

## 1. General description

SMCJ series, 1500W transient voltage suppressor (TVS) in SMC package, designed to protect electronic circuit which induced by lightning surge or other transient voltage situation.

## 2. Features and benefits

- Peak pulse power 1500W @ 10/1000 $\mu$ s 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 |
|---------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| SMCJxxxXX     | SMC          | SMCJxxxXXJ            | Tape and reel  | 3000                   | SMCJ            | 18-Oct-2020        |
| eg. SMCJ5.0CA | SMC          | SMCJ5.0CAJ            | Tape and reel  | 3000                   | SMCJ            | 18-Oct-2020        |

## 5. Absolute maximum ratings

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

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

| Symbol                         | Parameter                      | Conditions   | Values     | Unit       |
|--------------------------------|--------------------------------|--|------------|------------|
| <b>Absolute maximum rating</b> |                                |  |            |            |
| $P_{PPM}$                      | peak pulse power               | [1]  | 1500       | W          |
| $P_{M(AV)}$                    | steady state power dissipation | on infinite heatsink at $T_a = 50^\circ C$   | 5          | W          |
| $I_{FSM}$                      | peak forward surge current     | $t_p = 8.3$ ms; single half sine-wave pulse; duty cycle = 4 pulses per minute maximum; unidirectional units only | 200        | A          |
| $V_F$                          | forward on-state voltage       | $I_F = 100$ A; unidirectional units only   | 3.5        | V          |
| $T_{stg}$                      | storage temperature range      |  | -65 to 150 | $^\circ C$ |
| $T_j$                          | operating temperature range    |  | -65 to 150 | $^\circ C$ |

[1] In accordance with IEC 61643-321 (10/1000  $\mu$ s current waveform).

## 6. Characteristics

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

| PN<br>(Uni) | PN<br>(Bi) | Reverse<br>Stand off<br>Voltage<br>$V_R$<br>(V) | Breakdown<br>Voltage $V_{BR}$ @<br>$I_T$<br>(V) |       | Test<br>current<br>$I_T$<br>(mA) | Max.<br>Clamping<br>Voltage $V_C$<br>@ $I_{PP}$<br>(V) | Max. Peak<br>Pulse<br>Current<br>$I_{PP}$<br>(A) | Maximum<br>Reverse<br>Leakage<br>$I_R$ @ $V_R$<br>( $\mu$ A) | Marking |        |
|-------------|------------|---|---|-------|----------------------------------|--|--|--|---------|--------|
|             |            |   | Min   | Max   |                                  |  |  |  | Uni     | Bi     |
| SMCJ5.0A    | SMCJ5.0CA  | 5   | 6.45  | 6.98  | 10                               | 9.2  | 163  | 400  | C005AJ  | C005CJ |
| SMCJ6.0A    | SMCJ6.0CA  | 6   | 6.8   | 7.32  | 10                               | 10.3   | 145.7  | 400  | C006AJ  | C006CJ |
| SMCJ6.5A    | SMCJ6.5CA  | 6.5   | 7.27  | 7.92  | 10                               | 11.2   | 134  | 250  | C06FAJ  | C06FCJ |
| SMCJ7.0A    | SMCJ7.0CA  | 7   | 7.82  | 8.57  | 10                               | 12   | 125  | 200  | C007AJ  | C007CJ |
| SMCJ8.0A    | SMCJ8.0CA  | 8   | 8.95  | 9.76  | 1                                | 13.6   | 110.3  | 100  | C008AJ  | C008CJ |
| SMCJ9.0A    | SMCJ9.0CA  | 9   | 10.1  | 11    | 1                                | 15.4   | 97.4   | 10   | C009AJ  | C009CJ |
| SMCJ10A     | SMCJ10CA   | 10  | 11.21   | 12.19 | 1                                | 17   | 88.3   | 5  | C010AJ  | C010CJ |
| SMCJ11A     | SMCJ11CA   | 11  | 12.32   | 13.38 | 1                                | 18.2   | 82.5   | 1  | C011AJ  | C011CJ |
| SMCJ12A     | SMCJ12CA   | 12  | 13.43   | 14.57 | 1                                | 19.9   | 75.4   | 1  | C012AJ  | C012CJ |
| SMCJ13A     | SMCJ13CA   | 13  | 14.54   | 15.76 | 1                                | 21.5   | 69.8   | 1  | C013AJ  | C013CJ |
| SMCJ14A     | SMCJ14CA   | 14  | 15.75   | 17.04 | 1                                | 23.2   | 64.7   | 1  | C014AJ  | C014CJ |
| SMCJ15A     | SMCJ15CA   | 15  | 16.86   | 18.33 | 1                                | 24.4   | 61.5   | 1  | C015AJ  | C015CJ |
| SMCJ16A     | SMCJ16CA   | 16  | 17.93   | 19.56 | 1                                | 26   | 57.7   | 1  | C016AJ  | C016CJ |
| SMCJ17A     | SMCJ17CA   | 17  | 19.05   | 20.76 | 1                                | 27.6   | 54.4   | 1  | C017AJ  | C017CJ |
| SMCJ18A     | SMCJ18CA   | 18  | 20.19   | 21.9  | 1                                | 29.2   | 51.4   | 1  | C018AJ  | C018CJ |
| SMCJ20A     | SMCJ20CA   | 20  | 22.41   | 24.28 | 1                                | 32.4   | 46.3   | 1  | C020AJ  | C020CJ |
| SMCJ22A     | SMCJ22CA   | 22  | 24.63   | 26.66 | 1                                | 35.5   | 42.3   | 1  | C022AJ  | C022CJ |
| SMCJ24A     | SMCJ24CA   | 24  | 26.95   | 29.23 | 1                                | 38.9   | 38.6   | 1  | C024AJ  | C024CJ |
| SMCJ26A     | SMCJ26CA   | 26  | 29.12   | 31.67 | 1                                | 42.1   | 35.7   | 1  | C026AJ  | C026CJ |
| SMCJ28A     | SMCJ28CA   | 28  | 31.33   | 34.16 | 1                                | 45.4   | 33.1   | 1  | C028AJ  | C028CJ |
| SMCJ30A     | SMCJ30CA   | 30  | 33.55   | 36.54 | 1                                | 48.4   | 31   | 1  | C030AJ  | C030CJ |
| SMCJ33A     | SMCJ33CA   | 33  | 36.98   | 40.3  | 1                                | 53.3   | 28.2   | 1  | C033AJ  | C033CJ |
| SMCJ36A     | SMCJ36CA   | 36  | 40.3  | 43.9  | 1                                | 58.1   | 25.9   | 1  | C036AJ  | C036CJ |
| SMCJ40A     | SMCJ40CA   | 40  | 44.7  | 48.8  | 1                                | 64.5   | 23.3   | 1  | C040AJ  | C040CJ |
| SMCJ43A     | SMCJ43CA   | 43  | 48.2  | 52.4  | 1                                | 69.4   | 21.7   | 1  | C043AJ  | C043CJ |
| SMCJ45A     | SMCJ45CA   | 45  | 50.4  | 54.9  | 1                                | 72.7   | 20.6   | 1  | C045AJ  | C045CJ |
| SMCJ48A     | SMCJ48CA   | 48  | 53.8  | 58.4  | 1                                | 77.4   | 19.4   | 1  | C048AJ  | C048CJ |
| SMCJ51A     | SMCJ51CA   | 51  | 57.2  | 62.1  | 1                                | 82.4   | 18.2   | 1  | C051AJ  | C051CJ |
| SMCJ54A     | SMCJ54CA   | 54  | 60.5  | 65.7  | 1                                | 87.1   | 17.3   | 1  | C054AJ  | C054CJ |
| SMCJ58A     | SMCJ58CA   | 58  | 65  | 70.6  | 1                                | 93.6   | 16.1   | 1  | C058AJ  | C058CJ |
| SMCJ60A     | SMCJ60CA   | 60  | 67.3  | 73    | 1                                | 96.8   | 15.5   | 1  | C060AJ  | C060CJ |
| SMCJ64A     | SMCJ64CA   | 64  | 71.6  | 78    | 1                                | 103  | 14.6   | 1  | C064AJ  | C064CJ |
| SMCJ70A     | SMCJ70CA   | 70  | 78.5  | 85.2  | 1                                | 113  | 13.3   | 1  | C070AJ  | C070CJ |
| SMCJ75A     | SMCJ75CA   | 75  | 83.9  | 91.5  | 1                                | 121  | 12.4   | 1  | C075AJ  | C075CJ |
| SMCJ78A     | SMCJ78CA   | 78  | 87.4  | 95.1  | 1                                | 126  | 11.9   | 1  | C078AJ  | C078CJ |
| SMCJ85A     | SMCJ85CA   | 85  | 95.1  | 103.2 | 1                                | 137  | 11   | 1  | C085AJ  | C085CJ |

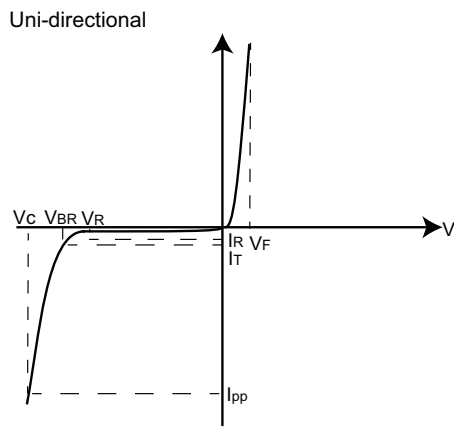


Fig. 1. I-V curve characteristics; Uni-directional

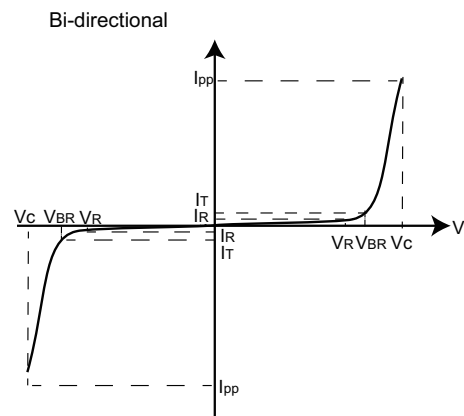


Fig. 2. I-V curve characteristics; Bi-directional



Fig. 3. Peak pulse power derating curve

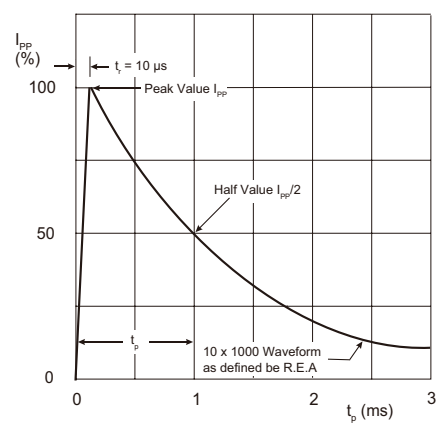


Fig. 4. Pulse waveform

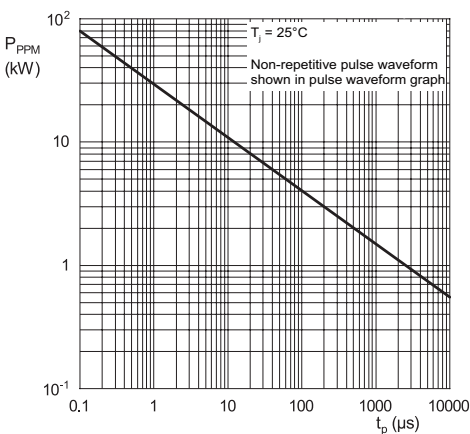


Fig. 5. Peak pulse power rating curve

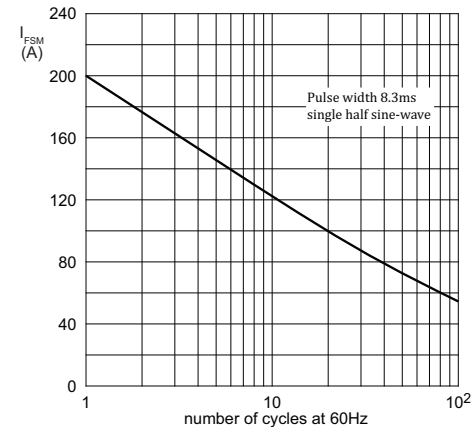


Fig. 6. Maximum non-repetitive surge current

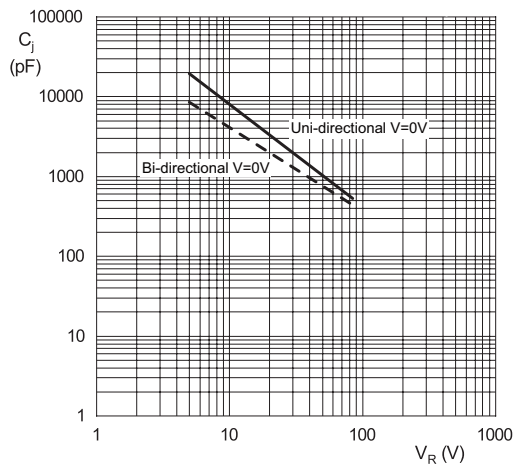


Fig. 7. Typical junction capacitance

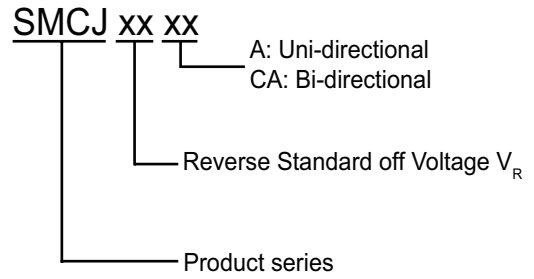


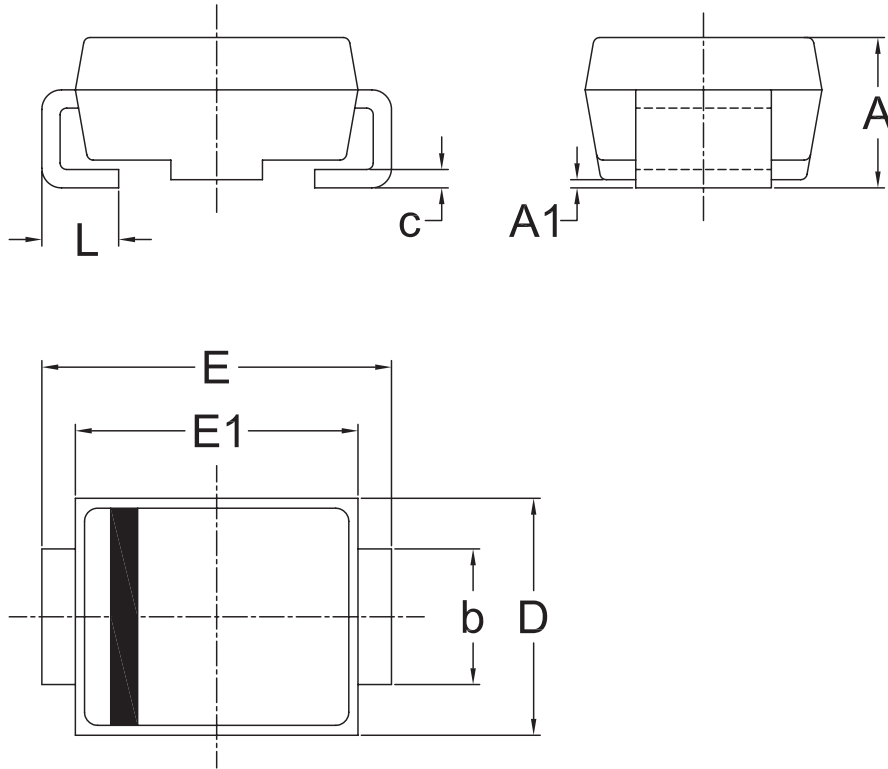
Fig. 8. Part numbering



Fig. 9. Part marking

7. Package outline

SMC



| UNIT | A   | A1   | b    | c    | D    | E    | E1   | L    |      |
|------|-----|------|------|------|------|------|------|------|------|
| mm   | Max | 2.83 | 0.30 | 3.10 | 0.25 | 6.15 | 8.15 | 7.05 | 1.60 |
|      | Min | 2.33 | 0.00 | 2.80 | 0.15 | 5.85 | 7.65 | 6.75 | 0.90 |

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. |
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| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

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