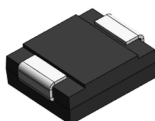


# SMCJ

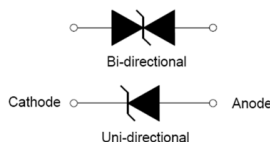
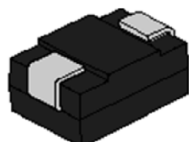
## Automotive grade 1500 W Transient voltage suppressor



### Product features

- Automotive grade (AEC-Q101 qualified)
- Low profile SMC package
- Excellent clamping capability
- High reliability application
- 1500 W peak pulse power capability at 10/1000  $\mu$ s waveform
- Typical  $I_R$  less than 1  $\mu$ A
- Fast response time: typically less than 1.0 ps from 0 V to  $V_{BR}$  minimum
- Plastic package meets UL 94 V-0 flammability rating
- Meets moisture sensitivity level (MSL) level 1
- Terminal: tin plated, solderable per J-STD-002
- UL 497B recognized.  
File No. : E198449 Guide QVGQ2

### PIN configuration



### Applications

- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- Network systems and body electronics
- Power Train controls
- xEV and battery systems

### Environmental compliance and general specifications

- AEC-Q101 qualified



### Ordering part number

**SMCJ 15 C A H**  
 Family name \_\_\_\_\_  
 $V_R$  voltage \_\_\_\_\_  
 Bi-/Uni-Directional (Blank=Uni, C=Bi) \_\_\_\_\_  
 Voltage tolerance \_\_\_\_\_  
 High reliability application \_\_\_\_\_

### Alternate ordering part number

**SMCJE 15 C A H**  
 Family name \_\_\_\_\_  
 $V_R$  voltage \_\_\_\_\_  
 Bi-/Uni-Directional (Blank=Uni, C=Bi) \_\_\_\_\_  
 Voltage tolerance \_\_\_\_\_  
 High reliability application \_\_\_\_\_

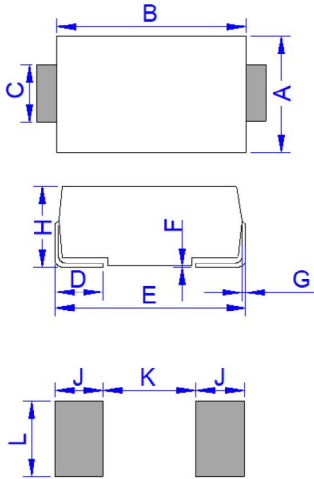
## Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

| Parameter                                                             | Symbol          | Value       | Unit |
|-----------------------------------------------------------------------|-----------------|-------------|------|
| Storage operating junction temperature range                          | $T_{STG}/T_J$   | -55 to +150 | °C   |
| Steady state power dissipation at $T_L = +75$ °C                      | $P_{M(AV)}$     | 6.5         | W    |
| Peak pulse power dissipation on 10/1000 $\mu$ s waveform              | $P_{PP}$        | 1500        | W    |
| Maximum instantaneous forward voltage at 100 A for unidirectional     | $V_F$           | 5           | V    |
| Peak forward surge current, 8.3 ms single half sine wave <sup>1</sup> | $I_{FSM}$       | 200         | A    |
| Typical thermal resistance junction to lead                           | $R_{\theta JL}$ | 15          | °C/W |
| Typical thermal resistance junction to ambient                        | $R_{\theta JA}$ | 75          | °C/W |

1. Measured on 8.3 ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle = 4 per minute maximum

## Mechanical parameters, pad layout- mm/inches



|           | Millimeters |         | Inches  |         |
|-----------|-------------|---------|---------|---------|
| Dimension | Minimum     | Maximum | Minimum | Maximum |
| A         | 5.75        | 6.25    | 0.226   | 0.246   |
| B         | 6.90        | 7.40    | 0.272   | 0.291   |
| C         | 2.75        | 3.25    | 0.108   | 0.128   |
| D         | 0.95        | 1.52    | 0.037   | 0.060   |
| E         | 7.70        | 8.20    | 0.303   | 0.323   |
| F         | 0.051       | 0.203   | 0.002   | 0.008   |
| G         | 0.15        | 0.31    | 0.006   | 0.012   |
| H         | 2.15        | 2.62    | 0.085   | 0.103   |
| J         | 2.40        | -       | 0.094   | -       |
| K         | -           | 4.20    | -       | 0.165   |
| L         | 3.30        | -       | 0.130   | -       |

## Part marking

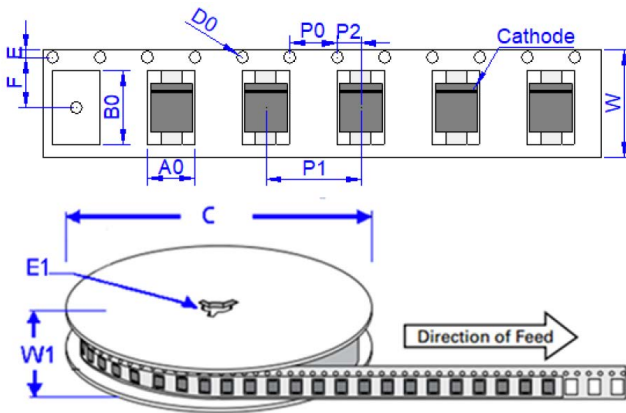


Cathode band (uni-polar only)  
Part marking: xxx = Refer to marking designator listed in Electrical Characteristics table  
yyyy- date code

## Packaging information - mm/inches

Drawing not to scale.

Supplied in tape and reel packaging, 3,000 parts per 13" diameter reel (EIA-481 compliant)



| Dimensions | Millimeters | Inches         |
|------------|-------------|----------------|
| A0         | 6.05 ± 0.3  | 0.238 ± 0.012  |
| B0         | 8.31 ± 0.3  | 0.327 ± 0.012  |
| C          | 330.0       | 13.0           |
| D0         | 1.55 ± 0.1  | 0.061 ± 0.004  |
| E          | 1.75 ± 0.2  | 0.069 ± 0.008  |
| E1         | 13.3 ± 0.3  | 0.524 ± 0.012  |
| F          | 7.50 ± 0.2  | 0.295 ± 0.008  |
| P0         | 4.00 ± 0.2  | 0.157 ± 0.008  |
| P1         | 8.00 ± 0.2  | 0.3145 ± 0.008 |
| P2         | 2.00 ± 0.2  | 0.079 ± 0.008  |
| W          | 16.0 ± 0.2  | 0.630 ± 0.008  |
| W1         | 19.7 ± 2.0  | 0.776 ± 0.079  |

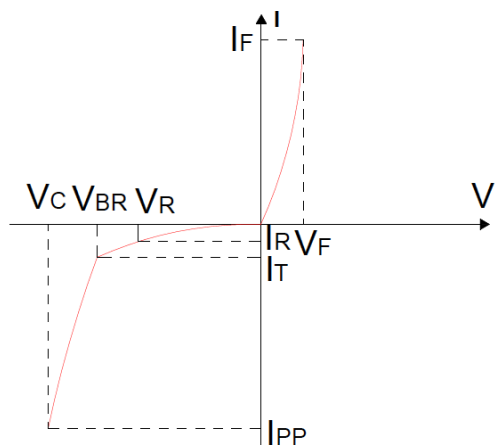
Electrical specifications (+25 °C)

| 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)   | ( $\mu$ A)  | min (V)        | max (V) | (mA)  | max (V)        | (A)      |
| SMCJ15AH    | SMCJ15CAH  | GEM     | BEM | 15    | 1           | 16.7           | 18.5    | 1     | 24.4           | 61.5     |
| SMCJ16AH    | SMCJ16CAH  | GEP     | BEP | 16    | 1           | 17.8           | 19.7    | 1     | 26             | 57.7     |
| SMCJ17AH    | SMCJ17CAH  | GER     | BER | 17    | 1           | 18.9           | 20.9    | 1     | 27.6           | 54.4     |
| SMCJ18AH    | SMCJ18CAH  | GET     | BET | 18    | 1           | 20             | 22.1    | 1     | 29.2           | 51.4     |
| SMCJ20AH    | SMCJ20CAH  | GEV     | BEV | 20    | 1           | 22.2           | 24.5    | 1     | 32.4           | 46.3     |
| SMCJ22AH    | SMCJ22CAH  | GEX     | BEX | 22    | 1           | 24.4           | 26.9    | 1     | 35.5           | 42.3     |
| SMCJ24AH    | SMCJ24CAH  | GEZ     | BEZ | 24    | 1           | 26.7           | 29.5    | 1     | 38.9           | 38.6     |
| SMCJ26AH    | SMCJ26CAH  | GFE     | BFE | 26    | 1           | 28.9           | 31.9    | 1     | 42.1           | 35.6     |
| SMCJ28AH    | SMCJ28CAH  | GFG     | BFG | 28    | 1           | 31.1           | 34.4    | 1     | 45.4           | 33.1     |
| SMCJ30AH    | SMCJ30CAH  | GFK     | BFK | 30    | 1           | 33.3           | 36.8    | 1     | 48.4           | 31       |
| SMCJ33AH    | SMCJ33CAH  | GFM     | BFM | 33    | 1           | 36.7           | 40.6    | 1     | 53.3           | 28.2     |
| SMCJ36AH    | SMCJ36CAH  | GFP     | BFP | 36    | 1           | 40             | 44.2    | 1     | 58.1           | 25.8     |
| SMCJ40AH    | SMCJ40CAH  | GFR     | BFR | 40    | 1           | 44.4           | 49.1    | 1     | 64.5           | 23.3     |
| SMCJ43AH    | SMCJ43CAH  | GFT     | BFT | 43    | 1           | 47.8           | 52.8    | 1     | 69.4           | 21.6     |
| SMCJ45AH    | SMCJ45CAH  | GFV     | BFV | 45    | 1           | 50             | 55.3    | 1     | 72.7           | 20.6     |
| SMCJ48AH    | SMCJ48CAH  | GFX     | BFX | 48    | 1           | 53.3           | 58.9    | 1     | 77.4           | 19.4     |
| SMCJ51AH    | SMCJ51CAH  | GFZ     | BFZ | 51    | 1           | 56.7           | 62.7    | 1     | 82.4           | 18.2     |
| SMCJ54AH    | SMCJ54CAH  | GGE     | BGE | 54    | 1           | 60             | 66.3    | 1     | 87.1           | 17.2     |
| SMCJ58AH    | SMCJ58CAH  | GGG     | BGG | 58    | 1           | 64.4           | 71.2    | 1     | 93.6           | 16.1     |
| SMCJ60AH    | SMCJ60CAH  | GGK     | BGK | 60    | 1           | 66.7           | 73.7    | 1     | 96.8           | 15.5     |
| SMCJ64AH    | SMCJ64CAH  | GGM     | BGM | 64    | 1           | 71.1           | 78.6    | 1     | 103            | 14.6     |
| SMCJ70AH    | SMCJ70CAH  | GGP     | BGP | 70    | 1           | 77.8           | 86      | 1     | 113            | 13.3     |
| SMCJ75AH    | SMCJ75CAH  | GGR     | BGR | 75    | 1           | 83.3           | 92.1    | 1     | 121            | 12.4     |
| SMCJ78AH    | SMCJ78CAH  | GGT     | BGT | 78    | 1           | 86.7           | 95.8    | 1     | 126            | 11.9     |
| SMCJ85AH    | SMCJ85CAH  | GGV     | BGV | 85    | 1           | 94.4           | 104     | 1     | 137            | 11       |
| SMCJ90AH    | SMCJ90CAH  | GGX     | BGX | 90    | 1           | 100            | 111     | 1     | 146            | 10.3     |
| SMCJ100AH   | SMCJ100CAH | GGZ     | BGZ | 100   | 1           | 111            | 123     | 1     | 162            | 9.3      |
| SMCJ110AH   | SMCJ110CAH | GHE     | BHE | 110   | 1           | 122            | 135     | 1     | 177            | 8.5      |
| SMCJ120AH   | SMCJ120CAH | GHG     | BHG | 120   | 1           | 133            | 147     | 1     | 193            | 7.8      |
| SMCJ130AH   | SMCJ130CAH | GHK     | BHK | 130   | 1           | 144            | 159     | 1     | 209            | 7.2      |
| SMCJ150AH   | SMCJ150CAH | GHM     | BHM | 150   | 1           | 167            | 185     | 1     | 243            | 6.2      |
| SMCJ160AH   | SMCJ160CAH | GHP     | BHP | 160   | 1           | 178            | 197     | 1     | 259            | 5.8      |
| SMCJ170AH   | SMCJ170CAH | GHR     | BHR | 170   | 1           | 189            | 209     | 1     | 275            | 5.5      |
| SMCJ180AH   | SMCJ180CAH | GHT     | BHT | 180   | 1           | 201            | 222     | 1     | 292            | 5.2      |
| SMCJ190AH   | SMCJ190CAH | GHU     | BHU | 190   | 1           | 211            | 234     | 1     | 307            | 4.9      |
| SMCJ200AH   | SMCJ200CAH | GHV     | BHV | 200   | 1           | 224            | 247     | 1     | 324            | 4.7      |
| SMCJ210AH   | SMCJ210CAH | GHW     | BHW | 210   | 1           | 233            | 258     | 1     | 337            | 4.5      |
| SMCJ220AH   | SMCJ220CAH | GHX     | BHX | 220   | 1           | 246            | 272     | 1     | 356            | 4.2      |
| SMCJ250AH   | SMCJ250CAH | GJG     | BJG | 250   | 1           | 279            | 309     | 1     | 405            | 3.7      |
| SMCJ300AH   | SMCJ300CAH | GJK     | BJK | 300   | 1           | 335            | 371     | 1     | 486            | 3.1      |
| SMCJ350AH   | SMCJ350CAH | GJM     | BJM | 350   | 1           | 391            | 432     | 1     | 567            | 2.7      |
| SMCJ400AH   | SMCJ400CAH | GJP     | BJP | 400   | 1           | 447            | 494     | 1     | 648            | 2.3      |
| SMCJ440AH   | SMCJ440CAH | GJR     | BJR | 440   | 1           | 492            | 543     | 1     | 713            | 2.1      |

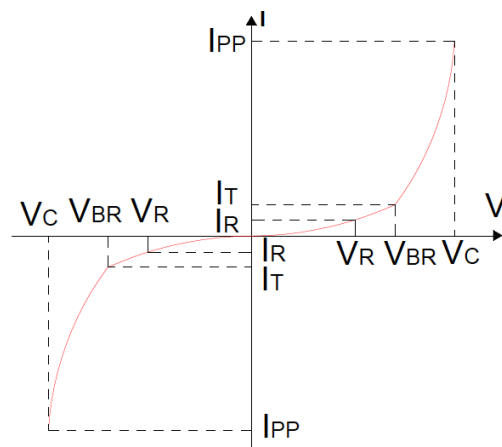
Note: Standard part numbers listed. Alternate part numbers have the addition of an E and a “.” for the “.” where applicable. Example standard part number SMCJ15AH, Alternate part number SMCJE15AH

**Ratings and V-I characteristic curves** (+25 °C unless otherwise noted)

**V- I curve characteristics (Uni-directional)**



**V- I curve characteristics (Bi-directional)**



Surge waveform: 10/1000  $\mu$ s

$V_R$ : Stand-off voltage – Maximum voltage that can be applied

$V_{BR}$ : Breakdown voltage

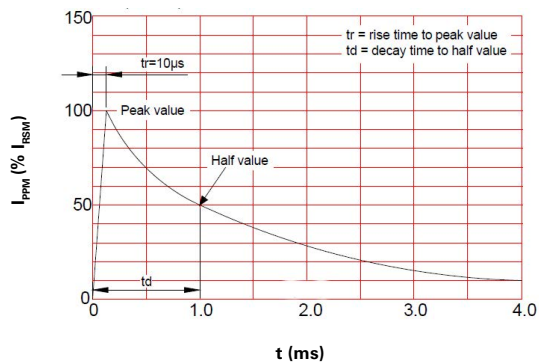
$V_C$ : Clamping voltage – Peak voltage measured across the suppressor at a specified  $I_{PP}$

$I_R$ : Reverse leakage current

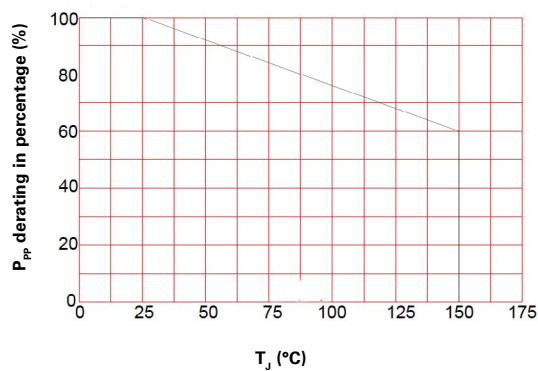
$I_T$ : Test current

$V_F$ : Forward voltage drop for Uni-directional

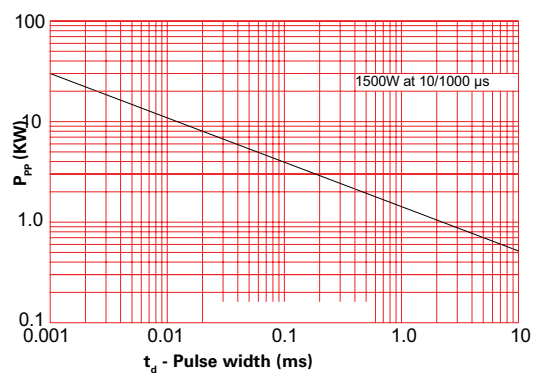
**Pulse waveform**



**Pulse derating curve**



**Peak pulse power dissipation curve**



## Solder reflow profile



Table 1 - Standard SnPb solder ( $T_C$ )

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm           | 235 °C                      | 220 °C                      |
| ≥2.5 mm           | 220 °C                      | 220 °C                      |

Table 2 - Lead (Pb) free solder ( $T_C$ )

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >2000 |
|-------------------|-----------------------------|-----------------------------------|------------------------------|
| <1.6 mm           | 260 °C                      | 260 °C                            | 260 °C                       |
| 1.6 - 2.5 mm      | 260 °C                      | 250 °C                            | 245 °C                       |
| >2.5 mm           | 250 °C                      | 245 °C                            | 245 °C                       |

## Reference J-STD-020

| Profile feature                                                                   | Standard SnPb solder | Lead (Pb) free solder |
|-----------------------------------------------------------------------------------|----------------------|-----------------------|
| Preheat and soak                                                                  |                      |                       |
| • Temperature min. ( $T_{smin}$ )                                                 | 100 °C               | 150 °C                |
| • Temperature max. ( $T_{smax}$ )                                                 | 150 °C               | 200 °C                |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                     | 60-120 seconds       | 60 - 180 seconds      |
| Ramp up rate $T_L$ to $T_p$                                                       | 3 °C/ second max.    | 3 °C/ second max.     |
| Liquidous temperature ( $T_L$ )                                                   | 183 °C               | 217 °C                |
| Time ( $t_L$ ) maintained above $T_L$                                             | 60-150 seconds       | 60-150 seconds        |
| Peak package body temperature ( $T_p$ )*                                          | Table 1              | Table 2 (+0, -5 °C)   |
| Time ( $t_p$ )* within 5 °C of the specified classification temperature ( $T_C$ ) | 20 seconds*          | 40 seconds*           |
| Ramp-down rate ( $T_p$ to $T_L$ )                                                 | 6 °C/ second max.    | 6 °C/ second max.     |
| Time 25 °C to peak temperature                                                    | 6 minutes max.       | 8 minutes max.        |

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

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