

# NUP4016P5T5G, SZNUP4016P5T5G

## Ultra-Low Capacitance Diode-TVS Array for High Speed Data Line Protection

The NUP4016P5 transient voltage suppressor is designed to protect high speed data lines from ESD. Ultra-low capacitance and high level of ESD protection makes this device well suited for use in USB 2.0 applications.

### Features

- Ultra-Low Capacitance (0.5 pF Typical Between I/O Lines and Ground)
- ESD Rating of Class 3B (Exceeding 8 kV) per Human Body model and Class C (Exceeding 400 V) per Machine Model
- Protection for the Following IEC Standards:  
IEC 61000-4-2 15 kV (contact)
- UL Flammability Rating of 94 V-0
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- This is a Pb-Free Device\*

### Typical Applications

- High Speed Communication Line Protection
- USB 2.0 High Speed Data Line and Power Line Protection
- Monitors and Flat Panel Displays
- MP3
- Gigabit Ethernet

### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

| Rating                                                                      | Symbol           | Value                 | Unit |
|-----------------------------------------------------------------------------|------------------|-----------------------|------|
| Operating Junction Temperature Range                                        | T <sub>J</sub>   | -40 to +125           | °C   |
| Storage Temperature Range                                                   | T <sub>stg</sub> | -55 to +150           | °C   |
| Lead Solder Temperature – Maximum (10 Seconds)                              | T <sub>L</sub>   | 260                   | °C   |
| Human Body Model (HBM)<br>Machine Model (MM)<br>IEC 61000-4-2 Contact (ESD) | ESD              | 16000<br>400<br>15000 | V    |

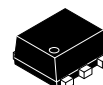
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

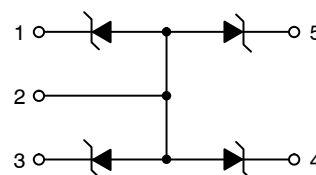


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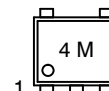
<http://onsemi.com>



SOT-953  
CASE 527AE



MARKING DIAGRAM



4 = Specific Device Code  
M = Date Code

### ORDERING INFORMATION

| Device         | Package              | Shipping†              |
|----------------|----------------------|------------------------|
| NUP4016P5T5G   | SOT-953<br>(Pb-Free) | 4,000 /<br>Tape & Reel |
| SZNUP4016P5T5G | SOT-953<br>(Pb-Free) | 4,000 /<br>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.

# NUP4016P5T5G, SZNUP4016P5T5G

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

| Parameter               | Symbol    | Conditions                                                       | Min | Typ | Max | Unit          |
|-------------------------|-----------|------------------------------------------------------------------|-----|-----|-----|---------------|
| Reverse Working Voltage | $V_{RWM}$ | (Note 1)                                                         |     |     | 5.0 | V             |
| Breakdown Voltage       | $V_{BR}$  | $I_T = 1\text{ mA}$ , (Note 2)                                   | 5.5 |     |     | V             |
| Reverse Leakage Current | $I_R$     | $V_{RWM} = 5\text{ V}$                                           |     |     | 1.0 | $\mu\text{A}$ |
| Junction Capacitance    | $C_J$     | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ between I/O Pins and GND |     | 0.5 | 0.8 | pF            |
| Junction Capacitance    | $C_J$     | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ between I/O Pins         |     | 0.3 | 0.5 | pF            |

1. TVS devices are normally selected according to the working peak reverse voltage ( $V_{RWM}$ ), which should be equal or greater than the DC or continuous peak operating voltage level.
2.  $V_{BR}$  is measured at pulse test current  $I_T$ .
3. Include SZ-prefix devices where applicable.

## TYPICAL PERFORMANCE CURVES

( $T_J = 25^\circ\text{C}$  unless otherwise noted)

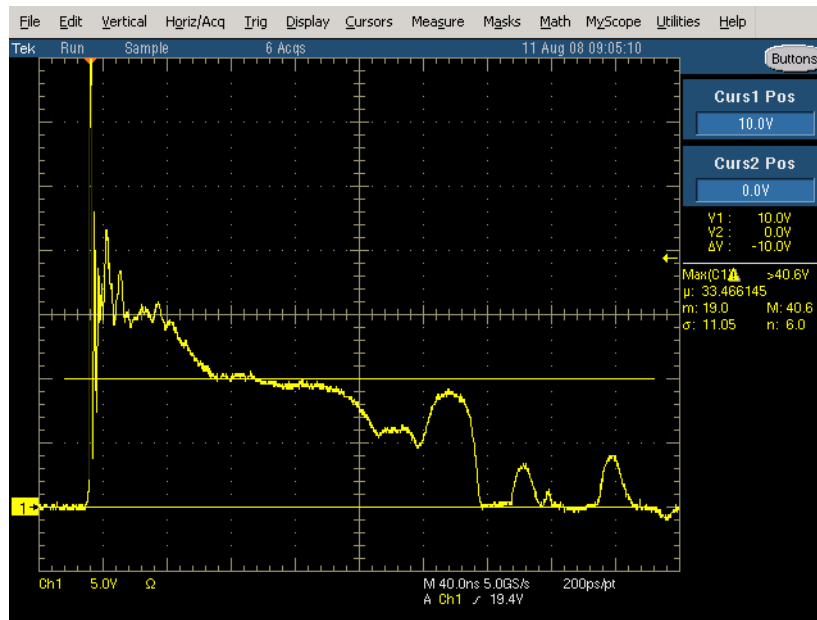
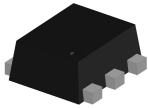


Figure 1. ESD Clamping Voltage Screenshot  
(8 kV Contact per IEC61000-4-2)

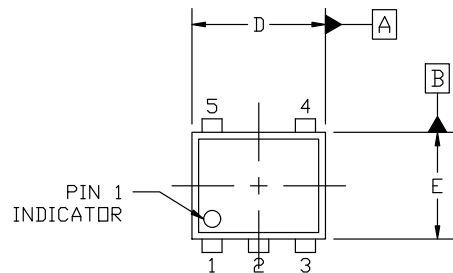


**SOT-953 1.00x0.80x0.37, 0.35P**  
**CASE 527AE**  
**ISSUE F**

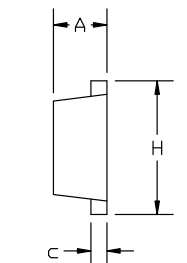
DATE 17 JAN 2024

**NOTES:**

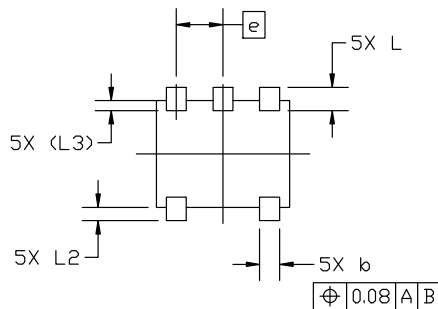
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.



TOP VIEW

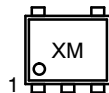


SIDE VIEW



BOTTOM VIEW

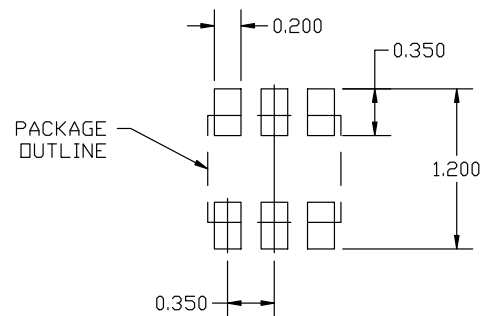
**GENERIC MARKING DIAGRAM\***



X = Specific Device Code  
M = Month Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

| MILLIMETERS |             |       |       |
|-------------|-------------|-------|-------|
| DIM         | MIN         | NOM   | MAX   |
| A           | 0.34        | 0.37  | 0.40  |
| b           | 0.10        | 0.15  | 0.20  |
| C           | 0.07        | 0.12  | 0.17  |
| D           | 0.95        | 1.00  | 1.05  |
| E           | 0.75        | 0.80  | 0.85  |
| e           | 0.35 BSC    |       |       |
| H           | 0.95        | 1.00  | 1.05  |
| L           | 0.125       | 0.175 | 0.225 |
| L2          | 0.05        | 0.10  | 0.15  |
| L3          | 0.075 (REF) |       |       |



**RECOMMENDED MOUNTING 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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