

NS6A13AT3G

600 Watt Peak Power Zener Transient Voltage Suppressor

Unidirectional

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.

Specification Features:

- Peak Reverse Working Voltage of 13 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

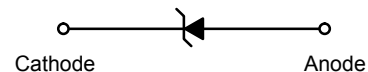
MOUNTING POSITION: Any



Expertise Applied | Answers Delivered

Littelfuse.com

PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSOR



SMA
CASE 403D
PLASTIC

MARKING DIAGRAM



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

ORDERING INFORMATION

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

NS6A13AT3G

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 50 | mW/ $^\circ\text{C}$ $^\circ\text{C}/\text{W}$ |
| 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 | $R_{\theta JA}$ | 4.0 250 | mW/ $^\circ\text{C}$ $^\circ\text{C}/\text{W}$ |
| 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 | $^\circ\text{C}$ |

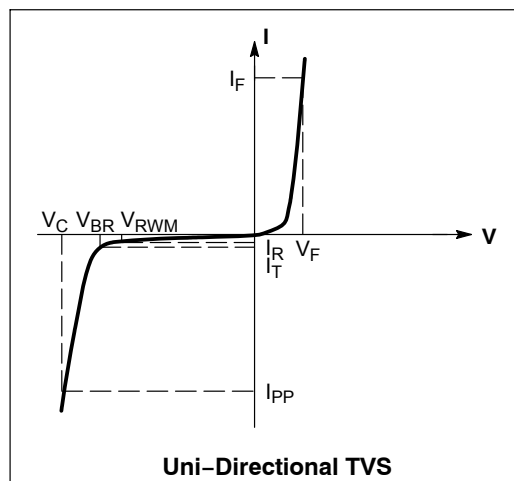
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- 10 X 1000 μs , non-repetitive.
- 1" square copper pad, FR-4 board
- FR-4 board, using 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 | $I_R @ V_{RWM}$ 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 |
| NS6A13AT3G | 6LG | 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, $T_J = 25^\circ\text{C}$.

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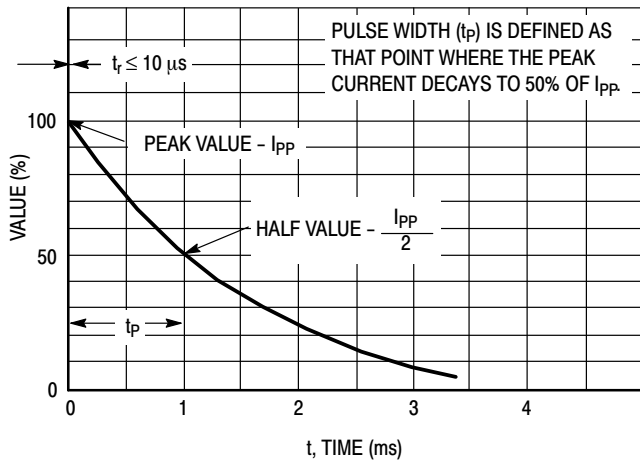


Figure 1. $10 \times 1000 \mu s$ Pulse Waveform

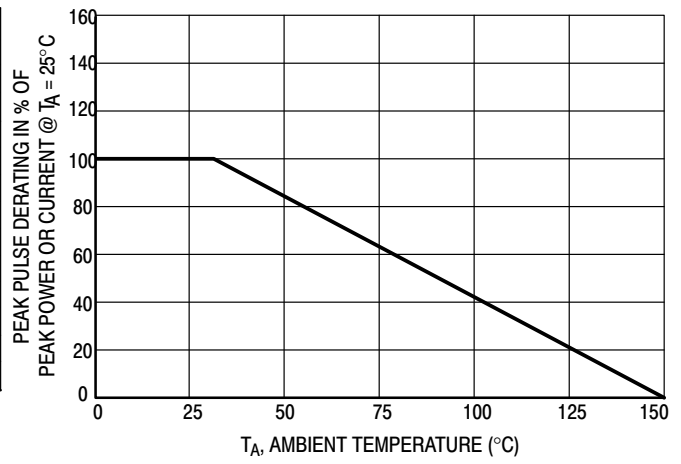


Figure 2. Pulse Derating Curve

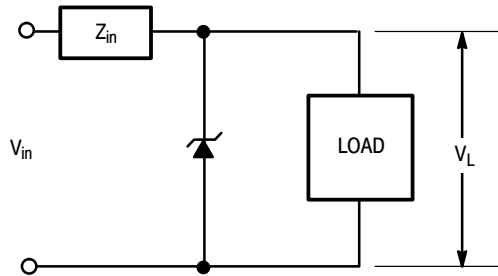
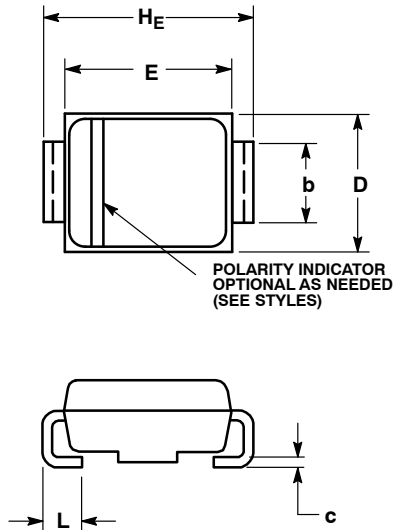


Figure 3. Typical Protection Circuit

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PACKAGE DIMENSIONS

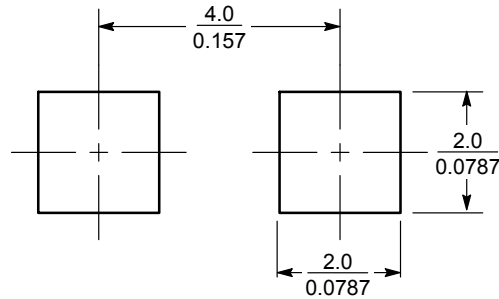
SMA
CASE 403D-02
ISSUE F



- 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



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

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