

# NS6A5.0AFT3G, SZNS6A5.0AFT3G Series

## 500 Watt Peak Power Zener Transient Voltage Suppressors

### Unidirectional

The NS6AxxAFT3G series is designed to protect voltage sensitive components from high voltage, high energy transients. This device has excellent clamping capability, high surge capability, low zener impedance and fast response time. The NS6AxxAFT3G series is ideally suited for use in computer hard disk drives, communication systems, automotive, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.

#### Specification Features:

- Peak Reverse Working Voltage Range – 5 V to 64 V
- Peak Pulse Power of 500 W (10 x 1000  $\mu$ sec)
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- ESD Rating of Class 4 (>8 kV) IEC 61000-4-2
- Fast Response Time
- Low Profile Package
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

#### Mechanical Characteristics:

**CASE:** Void-free, transfer-molded, thermosetting plastic

**FINISH:** All external surfaces are corrosion resistant and leads are readily solderable

#### MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:

260°C for 10 Seconds

**LEADS:** Modified L-Bend providing more contact area to bond pads

**POLARITY:** Cathode indicated by polarity band

**MOUNTING POSITION:** Any



Expertise Applied | Answers Delivered

[Littelfuse.com](http://Littelfuse.com)

### PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS



SMA-FL  
CASE 403AA

#### MARKING DIAGRAM



xxx = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

#### ORDERING INFORMATION

Device	Package	Shipping
NS6AxxAFT3G, SZNS6AxxAFT3G	SMA-FL (Pb-Free)	5000 / Tape & Reel

# NS6A5.0AFT3G, SZNS6A5.0AFT3G Series

## MAXIMUM RATINGS

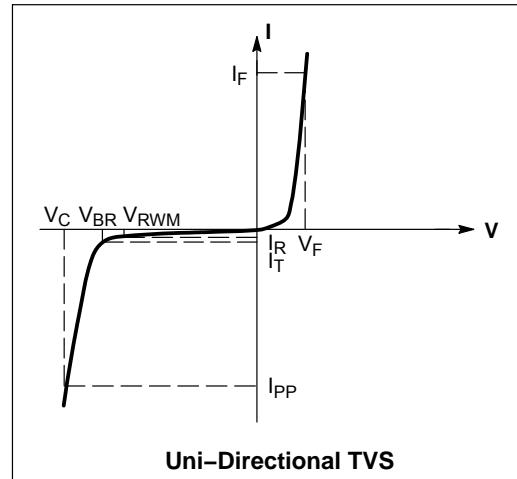
Rating	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ $T_L = 25^\circ\text{C}$ , Pulse Width = 1 ms	$P_{PK}$	500	W
DC Power Dissipation @ $T_L = 75^\circ\text{C}$ Measured Zero Lead Length (Note 2) Derate Above $75^\circ\text{C}$	$P_D$	1.5	W
Thermal Resistance from Junction-to-Lead	$R_{\theta JL}$	20 50	$\text{mW}/^\circ\text{C}$ $^\circ\text{C}/\text{W}$
DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	0.5 4.0	W $\text{mW}/^\circ\text{C}$ $^\circ\text{C}/\text{W}$
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	250	
Forward Surge Current (Note 4) @ $T_A = 25^\circ\text{C}$	$I_{FSM}$	40	A
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

1.  $10 \times 1000 \mu\text{s}$ , non-repetitive.
2. 1 in square copper pad, FR-4 board.
3. FR-4 board, using Littelfuse minimum recommended footprint, as shown in 403AA case outline dimensions spec.
4. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 3.5 \text{ V Max.} @ I_F$ (Note 5) = 30 A)

Symbol	Parameter
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$V_{RWM}$	Working Peak Reverse Voltage
$I_R$	Maximum Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$

5. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, non-repetitive duty cycle.



# NS6A5.0AFT3G, SZNS6A5.0AFT3G Series

## ELECTRICAL CHARACTERISTICS

Device*	Device Marking	V <sub>RWM</sub> (Note 6)	I <sub>R</sub> @ V <sub>RWM</sub>	Breakdown Voltage			V <sub>C</sub> @ I <sub>PP</sub> (Note 8)		C <sub>typ</sub> (Note 9)	
				V <sub>BR</sub> (Note 7) Volts			@ I <sub>T</sub>	V <sub>C</sub>	I <sub>PP</sub>	
		V	μA	Min	Nom	Max	mA	V	A	pF
NS6A5.0AFT3G	6AA	5	800	6.4	6.70	7	10	9.2	65.2	2700
NS6A6.0AFT3G**	6AB	6	800	6.67	7.02	7.37	10	10.3	58.3	2300
NS6A6.5AFT3G**	6AC	6.5	500	7.22	7.60	7.98	10	11.2	53.6	2140
NS6A7.0AFT3G**	6AD	7	500	7.78	8.19	8.6	10	12	50	2005
NS6A7.5AFT3G**	6AE	7.5	100	8.33	8.77	9.21	1	12.9	46.5	1890
NS6A8.0AFT3G**	6AF	8	50	8.89	9.36	9.83	1	13.6	44.1	1780
NS6A8.5AFT3G	6AG	8.5	10	9.44	9.92	10.4	1	14.4	41.7	1690
NS6A9.0AFT3G**	6AH	9	5	10	10.55	11.1	1	15.4	39	1605
NS6A10AFT3G**	6AI	10	5	11.1	11.70	12.3	1	17	35.3	1460
NS6A11AFT3G**	6AL	11	5	12.2	12.85	13.5	1	18.2	33	1345
NS6A12AFT3G	6AJ	12	5	13.3	14.00	14.7	1	19.9	30.2	1245
NS6A13AFT3G	6AK	13	5	14.4	15.15	15.9	1	21.5	27.9	1160
NS6A14AFT3G**	6AM	14	5	15.6	16.40	17.2	1	23.2	20.5	1085
NS6A15AFT3G	6AN	15	5	16.7	17.60	18.5	1	24.4	20.0	1020
NS6A16AFT3G**	6AO	16	5	17.8	18.75	19.7	1	26	19.5	965
NS6A17AFT3G**	6AP	17	5	18.9	19.90	20.9	1	27.6	19.0	915
NS6A18AFT3G**	6AQ	18	5	20	21.05	22.1	1	29.2	18.5	870
NS6A20AFT3G**	6AR	20	5	22.2	23.35	24.5	1	32.4	17.5	790
NS6A22AFT3G	6AS	22	5	24.4	25.65	26.9	1	35.5	16.5	730
NS6A24AFT3G	6AT	24	5	26.7	28.10	29.5	1	38.9	15.4	675
NS6A26AFT3G**	6AU	26	5	28.9	30.40	31.9	1	42.1	14.2	630
NS6A28AFT3G	6AV	28	5	31.1	32.75	34.4	1	45.4	13.2	590
NS6A30AFT3G	6AW	30	5	33.3	35.05	36.8	1	48.4	12.4	555
NS6A33AFT3G	6AX	33	5	36.7	38.65	40.6	1	53.3	11.3	510
NS6A36AFT3G	6AY	36	5	40	42.10	44.2	1	58.1	10.3	470
NS6A40AFT3G**	6AZ	40	5	44.4	46.75	49.1	1	64.5	9.3	430
NS6A43AFT3G**	6A0	43	5	47.8	50.30	52.8	1	69.4	8.6	400
NS6A45AFT3G**	6A1	45	5	50	52.65	55.3	1	72.2	8.3	385
NS6A48AFT3G**	6A2	48	5	53.3	56.10	58.9	1	77.4	7.7	365
NS6A51AFT3G**	6A3	51	5	56.7	59.70	62.7	1	82.4	7.3	345
NS6A54AFT3G**	6A4	54	5	60	63.15	66.3	1	87.1	6.9	330
NS6A58AFT3G**	6A5	58	5	64.4	67.80	71.2	1	93.6	6.4	310
NS6A60AFT3G**	6A7	60	5	66.7	70.20	73.7	1	96.8	6.2	300
NS6A64AFT3G	6A8	64	5	71.1	74.85	78.6	1	103	5.8	280

\*Includes SZ-prefix devices where applicable.

\*\*In development. Contact local sales rep for availability.

6. A transient suppressor is normally selected according to the working peak reverse voltage (V<sub>RWM</sub>), which should be equal to or greater than the DC or continuous peak operating voltage level.

7. V<sub>BR</sub> measured at pulse test current I<sub>T</sub> at an ambient temperature of 25°C.

8. Surge current waveform per Figure 1.

9. Bias Voltage = 0 V, F = 1 MHz, T<sub>J</sub> = 25°C.

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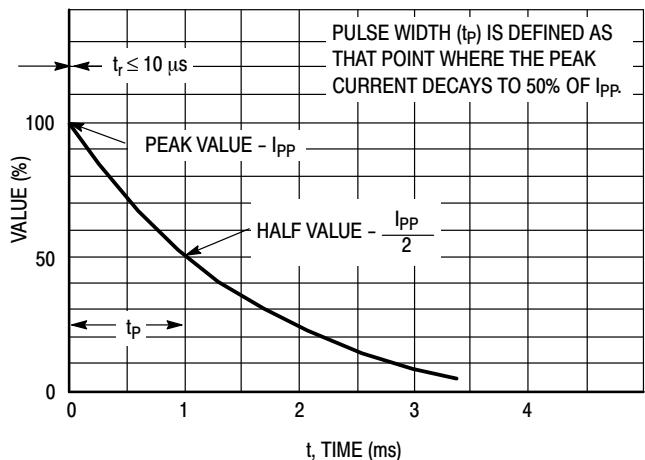


Figure 1.  $10 \times 1000 \mu\text{s}$  Pulse Waveform

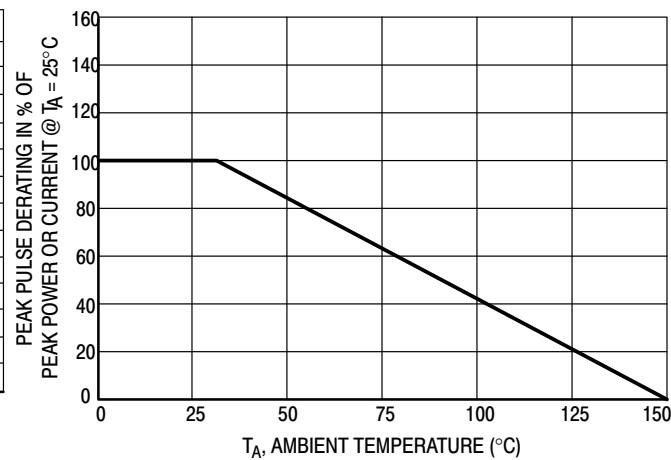


Figure 2. Pulse Derating Curve

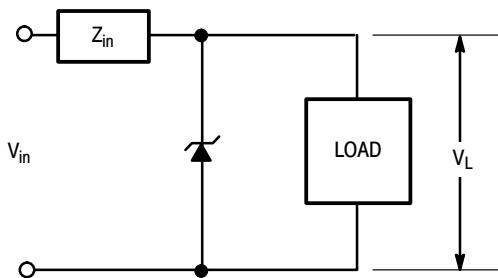
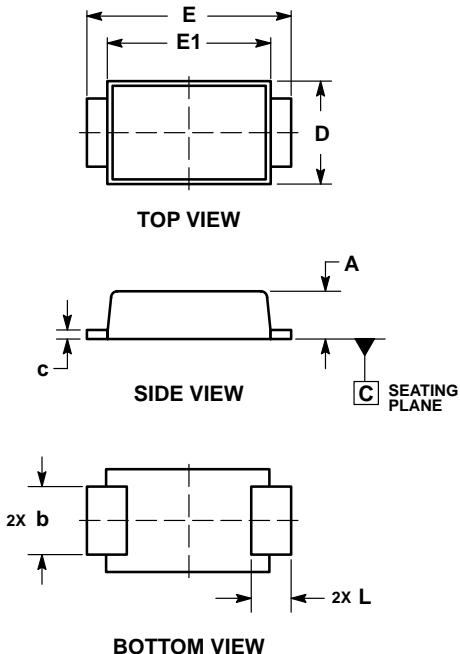


Figure 3. Typical Protection Circuit

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## PACKAGE DIMENSIONS

**SMA-FL**  
CASE 403AA  
ISSUE O

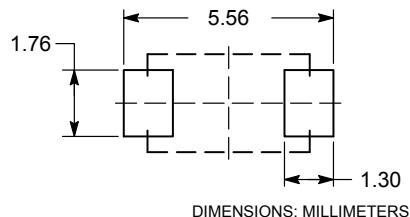


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.

MILLIMETERS		
DIM	MIN	MAX
A	0.90	1.10
b	1.25	1.65
c	0.15	0.30
D	2.40	2.80
E	4.80	5.40
E1	4.00	4.60
L	0.70	1.10

## RECOMMENDED SOLDER FOOTPRINT



Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse.

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