# SMCJ Series

## 1500W Transient Voltage Suppressor

Rev.02 - 24 November 2023 Product data sheet

## 1. General description

SMCJ series, 1500W transient voltage suppressor (TVS) in SMC package, designed to protect electronic circuits against damage induced by lightning surges or other transient voltage events.

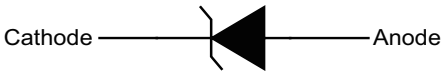



## 2. Features and benefits

- Peak pulse power 1500W @ 10/1000μs waveform
- Excellent clamping capability
- Low incremental surge resistance
- Surface mount package for easy assembly and PCB space-saving
- Typical $I_R$ < 1μA when $V_{BR}$ min > 12V
- Fast response time: typically < 1.0ps from 0V to $V_{BR}$ minimum
- IEC 61000-4-2 ESD 30kV (Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Guaranteed high temperature for reflow soldering: 260°C/10sec
- Mold compound complies to UL94V-0 flammability classification
- Meets MSL level 1, per J-STD-020
- Pb-free lead finish
- Halogen free and RoHS compliant



Bi-directional




Uni-directional

## 3. Applications

- Power supplies
- Industrial applications
- Power management circuits
- I/O interfaces

## 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 °C unless otherwise specified.*

| Symbol | Parameter | Conditions | Values | Unit |
|---|---|---|---|---|
| **Absolute maximum rating** | | | | |
| $P_{PPM}$ | peak pulse power | [1] | 1500 | W |
| $P_{M(AV)}$ | steady state power dissipation | on infinite heatsink at $T_a$ = 50 °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 | °C |
| $T_j$ | operating temperature range | | -65 to 150 | °C |

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

## 6. Characteristics

*$T_j$ = 25 °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 $I_R$ @ $V_R$ (µA) | 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 |
| SMCJ90A | SMCJ90CA | 90 | 100 | 111 | 1 | 146 | 10.3 | 1 | C090AJ | C090CJ |
| SMCJ100A | SMCJ100CA | 100 | 111 | 123 | 1 | 162 | 9.3 | 1 | C100AJ | C100CJ |


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*$T_j$ = 25 °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 $I_R$ @ $V_R$ (µA) | Marking | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | | | | | Uni | Bi |
| SMCJ110A | SMCJ110CA | 110 | 122 | 135 | 1 | 177 | 8.5 | 1 | C110AJ | C110CJ |
| SMCJ120A | SMCJ120CA | 120 | 133 | 147 | 1 | 193 | 7.8 | 1 | C120AJ | C120CJ |
| SMCJ130A | SMCJ130CA | 130 | 144 | 159 | 1 | 209 | 7.2 | 1 | C130AJ | C130CJ |
| SMCJ150A | SMCJ150CA | 150 | 167 | 185 | 1 | 243 | 6.2 | 1 | C150AJ | C150CJ |
| SMCJ160A | SMCJ160CA | 160 | 178 | 197 | 1 | 259 | 5.8 | 1 | C160AJ | C160CJ |
| SMCJ170A | SMCJ170CA | 170 | 189 | 209 | 1 | 275 | 5.5 | 1 | C170AJ | C170CJ |
| SMCJ180A | SMCJ180CA | 180 | 201 | 222 | 1 | 292 | 5.2 | 1 | C180AJ | C180CJ |
| SMCJ190A | SMCJ190CA | 190 | 209 | 231 | 1 | 307 | 4.9 | 1 | C190AJ | C190CJ |
| SMCJ200A | SMCJ200CA | 200 | 224 | 247 | 1 | 324 | 4.7 | 1 | C200AJ | C200CJ |
| SMCJ220A | SMCJ220CA | 220 | 246 | 272 | 1 | 356 | 4.2 | 1 | C220AJ | C220CJ |


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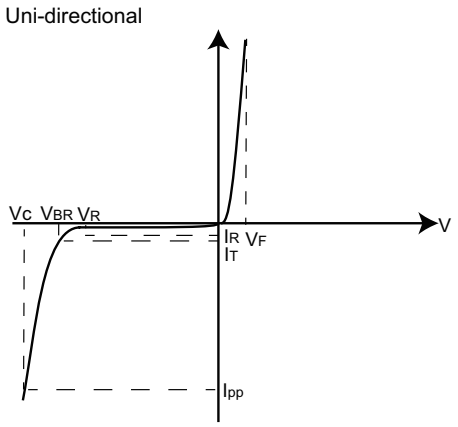



Fig. 1. I-V curve characteristics; Uni-directional

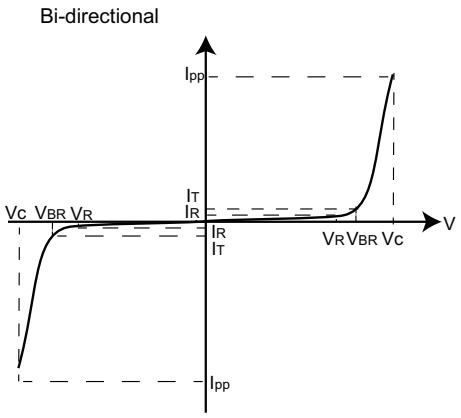



Fig. 2. I-V curve characteristics; Bi-directional

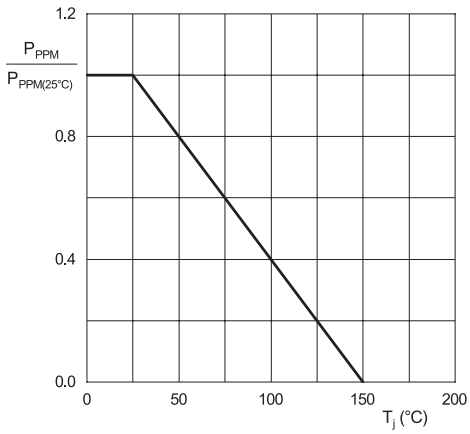



Fig. 3. Peak pulse power derating curve

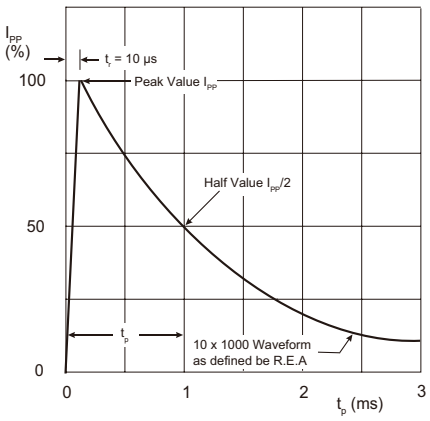



Fig. 4. Pulse waveform

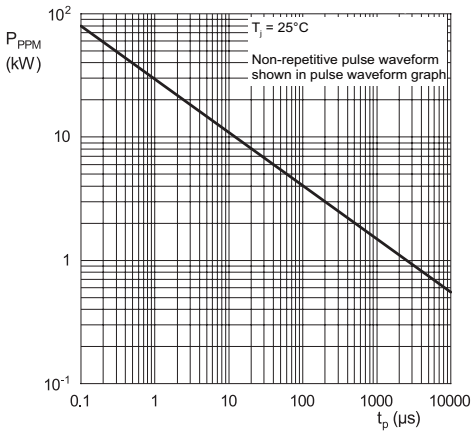



Fig. 5. Peak pulse power rating curve

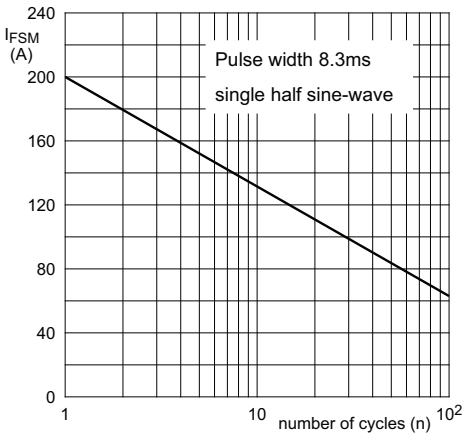



Fig. 6. Maximum non-repetitive surge current Uni-directional only


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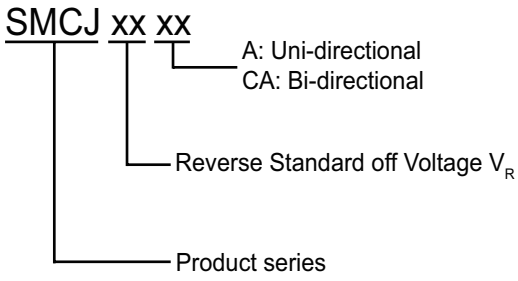



**Fig. 7. Part numbering**

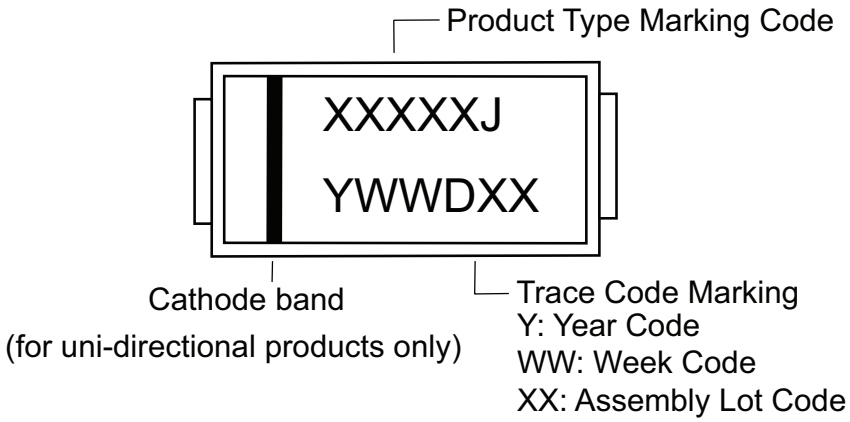


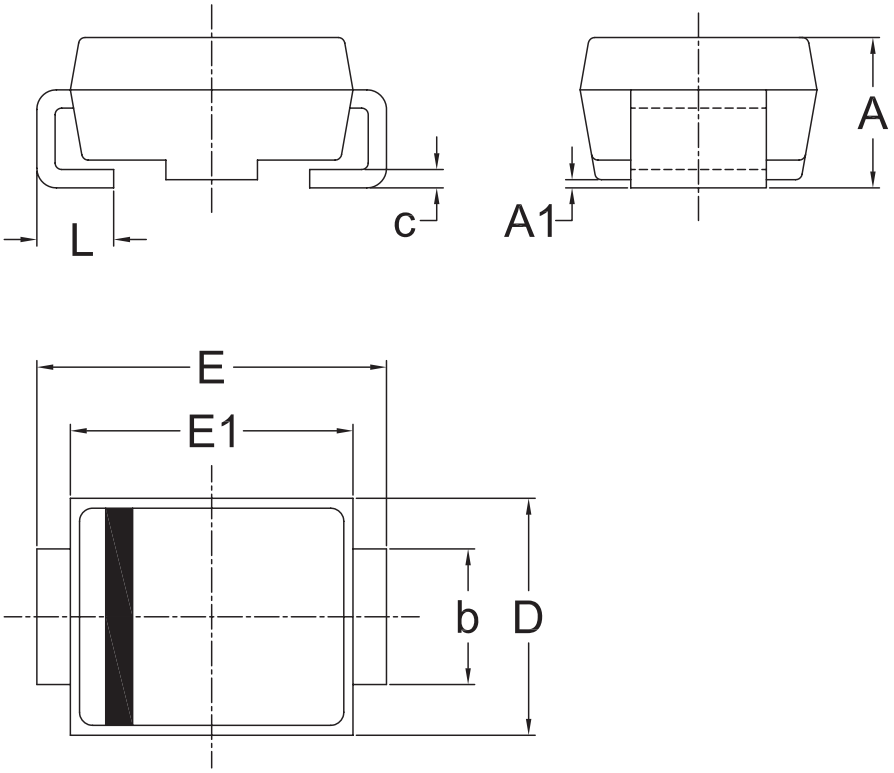

**Fig. 8. Part marking**


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## 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.


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|---|---|---|
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