

NS6A5.0AFT3G Series

600 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 of 5 V
- Peak Pulse Power of 600 W (10 x 1000 µsec)
- 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
- This is a Pb-Free Device

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

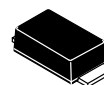
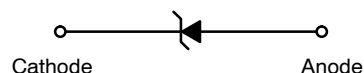
MOUNTING POSITION: Any



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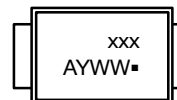
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PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS



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	SMA-FL (Pb-Free)	5000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NS6A5.0AFT3G Series

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ $T_L = 25^\circ\text{C}$, Pulse Width = 1 ms	P_{PK}	600	W
DC Power Dissipation @ $T_L = 75^\circ\text{C}$ Measured Zero Lead Length (Note 2) Derate Above 75°C	P_D	1.5	W
Thermal Resistance from Junction-to-Lead	$R_{\theta JL}$	20	$\text{mW}/^\circ\text{C}$
		50	$^\circ\text{C}/\text{W}$
DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	0.5	W
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	4.0	$\text{mW}/^\circ\text{C}$
		250	$^\circ\text{C}/\text{W}$
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	$^\circ\text{C}$

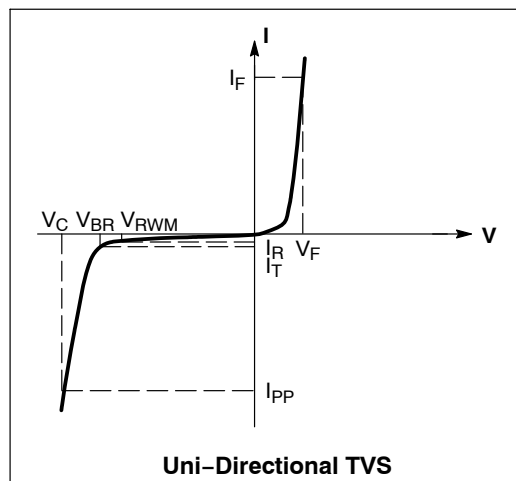
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- 10 X 1000 μs , non-repetitive.
- 1 in square copper pad, FR-4 board.
- FR-4 board, using ON Semiconductor minimum recommended footprint, as shown in 403AA case outline dimensions spec.
- 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

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



ELECTRICAL CHARACTERISTICS

Device	Device Marking	V_{RWM} (Note 6) V	I_R @ V_{RWM} μA	Breakdown Voltage				V_C @ I_{PP} (Note 8)		C_{typ} (Note 9) pF
				V_{BR} (Note 7) Volts			@ I_T	V_C	I_{PP}	
				Min	Nom	Max	mA	V	A	
NS6A5.0AFT3G	6AA	5.0	800	6.40	6.7	7.0	10	9.2	65.2	2700
NS6A12AFT3G	6AJ	12	0.5	13.3	14	14.7	1.0	19.5	31	1450
NS6A13AFT3G	6AK	13	5.0	14.4	15.15	15.9	1.0	21.5	27.9	1160

- A transient suppressor is normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal to or greater than the DC or continuous peak operating voltage level.
- V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C .
- Surge current waveform per Figure 1.
- Bias Voltage = 0 V, F = 1 MHz, $T_J = 25^\circ\text{C}$.

NS6A5.0AFT3G Series

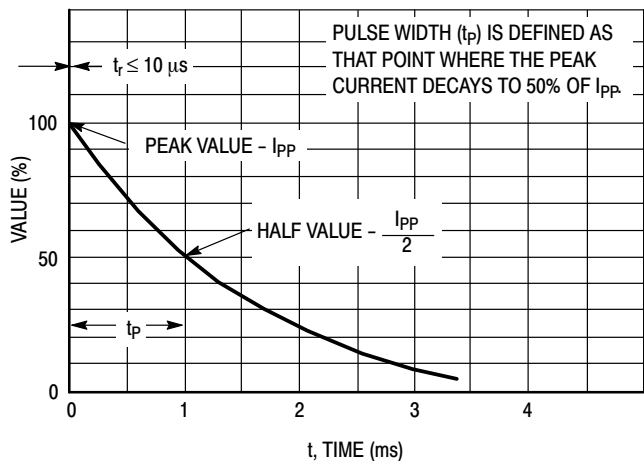


Figure 1. 10 × 1000 μs Pulse Waveform

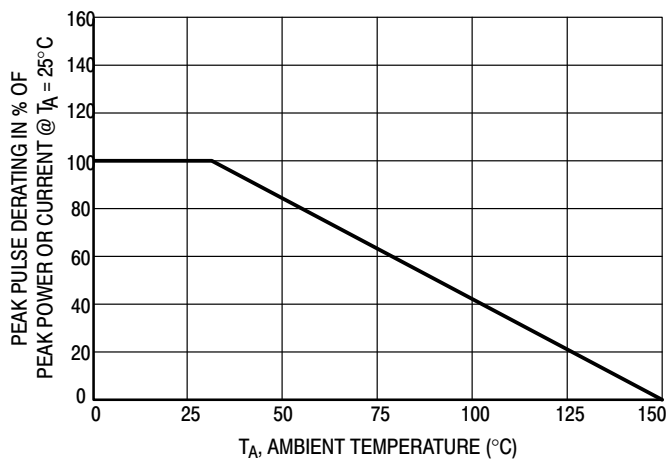


Figure 2. Pulse Derating Curve

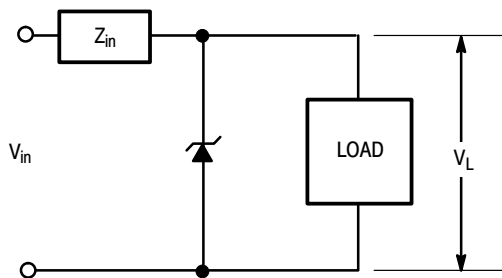
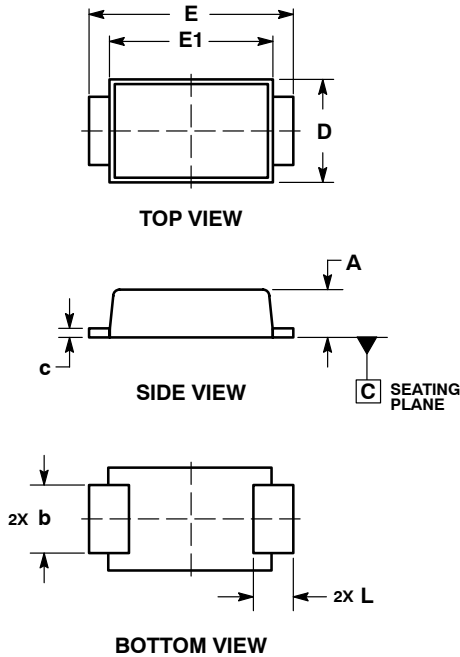


Figure 3. Typical Protection Circuit

NS6A5.0AFT3G Series

PACKAGE DIMENSIONS

SMA-FL
CASE 403AA-01
ISSUE O

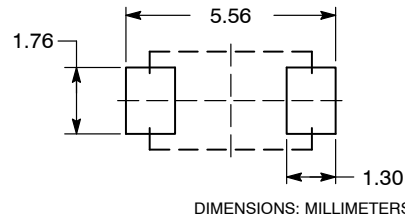


NOTES:

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*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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