

# NUP4301MR6T1G, SZNUP4301MR6T1G

## Low Capacitance Diode Array for ESD Protection in Four Data Lines

SZ/NUP4301MR6T1G is a micro-integrated device designed to provide protection for sensitive components from possible harmful electrical transients; for example, ESD (electrostatic discharge).

### Features

- Low Capacitance (1.5 pf Maximum Between I/O Lines)
- Single Package Integration Design
- Provides ESD Protection for JEDEC Standards JESD22  
Machine Model = Class C  
Human Body Model = Class 3B
- Protection for IEC61000-4-2 (Level 4)  
8.0 kV (Contact)  
15 kV (Air)
- Ensures Data Line Speed and Integrity
- Fewer Components and Less Board Space
- Direct the Transient to Either Positive Side or to the Ground
- 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\*

### Applications

- USB 1.1 and 2.0 Data Line Protection
- T1/E1 Secondary IC Protection
- T3/E3 Secondary IC Protection
- HDSL, IDSL Secondary IC Protection
- Video Line Protection
- Microcontroller Input Protection
- Base Stations
- I<sup>2</sup>C Bus Protection



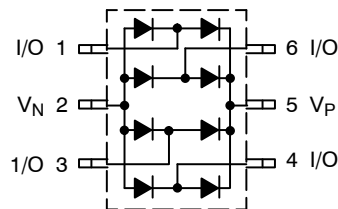
ON Semiconductor®

<http://onsemi.com>

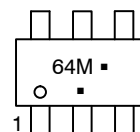


SC-74  
CASE 318F  
PLASTIC

### PIN CONFIGURATION AND SCHEMATIC



### MARKING DIAGRAM



64 = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location.)

\*Date Code orientation may vary depending upon manufacturing location.

### ORDERING INFORMATION

| Device          | Package            | Shipping†              |
|-----------------|--------------------|------------------------|
| NUP4301MR6T1G   | SC-74<br>(Pb-Free) | 3,000 /<br>Tape & Reel |
| SZNUP4301MR6T1G | SC-74<br>(Pb-Free) | 3,000 /<br>Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

# NUP4301MR6T1G, SZNUP4301MR6T1G

## MAXIMUM RATINGS (Each Diode) ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

| Rating                                                                                  | Symbol          | Value             | Unit |
|-----------------------------------------------------------------------------------------|-----------------|-------------------|------|
| Reverse Voltage                                                                         | $V_R$           | 70                | Vdc  |
| Forward Current                                                                         | $I_F$           | 200               | mAdc |
| Peak Forward Surge Current                                                              | $I_{FM(surge)}$ | 500               | mAdc |
| Repetitive Peak Reverse Voltage                                                         | $V_{RRM}$       | 70                | V    |
| Average Rectified Forward Current (Note 1) (averaged over any 20 ms period)             | $I_{F(AV)}$     | 715               | mA   |
| Repetitive Peak Forward Current                                                         | $I_{FRM}$       | 450               | mA   |
| Non-Repetitive Peak Forward Current<br>t = 1.0 $\mu\text{s}$<br>t = 1.0 ms<br>t = 1.0 S | $I_{FSM}$       | 2.0<br>1.0<br>0.5 | A    |

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. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.

## THERMAL CHARACTERISTICS

| Characteristic                                       | Symbol          | Max         | Unit               |
|------------------------------------------------------|-----------------|-------------|--------------------|
| Thermal Resistance, Junction-to-Ambient              | $R_{\theta JA}$ | 556         | $^\circ\text{C/W}$ |
| Lead Solder Temperature, Maximum 10 Seconds Duration | $T_L$           | 260         | $^\circ\text{C}$   |
| Junction Temperature                                 | $T_J$           | -40 to +85  | $^\circ\text{C}$   |
| Storage Temperature                                  | $T_{stg}$       | -55 to +150 | $^\circ\text{C}$   |

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

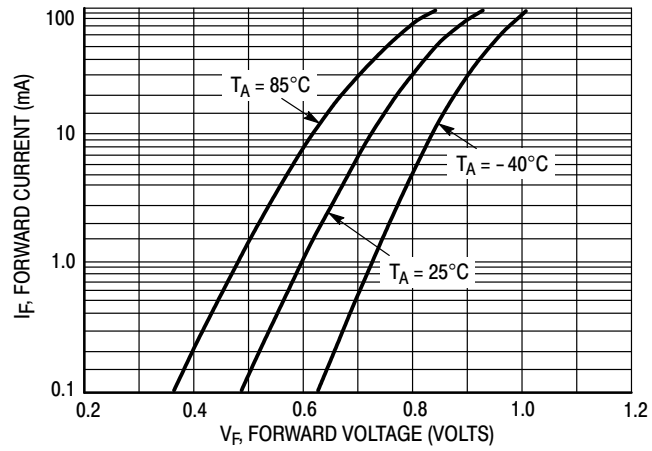
| Characteristic                                                                                                                                                                    | Symbol     | Min              | Typ              | Max                        | Unit            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|------------------|----------------------------|-----------------|
| <b>OFF CHARACTERISTICS</b>                                                                                                                                                        |            |                  |                  |                            |                 |
| Reverse Breakdown Voltage<br>( $I_{(BR)} = 100 \mu\text{A}$ )                                                                                                                     | $V_{(BR)}$ | 70               | –                | –                          | Vdc             |
| Reverse Voltage Leakage Current<br>( $V_R = 70 \text{ Vdc}$ )<br>( $V_R = 25 \text{ Vdc}$ , $T_J = 150^\circ\text{C}$ )<br>( $V_R = 70 \text{ Vdc}$ , $T_J = 150^\circ\text{C}$ ) | $I_R$      | –<br>–<br>–      | –<br>–<br>–      | 2.5<br>30<br>50            | $\mu\text{Adc}$ |
| Capacitance (between I/O pins)<br>( $V_R = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$ )                                                                                                 | $C_D$      | –                | 0.8              | 1.5                        | pF              |
| Capacitance (between I/O pin and ground)<br>( $V_R = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$ )                                                                                       | $C_D$      | –                | 1.6              | 3                          | pF              |
| Forward Voltage<br>( $I_F = 1.0 \text{ mAdc}$ )<br>( $I_F = 10 \text{ mAdc}$ )<br>( $I_F = 50 \text{ mAdc}$ )<br>( $I_F = 150 \text{ mAdc}$ )                                     | $V_F$      | –<br>–<br>–<br>– | –<br>–<br>–<br>– | 715<br>855<br>1000<br>1250 | mVdc            |

2. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.

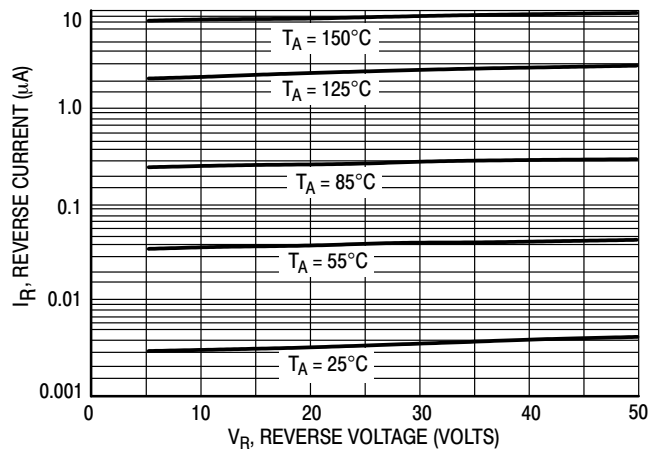
3. Include SZ-prefix devices where applicable.

# NUP4301MR6T1G, SZNUP4301MR6T1G

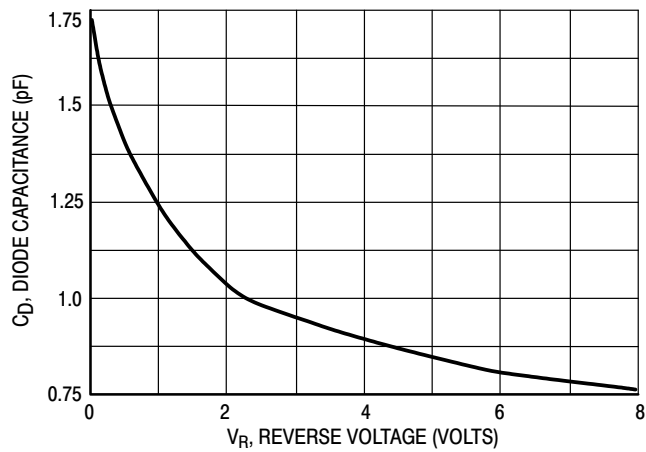
## Curves Applicable to Each Cathode



**Figure 1. Forward Voltage**



**Figure 2. Leakage Current**

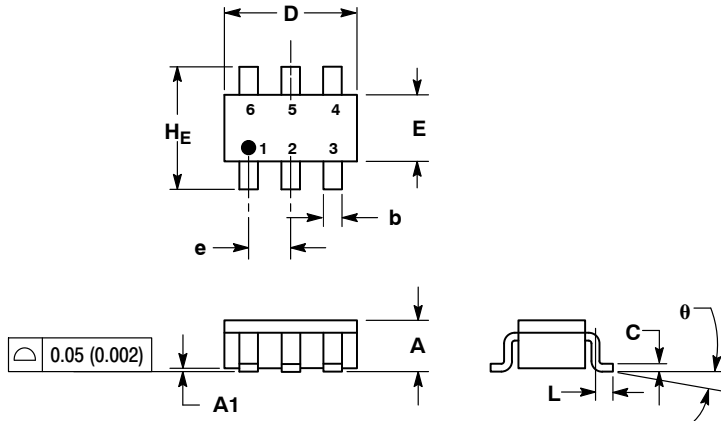


**Figure 3. Capacitance**

# NUP4301MR6T1G, SZNUP4301MR6T1G

## PACKAGE DIMENSIONS

SC-74  
CASE 318F-05  
ISSUE M

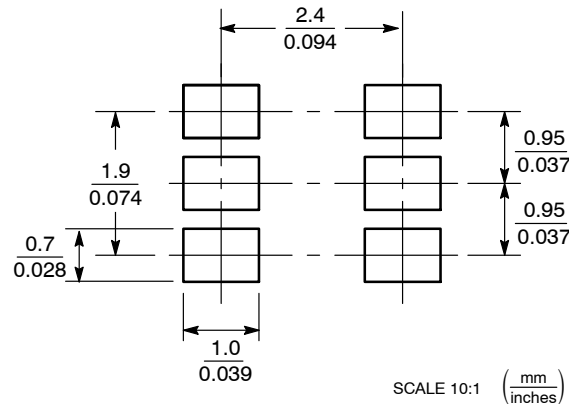


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318F-01, -02, -03, -04 OBSOLETE. NEW STANDARD 318F-05.

| DIM      | MILLIMETERS |      |      | INCHES |       |       |
|----------|-------------|------|------|--------|-------|-------|
|          | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A        | 0.90        | 1.00 | 1.10 | 0.035  | 0.039 | 0.043 |
| A1       | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b        | 0.25        | 0.37 | 0.50 | 0.010  | 0.015 | 0.020 |
| c        | 0.10        | 0.18 | 0.26 | 0.004  | 0.007 | 0.010 |
| D        | 2.90        | 3.00 | 3.10 | 0.114  | 0.118 | 0.122 |
| E        | 1.30        | 1.50 | 1.70 | 0.051  | 0.059 | 0.067 |
| e        | 0.85        | 0.95 | 1.05 | 0.034  | 0.037 | 0.041 |
| L        | 0.20        | 0.40 | 0.60 | 0.008  | 0.016 | 0.024 |
| H        | 2.50        | 2.75 | 3.00 | 0.099  | 0.108 | 0.118 |
| $\theta$ | 0°          | —    | 10°  | 0°     | —     | 10°   |

## SOLDERING 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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NUP4301MR6T1/D



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Электрон  
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