



# THE DATASHEET OF SMCJ78A-E3/9AT



## Surface Mount TRANSZORB® 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
P <sub>D</sub>	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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available

### 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

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 μs waveform <sup>(1)(2)</sup>	P <sub>PPM</sub>	1500	W
Peak pulse current with a 10/1000 μs waveform <sup>(1)</sup>	I <sub>PPM</sub>	See next table	A
Peak forward surge current 8.3 ms single half sine-wave uni-directional only <sup>(2)</sup>	I <sub>FSM</sub>	200	A
Power dissipation on infinite heatsink, T <sub>A</sub> = 50 °C	P <sub>D</sub>	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<sub>A</sub> = 25 °C per fig. 2

<sup>(2)</sup> Mounted on 0.31" x 0.31" (8.0 mm x 8.0 mm) copper pads to each terminal



ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C unless otherwise noted)

Table with columns: DEVICE TYPE MODIFIED "J" BEND LEAD, DEVICE MARKING CODE (UNI, BI), BREAKDOWN VOLTAGE VBR AT IT (MIN., MAX.), TEST CURRENT IT (mA), STAND-OFF VOLTAGE VWM (V), MAXIMUM REVERSE LEAKAGE AT VWM ID (uA), MAXIMUM PEAK PULSE SURGE CURRENT IPPM (A), MAXIMUM CLAMPING VOLTAGE AT IPPM VC (V). Rows list various device types from SMCJ5.0A to SMCJ188A.

Notes

- (1) Pulse test: tp ≤ 50 ms
(2) Surge current waveform per fig. 3 and derate per fig. 2
(3) For bi-directional types having VWM of 10 V and less, the ID limit is doubled
(4) All terms and symbols are consistent with ANSI/IEEE C62.35
(5) For the bi-directional SMCJ5.0CA, the maximum VBR is 7.25 V
(6) VF = 3.5 V at IF = 100 A (uni-directional only)
(7) 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

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

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

<b>ORDERING INFORMATION</b> (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				
SMCJ5.0A-E3/9AT	0.211	9AT	3500	13" diameter plastic tape and reel
SMCJ5.0A-M3/9AT				
SMCJ5.0AHE3_A/H <sup>(1)</sup>	0.211	H	850	7" diameter plastic tape and reel
SMCJ5.0AHM3_A/H <sup>(1)</sup>				
SMCJ5.0AHE3_A/I <sup>(1)</sup>	0.211	I	3500	13" diameter plastic tape and reel
SMCJ5.0AHM3_A/I <sup>(1)</sup>				

**Note**
<sup>(1)</sup> AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Peak Pulse Power Rating Curve



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

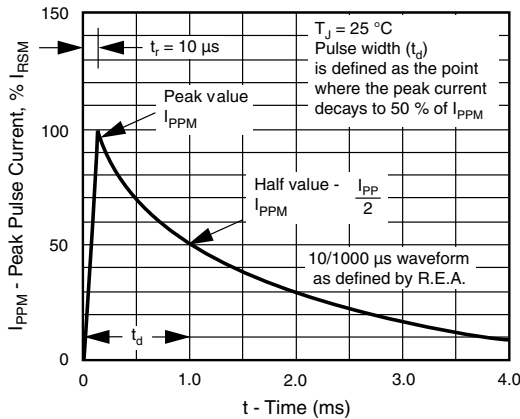


Fig. 3 - Pulse Waveform



Fig. 5 - Typical Transient Thermal Impedance



Fig. 4 - Typical Junction Capacitance Uni-Directional



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

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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