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
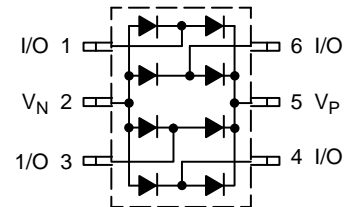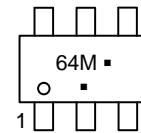- Base Stations
- I^2C Bus Protection

ON Semiconductor®

SC−74
CASE 318F

PIN CONFIGURATION AND SCHEMATIC

I/O	1		6	I/O
V_N	2		5	V_P
1/O	3		4	I/O

MARKING DIAGRAM

64M ▪

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64 = Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location.)

*Date Code orientation may vary depending up-on 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.

September, 2014 – Rev. 7

Publication Order Number:
NUP4301MR6T1/D

NUP4301MR6, SZNUP4301MR6

MAXIMUM RATINGS (Each Diode) (T_J = 25°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 × 0.75 × 0.062 in.

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted) (Each Diode)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Reverse Breakdown Voltage 　　($I_{(BR)}$ = 100 μA)	$V_{(BR)}$	 70	 –	 –	Vdc
Reverse Voltage Leakage Current 　　(V_R = 70 Vdc) 　　(V_R = 25 Vdc, T_J = 150°C) 　　(V_R = 70 Vdc, T_J = 150°C)	I_R	 – – –	 – – –	 2.5 30 50	μAdc
Capacitance (between I/O pins) 　　(V_R = 0 V, f = 1.0 MHz)	C_D	 –	 0.8	 1.5	pF
Capacitance (between I/O pin and ground) 　　(V_R = 0 V, f = 1.0 MHz)	C_D	 –	 1.6	 3	pF
Forward Voltage 　　(I_F = 1.0 mAdc) 　　(I_F = 10 mAdc) 　　(I_F = 50 mAdc) 　　(I_F = 150 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 × 0.3 × 0.024 in. 99.5% alumina.
3. Include SZ-prefix devices where applicable.

NUP4301MR6, SZNUP4301MR6

Curves Applicable to Each Cathode

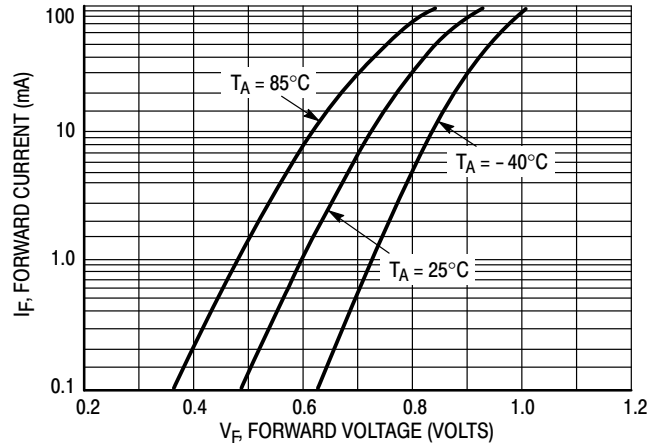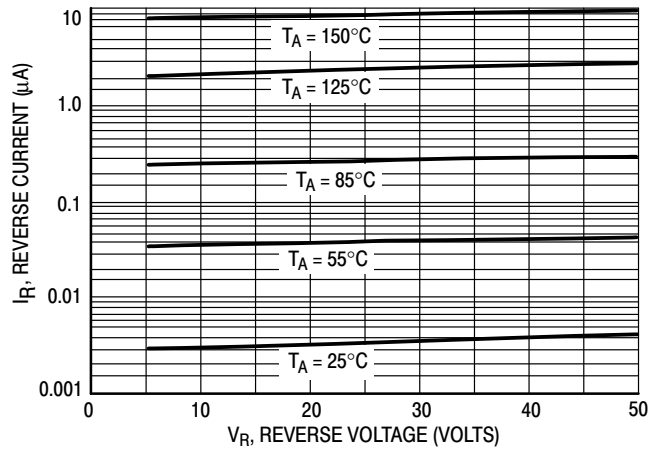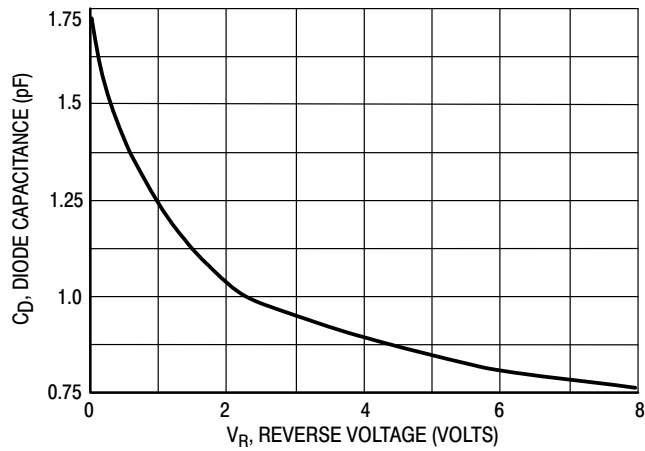
Figure 1. Forward Voltage

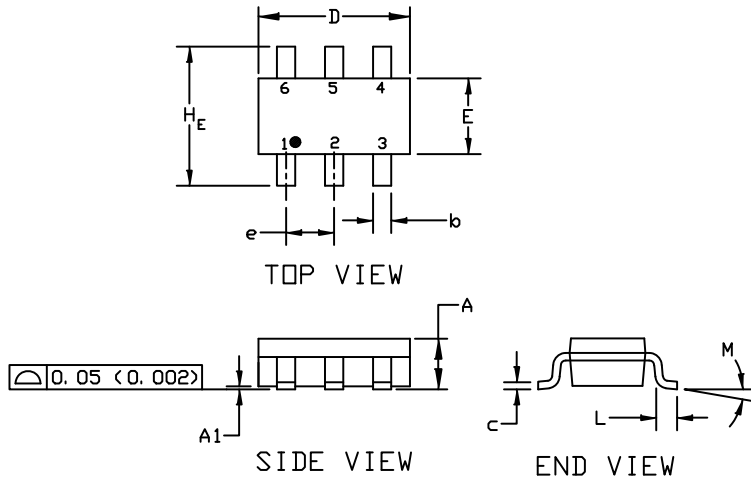**Figure 2. Leakage Current**

Figure 3. Capacitance

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SCALE 2:1

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ISSUE P

DATE 07 OCT 2021

TOP VIEW

SIDE VIEW

END VIEW

0.05 (0.002)

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
H_E	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 M▪
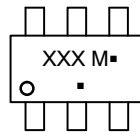
XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(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.
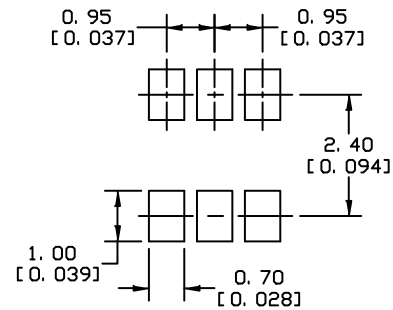
0.95 [0.037]   0.95 [0.037]

2.40 [0.094]

1.00 [0.039]

0.70 [0.028]

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

SOLDERING FOOTPRINT

STYLE 1:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

STYLE 2:
PIN 1. NO CONNECTION
2. COLLECTOR
3. EMITTER
4. NO CONNECTION
5. COLLECTOR
6. BASE

STYLE 3:
PIN 1. EMITTER 1
2. BASE 1
3. COLLECTOR 2
4. EMITTER 2
5. BASE 2
6. COLLECTOR 1

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

STYLE 5:
PIN 1. CHANNEL 1
2. ANODE
3. CHANNEL 2
4. CHANNEL 3
5. CATHODE
6. CHANNEL 4

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 8:
PIN 1. EMITTER 1
2. BASE 2
3. COLLECTOR 2
4. EMITTER 2
5. BASE 1
6. COLLECTOR 1

STYLE 9:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

STYLE 10:
PIN 1. ANODE/CATHODE
2. BASE
3. EMITTER
4. COLLECTOR
5. ANODE
6. CATHODE

STYLE 11:
PIN 1. EMITTER
2. BASE
3. ANODE/CATHODE
4. ANODE
5. CATHODE
6. COLLECTOR

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