# SMCJ5.0A thru SMCJ188CA

Vishay General Semiconductor

## Surface Mount TRANSZORB<sup>®</sup> Transient Voltage Suppressors



SMC (DO-214AB)

PRIMARY CHARACTERISTICS					
V <sub>BR</sub> uni-directional	6.40 V to 231 V				
V <sub>BR</sub> bi-directional	6.40 V to 231 V				
V <sub>WM</sub>	5.0 V to 188 V				
P <sub>PPM</sub>	1500 W				
PD	6.5 W				
I <sub>FSM</sub> (uni-directional only)	200 A				
T <sub>J</sub> max.	150 °C				
Polarity	Uni-directional, bi-directional				
Package	SMC (DO-214AB)				

### **DEVICES FOR BI-DIRECTION APPLICATIONS**

For bi-directional devices use CA suffix (e.g. SMCJ188CA). Electrical characteristics apply in both directions.

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in uni-directional and bi-directional
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
   Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

### TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive, and telecommunication.

### **MECHANICAL DATA**

Case: SMC (DO-214AB)

Molding compound meets UL 94 V-0 flammability rating Base P/N-E3 - RoHS-compliant, commercial grade Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B, ...)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** for uni-directional types the band denotes cathode end, no marking on bi-directional types

PARAMETER	SYMBOL	VALUE	UNIT				
Peak pulse power dissipation with a 10/1000 $\mu s$ waveform $^{(1)(2)}$	P <sub>PPM</sub>	1500	W				
Peak pulse current with a 10/1000 $\mu s$ waveform $^{(1)}$	I <sub>PPM</sub>	See next table	А				
Peak forward surge current 8.3 ms single half sine-wave uni-directional only $^{(2)}$	I <sub>FSM</sub>	200	А				
Power dissipation on infinite heatsink, $T_A = 50 \ ^\circ C$	PD	6.5	W				
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C				

Notes

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

(2) Mounted on 0.31" x 0.31" (8.0 mm x 8.0 mm) copper pads to each terminal

Revision: 24-Jan-2019 **1** Document Number: 88394 For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT



COMPLIANT HALOGEN

FREE



# SMCJ5.0A thru SMCJ188CA



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### Vishay General Semiconductor

DEVICE TYPE MODIFIED         DEVICE MARKING CODE         VOLTAGE WR, AT Ir, (V) WR, (M) WR, (M) W	<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25 \text{ °C}$ unless otherwise noted)									
(HSMCJ60A <sup>(0)</sup> )         GDE         GoDe         6.40         7.07         10         5.0         1000         163.0           (HSMCJ60A         GDG         GDG         6.67         7.37         10         6.0         1000         145.6           (HSMCJ6A         GDK         BDK         7.22         7.98         10         6.5         500         133.9           (HSMCJ6A         GDM         GDM         7.78         8.60         10         7.0         200         125.0           (HSMCJ6AA         GDR         BDP         8.33         9.21         1.0         7.5         100         116.3           (HSMCJ8AA         GDR         BDR         8.89         9.83         1.0         8.0         50         110.3           (HSMCJ9AA         GDZ         BDX         11.1         1.0         9.0         10         97.4           (HSMCJ1AA         GEZ         BEZ         13.3         14.7         1.0         11         5.0         75.4           (HSMCJ1AA         GEE         BEE         13.3         14.7         1.0         14         1.0         64.7         7           (HSMCJ1AA         GEM         BEK <td< th=""><th>MODIFIED</th><th>co</th><th>DE</th><th>VOLT V<sub>BR</sub> A (</th><th>TAGE T I<sub>T</sub> <sup>(1)</sup> V)</th><th>CURRENT</th><th>VOLTAGE V<sub>WM</sub></th><th>REVERSE LEAKAGE AT V<sub>WM</sub></th><th>PEAK PULSE SURGE CURRENT</th><th>MAXIMUM CLAMPING VOLTAGEAT IPPM</th></td<>	MODIFIED	co	DE	VOLT V <sub>BR</sub> A (	TAGE T I <sub>T</sub> <sup>(1)</sup> V)	CURRENT	VOLTAGE V <sub>WM</sub>	REVERSE LEAKAGE AT V <sub>WM</sub>	PEAK PULSE SURGE CURRENT	MAXIMUM CLAMPING VOLTAGEAT IPPM
IPSMCJ60A         GDG         6.67         7.37         10         6.0         1000         145.6           (PSMCJ65A         GDK         BDK         7.22         7.98         10         6.5         500         133.9           (PSMCJ7.0A         GDM         GDM         GDM         RDM         7.78         8.60         10         7.0         200         125.0           (PSMCJ8.0A         GDP         BDP         8.33         9.21         1.0         7.5         100         116.3           (PSMCJ8.0A         GDV         BDT         9.44         10.4         1.0         8.5         20         104.2           (PSMCJ8.0A         GDV         BDV         10.0         11         5.0         88.2           (PSMCJ10A         GDZ         GDZ         12.2         13.5         1.0         11         5.0         88.2           (PSMCJ12A         GEE         BEE         13.3         1.47         1.0         12         5.0         75.4           (PSMCJ13A         GEG         GEG         14.4         15.9         1.0         13         1.0         61.5         1.0           (PSMCJ16A         GEW         BEK	(.)	-								V <sub>c</sub> (V)
H9MCJ65A         GDK         7.28         7.98         10         6.5         500         133.9           (HSMCJ7.0A         GDM         GDM         7.78         8.60         10         7.0         200         125.0           (HSMCJ7.5A         GDP         BDP         8.83         9.21         1.0         7.5         100         116.3           (HSMCJ8.5A         GDT         BDT         9.44         10.4         1.0         8.5         20         104.2           (HSMCJ10A         GDZ         BDV         10.0         11.1         1.0         9.0         10         97.4           (HSMCJ11A         GDZ         GEZ         12.2         13.5         1.0         11         5.0         88.2           (HSMCJ12A         GEE         BEE         13.3         14.7         1.0         14         1.0         64.7           (HSMCJ13A         GEG         GEG         14.4         15.6         1.0         15         1.0         61.5         1.0           (HSMCJ16A         GEF         GEF         GER         18.9         20.9         1.0         17         1.0         54.3         1.7         1.0         1.0         1.0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>9.2</td>										9.2
(PSMCJ7.0A         GDM         GDM         7.8         8.60         10         7.0         200         125.0           (PSMCJ7.5A         GDP         BDP         8.33         9.21         1.0         7.5         100         116.3           (PSMCJ8.6A         GDT         BDT         9.44         10.4         1.0         8.5         20         104.2           (PSMCJ9.0A         GDV         BDV         10.0         11.1         1.0         9.0         10         97.4           (PSMCJ10A         GDX         BDX         11.1         12.3         1.0         10         5.0         88.2           (PSMCJ10A         GDZ         GDZ         12.2         13.5         1.0         11         5.0         88.2           (PSMCJ13A         GEE         BEE         13.3         14.7         1.0         12         5.0         75.4           (PSMCJ13A         GEE         BEE         15.6         1.0         15         1.0         61.5         .2           (PSMCJ13A         GEE         BEE         10.8         10.0         17         1.0         54.3         .3           (PSMCJ13A         GEE         BEE         20.9 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td>10.3</td>						-				10.3
(HSMCJ7.5A         GDP         BDP         8.33         9.21         1.0         7.5         100         116.3           (HSMCJ8.0A         GDR         BDR         8.89         9.83         1.0         8.0         50         110.3           (HSMCJ8.0A         GDT         BDT         9.44         10.4         1.0         8.5         20         104.2           (HSMCJ10A         GDV         BDV         10.0         11.1         1.0         9.0         10         97.4           (HSMCJ11A         GDZ         GDZ         12.2         13.5         1.0         11         5.0         88.2           (HSMCJ13A         GEE         BEE         13.3         14.7         1.0         12         5.0         75.4           (HSMCJ13A         GEK         BEK         15.6         17.2         1.0         14         1.0         64.7         15           (HSMCJ16A         GEF         GEF         18.9         20.9         1.0         16         1.0         57.7         10         54.3         10         10.4         10.3         10.3         10.3         10.3         10.3         11.3         11.4         1.0         10.3         10.3 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>11.2</td>										11.2
H9MCJ80A         GDR         BDR         8.89         9.83         1.0         8.0         50         110.3           (HSMCJ85A         GDT         BDT         9.44         10.4         1.0         8.5         20         104.2           (HSMCJ86A         GDT         BDV         10.0         11.1         1.0         9.0         10         97.4           (HSMCJ10A         GDX         BDX         11.1         12.3         1.0         10         5.0         88.2           (HSMCJ12A         GEE         BEE         13.3         14.7         1.0         12         5.0         75.4           (HSMCJ13A         GEG         GEG         14.4         15.9         1.0         13         1.0         69.8         1.1           (HSMCJ13A         GEM         BEK         15.6         17.2         1.0         14         1.0         64.7         1.1         1.0         61.5         1.0         15         1.0         61.5         1.0         10.1         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.										12.0
H9MCJ85A         GDT         BDT         9.44         10.4         1.0         8.5         20         104.2           (HSMCJ90A         GDV         BDV         10.0         11.1         1.0         9.0         10         97.4           (HSMCJ10A         GDZ         BDX         11.1         12.3         1.0         11         5.0         88.2           (HSMCJ1A         GDZ         GDZ         12.2         13.5         1.0         11         5.0         88.2           (HSMCJ1A         GEE         BEE         13.3         14.7         1.0         12         5.0         75.4           (HSMCJ1A         GEE         BEE         13.6         1.0         13         1.0         69.8         15.6           (HSMCJ15A         GER         BEK         15.6         17.2         1.0         16         1.0         57.7         10           (HSMCJ16A         GEF         BEF         20.9         1.0         17         1.0         54.3         10         10.4         46.3         10         10.4         46.3         10         10.4         46.3         10         10.4         10.3         10.4         10.3         10.4         <		-								12.9
(H)SMCJ8.0A         GDV         BDV         10.0         11.1         1.0         9.0         10         97.4           (H)SMCJ10A         GDZ         GDZ         IZ.2         13.5         1.0         11         5.0         88.2           (H)SMCJ12A         GEE         BEE         13.3         14.7         1.0         12         5.0         75.4           (H)SMCJ12A         GEE         BEE         13.3         14.7         1.0         12         5.0         75.4           (H)SMCJ13A         GEG         GEG         14.4         15.9         1.0         13         1.0         69.8         1.1           (H)SMCJ14A         GEK         BEK         15.6         1.0         15         1.0         61.5         1.1           (H)SMCJ16A         GEP         GEP         17.8         19.7         1.0         16         1.0         57.7         1.1           (H)SMCJ20A         GEV         BEV         22.2         24.5         1.0         20         1.0         46.3         1.1           (H)SMCJ20A         GEZ         BEZ         26.7         29.5         1.0         22         1.0         42.3         1.1 <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>13.6</td></tr<>										13.6
(H)SMCJ10A         GDX         BDX         11.1         12.3         1.0         10         5.0         88.2           (H)SMCJ1A         GDZ         GDZ         12.2         13.5         1.0         11         5.0         88.2           (H)SMCJ1AA         GEE         BEE         13.3         1.0         11         5.0         88.2           (H)SMCJ1AA         GEG         GEG         14.4         15.9         1.0         13         1.0         69.8           (H)SMCJ1AA         GEK         BEK         15.6         17.2         1.0         14         1.0         64.7           (H)SMCJ15A         GEM         BEM         16.6         17.2         1.0         16         1.0         57.7           (H)SMCJ17A         GER         GER         18.9         20.9         1.0         17         1.0         54.3         1.1           (H)SMCJ20A         GEV         BEV         22.2         24.5         1.0         20         1.0         46.3         1.1           (H)SMCJ22A         GEZ         BEZ         26.7         29.5         1.0         24         1.0         38.6         1.0         1.0         33.0         1.0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>14.4</td>										14.4
$\begin{array}{cccccccccccccccccccccccccccccccccccc$										15.4
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$		-					-			17.0
										18.2
										19.9
										21.5
										23.2
										24.4
							-	1.0		26.0
(+)SMCJ20A       GEV       BEV       22.2       24.5       1.0       20       1.0       46.3       1         (+)SMCJ22A       GEX       BEX       24.4       26.9       1.0       22       1.0       42.3       1         (+)SMCJ2A       GEZ       BEZ       26.7       29.5       1.0       24       1.0       38.6       1         (+)SMCJ2A       GFE       BFE       28.9       31.9       1.0       26       1.0       35.6       1         (+)SMCJ2A       GFK       BFK       33.3       36.8       1.0       28       1.0       33.0       1         (+)SMCJ3A       GFK       BFK       33.3       36.8       1.0       30       1.0       28.1       1         (+)SMCJ3A       GFK       BFK       43.3       36.8       1.0       30       1.0       28.1       1         (+)SMCJ4A       GFF       BFP       40.0       44.2       1.0       36       1.0       28.1       1       1       1.0       1.0       23.3       1       1       1       1.0       1.0       23.3       1       1       1       1       1       1       1       1	(+)SMCJ17A	GER	GER	18.9	20.9	1.0	17	1.0	54.3	27.6
(+)SMCJ22A       GEX       BEX       24.4       26.9       1.0       22       1.0       42.3       1         (+)SMCJ24A       GEZ       BEZ       26.7       29.5       1.0       24       1.0       38.6       1         (+)SMCJ26A       GFE       BFE       28.9       31.9       1.0       26       1.0       35.6       1         (+)SMCJ28A       GFG       BFG       31.1       34.4       1.0       28       1.0       33.0       1         (+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       28.1       1         (+)SMCJ30A       GFF       BFF       40.6       1.0       33       1.0       28.1       1       1         (+)SMCJ30A       GFF       BFP       40.0       44.2       1.0       36       1.0       28.8       1       1       1.0       28.1       1       1       1       1.0       28.1       1       1       1       1.0       28.1       1       1       1       1       1       0       28.1       1       1       0       1       1       0       1       1       1       0       <	<sup>(+)</sup> SMCJ18A	GET	BET	20.0	22.1	1.0	18	1.0	51.4	29.2
(+)SMCJ24A       GEZ       BEZ       26.7       29.5       1.0       24       1.0       38.6       38.6         (+)SMCJ26A       GFE       BFE       28.9       31.9       1.0       26       1.0       35.6         (+)SMCJ28A       GFG       BFG       31.1       34.4       1.0       28       1.0       33.0         (+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       31.0         (+)SMCJ3AA       GFM       BFM       33.3       36.8       1.0       33       1.0       28.1       31.0         (+)SMCJ3AA       GFM       BFM       40.6       1.0       33       1.0       28.1       31.0         (+)SMCJ4AA       GFF       BFF       40.0       44.2       1.0       36       1.0       23.3       31.0         (+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6       31.0         (+)SMCJ43A       GFY       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ51A       GFZ       GFZ       66.7       73.7       1.0       54       1.0	(+)SMCJ20A	GEV	BEV	22.2	24.5	1.0	20	1.0		32.4
(+)SMCJ26A       GFE       BFE       28.9       31.9       1.0       26       1.0       35.6         (+)SMCJ28A       GFG       BFG       31.1       34.4       1.0       28       1.0       33.0         (+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       31.0         (+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       28.1         (+)SMCJ30A       GFK       BFR       40.6       1.0       33       1.0       28.1         (+)SMCJ30A       GFF       BFP       40.0       44.2       1.0       36       1.0       28.1         (+)SMCJ40A       GFR       BFR       44.4       49.1       1.0       40       1.0       23.3         (+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6       (+)SMCJ48A         (+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ51A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       17.2       (+)SMCJ58A	<sup>(+)</sup> SMCJ22A	GEX	BEX	24.4	26.9	1.0	22	1.0	42.3	35.5
(+)SMCJ28A       GFG       BFG       31.1       34.4       1.0       28       1.0       33.0          (+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       31.0          (+)SMCJ33A       GFM       BFM       36.7       40.6       1.0       33       1.0       28.1          (+)SMCJ36A       GFP       BFP       40.0       44.2       1.0       36       1.0       25.8          (+)SMCJ43A       GFT       BFR       44.4       49.1       1.0       40       1.0       23.3          (+)SMCJ43A       GFT       BFR       44.4       49.1       1.0       40       1.0       23.3          (+)SMCJ43A       GFT       BFR       44.4       49.1       1.0       43       1.0       21.6          (+)SMCJ43A       GFT       GFT       TA7.8       52.8       1.0       448       1.0       19.4          (+)SMCJ48A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2          (+)SMCJ54A       GGE       GGE <td>(+)SMCJ24A</td> <td>GEZ</td> <td>BEZ</td> <td>26.7</td> <td>29.5</td> <td>1.0</td> <td>24</td> <td>1.0</td> <td>38.6</td> <td>38.9</td>	(+)SMCJ24A	GEZ	BEZ	26.7	29.5	1.0	24	1.0	38.6	38.9
(+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       31.0         (+)SMCJ33A       GFM       BFM       36.7       40.6       1.0       33       1.0       28.1         (+)SMCJ36A       GFP       BFP       40.0       44.2       1.0       36       1.0       25.8         (+)SMCJ40A       GFR       BFR       44.4       49.1       1.0       40       1.0       23.3         (+)SMCJ40A       GFR       BFR       44.4       49.1       1.0       40       1.0       23.3         (+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6         (+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ54A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2         (+)SMCJ54A       GGE       GGE       60.0       66.3       1.0       54       1.0       17.2         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5         (+)SMCJ60A <td< td=""><td>(+)SMCJ26A</td><td>GFE</td><td>BFE</td><td>28.9</td><td>31.9</td><td>1.0</td><td>26</td><td>1.0</td><td>35.6</td><td>42.1</td></td<>	(+)SMCJ26A	GFE	BFE	28.9	31.9	1.0	26	1.0	35.6	42.1
(+)SMCJ30A       GFK       BFK       33.3       36.8       1.0       30       1.0       31.0         (+)SMCJ33A       GFM       BFM       36.7       40.6       1.0       33       1.0       28.1         (+)SMCJ36A       GFP       BFP       40.0       44.2       1.0       36       1.0       25.8         (+)SMCJ40A       GFR       BFR       44.4       49.1       1.0       40       1.0       23.3         (+)SMCJ40A       GFR       BFR       44.4       49.1       1.0       40       1.0       23.3         (+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6         (+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ54A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2         (+)SMCJ54A       GGE       GGE       60.0       66.3       1.0       54       1.0       17.2         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5         (+)SMCJ60A <td< td=""><td>(+)SMCJ28A</td><td>GFG</td><td>BFG</td><td>31.1</td><td>34.4</td><td>1.0</td><td>28</td><td>1.0</td><td>33.0</td><td>45.4</td></td<>	(+)SMCJ28A	GFG	BFG	31.1	34.4	1.0	28	1.0	33.0	45.4
(+)SMCJ33A       GFM       BFM       36.7       40.6       1.0       33       1.0       28.1       1         (+)SMCJ36A       GFP       BFP       40.0       44.2       1.0       36       1.0       25.8       1         (+)SMCJ40A       GFR       BFR       44.4       49.1       1.0       40       1.0       23.3       1         (+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6       1         (+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ48A       GFX       GFX       53.3       58.9       1.0       48       1.0       19.4       1         (+)SMCJ51A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2       1         (+)SMCJ54A       GGE       GGE       60.0       66.3       1.0       54       1.0       17.2       1         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5       1         (+)SMCJ60A       GGM       GGM       71.1       78.6		GFK	BFK	33.3	36.8	1.0	30	1.0	31.0	48.4
(+)SMCJ36A         GFP         BFP         40.0         44.2         1.0         36         1.0         25.8           (+)SMCJ40A         GFR         BFR         44.4         49.1         1.0         40         1.0         23.3         10           (+)SMCJ43A         GFT         BFT         47.8         52.8         1.0         43         1.0         21.6           (+)SMCJ45A         GFV         GFV         50.0         55.3         1.0         45         1.0         20.6           (+)SMCJ45A         GFX         GFX         53.3         58.9         1.0         48         1.0         19.4           (+)SMCJ51A         GFZ         GFZ         56.7         62.7         1.0         51         1.0         18.2           (+)SMCJ54A         GGE         GGE         60.0         66.3         1.0         54         1.0         17.2         16           (+)SMCJ60A         GGK         GGK         66.7         73.7         1.0         60         1.0         15.5         16           (+)SMCJ60A         GGM         GGM         71.1         78.6         1.0         64         1.0         14.6         16         16.0		GFM	BFM	36.7	40.6	1.0	33	1.0	28.1	53.3
(+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6         (+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ48A       GFX       GFX       53.3       58.9       1.0       48       1.0       19.4         (+)SMCJ51A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2         (+)SMCJ54A       GGE       GGG       64.4       71.2       1.0       58       1.0       16.0         (+)SMCJ60A       GGK       GGG       64.4       71.2       1.0       58       1.0       16.0         (+)SMCJ60A       GGK       GGG       64.4       71.2       1.0       60       1.0       15.5         (+)SMCJ60A       GGK       GGM       71.1       78.6       1.0       64       1.0       14.6         (+)SMCJ70A       GGP       GGP       77.8       86.0       1.0       75       1.0       12.4         (+)SMCJ75A       GGR       GGT       86.7       95.8       1.0       78       1.0       11.9         (+)SMCJ85A <td< td=""><td></td><td>GFP</td><td>BFP</td><td>40.0</td><td>44.2</td><td>1.0</td><td>36</td><td>1.0</td><td>25.8</td><td>58.1</td></td<>		GFP	BFP	40.0	44.2	1.0	36	1.0	25.8	58.1
(+)SMCJ43A       GFT       BFT       47.8       52.8       1.0       43       1.0       21.6         (+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ48A       GFX       GFX       53.3       58.9       1.0       48       1.0       19.4         (+)SMCJ51A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2         (+)SMCJ54A       GGE       GGG       64.4       71.2       1.0       58       1.0       16.0         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5         (+)SMCJ64A       GGM       GGM       71.1       78.6       1.0       64       1.0       14.6         (+)SMCJ70A       GGP       GGP       77.8       86.0       1.0       75       1.0       12.4         (+)SMCJ75A       GGR       GGT       86.7       95.8       1.0       78       1.0       11.9         (+)SMCJ78A       GGT       GGT       86.7       95.8       1.0       78       1.0       10.9         (+)SMCJ85A <td< td=""><td>(+)SMCJ40A</td><td>GFR</td><td>BFR</td><td>44.4</td><td>49.1</td><td>1.0</td><td>40</td><td>1.0</td><td>23.3</td><td>64.5</td></td<>	(+)SMCJ40A	GFR	BFR	44.4	49.1	1.0	40	1.0	23.3	64.5
(+)SMCJ45A       GFV       GFV       50.0       55.3       1.0       45       1.0       20.6         (+)SMCJ48A       GFX       GFX       53.3       58.9       1.0       48       1.0       19.4         (+)SMCJ51A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2         (+)SMCJ54A       GGE       GGE       60.0       66.3       1.0       54       1.0       17.2         (+)SMCJ58A       GGG       GGG       64.4       71.2       1.0       58       1.0       16.0         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5         (+)SMCJ64A       GGM       GGM       71.1       78.6       1.0       64       1.0       14.6         (+)SMCJ70A       GGP       GGP       77.8       86.0       1.0       75       1.0       12.4         (+)SMCJ75A       GGR       GGT       86.7       95.8       1.0       78       1.0       11.9         (+)SMCJ78A       GGT       GGX       100       111       1.0       85       1.0       10.9         (+)SMCJ30A       G	(+)SMCJ43A	GFT	BFT	47.8	52.8	1.0	43			69.4
(+)SMCJ48A       GFX       GFX       53.3       58.9       1.0       48       1.0       19.4         (+)SMCJ51A       GFZ       GFZ       56.7       62.7       1.0       51       1.0       18.2         (+)SMCJ54A       GGE       GGE       60.0       66.3       1.0       54       1.0       17.2         (+)SMCJ58A       GGG       GGG       64.4       71.2       1.0       58       1.0       16.0         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5         (+)SMCJ64A       GGM       GGM       71.1       78.6       1.0       64       1.0       14.6         (+)SMCJ70A       GGP       GGP       77.8       86.0       1.0       70       1.0       13.3         (+)SMCJ75A       GGR       GGT       86.7       95.8       1.0       78       1.0       11.9         (+)SMCJ85A       GGV       GGV       94.4       104       1.0       85       1.0       10.9         (+)SMCJ90A       GGZ       GGZ       111       123       1.0       100       1.0       9.3         (+)SMCJ100A       G	(+)SMCJ45A	GFV	GFV	50.0	55.3	1.0	45	1.0	20.6	72.7
(+)SMCJ51A         GFZ         GFZ         56.7         62.7         1.0         51         1.0         18.2           (+)SMCJ54A         GGE         GGE         60.0         66.3         1.0         54         1.0         17.2         10         10         17.2         10         10         17.2         10         10         16.0         10         17.2         10         10         16.0         10         11         10         11.0         11.0         11.0         11.0         11         10         10         11         10         11         10         11         10         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         11         10         10         11         10         10         10         11         10         10         10         10         10         10         10         10         10         10         10         10         10										77.4
(+)SMCJ54A       GGE       GGE       60.0       66.3       1.0       54       1.0       17.2         (+)SMCJ58A       GGG       GGG       64.4       71.2       1.0       58       1.0       16.0       16.0         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5       10         (+)SMCJ64A       GGM       GGM       71.1       78.6       1.0       64       1.0       14.6         (+)SMCJ70A       GGP       GGP       77.8       86.0       1.0       70       1.0       13.3         (+)SMCJ75A       GGR       GGR       83.3       92.1       1.0       75       1.0       12.4         (+)SMCJ78A       GGT       GGT       86.7       95.8       1.0       78       1.0       11.9         (+)SMCJ85A       GGV       GGV       94.4       104       1.0       85       1.0       10.9         (+)SMCJ100A       GGZ       GGZ       111       1.0       100       1.0       9.3         (+)SMCJ100A       GGZ       GGZ       111       123       1.0       100       1.0       9.3         (+)SMCJ12		GFZ	GFZ	56.7	62.7	1.0		1.0	18.2	82.4
(+)SMCJ58A       GGG       GGG       64.4       71.2       1.0       58       1.0       16.0       16.0         (+)SMCJ60A       GGK       GGK       66.7       73.7       1.0       60       1.0       15.5       15.5         (+)SMCJ64A       GGM       GGM       71.1       78.6       1.0       64       1.0       14.6         (+)SMCJ70A       GGP       GGP       77.8       86.0       1.0       70       1.0       13.3         (+)SMCJ75A       GGR       GGR       83.3       92.1       1.0       75       1.0       12.4         (+)SMCJ78A       GGT       GGT       86.7       95.8       1.0       78       1.0       11.9         (+)SMCJ85A       GGV       GGV       94.4       104       1.0       85       1.0       10.9         (+)SMCJ90A       GGZ       GGZ       111       1.0       100       1.0       10.3         (+)SMCJ100A       GGZ       GGZ       111       123       1.0       100       1.0       9.3         (+)SMCJ120A       GHE       GHE       122       135       1.0       110       1.0       8.5										87.1
(+)SMCJ60A         GGK         GGK         66.7         73.7         1.0         60         1.0         15.5         10           (+)SMCJ64A         GGM         GGM         GGM         71.1         78.6         1.0         64         1.0         14.6           (+)SMCJ70A         GGP         GGP         77.8         86.0         1.0         70         1.0         13.3           (+)SMCJ75A         GGR         GGR         83.3         92.1         1.0         75         1.0         12.4           (+)SMCJ78A         GGT         GGT         86.7         95.8         1.0         78         1.0         11.9           (+)SMCJ85A         GGV         GGV         94.4         104         1.0         85         1.0         10.9           (+)SMCJ90A         GGZ         GGZ         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ120A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG </td <td>(+)SMCJ58A</td> <td>GGG</td> <td>GGG</td> <td>64.4</td> <td></td> <td>1.0</td> <td>58</td> <td>1.0</td> <td>16.0</td> <td>93.6</td>	(+)SMCJ58A	GGG	GGG	64.4		1.0	58	1.0	16.0	93.6
(+)SMCJ64A         GGM         GGM         71.1         78.6         1.0         64         1.0         14.6           (+)SMCJ70A         GGP         GGP         77.8         86.0         1.0         70         1.0         13.3           (+)SMCJ75A         GGR         GGR         83.3         92.1         1.0         75         1.0         12.4           (+)SMCJ78A         GGT         GGT         86.7         95.8         1.0         78         1.0         11.9           (+)SMCJ85A         GGV         GGV         94.4         104         1.0         85         1.0         10.9           (+)SMCJ90A         GGZ         GGZ         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8										96.8
(+)SMCJ70A         GGP         GGP         77.8         86.0         1.0         70         1.0         13.3           (+)SMCJ75A         GGR         GGR         83.3         92.1         1.0         75         1.0         12.4           (+)SMCJ78A         GGT         GGT         86.7         95.8         1.0         78         1.0         11.9           (+)SMCJ85A         GGV         GGV         94.4         104         1.0         85         1.0         10.9           (+)SMCJ90A         GGX         GGX         100         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ10A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8							64			103
(+)SMCJ75A         GGR         GGR         83.3         92.1         1.0         75         1.0         12.4           (+)SMCJ78A         GGT         GGT         86.7         95.8         1.0         78         1.0         11.9           (+)SMCJ85A         GGV         GGV         94.4         104         1.0         85         1.0         10.9           (+)SMCJ90A         GGX         GGX         100         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8							-			113
(+)SMCJ78A         GGT         GGT         86.7         95.8         1.0         78         1.0         11.9           (+)SMCJ85A         GGV         GGV         94.4         104         1.0         85         1.0         10.9           (+)SMCJ90A         GGX         GGX         100         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8										121
(+)SMCJ85A         GGV         GGV         94.4         104         1.0         85         1.0         10.9           (+)SMCJ90A         GGX         GGX         100         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8										126
(+)SMCJ90A         GGX         GGX         100         111         1.0         90         1.0         10.3           (+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8										137
(+)SMCJ100A         GGZ         GGZ         111         123         1.0         100         1.0         9.3           (+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8										146
(+)SMCJ110A         GHE         GHE         122         135         1.0         110         1.0         8.5           (+)SMCJ120A         GHG         GHG         133         147         1.0         120         1.0         7.8										162
(+)SMCJ120A GHG GHG 133 147 1.0 120 1.0 7.8										177
										193
V#SMCJ130A   (HK   (HK   144   159   10   130   10   72	(+)SMCJ130A	GHK	GHK	144	159	1.0	130	1.0	7.2	209
										243
										259
										275
										328

### Notes

<sup>(1)</sup> Pulse test:  $t_p \le 50 \text{ ms}$ 

<sup>(2)</sup> Surge current waveform per fig. 3 and derate per fig. 2

 $^{(3)}$  For bi-directional types having V<sub>WM</sub> of 10 V and less, the I<sub>D</sub> limit is doubled

<sup>(4)</sup> All terms and symbols are consistent with ANSI/IEEE C62.35

 $^{(5)}\,$  For the bi-directional SMCJ5.0CA, the maximum  $V_{BR}\,$  is 7.25 V

 $^{(6)}$  V<sub>F</sub> = 3.5 V at I<sub>F</sub> = 100 A (uni-directional only)

(+) Underwriters laboratory recognition for the classification of protectors (QVGQ2) under the UL standard for safety 497B and file number E136766 for both uni-directional and bi-directional devices

Revision: 24-Jan-2019

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For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>

# SMCJ5.0A thru SMCJ188CA



## Vishay General Semiconductor

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	VALUE	UNIT			
Typical thermal resistance, junction to ambient air <sup>(1)</sup>	$R_{ extsf{ heta}JA}$	75	°C/W			
Typical thermal resistance, junction to lead	$R_{ ext{ ext{ heta}JL}}$	15	C/ W			

#### Note

<sup>(1)</sup> Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)						
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE		
SMCJ5.0A-E3/57T	0.211	57T	850	7" diameter plastic tape and reel		
SMCJ5.0A-M3/57T	0.211	571				
SMCJ5.0A-E3/9AT	0.211	0.211 9AT		10" diameter plastic tana and real		
SMCJ5.0A-M3/9AT	0.211	941	3500	13" diameter plastic tape and reel		
SMCJ5.0AHE3_A/H <sup>(1)</sup>	0.011		050			
SMCJ5.0AHM3_A/H <sup>(1)</sup>	0.211	Н	850	7" diameter plastic tape and reel		
SMCJ5.0AHE3_A/I (1)	0.211	1	3500	13" diameter plastic tape and reel		
SMCJ5.0AHM3_A/I <sup>(1)</sup>	0.211	I		To diameter plastic tape and reel		

Note

(1) AEC-Q101 qualified

### RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

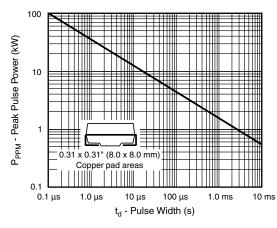


Fig. 1 - Peak Pulse Power Rating Curve

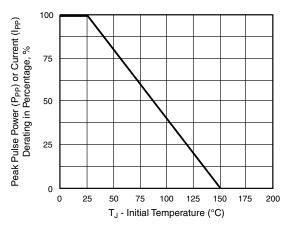


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature



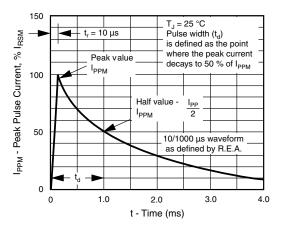


Fig. 3 - Pulse Waveform

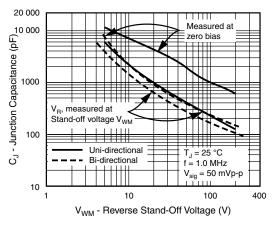
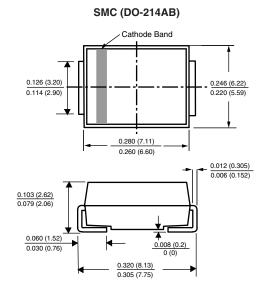
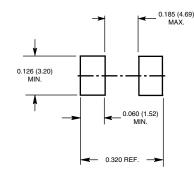


Fig. 4 - Typical Junction Capacitance Uni-Directional

### **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)



#### **Mounting Pad Layout**



SMCJ5.0A thru SMCJ188CA

Vishay General Semiconductor

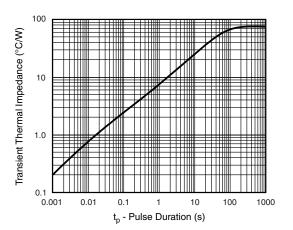


Fig. 5 - Typical Transient Thermal Impedance

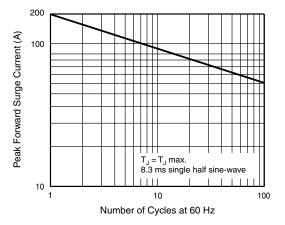


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Use On

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 4
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