



**THE DATASHEET OF  
NUP2301MW6T1G**



# NUP2301MW6T1G, SZNUP2301MW6T1G

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

NUP2301MW6T1G 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 (2.0 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

- 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



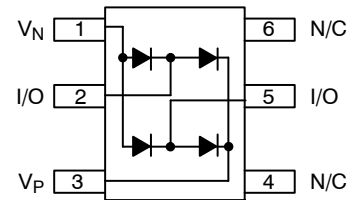
ON Semiconductor®

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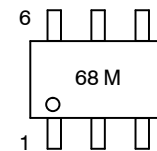


SC-88  
CASE 419B  
STYLE 23

### PIN CONFIGURATION AND SCHEMATIC



### MARKING DIAGRAM



68 = Specific Device Code  
M = Date Code

### ORDERING INFORMATION

| Device          | Package            | Shipping†              |
|-----------------|--------------------|------------------------|
| NUP2301MW6T1G   | SC-88<br>(Pb-Free) | 3,000 /<br>Tape & Reel |
| SZNUP2301MW6T1G | SC-88<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.

# NUP2301MW6T1G, SZNUP2301MW6T1G

## 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>$t = 1.0 \text{ ms}$<br>$t = 1.0 \text{ S}$ | $I_{FSM}$       | 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                 | $R_{\theta JA}$ | 625         | $^\circ\text{C/W}$ |
| Lead Solder Temperature<br>Maximum 10 Seconds Duration | $T_L$           | 260         | $^\circ\text{C}$   |
| Junction Temperature                                   | $T_J$           | -55 to +150 | $^\circ\text{C}$   |
| 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 |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

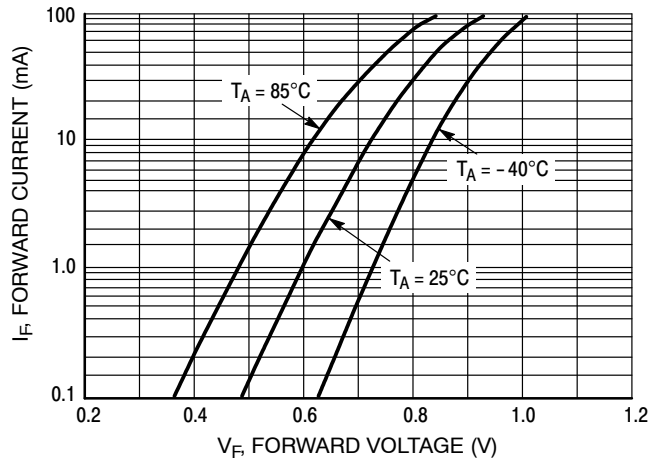
|   |            |    |     |                            |                  |
|---|------------|----|-----|----------------------------|------------------|
| Reverse Breakdown Voltage<br>( $I_{(BR)} = 100 \mu\text{A}$ )   | $V_{(BR)}$ | 70 | -   | -                          | Vdc              |
| Reverse Voltage Leakage Current<br>( $V_R = 70 \text{ Vdc}$ )<br>( $V_R = 25 \text{ Vdc}$ , $T_J = 150^\circ\text{C}$ )<br>( $V_R = 70 \text{ Vdc}$ , $T_J = 150^\circ\text{C}$ ) | $I_R$      | -  | -   | 2.5<br>30<br>50            | $\mu\text{Adc}$  |
| Capacitance (between I/O pins)<br>( $V_R = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$ )   | $C_D$      | -  | 1.0 | 2.0                        | 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>( $I_F = 150 \text{ mAdc}$ )                                     | $V_F$      | -  | -   | 715<br>855<br>1000<br>1250 | mV <sub>dc</sub> |

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

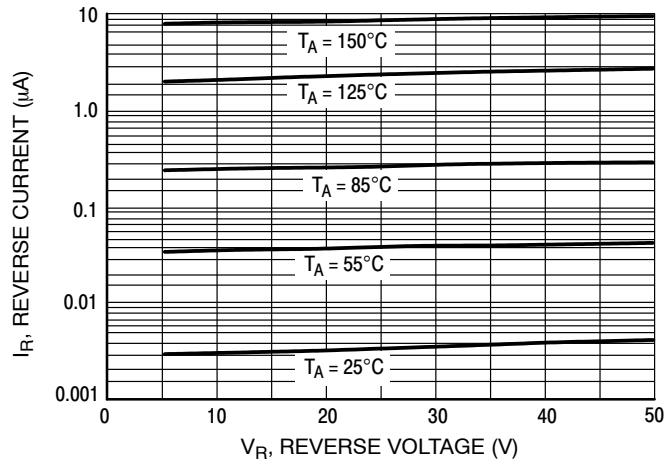
3. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.

4. Include SZ-prefix devices where applicable.

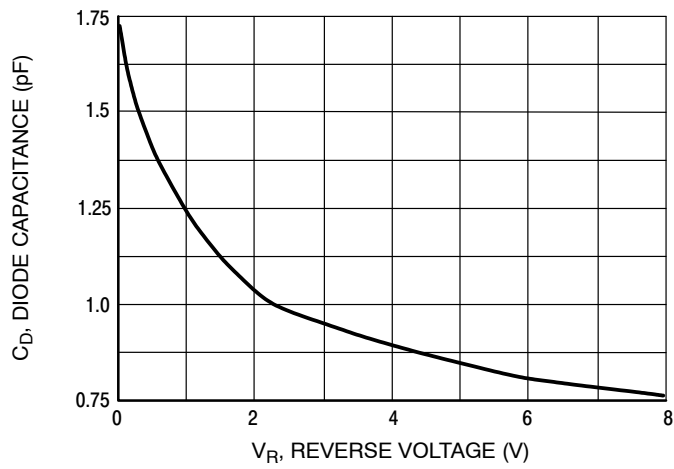
**NUP2301MW6T1G, SZNUP2301MW6T1G**



**Figure 1. Forward Voltage**



**Figure 2. Leakage Current**

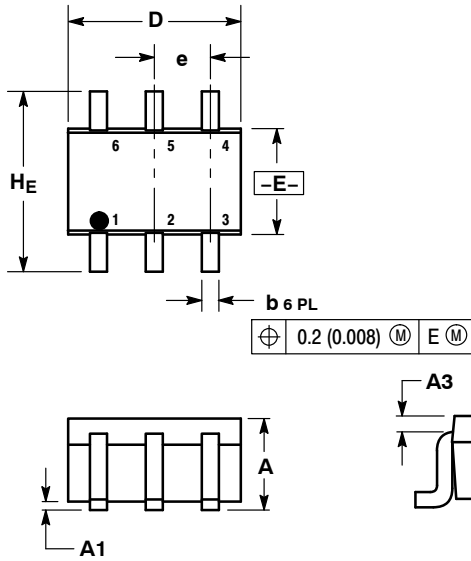


**Figure 3. Capacitance**

# NUP2301MW6T1G, SZNUP2301MW6T1G

## PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363  
CASE 419B-02  
ISSUE W

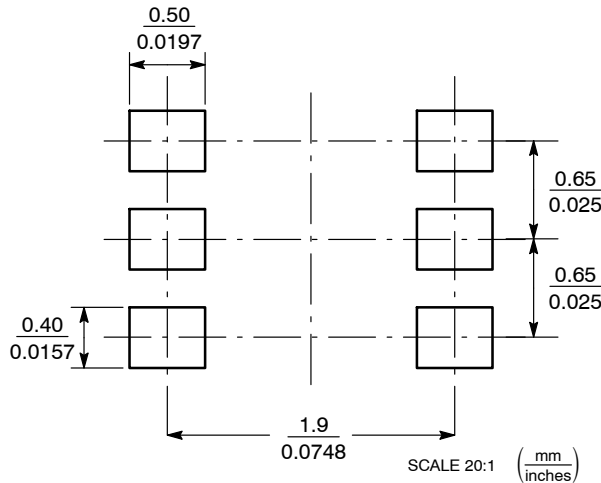


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

| DIM | MILLIMETERS |      |      | INCHES    |       |       |
|-----|-------------|------|------|-----------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A   | 0.80        | 0.95 | 1.10 | 0.031     | 0.037 | 0.043 |
| A1  | 0.00        | 0.05 | 0.10 | 0.000     | 0.002 | 0.004 |
| A3  | 0.20 REF    |      |      | 0.008 REF |       |       |
| b   | 0.10        | 0.21 | 0.30 | 0.004     | 0.008 | 0.012 |
| C   | 0.10        | 0.14 | 0.25 | 0.004     | 0.005 | 0.010 |
| D   | 1.80        | 2.00 | 2.20 | 0.070     | 0.078 | 0.086 |
| E   | 1.15        | 1.25 | 1.35 | 0.045     | 0.049 | 0.053 |
| e   | 0.65 BSC    |      |      | 0.026 BSC |       |       |
| L   | 0.10        | 0.20 | 0.30 | 0.004     | 0.008 | 0.012 |
| HE  | 2.00        | 2.10 | 2.20 | 0.078     | 0.082 | 0.086 |

- STYLE 23:  
PIN 1. Vn  
2. CH1  
3. Vp  
4. N/C  
5. CH2  
6. N/C

## 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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