

1. General description

SMAJ series, 400W transient voltage suppressor (TVS) in SMA package, designed to protect electronic circuit which induced by lightning surge or other transient voltage situation.

2. Features and benefits

- Peak pulse power 400W @ 10/1000µs waveform
- Excellent clamping capability
- Low incremental surge resistance
- Surface mount package for easy assembly and board space saving
- Typical $I_R < 1\mu A$ When $V_R > 12V$
- Fast response time: Typically less than 1.0ps from 0V to BV min
- IEC 61000-4-2 ESD 30kV (Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- High temperature to reflow soldering guaranteed: 260°C/10sec
- Meet UL94V-0 flammability classification which guaranteed by mold compound
- Meet MSL level1, per J-STD-020
- Lead free lead finish
- Halogen free and RoHS compliant



Bi-directional



Uni-directional

3. Applications

- Power supply protection
- Industrial application
- Power management
- I/O interface protection



4. Ordering information

| Type number | Package name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|---------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| SMAJxxxXX | SMA | SMAJxxxXXJ | Tape and reel | 5000 | SMAJ | 18-Oct-2020 |
| eg. SMAJ5.0CA | SMA | SMAJ5.0CAJ | Tape and reel | 5000 | SMAJ | 18-Oct-2020 |

5. Absolute maximum ratings

In accordance with the Absolute Maximum Rating System (IEC 60134).

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Values | Unit |
|--------------------------------|--------------------------------|--|------------|------------------|
| Absolute maximum rating | | | | |
| P_{PPM} | peak pulse power | [1] | 400 | W |
| $P_{M(AV)}$ | steady state power dissipation | on infinite heatsink at $T_a = 50\text{ }^\circ\text{C}$ | 3.3 | W |
| I_{FSM} | peak forward surge current | $t_p = 8.3\text{ ms}$; single half sine-wave pulse; duty cycle = 4 pulses per minute maximum; unidirectional units only | 60 | A |
| V_F | forward on-state voltage | $I_F = 35\text{ A}$; unidirectional units only | 3.5 | V |
| T_{stg} | storage temperature range | | -65 to 150 | $^\circ\text{C}$ |
| T_j | operating temperature range | | -65 to 150 | $^\circ\text{C}$ |

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).

6. Characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| PN (Uni) | PN (Bi) | Reverse Stand off Voltage V_R (V) | Breakdown Voltage V_{BR} @ I_T (V) | | Test current I_T (mA) | Max. Clamping Voltage V_C @ I_{PP} (V) | Max. Peak Pulse Current I_{PP} (A) | Maximum Reverse Leakage I_R @ V_R (μ A) | Marking | |
|-------------|------------|---|---|-------|----------------------------------|--|--|--|---------|--------|
| | | | Min | Max | | | | | Uni | Bi |
| SMAJ5.0A | SMAJ5.0CA | 5 | 6.45 | 6.98 | 10 | 9.2 | 43.5 | 400 | A005AJ | A005CJ |
| SMAJ6.0A | SMAJ6.0CA | 6 | 6.8 | 7.32 | 10 | 10.3 | 38.8 | 400 | A006AJ | A006CJ |
| SMAJ6.5A | SMAJ6.5CA | 6.5 | 7.27 | 7.92 | 10 | 11.2 | 35.7 | 250 | A06FAJ | A06FCJ |
| SMAJ7.0A | SMAJ7.0CA | 7 | 7.82 | 8.57 | 10 | 12 | 33.3 | 100 | A007AJ | A007CJ |
| SMAJ8.0A | SMAJ8.0CA | 8 | 8.95 | 9.76 | 1 | 13.6 | 29.4 | 50 | A008AJ | A008CJ |
| SMAJ9.0A | SMAJ9.0CA | 9 | 10.1 | 11 | 1 | 15.4 | 26 | 10 | A009AJ | A009CJ |
| SMAJ10A | SMAJ10CA | 10 | 11.21 | 12.19 | 1 | 17 | 23.5 | 5 | A010AJ | A010CJ |
| SMAJ11A | SMAJ11CA | 11 | 12.32 | 13.38 | 1 | 18.2 | 22 | 1 | A011AJ | A011CJ |
| SMAJ12A | SMAJ12CA | 12 | 13.43 | 14.57 | 1 | 19.9 | 20.1 | 1 | A012AJ | A012CJ |
| SMAJ13A | SMAJ13CA | 13 | 14.54 | 15.76 | 1 | 21.5 | 18.6 | 1 | A013AJ | A013CJ |
| SMAJ14A | SMAJ14CA | 14 | 15.75 | 17.04 | 1 | 23.2 | 17.2 | 1 | A014AJ | A014CJ |
| SMAJ15A | SMAJ15CA | 15 | 16.86 | 18.34 | 1 | 24.4 | 16.4 | 1 | A015AJ | A015CJ |
| SMAJ16A | SMAJ16CA | 16 | 17.97 | 19.52 | 1 | 26 | 15.4 | 1 | A016AJ | A016CJ |
| SMAJ17A | SMAJ17CA | 17 | 19.08 | 20.72 | 1 | 27.6 | 14.5 | 1 | A017AJ | A017CJ |
| SMAJ18A | SMAJ18CA | 18 | 20.19 | 21.9 | 1 | 29.2 | 13.7 | 1 | A018AJ | A018CJ |
| SMAJ20A | SMAJ20CA | 20 | 22.41 | 24.28 | 1 | 32.4 | 12.3 | 1 | A020AJ | A020CJ |
| SMAJ22A | SMAJ22CA | 22 | 24.63 | 26.66 | 1 | 35.5 | 11.3 | 1 | A022AJ | A022CJ |
| SMAJ24A | SMAJ24CA | 24 | 26.95 | 29.23 | 1 | 38.9 | 10.3 | 1 | A024AJ | A024CJ |
| SMAJ26A | SMAJ26CA | 26 | 29.12 | 31.67 | 1 | 42.1 | 9.5 | 1 | A026AJ | A026CJ |
| SMAJ28A | SMAJ28CA | 28 | 31.33 | 34.16 | 1 | 45.4 | 8.8 | 1 | A028AJ | A028CJ |
| SMAJ30A | SMAJ30CA | 30 | 33.55 | 36.54 | 1 | 48.4 | 8.3 | 1 | A030AJ | A030CJ |
| SMAJ33A | SMAJ33CA | 33 | 36.98 | 40.3 | 1 | 53.3 | 7.5 | 1 | A033AJ | A033CJ |
| SMAJ36A | SMAJ36CA | 36 | 40.3 | 43.9 | 1 | 58.1 | 6.9 | 1 | A036AJ | A036CJ |
| SMAJ40A | SMAJ40CA | 40 | 44.7 | 48.8 | 1 | 64.5 | 6.2 | 1 | A040AJ | A040CJ |
| SMAJ43A | SMAJ43CA | 43 | 48.2 | 52.4 | 1 | 69.4 | 5.8 | 1 | A043AJ | A043CJ |
| SMAJ45A | SMAJ45CA | 45 | 50.4 | 54.9 | 1 | 72.7 | 5.5 | 1 | A045AJ | A045CJ |
| SMAJ48A | SMAJ48CA | 48 | 53.7 | 58.5 | 1 | 77.4 | 5.2 | 1 | A048AJ | A048CJ |
| SMAJ51A | SMAJ51CA | 51 | 57.1 | 62.3 | 1 | 82.4 | 4.9 | 1 | A051AJ | A051CJ |
| SMAJ54A | SMAJ54CA | 54 | 60.5 | 65.8 | 1 | 87.1 | 4.6 | 1 | A054AJ | A054CJ |
| SMAJ58A | SMAJ58CA | 58 | 64.9 | 70.7 | 1 | 93.6 | 4.3 | 1 | A058AJ | A058CJ |
| SMAJ60A | SMAJ60CA | 60 | 67.2 | 73.2 | 1 | 96.8 | 4.1 | 1 | A060AJ | A060CJ |
| SMAJ64A | SMAJ64CA | 64 | 71.6 | 78 | 1 | 103 | 3.9 | 1 | A064AJ | A064CJ |
| SMAJ70A | SMAJ70CA | 70 | 78.4 | 85.4 | 1 | 113 | 3.5 | 1 | A070AJ | A070CJ |
| SMAJ75A | SMAJ75CA | 75 | 83.9 | 91.5 | 1 | 121 | 3.3 | 1 | A075AJ | A075CJ |
| SMAJ78A | SMAJ78CA | 78 | 87.4 | 95.1 | 1 | 126 | 3.2 | 1 | A078AJ | A078CJ |
| SMAJ85A | SMAJ85CA | 85 | 95.1 | 103.3 | 1 | 137 | 2.9 | 1 | A085AJ | A085CJ |

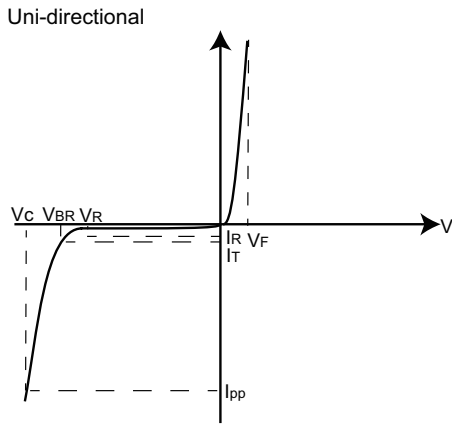


Fig. 1. I-V curve characteristics; Uni-directional

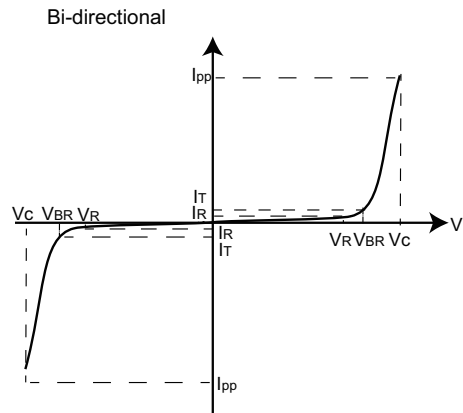


Fig. 2. I-V curve characteristics; Bi-directional



Fig. 3. Peak pulse power derating curve

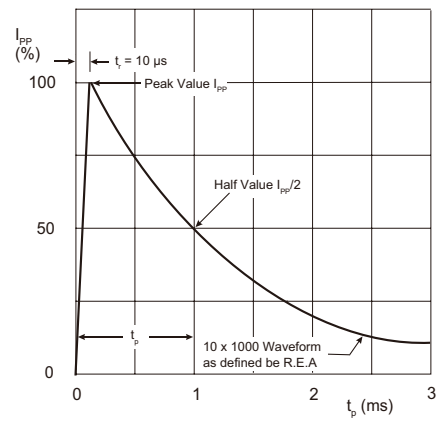


Fig. 4. Pulse waveform

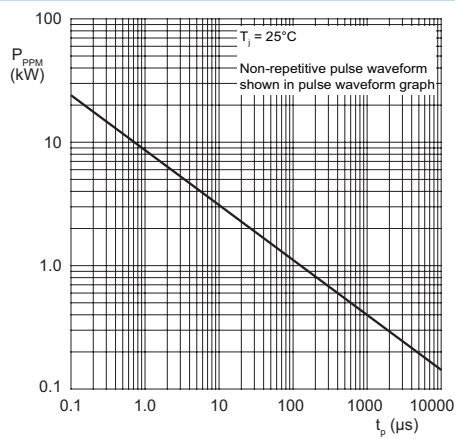


Fig. 5. Peak pulse power rating curve

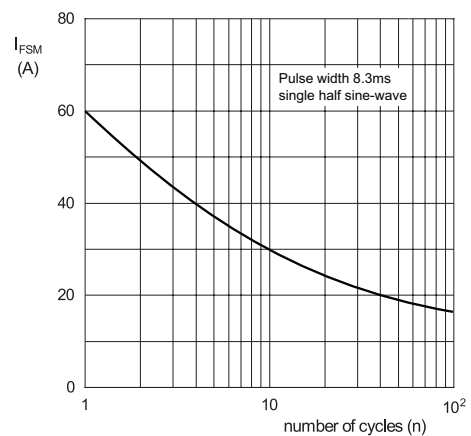


Fig. 6. Maximum non-repetitive surge current

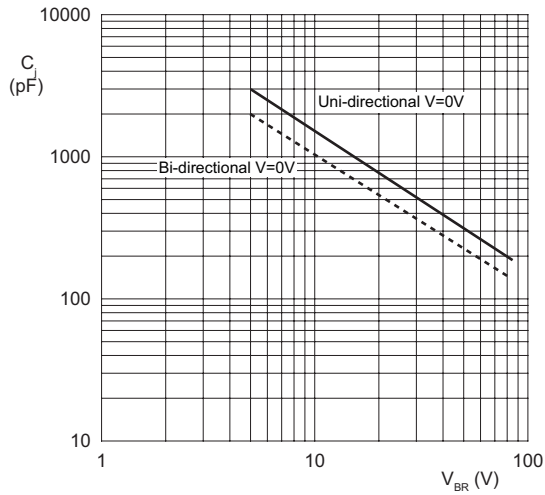


Fig. 7. Typical junction capacitance

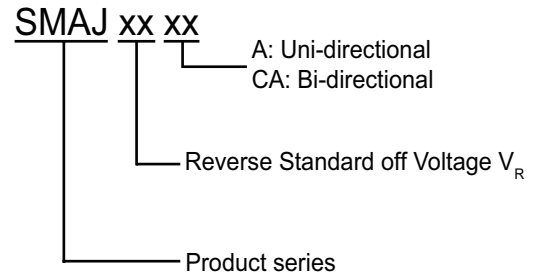


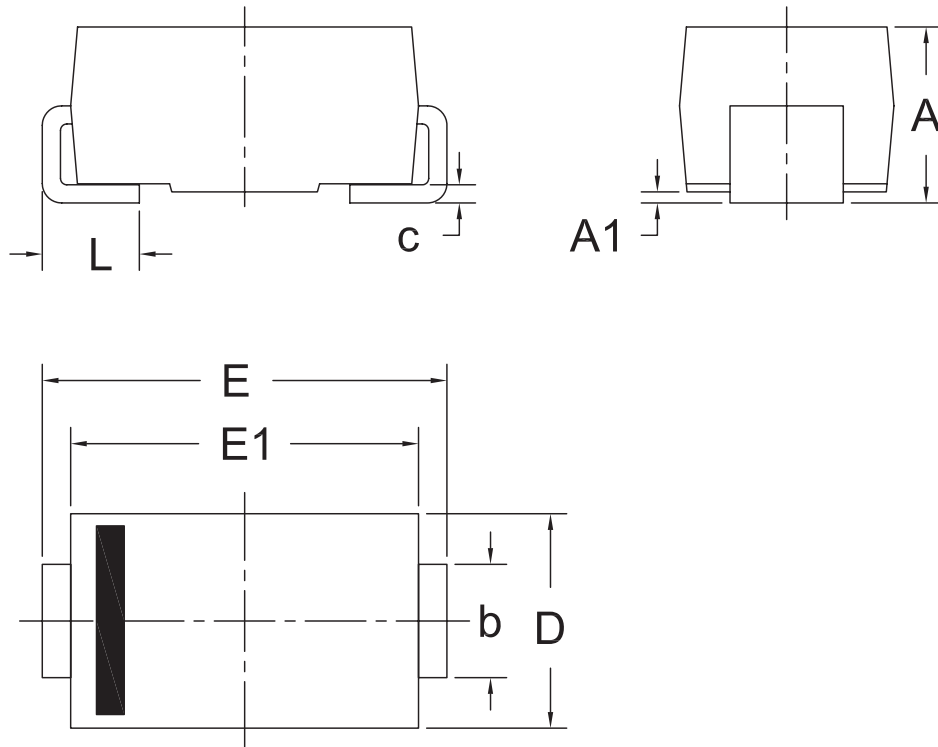
Fig. 8. Part numbering



Fig. 9. Part marking

7. Package outline

SMA



| UNIT | A | A1 | b | c | D | E | E1 | L | |
|------|-----|------|------|------|------|------|------|------|------|
| mm | Max | 2.45 | 0.20 | 1.65 | 0.25 | 2.85 | 5.25 | 4.55 | 1.55 |
| | Min | 1.95 | 0.10 | 1.35 | 0.15 | 2.55 | 4.75 | 4.25 | 0.85 |

Remark: Dimensions D and E1 do not include mold flash & gate remain.

8. Legal information

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| Document status [1][2] | Product status [3] | Definition |
|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

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- [2] The term 'short data sheet' is explained in section "Definitions".
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