

### NS6A13AT3G



#### Description

The NS6A13AT3G 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 NS6A13AT3G 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.

#### Features

- Peak Reverse Working Voltage of 13 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

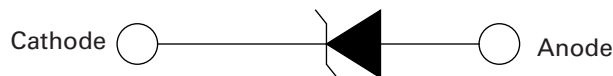
#### Maximum Ratings and Thermal Characteristics

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	$\text{mW}/^\circ\text{C}$
		50	$^\circ\text{C}/\text{W}$
DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_{DJA}$	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.

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

#### Functional Diagram



#### Additional Information



Datasheet

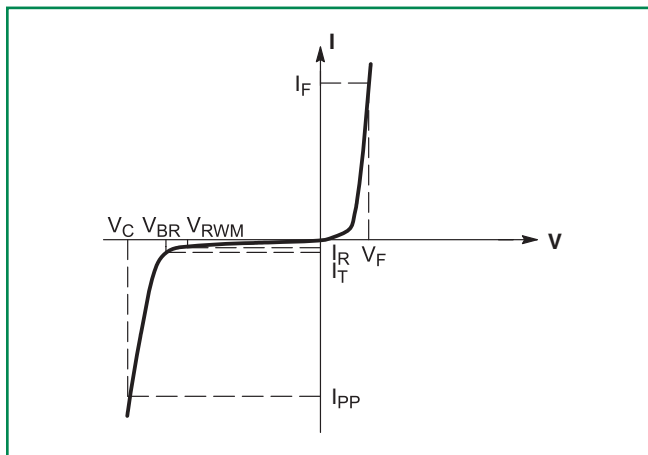


Resources



Samples

### I-V Curve Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted, $V = 3.5\text{ V Max.}$ @ $I_F$ (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.

### 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) (V)			@ I <sub>T</sub>	V <sub>C</sub>	I <sub>pp</sub>	
		V	μA	MIN	NOM	MAX	mA	V	A	
NS6A13AT3G	6LG	13	5.0	14.4	15.15	15.9	1.0	21.5	27.9	1160

6. 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.

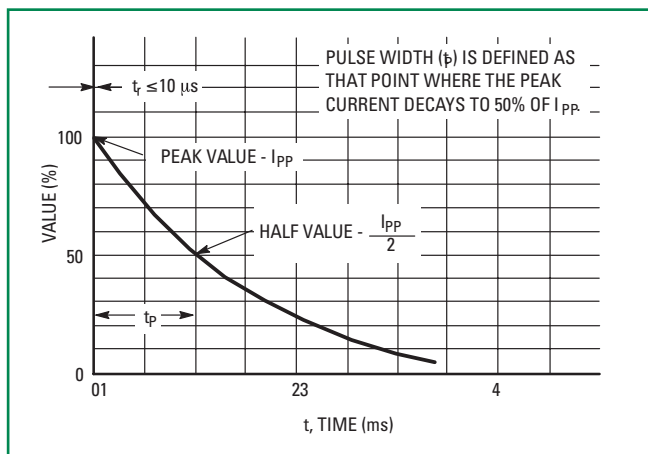
7.  $V_{BR}$  measured at pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

8. Surge current waveform per Figure 1.

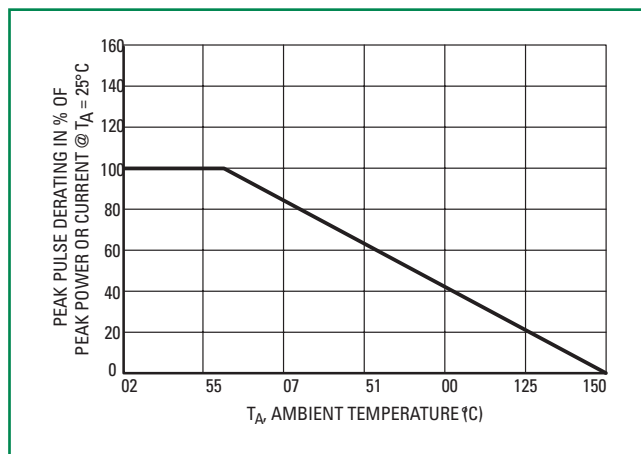
9. Bias Voltage = 0 V, F = 1 MHz,  $T_J = 25^\circ\text{C}$ .

## Ratings and Characteristic Curves

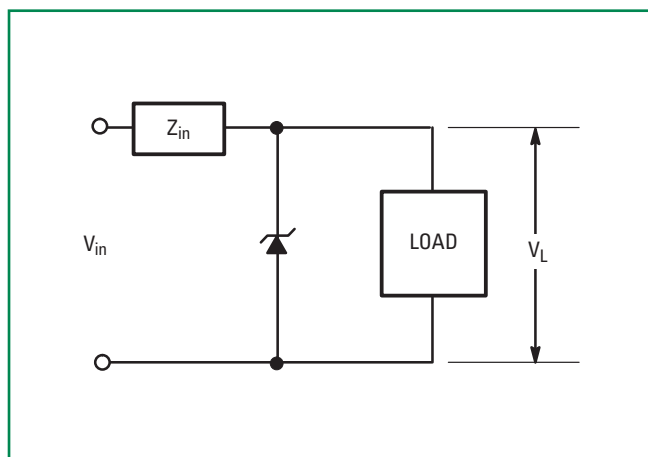
**Figure 1. 10 x 1000  $\mu$ s Pulse Waveform**



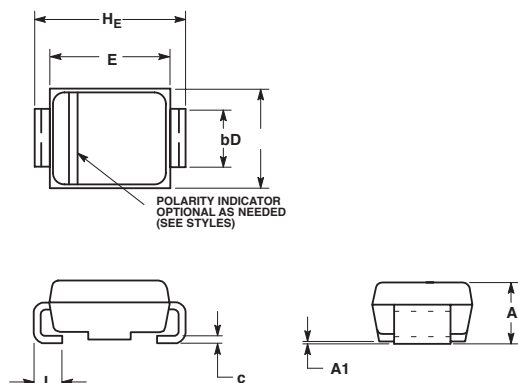
**Figure 2. Pulse Derating Curve**



**Figure 3. Typical Protection Circuit**



### Dimensions



Dim	Inches			Millimeters		
	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

#### NOTES:

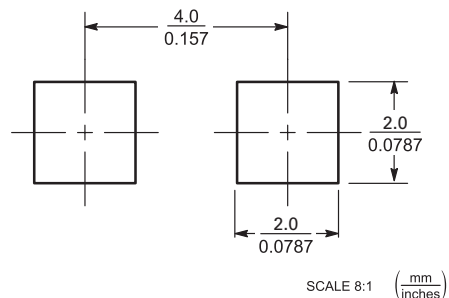
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 403D-01 OBSOLETE, NEW STANDARD IS 403D-02

### Part Marking System



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

### Soldering Footprint



### ORDERING INFORMATION

Device	Package	Shipping†
NS6A13AT3G	SMA (Pb-Free)	5000 / Tape & Reel

### Flow/Wave Soldering (Solder Dipping)

Peak Temperature :	260°C
Dipping Time :	10 seconds

### Physical Specifications

Case	Void-free, transfer-molded, thermosetting plastic
Polarity	Cathode indicated by polarity band
Leads	Modified L-Bend providing more contact area to bond pads
Finish	All external surfaces are corrosion resistant and leads are readily solderable
Mounting Position	Any

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