

## High Power Density Surface Mount TRANSZORB® Transient Voltage Suppressors



DO-214AC (SMA)



### 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-020C, LF max peak of 260 °C
- Solder dip 260 °C, 40 seconds
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

### PRIMARY CHARACTERISTICS

$V_{WM}$	5.0 V to 40 V
$P_{PPM}$	500 W
$I_{FSM}$ (uni-directional only)	40 A
$T_J$ max.	150 °C

### DEVICES FOR BI-DIRECTION APPLICATIONS

For bi-directional devices use C or CA suffix (e.g. SMA5J40CA).

Electrical characteristics apply in both directions.

### 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:** DO-214AC (SMA)

Epoxy meets UL 94V-0 flammability rating

**Terminals:** Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

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

### MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (Fig. 1)	$P_{PPM}$	500	W
Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup>	$I_{PPM}$	See next table	A
Peak forward surge current 8.3 ms single half sine-wave uni-directional only <sup>(2)</sup>	$I_{FSM}$	40	A
Operating junction and storage temperature range	$T_J, T_{STG}$	- 55 to + 150	°C

#### Notes:

(1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25$  °C per Fig. 2.

(2) Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)									
DEVICE TYPE	DEVICE MARKING CODE		BREAKDOWN VOLTAGE $V_{BR}$ (V) <sup>(1)</sup>		TEST CURRENT $I_T$ (mA)	STAND-OFF VOLTAGE $V_{WM}$ (V)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) <sup>(3)</sup>	MAXIMUM PEAK PULSE CURRENT $I_{PPM}$ (A) <sup>(2)</sup>	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)
	UNI	BI	MIN	MAX					
SMA5J5.0	5AD	5AD	6.40	7.82	10	5.0	800	52.1	9.6
SMA5J5.0A <sup>(5)</sup>	5AE	5AE	6.40	7.07	10	5.0	800	54.3	9.2
SMA5J6.0	5AF	5AF	6.67	8.15	10	6.0	800	43.9	11.4
SMA5J6.0A	5AG	5AG	6.67	7.37	10	6.0	800	48.5	10.3
SMA5J6.5	5AH	5AH	7.22	8.82	10	6.5	500	40.7	12.3
SMA5J6.5A	5AK	5AK	7.22	7.98	10	6.5	500	44.6	11.2
SMA5J7.0	5AL	5AL	7.78	9.51	10	7.0	200	37.6	13.3
SMA5J7.0A	5AM	5AM	7.78	8.6	10	7.0	200	41.7	12.0
SMA5J7.5	5AN	5AN	8.33	10.2	1.0	7.5	100	35.0	14.3
SMA5J7.5A	5AP	5AP	8.33	9.21	1.0	7.5	100	38.8	12.9
SMA5J8.0	5AQ	5AQ	8.89	10.9	1.0	8.0	50	33.3	15.0
SMA5J8.0A	5AR	5AR	8.89	9.83	1.0	8.0	50	36.8	13.6
SMA5J8.5	5AS	5AS	9.44	11.5	1.0	8.5	10	31.4	15.9
SMA5J8.5A	5AT	5AT	9.44	10.4	1.0	8.5	10	34.7	14.4
SMA5J9.0	5AU	5AU	10.0	12.2	1.0	9.0	5.0	29.6	16.9
SMA5J9.0A	5AV	5AV	10.0	11.1	1.0	9.0	5.0	32.5	15.4
SMA5J10	5AW	5AW	11.1	13.6	1.0	10	1.0	26.6	18.8
SMA5J10A	5AX	5AX	11.1	12.3	1.0	10	1.0	29.4	17.0
SMA5J11	5AY	5AY	12.2	14.9	1.0	11	1.0	24.9	20.1
SMA5J11A	5AZ	5AZ	12.2	13.5	1.0	11	1.0	27.5	18.2
SMA5J12	5BD	5BD	13.3	16.3	1.0	12	1.0	22.7	22.0
SMA5J12A	5BE	5BE	13.3	14.7	1.0	12	1.0	25.1	19.9
SMA5J13	5BF	5BF	14.4	17.6	1.0	13	1.0	21.0	23.8
SMA5J13A	5BG	5BG	14.4	15.9	1.0	13	1.0	23.3	21.5
SMA5J14	5BH	5BH	15.6	19.1	1.0	14	1.0	19.4	25.8
SMA5J14A	5BK	5BK	15.6	17.2	1.0	14	1.0	21.6	23.2
SMA5J15	5BL	5BL	16.7	20.4	1.0	15	1.0	18.6	26.9
SMA5J15A	5BM	5BM	16.7	18.5	1.0	15	1.0	20.5	24.4
SMA5J16	6BN	5BN	17.8	21.8	1.0	16	1.0	17.4	28.8
SMA5J16A	5BP	5BP	17.8	19.7	1.0	16	1.0	19.2	26.0
SMA5J17	5BQ	5BQ	18.9	23.1	1.0	17	1.0	16.4	30.5
SMA5J17A	5BR	5BR	18.9	20.9	1.0	17	1.0	18.1	27.6
SMA5J18	5BS	5BS	20.0	24.4	1.0	18	1.0	15.5	32.2
SMA5J18A	5BT	5BT	20.0	22.1	1.0	18	1.0	17.1	29.2
SMA5J20	5BU	5BU	22.2	27.1	1.0	20	1.0	14.0	35.8
SMA5J20A	5BV	5BV	22.2	24.5	1.0	20	1.0	15.4	32.4
SMA5J22	5BW	5BW	24.4	29.8	1.0	22	1.0	12.7	39.4
SMA5J22A	5BX	5BX	24.4	26.9	1.0	22	1.0	14.1	35.5
SMA5J24	5BY	5BY	26.7	32.6	1.0	24	1.0	11.6	43.0

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)									
DEVICE TYPE	DEVICE MARKING CODE		BREAKDOWN VOLTAGE $V_{BR}$ (V) <sup>(1)</sup>		TEST CURRENT $I_T$ (mA)	STAND-OFF VOLTAGE $V_{WM}$ (V)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) <sup>(3)</sup>	MAXIMUM PEAK PULSE CURRENT $I_{PPM}$ (A) <sup>(2)</sup>	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)
	UNI	BI	MIN	MAX					
SMA5J24A	5BZ	5BZ	26.7	29.5	1.0	24	1.0	12.9	38.9
SMA5J26	5CD	5CD	28.9	35.3	1.0	26	1.0	10.7	46.6
SMA5J26A	5CE	5CE	28.9	31.9	1.0	26	1.0	11.9	42.1
SMA5J28	5CF	5CF	31.1	38.0	1.0	28	1.0	10.0	50.0
SMA5J28A	5CG	5CG	31.1	34.4	1.0	28	1.0	11.0	45.4
SMA5J30	5CH	5CH	33.3	40.7	1.0	30	1.0	9.3	53.5
SMA5J30A	5CK	5CK	33.3	36.8	1.0	30	1.0	10.3	48.4
SMA5J33	5CL	5CL	36.7	44.9	1.0	33	1.0	8.5	59.0
SMA5J33A	5CM	5CM	36.7	40.6	1.0	33	1.0	9.4	53.3
SMA5J36	5CN	5CN	40.0	48.9	1.0	36	1.0	7.8	64.3
SMA5J36A	5CP	5CP	40.0	44.2	1.0	36	1.0	8.6	58.1
SMA5J40	5CQ	5CQ	44.4	54.3	1.0	40	1.0	7.0	71.4
SMA5J40A	5CR	5CR	44.4	49.1	1.0	40	1.0	7.8	64.5

**Notes:**

- (1) Pulse test:  $t_p \leq 50\text{ ms}$
- (2) Surge current waveform per Fig. 3 and derate per Fig. 2
- (3) For bi-directional types having  $V_{WM}$  of 10 V and less, the  $I_D$  limit is doubled
- (4) All terms and symbols are consistent with ANSI/IEEE C62.35
- (5) For the bi-directional SMA5J5.0CA, the maximum  $V_{BR}$  is 7.25 V
- (6)  $V_F = 3.5\text{ V}$  at  $I_F = 25\text{ A}$  (uni-directional only)

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Thermal resistance, junction to ambient <sup>(1)</sup>	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Thermal resistance, junction to leads	$R_{\theta JL}$	25	$^\circ\text{C/W}$

**Note:**

- (1) Mounted on minimum recommended pad layout

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMA5J5.0A-E3/61	0.064	61	1800	7" diameter plastic tape and reel
SMA5J5.0A-E3/5A	0.064	5A	7500	13" diameter plastic tape and reel
SMA5J5.0AHE3/61 <sup>(1)</sup>	0.064	61	1800	7" diameter plastic tape and reel
SMA5J5.0AHE3/5A <sup>(1)</sup>	0.064	5A	7500	13" diameter plastic tape and reel

**Note:**

- (1) Automotive grade AEC Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES

( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

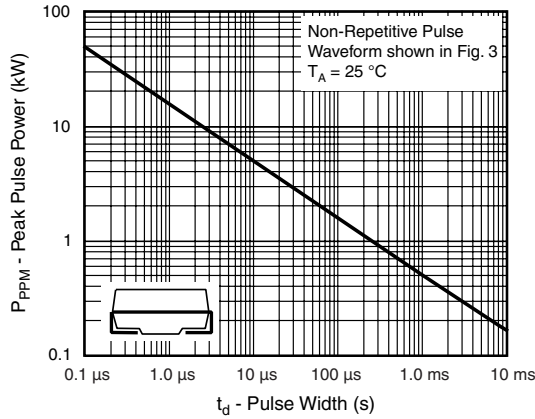


Figure 1. Peak Pulse Power Rating Curve

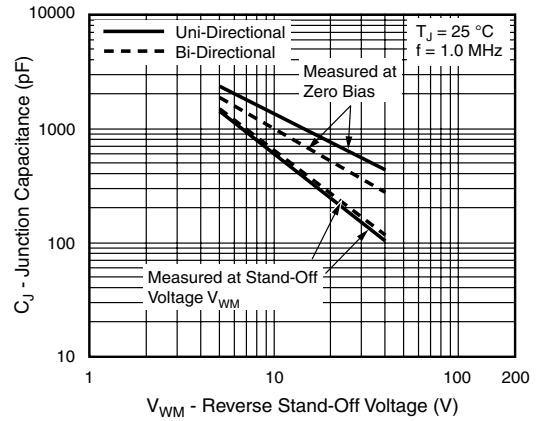


Figure 4. Typical Junction Capacitance

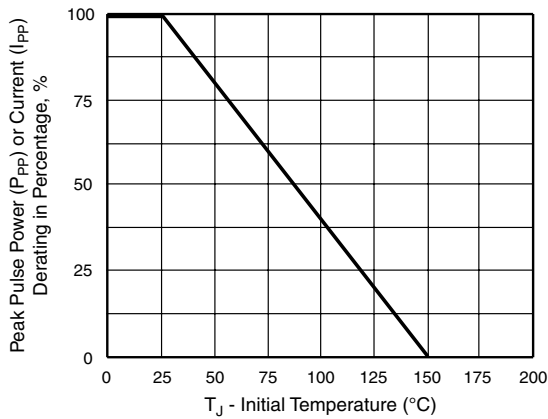


Figure 2. Pulse Power or Current vs. Initial Junction Temperature

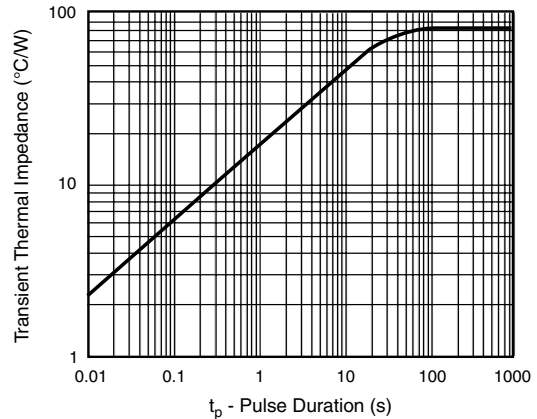


Figure 5. Typical Transient Thermal Impedance

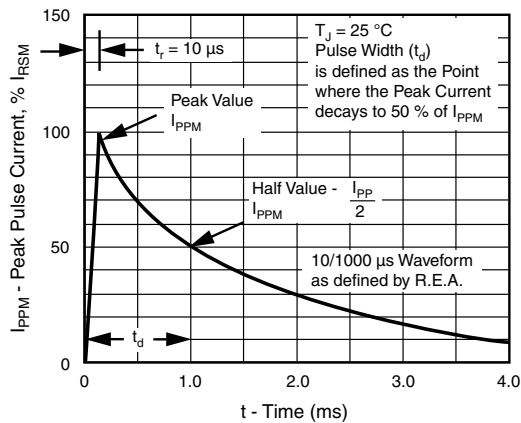


Figure 3. Pulse Waveform

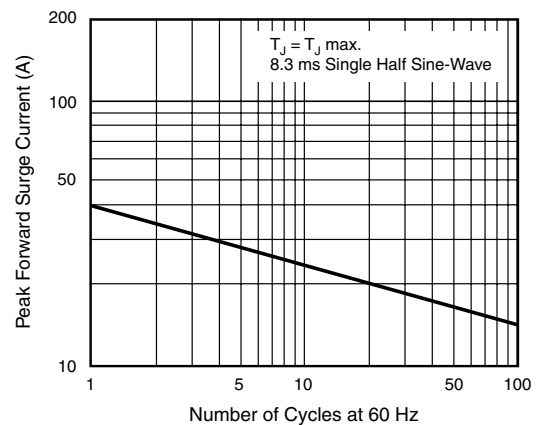
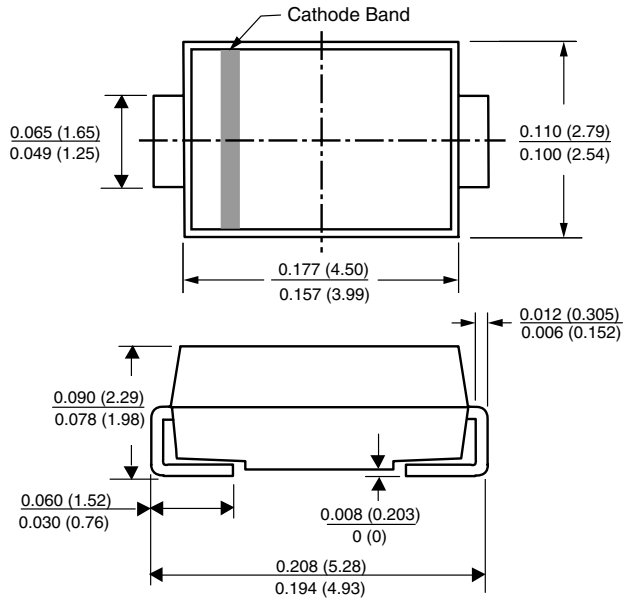


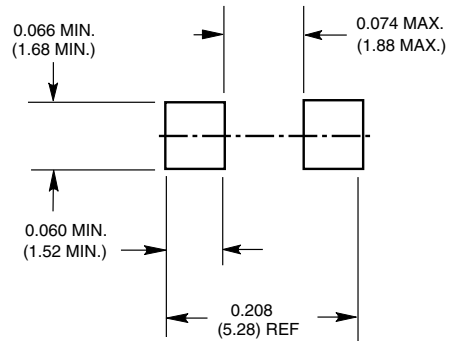
Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-214AC (SMA)



### Mounting Pad Layout





## Disclaimer

All product specifications and data are subject to change without notice.

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