

# NS6A5.0AT3G

## 600 Watt Peak Power Zener Transient Voltage Suppressors

### Unidirectional

The NS6A5.0AT3G 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 NS6A5.0AT3G 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  $\mu$ 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
- 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

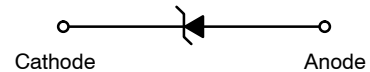
**MOUNTING POSITION:** Any



ON Semiconductor®

<http://onsemi.com>

### PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS



SMA  
CASE 403D  
PLASTIC

#### MARKING DIAGRAM



6QE = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

#### ORDERING INFORMATION

Device	Package	Shipping†
NS6A5.0AT3G	SMA (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.

# NS6A5.0AT3G

## 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 $75^\circ\text{C}$	$P_D$	1.5	W
Thermal Resistance from Junction-to-Lead	$R_{\theta JL}$	20	$\text{mW}/^\circ\text{C}$
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	0.5	W
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	4.0	$\text{mW}/^\circ\text{C}$
Forward Surge Current (Note 4) @ $T_A = 25^\circ\text{C}$	$I_{FSM}$	250	A
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

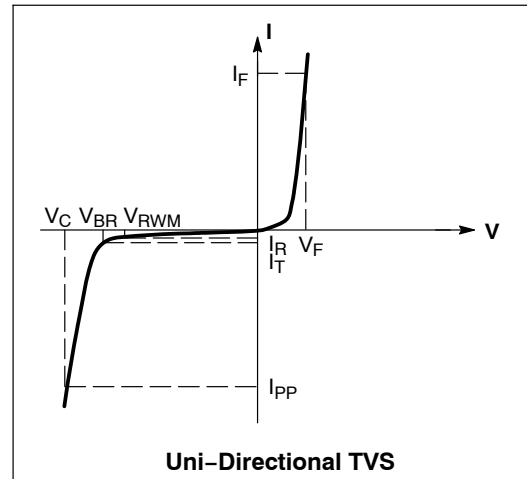
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- 10 X 1000  $\mu\text{s}$ , non-repetitive.
- 1 in square copper pad, FR-4 board.
- FR-4 board, using ON Semiconductor minimum recommended footprint, as shown in 403D 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	$I_R @ V_{RWM}$ $\mu\text{A}$	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	
NS6A5.0AT3G	6QE	5.0	800	6.40	6.7	7.0	10	9.2	65.2	2700

- 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  $25^\circ\text{C}$ .
- Surge current waveform per Figure 1.
- Bias Voltage = 0 V, F = 1 MHz,  $T_J = 25^\circ\text{C}$ .

# NS6A5.0AT3G

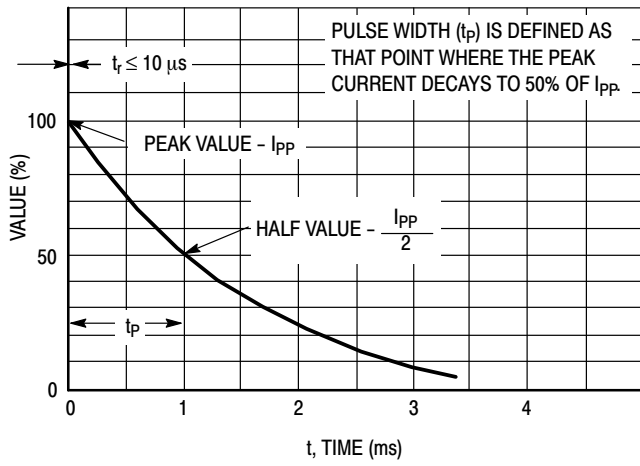


Figure 1.  $10 \times 1000 \mu s$  Pulse Waveform

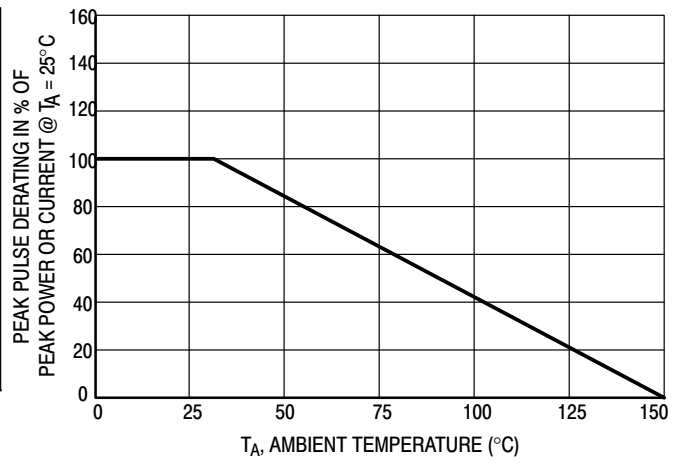


Figure 2. Pulse Derating Curve

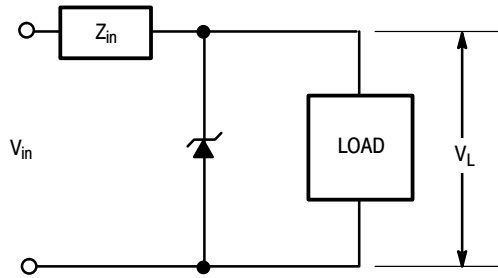
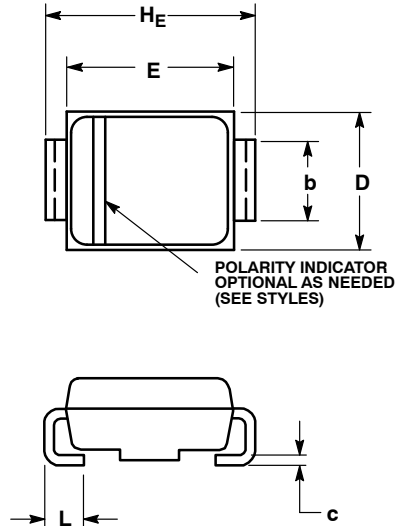


Figure 3. Typical Protection Circuit

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## PACKAGE DIMENSIONS

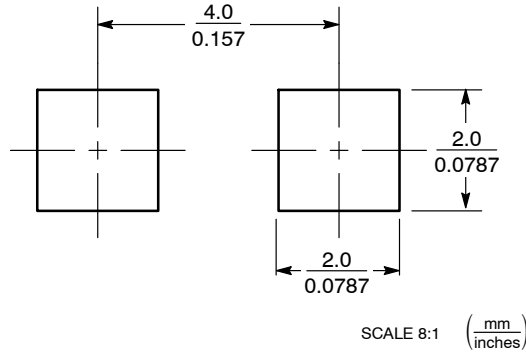
### SMA CASE 403D-02 ISSUE F



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 403D-01 OBSOLETE, NEW STANDARD IS 403D-02.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.97	2.10	2.20	0.078	0.083	0.087
A1	0.05	0.10	0.15	0.002	0.004	0.006
b	1.27	1.45	1.63	0.050	0.057	0.064
c	0.15	0.28	0.41	0.006	0.011	0.016
D	2.29	2.60	2.92	0.090	0.103	0.115
E	4.06	4.32	4.57	0.160	0.170	0.180
HE	4.83	5.21	5.59	0.190	0.205	0.220
L	0.76	1.14	1.52	0.030	0.045	0.060

### SOLDERING FOOTPRINT\*



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

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