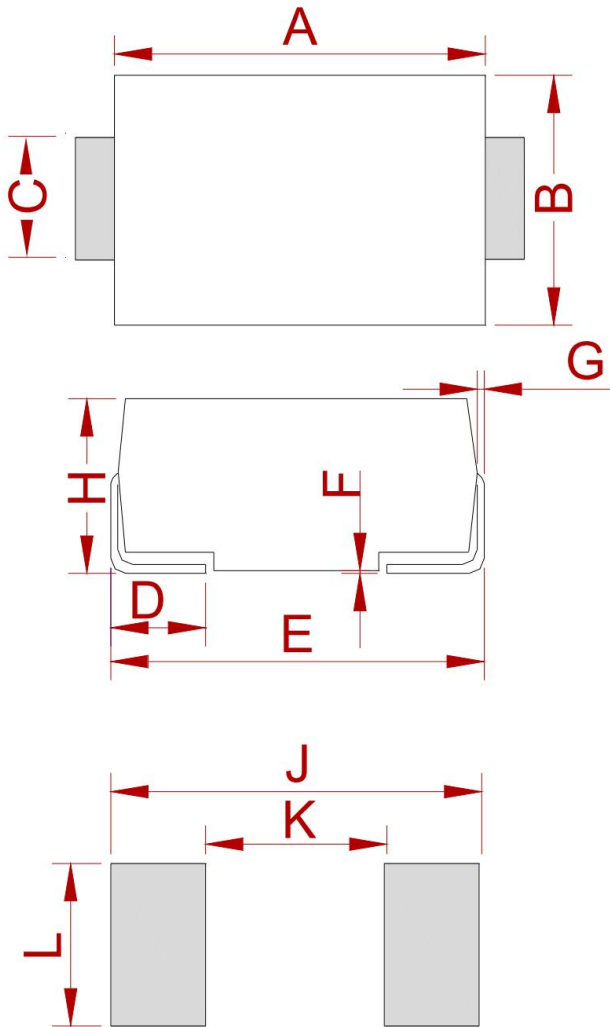


FIG5: Steady State Power Dissipation



PACKAGE MECHANICAL DATA



| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.25 | 4.65 | 0.167 | 0.183 |
| B | 2.50 | 2.90 | 0.098 | 0.114 |
| C | 1.35 | 1.65 | 0.053 | 0.065 |
| D | 0.76 | 1.52 | 0.030 | 0.060 |
| E | 4.93 | 5.28 | 0.194 | 0.208 |
| F | 0.051 | 0.203 | 0.002 | 0.008 |
| G | 0.15 | 0.31 | 0.006 | 0.012 |
| H | 1.98 | 2.41 | 0.078 | 0.095 |
| J | 6.50 | | 0.256 | |
| K | | 2.30 | | 0.090 |
| L | 1.70 | | 0.067 | |

REEL SPECIFICATION

| P/N | PKG | QTY |
|--------------|-----|------|
| SMAJXXXA(CA) | SMA | 2000 |

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