

# NS6A12AT3G

## 600 Watt Peak Power Zener Transient Voltage Suppressor

### Unidirectional

The NS6A12AT3G 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 NS6A12AT3G 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 12 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

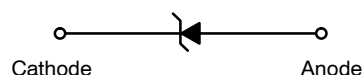
**MOUNTING POSITION:** Any



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### PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSOR



SMA  
CASE 403D  
PLASTIC

#### MARKING DIAGRAM



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

#### ORDERING INFORMATION

Device	Package	Shipping†
NS6A12AT3G	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 Specification Brochure, BRD8011/D.

# NS6A12AT3G

## 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 50	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	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	4.0 250	mW/ $^\circ\text{C}$ $^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

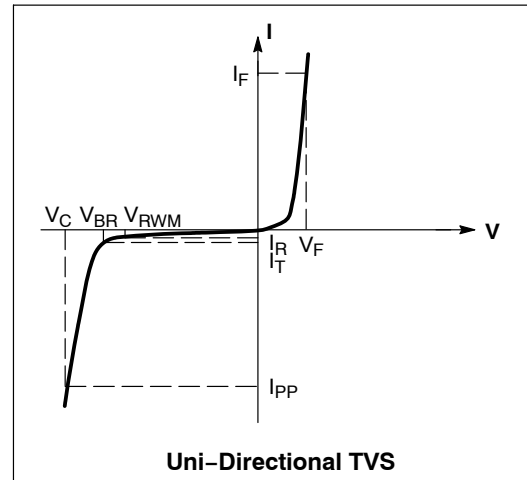
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- 10 X 1000  $\mu\text{s}$ , non-repetitive.
- 1" square copper pad, FR-4 board
- FR-4 board, using ON Semiconductor minimum recommended footprint, as shown in 403D case outline dimensions spec.

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

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 5) V	$I_R @ V_{RWM}$ $\mu\text{A}$	Breakdown Voltage			$V_C @ I_{PP}$ (Note 7)		
				$V_{BR}$ (Note 6) Volts			@ $I_T$	$V_C$	$I_{PP}$
				Min	Nom	Max	mA	V	A
NS6A12AT3G	6LF	12	0.5	13.3	14.0	14.7	1.0	31	19.5

- 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.

# NS6A12AT3G

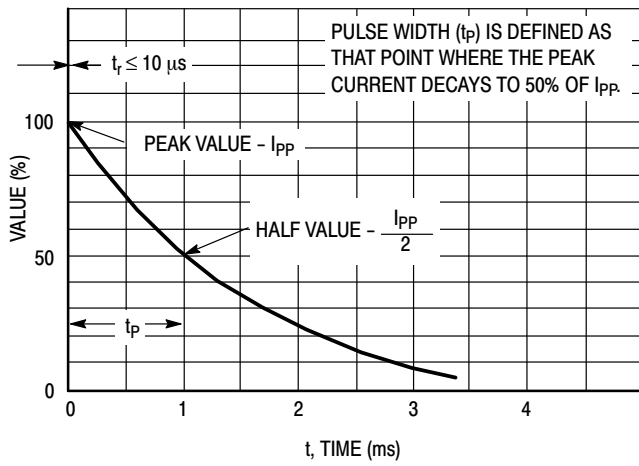


Figure 1.  $10 \times 1000 \mu\text{s}$  Pulse Waveform

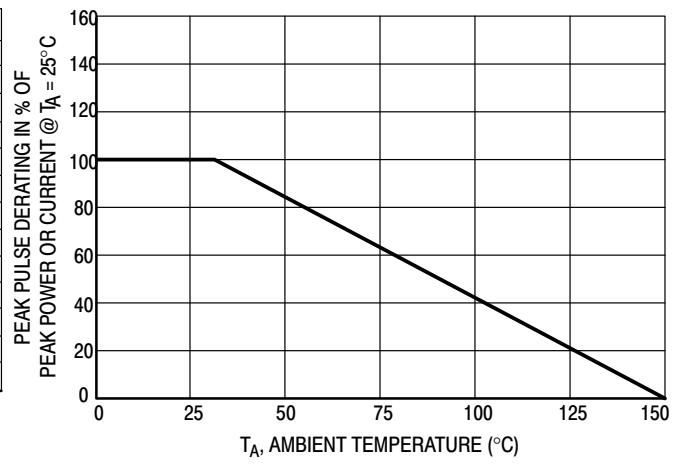


Figure 2. Pulse Derating Curve

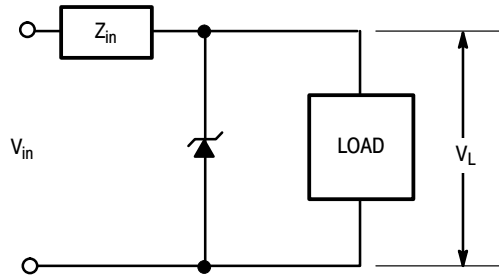
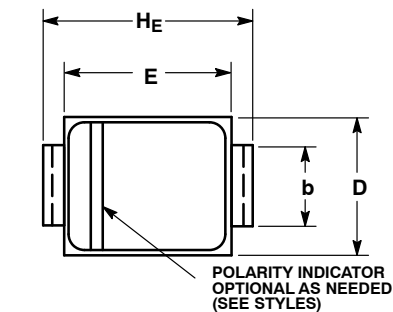


Figure 3. Typical Protection Circuit

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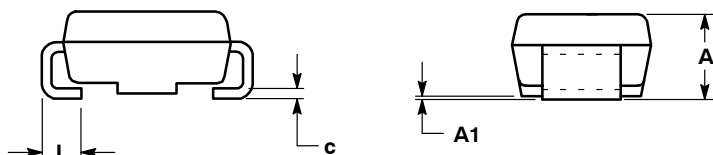
## PACKAGE DIMENSIONS

### SMA CASE 403D-02 ISSUE G

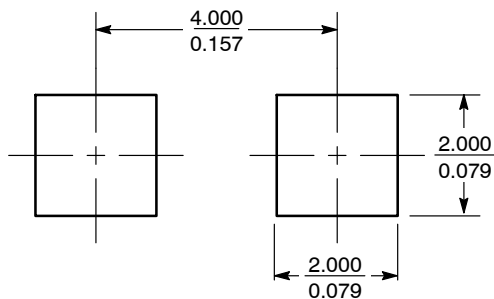


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L.

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	0.20	0.002	0.004	0.008
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\*



SCALE 8:1  $\left(\frac{\text{mm}}{\text{inches}}\right)$

\*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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