

NUP4301MR6, SZNUP4301MR6

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
- I²C Bus Protection



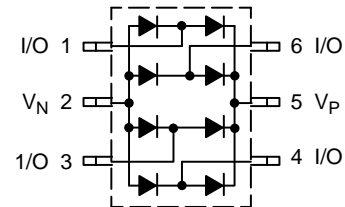
ON Semiconductor®

<http://onsemi.com>

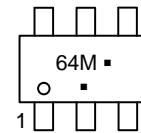


SC-74
CASE 318F

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 (Pb-Free) | 3,000 / Tape & Reel |
| SZNUP4301MR6T1G | SC-74 (Pb-Free) | 3,000 / 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.

NUP4301MR6, SZNUP4301MR6

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 t = 1.0 μs t = 1.0 ms t = 1.0 S | I_{FSM} | 2.0 1.0 0.5 | A |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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 | $^\circ\text{C}/\text{W}$ |
| Lead Solder Temperature, Maximum 10 Seconds Duration | T_L | 260 | $^\circ\text{C}$ |
| Junction Temperature | T_J | -40 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 ($I_{(BR)} = 100 \mu\text{A}$) | $V_{(BR)}$ | 70 | - | - | Vdc |
| Reverse Voltage Leakage Current ($V_R = 70 \text{ Vdc}$) ($V_R = 25 \text{ Vdc}$, $T_J = 150^\circ\text{C}$) ($V_R = 70 \text{ Vdc}$, $T_J = 150^\circ\text{C}$) | I_R | - | - | 2.5 30 50 | μAdc |
| Capacitance (between I/O pins) ($V_R = 0 \text{ V}$, $f = 1.0 \text{ MHz}$) | C_D | - | 0.8 | 1.5 | pF |
| Capacitance (between I/O pin and ground) ($V_R = 0 \text{ V}$, $f = 1.0 \text{ MHz}$) | C_D | - | 1.6 | 3 | pF |
| Forward Voltage ($I_F = 1.0 \text{ mAdc}$) ($I_F = 10 \text{ mAdc}$) ($I_F = 50 \text{ mAdc}$) ($I_F = 150 \text{ mAdc}$) | V_F | - | - | 715 855 1000 1250 | mV_{dc} |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

3. Include SZ-prefix devices where applicable.

NUP4301MR6, SZNUP4301MR6

Curves Applicable to Each Cathode

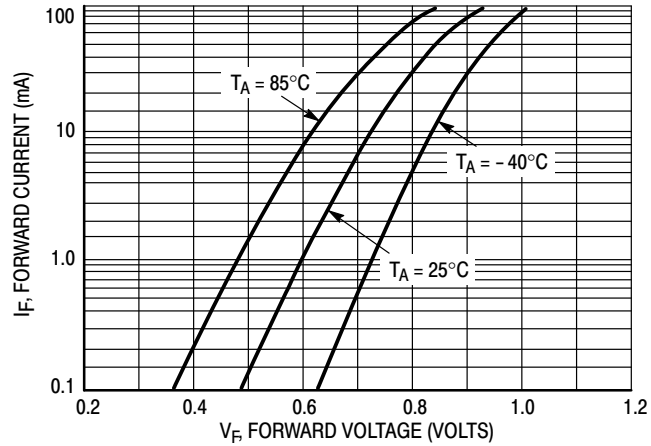


Figure 1. Forward Voltage

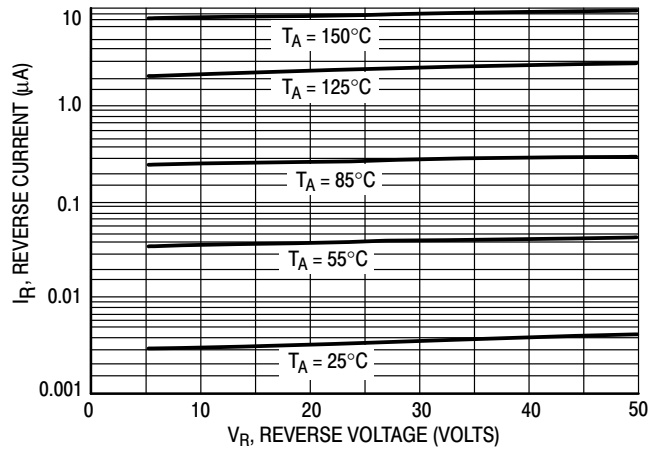


Figure 2. Leakage Current

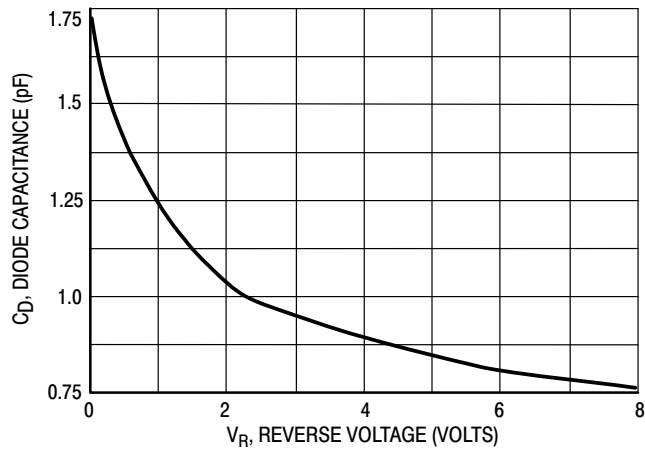


Figure 3. Capacitance

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 2:1

SC-74
CASE 318F
ISSUE P

DATE 07 OCT 2021



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
2. CONTROLLING DIMENSION: INCHES
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.

| 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 |
| HE | 2.50 | 2.75 | 3.00 | 0.099 | 0.108 | 0.118 |
| L | 0.20 | 0.40 | 0.60 | 0.008 | 0.016 | 0.024 |
| M | 0* | --- | 10* | 0* | --- | 10* |

GENERIC MARKING DIAGRAM*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

*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.



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

SOLDERING FOOTPRINT

- | | | | | | |
|---|--|---|--|---|---|
| <p>STYLE 1: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. ANODE 6. CATHODE</p> | <p>STYLE 2: PIN 1. NO CONNECTION 2. COLLECTOR 3. EMITTER 4. NO CONNECTION 5. COLLECTOR 6. BASE</p> | <p>STYLE 3: PIN 1. EMITTER 1 2. BASE 1 3. COLLECTOR 2 4. EMITTER 2 5. BASE 2 6. COLLECTOR 1</p> | <p>STYLE 4: PIN 1. COLLECTOR 2 2. EMITTER 1/EMITTER 2 3. COLLECTOR 1 4. EMITTER 3 5. BASE 1/BASE 2/COLLECTOR 3 6. BASE 3</p> | <p>STYLE 5: PIN 1. CHANNEL 1 2. ANODE 3. CHANNEL 2 4. CHANNEL 3 5. CATHODE 6. CHANNEL 4</p> | <p>STYLE 6: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE</p> |
| <p>STYLE 7: PIN 1. SOURCE 1 2. GATE 1 3. DRAIN 2 4. SOURCE 2 5. GATE 2 6. DRAIN 1</p> | <p>STYLE 8: PIN 1. EMITTER 1 2. BASE 2 3. COLLECTOR 2 4. EMITTER 2 5. BASE 1 6. COLLECTOR 1</p> | <p>STYLE 9: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2</p> | <p>STYLE 10: PIN 1. ANODE/CATHODE 2. BASE 3. EMITTER 4. COLLECTOR 5. ANODE 6. CATHODE</p> | <p>STYLE 11: PIN 1. EMITTER 2. BASE 3. ANODE/CATHODE 4. ANODE 5. CATHODE 6. COLLECTOR</p> | |

| | | |
|------------------|-------------|---|
| DOCUMENT NUMBER: | 98ASB42973B | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION: | SC-74 | PAGE 1 OF 1 |

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative