

Working Voltage: 5.0 to 440 V
Peak Pulse Power: 400 W

Surface Mount Transient Voltage Suppressors

Features

- Glass passivated chip
- 400 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle):0.01 %
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant

Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Dimensions: inch[mm]

Maximum Ratings($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | UNIT |
|---|----------------|----------------|------------------|
| Peak power dissipation with a 10/1000 μ s waveform ⁽¹⁾ | P_{PP} | 400 | W |
| Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾ | I_{PP} | See Next Table | A |
| Power dissipation on infinite heatsink at $T_L = 75^\circ\text{C}$ | P_D | 1.0 | W |
| Peak forward surge current, 8.3 ms single half sine-wave unidirectional only ⁽²⁾ | I_{FSM} | 40 | A |
| Maximum instantaneous forward voltage at 25 A for unidirectional only ⁽³⁾ | V_F | 3.5/5.0 | V |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Note:

(1)Non-repetitive current pulse per Fig.5 and derated above $T_A = 25^\circ\text{C}$ per Fig.1

(2)Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses 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 $V_{BR} > 201\text{V}$

Ratings and Characteristics Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)



Fig. 1 - Pulse Derating Curve



Fig. 2 - Maximum Non-Repetitive Surge Current



Fig. 3 - Steady State Power Derating Curve



Fig. 4 - Peak Pulse Power Rating Curve



Fig. 5 - Pulse Waveform



Fig. 6 - Typical Junction Capacitance

Electrical Characteristics($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Device Marking Code | | Breakdown Voltage V_{BR} @ I_T | | | Maximum Reverse Leakage I_R @ V_{RWM} (μA) | Working Peak Reverse Voltage V_{RWM} (V) | Maximum Reverse Surge Current I_{PP} (A) | Maximum Clamping Voltage V_C @ I_{PP} (V) |
|-------------------|------------------|---------------------|----|------------------------------------|---------|------------|---|--|--|---|
| | | Uni | Bi | Min (V) | Max (V) | I_T (mA) | | | | |
| SMAJ5.0 | SMAJ5.0C | AD | WD | 6.40 | 7.30 | 10 | 800 | 5.0 | 41.67 | 9.6 |
| SMAJ5.0A | SMAJ5.0CA | AE | WE | 6.40 | 7.00 | 10 | 800 | 5.0 | 43.48 | 9.2 |
| SMAJ6.0 | SMAJ6.0C | AF | WF | 6.67 | 8.15 | 10 | 800 | 6.0 | 35.09 | 11.4 |
| SMAJ6.0A | SMAJ6.0CA | AG | WG | 6.67 | 7.37 | 10 | 800 | 6.0 | 38.83 | 10.3 |
| SMAJ6.5 | SMAJ6.5C | AH | WH | 7.22 | 8.82 | 10 | 500 | 6.5 | 32.52 | 12.3 |
| SMAJ6.5A | SMAJ6.5CA | AK | WK | 7.22 | 7.98 | 10 | 500 | 6.5 | 35.71 | 11.2 |
| SMAJ7.0 | SMAJ7.0C | AL | WL | 7.78 | 9.51 | 10 | 200 | 7.0 | 30.08 | 13.3 |
| SMAJ7.0A | SMAJ7.0CA | AM | WM | 7.78 | 8.60 | 10 | 200 | 7.0 | 33.33 | 12.0 |
| SMAJ7.5 | SMAJ7.5C | AN | WN | 8.33 | 10.20 | 1 | 100 | 7.5 | 27.97 | 14.3 |
| SMAJ7.5A | SMAJ7.5CA | AP | WP | 8.33 | 9.21 | 1 | 100 | 7.5 | 31.01 | 12.9 |
| SMAJ8.0 | SMAJ8.0C | AQ | WQ | 8.89 | 10.90 | 1 | 50 | 8.0 | 26.67 | 15.0 |
| SMAJ8.0A | SMAJ8.0CA | AR | WR | 8.89 | 9.83 | 1 | 50 | 8.0 | 29.41 | 13.6 |
| SMAJ8.5 | SMAJ8.5C | AS | WS | 9.44 | 11.50 | 1 | 10 | 8.5 | 25.16 | 15.9 |
| SMAJ8.5A | SMAJ8.5CA | AT | WT | 9.44 | 10.40 | 1 | 10 | 8.5 | 27.78 | 14.4 |
| SMAJ9.0 | SMAJ9.0C | AU | WU | 10.00 | 12.20 | 1 | 5 | 9.0 | 23.67 | 16.9 |
| SMAJ9.0A | SMAJ9.0CA | AV | WV | 10.00 | 11.10 | 1 | 5 | 9.0 | 25.97 | 15.4 |
| SMAJ10 | SMAJ10C | AW | WW | 11.10 | 13.60 | 1 | 5 | 10.0 | 21.28 | 18.8 |
| SMAJ10A | SMAJ10CA | AX | WX | 11.10 | 12.30 | 1 | 5 | 10.0 | 23.53 | 17.0 |
| SMAJ11 | SMAJ11C | AY | WY | 12.20 | 14.90 | 1 | 1 | 11.0 | 19.90 | 20.1 |
| SMAJ11A | SMAJ11CA | AZ | WZ | 12.20 | 13.50 | 1 | 1 | 11.0 | 21.98 | 18.2 |
| SMAJ12 | SMAJ12C | BD | XD | 13.30 | 16.30 | 1 | 1 | 12.0 | 18.18 | 22.0 |
| SMAJ12A | SMAJ12CA | BE | XE | 13.30 | 14.70 | 1 | 1 | 12.0 | 20.10 | 19.9 |
| SMAJ13 | SMAJ13C | BF | XF | 14.40 | 17.60 | 1 | 1 | 13.0 | 16.81 | 23.8 |
| SMAJ13A | SMAJ13CA | BG | XG | 14.40 | 15.90 | 1 | 1 | 13.0 | 18.60 | 21.5 |
| SMAJ14 | SMAJ14C | BH | XH | 15.60 | 19.10 | 1 | 1 | 14.0 | 15.50 | 25.8 |
| SMAJ14A | SMAJ14CA | BK | XK | 15.60 | 17.20 | 1 | 1 | 14.0 | 17.24 | 23.2 |
| SMAJ15 | SMAJ15C | BL | XL | 16.70 | 20.40 | 1 | 1 | 15.0 | 14.87 | 26.9 |
| SMAJ15A | SMAJ15CA | BM | XM | 16.70 | 18.50 | 1 | 1 | 15.0 | 16.39 | 24.4 |
| SMAJ16 | SMAJ16C | BN | XN | 17.80 | 21.80 | 1 | 1 | 16.0 | 13.89 | 28.8 |
| SMAJ16A | SMAJ16CA | BP | XP | 17.80 | 19.70 | 1 | 1 | 16.0 | 15.38 | 26.0 |
| SMAJ17 | SMAJ17C | BQ | XQ | 18.90 | 23.10 | 1 | 1 | 17.0 | 13.11 | 30.5 |
| SMAJ17A | SMAJ17CA | BR | XR | 18.90 | 20.90 | 1 | 1 | 17.0 | 14.49 | 27.6 |
| SMAJ18 | SMAJ18C | BS | XS | 20.00 | 24.40 | 1 | 1 | 18.0 | 12.42 | 32.2 |
| SMAJ18A | SMAJ18CA | BT | XT | 20.00 | 22.10 | 1 | 1 | 18.0 | 13.70 | 29.2 |
| SMAJ19 | SMAJ19C | BA | XA | 21.13 | 25.76 | 1 | 1 | 19.0 | 11.76 | 34.0 |
| SMAJ19A | SMAJ19CA | BB | XB | 21.10 | 23.30 | 1 | 1 | 19.0 | 13.00 | 30.8 |
| SMAJ20 | SMAJ20C | BU | XU | 22.20 | 27.10 | 1 | 1 | 20.0 | 11.17 | 35.8 |
| SMAJ20A | SMAJ20CA | BV | XV | 22.20 | 24.50 | 1 | 1 | 20.0 | 12.35 | 32.4 |
| SMAJ22 | SMAJ22C | BW | XW | 24.40 | 29.80 | 1 | 1 | 22.0 | 10.15 | 39.4 |
| SMAJ22A | SMAJ22CA | BX | XX | 24.40 | 26.90 | 1 | 1 | 22.0 | 11.27 | 35.5 |
| SMAJ24 | SMAJ24C | BY | XY | 26.70 | 32.60 | 1 | 1 | 24.0 | 9.30 | 43.0 |
| SMAJ24A | SMAJ24CA | BZ | XZ | 26.70 | 29.50 | 1 | 1 | 24.0 | 10.28 | 38.9 |
| SMAJ26 | SMAJ26C | CD | YD | 28.90 | 35.30 | 1 | 1 | 26.0 | 8.58 | 46.6 |
| SMAJ26A | SMAJ26CA | CE | YE | 28.90 | 31.90 | 1 | 1 | 26.0 | 9.50 | 42.1 |
| SMAJ28 | SMAJ28C | CF | YF | 31.10 | 38.00 | 1 | 1 | 28.0 | 8.00 | 50.0 |
| SMAJ28A | SMAJ28CA | CG | YG | 31.10 | 34.40 | 1 | 1 | 28.0 | 8.81 | 45.4 |
| SMAJ30 | SMAJ30C | CH | YH | 33.30 | 40.70 | 1 | 1 | 30.0 | 7.48 | 53.5 |
| SMAJ30A | SMAJ30CA | CK | YK | 33.30 | 36.80 | 1 | 1 | 30.0 | 8.26 | 48.4 |
| SMAJ33 | SMAJ33C | CL | YL | 36.70 | 44.90 | 1 | 1 | 33.0 | 6.78 | 59.0 |
| SMAJ33A | SMAJ33CA | CM | YM | 36.70 | 40.60 | 1 | 1 | 33.0 | 7.50 | 53.3 |
| SMAJ36 | SMAJ36C | CN | YN | 40.00 | 48.90 | 1 | 1 | 36.0 | 6.22 | 64.3 |
| SMAJ36A | SMAJ36CA | CP | YP | 40.00 | 44.20 | 1 | 1 | 36.0 | 6.88 | 58.1 |

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Electrical Characteristics($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Device Marking Code | | Breakdown Voltage V_{BR} @ I_T | | | Maximum Reverse Leakage I_R @ V_{RWM} (uA) | Working Peak Reverse Voltage V_{RWM} (V) | Maximum Reverse Surge Current I_{PP} (A) | Maximum Clamping Voltage V_C @ I_{PP} (V) |
|-------------------|------------------|---------------------|----|------------------------------------|---------|------------|--|--|--|---|
| | | Uni | Bi | Min (V) | Max (V) | I_T (mA) | | | | |
| SMAJ40 | SMAJ40C | CQ | YQ | 44.40 | 54.30 | 1 | 1 | 40.0 | 5.60 | 71.4 |
| SMAJ40A | SMAJ40CA | CR | YR | 44.40 | 49.10 | 1 | 1 | 40.0 | 6.20 | 64.5 |
| SMAJ43 | SMAJ43C | CS | YS | 47.80 | 58.40 | 1 | 1 | 43.0 | 5.22 | 76.7 |
| SMAJ43A | SMAJ43CA | CT | YT | 47.80 | 52.80 | 1 | 1 | 43.0 | 5.76 | 69.4 |
| SMAJ45 | SMAJ45C | CU | YU | 50.00 | 61.10 | 1 | 1 | 45.0 | 4.98 | 80.3 |
| SMAJ45A | SMAJ45CA | CV | YV | 50.00 | 55.30 | 1 | 1 | 45.0 | 5.50 | 72.7 |
| SMAJ48 | SMAJ48C | CW | YW | 53.30 | 65.10 | 1 | 1 | 48.0 | 4.68 | 85.5 |
| SMAJ48A | SMAJ48CA | CX | YX | 53.30 | 58.90 | 1 | 1 | 48.0 | 5.17 | 77.4 |
| SMAJ51 | SMAJ51C | CY | YY | 56.70 | 69.30 | 1 | 1 | 51.0 | 4.39 | 91.1 |
| SMAJ51A | SMAJ51CA | CZ | YZ | 56.70 | 62.70 | 1 | 1 | 51.0 | 4.85 | 82.4 |
| SMAJ54 | SMAJ54C | RD | ZD | 60.00 | 73.30 | 1 | 1 | 54.0 | 4.15 | 96.3 |
| SMAJ54A | SMAJ54CA | RE | ZE | 60.00 | 66.30 | 1 | 1 | 54.0 | 4.59 | 87.1 |
| SMAJ58 | SMAJ58C | RF | ZF | 64.40 | 78.70 | 1 | 1 | 58.0 | 3.88 | 103.0 |
| SMAJ58A | SMAJ58CA | RG | ZG | 64.40 | 71.20 | 1 | 1 | 58.0 | 4.27 | 93.6 |
| SMAJ60 | SMAJ60C | RH | ZH | 66.70 | 81.50 | 1 | 1 | 60.0 | 3.74 | 107.0 |
| SMAJ60A | SMAJ60CA | RK | ZK | 66.70 | 73.70 | 1 | 1 | 60.0 | 4.13 | 96.8 |
| SMAJ64 | SMAJ64C | RL | ZL | 71.10 | 86.90 | 1 | 1 | 64.0 | 3.51 | 114.0 |
| SMAJ64A | SMAJ64CA | RM | ZM | 71.10 | 78.60 | 1 | 1 | 64.0 | 3.88 | 103.0 |
| SMAJ70 | SMAJ70C | RN | ZN | 77.80 | 95.10 | 1 | 1 | 70.0 | 3.20 | 125.0 |
| SMAJ70A | SMAJ70CA | RP | ZP | 77.80 | 86.00 | 1 | 1 | 70.0 | 3.54 | 113.0 |
| SMAJ75 | SMAJ75C | RQ | ZQ | 83.30 | 102.00 | 1 | 1 | 75.0 | 2.99 | 134.0 |
| SMAJ75A | SMAJ75CA | RR | ZR | 83.30 | 92.10 | 1 | 1 | 75.0 | 3.31 | 121.0 |
| SMAJ78 | SMAJ78C | RS | ZS | 86.70 | 106.00 | 1 | 1 | 78.0 | 2.88 | 139.0 |
| SMAJ78A | SMAJ78CA | RT | ZT | 86.70 | 95.80 | 1 | 1 | 78.0 | 3.17 | 126.0 |
| SMAJ80 | SMAJ80C | RA | ZA | 88.90 | 108.80 | 1 | 1 | 80.0 | 2.79 | 143.2 |
| SMAJ80A | SMAJ80CA | RB | ZB | 88.80 | 97.60 | 1 | 1 | 80.0 | 3.09 | 129.6 |
| SMAJ85 | SMAJ85C | RU | ZU | 94.40 | 115.00 | 1 | 1 | 85.0 | 2.65 | 151.0 |
| SMAJ85A | SMAJ85CA | RV | ZV | 94.40 | 104.00 | 1 | 1 | 85.0 | 2.92 | 137.0 |
| SMAJ90 | SMAJ90C | RW | ZW | 100.00 | 122.00 | 1 | 1 | 90.0 | 2.50 | 160.0 |
| SMAJ90A | SMAJ90CA | RX | ZX | 100.00 | 111.00 | 1 | 1 | 90.0 | 2.74 | 146.0 |
| SMAJ100 | SMAJ100C | RY | ZY | 111.00 | 136.00 | 1 | 1 | 100.0 | 2.23 | 179.0 |
| SMAJ100A | SMAJ100CA | RZ | ZZ | 111.00 | 123.00 | 1 | 1 | 100.0 | 2.47 | 162.0 |
| SMAJ110 | SMAJ110C | SD | VD | 122.00 | 149.00 | 1 | 1 | 110.0 | 2.04 | 196.0 |
| SMAJ110A | SMAJ110CA | SE | VE | 122.00 | 135.00 | 1 | 1 | 110.0 | 2.26 | 177.0 |
| SMAJ120 | SMAJ120C | SF | VF | 133.00 | 163.00 | 1 | 1 | 120.0 | 1.87 | 214.0 |
| SMAJ120A | SMAJ120CA | SG | VG | 133.00 | 147.00 | 1 | 1 | 120.0 | 2.07 | 193.0 |
| SMAJ130 | SMAJ130C | SH | VH | 144.00 | 176.00 | 1 | 1 | 130.0 | 1.73 | 231.0 |
| SMAJ130A | SMAJ130CA | SK | VK | 144.00 | 159.00 | 1 | 1 | 130.0 | 1.91 | 209.0 |
| SMAJ140 | SMAJ140C | SA | VA | 155.68 | 190.40 | 1 | 1 | 140.0 | 1.60 | 250.6 |
| SMAJ140A | SMAJ140CA | SB | VB | 155.00 | 171.00 | 1 | 1 | 140.0 | 1.76 | 226.8 |
| SMAJ150 | SMAJ150C | SL | VL | 167.00 | 204.00 | 1 | 1 | 150.0 | 1.49 | 268.0 |
| SMAJ150A | SMAJ150CA | SM | VM | 167.00 | 185.00 | 1 | 1 | 150.0 | 1.65 | 243.0 |
| SMAJ160 | SMAJ160C | SN | VN | 178.00 | 218.00 | 1 | 1 | 160.0 | 1.39 | 287.0 |
| SMAJ160A | SMAJ160CA | SP | VP | 178.00 | 197.00 | 1 | 1 | 160.0 | 1.54 | 259.0 |
| SMAJ170 | SMAJ170C | SQ | VQ | 189.00 | 231.00 | 1 | 1 | 170.0 | 1.32 | 304.0 |
| SMAJ170A | SMAJ170CA | SR | VR | 189.00 | 209.00 | 1 | 1 | 170.0 | 1.45 | 275.0 |
| SMAJ180 | SMAJ180C | SS | VS | 200.16 | 244.80 | 1 | 1 | 180.0 | 1.24 | 322.2 |
| SMAJ180A | SMAJ180CA | ST | VT | 200.00 | 220.00 | 1 | 1 | 180.0 | 1.37 | 291.6 |
| SMAJ190 | SMAJ190C | SU | VU | 211.28 | 258.40 | 1 | 1 | 190.0 | 1.18 | 340.1 |
| SMAJ190A | SMAJ190CA | SV | VV | 211.00 | 232.00 | 1 | 1 | 190.0 | 1.30 | 307.8 |
| SMAJ200A | SMAJ200CA | SW | VW | 224.00 | 247.00 | 1 | 1 | 200.0 | 1.23 | 324.0 |
| SMAJ220A | SMAJ220CA | SX | VX | 246.00 | 272.00 | 1 | 1 | 220.0 | 1.12 | 356.0 |
| SMAJ250A | SMAJ250CA | SZ | VZ | 279.00 | 309.00 | 1 | 1 | 250.0 | 0.99 | 405.0 |
| SMAJ300A | SMAJ300CA | DE | HE | 335.00 | 371.00 | 1 | 1 | 300.0 | 0.82 | 486.0 |
| SMAJ350A | SMAJ350CA | DG | HG | 391.00 | 432.00 | 1 | 1 | 350.0 | 0.71 | 567.0 |
| SMAJ400A | SMAJ400CA | DK | HK | 447.00 | 494.00 | 1 | 1 | 400.0 | 0.62 | 648.0 |
| SMAJ440A | SMAJ440CA | DM | HM | 492.00 | 543.00 | 1 | 1 | 440.0 | 0.56 | 713.0 |

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