NL27WZ32

Dual 2-Input OR Gate

The NL27WZ32 is a high performance dual 2−input OR Gate operating from a 1.65 V to 5.5 V supply.

Features

- Extremely High Speed: t_{PD} 2.5 ns (typical) at V_{CC} = 5 V
- Designed for 1.65 V to 5.5 V V_{CC} Operation
- Over Voltage Tolerant Inputs
- LVTTL Compatible − Interface Capability With 5 V TTL Logic with V_{CC} = 3 V
- LVCMOS Compatible
- 24 mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- Replacement for NC7WZ32
- Chip Complexity: FET = 120
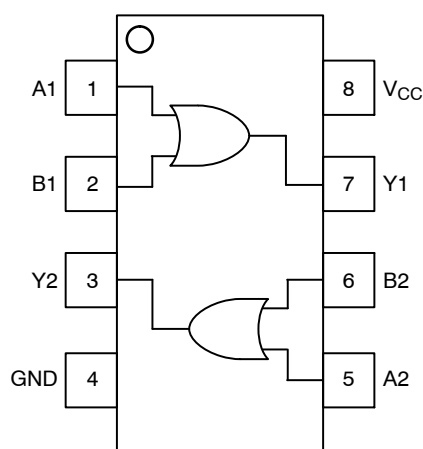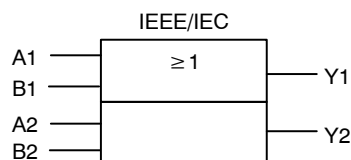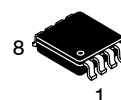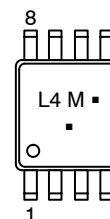- These Devices are Pb−Free and are RoHS Compliant

ON Semiconductor®

http://onsemi.com

MARKING DIAGRAM

US8
US SUFFIX
CASE 493

L4 M

LR = Device Code
M = Date Code*
∎ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

Figure 1. Pinout

Figure 2. Logic Symbol

PIN ASSIGNMENT

Pin	Function
1	A1
2	B1
3	Y2
4	GND
5	A2
6	B2
7	Y1
8	V_{CC}

FUNCTION TABLE

Input		Output $Y = A + B$
A	**B**	**Y**
L	L	L
L	H	H
H	L	H
H	H	H

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

NL27WZ32

MAXIMUM RATINGS

Symbol	Parameter	Value	Units
V_{CC}	DC Supply Voltage	−0.5 to +7.0	V
V_I	DC Input Voltage	−0.5 to +7.0	V
V_O	DC Output Voltage	−0.5 to +7.0	V
I_{IK}	DC Input Diode Current V_I < GND	−50	mA
I_{OK}	DC Output Diode Current V_O < GND	−50	mA
I_O	DC Output Sink Current	±50	mA
I_{CC}	DC Supply Current per Supply Pin	±100	mA
I_{GND}	DC Ground Current per Ground Pin	±100	mA
T_{STG}	Storage Temperature Range	−65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C
T_J	Junction Temperature under Bias	+150	°C
θ_{JA}	Thermal Resistance (Note 1)	250	°C/W
P_D	Power Dissipation in Still Air at 85°C	250	mW
MSL	Moisture Sensitivity	Level 1	
F_R	Flammability Rating Oxygen Index: 28 to 34	UL 94 V−0 @ 0.125 in	
V_{ESD}	ESD Withstand Voltage Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	> 2000 > 200 N/A	V
$I_{Latch-Up}$	Latch−Up Performance Above V_{CC} and Below GND at 85°C (Note 5)	±500	mA

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. Measured with minimum pad spacing on an FR4 board, using 10 mm−by−1 inch, 2−ounce copper trace with no air flow.
2. Tested to EIA/JESD22−A114−A.
3. Tested to EIA/JESD22−A115−A.
4. Tested to JESD22−C101−A.
5. Tested to EIA/JESD78.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Units
V_{CC}	Supply Voltage Operating Data Retention Only	1.65 1.5	5.5 5.5	V
V_I	Input Voltage (Note 6)	0	5.5	V
V_O	Output Voltage (HIGH or LOW State)	0	5.5	V
T_A	Operating Free−Air Temperature	−40	+85	°C
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate V_{CC} = 1.8 V ±0.15 V V_{CC} = 2.5 V ±0.2 V V_{CC} = 3.0 V ±0.3 V V_{CC} = 5.0 V ±0.5 V	0 0 0 0	20 20 10 5	ns/V

6. Unused inputs may not be left open. All inputs must be tied to a high−logic voltage level or a low−logic input voltage level.

NL27WZ32

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V_{CC} (V)	T_A = +25°C Min	Typ	Max	T_A = −40°C to +85°C Min	Max	Units
V_{IH}	HIGH Level Input Voltage		1.65 to 1.95	0.75 V_{CC} 0.7 V_{CC}			0.75 V_{CC} 0.7 V_{CC}		V
V_{IL}	LOW Level Input Voltage		1.65 to 1.95 2.3 to 5.5			0.3 V_{CC}		0.3 V_{CC}	V
V_{OH}	HIGH Level Output Voltage $V_{IN} = V_{IH}$	I_{OH} = −100 µA	1.65 2.3 3.0 4.5	1.55 2.2 2.9 4.4	1.65 2.3 3.0 4.5		1.55 2.2 2.9 4.4		V
		I_{OH} = −4 mA I_{OH} = −8 mA I_{OH} = −16 mA I_{OH} = −24 mA I_{OH} = −32 mA	1.65 2.3 3.0 3.0 4.5	1.29 1.9 2.4 2.3 3.8	1.52 2.15 2.8 2.68 4.2		1.20 1.9 2.4 2.3 3.8		
V_{OL}	Low−Level Output Voltage $V_{IN} = V_{IL}$	I_{OL} = 100 µA	1.65 2.3 3.0 4.5		0 0 0 0	0.1 0.1 0.1 0.1			V
		I_{OH} = 4 mA I_{OH} = 8 mA I_{OH} = 16 mA I_{OH} = 24 mA I_{OH} = 32 mA	1.65 2.3 3.0 3.0 4.5		0.08 0.1 0.15 0.22 0.22	0.24 0.3 0.4 0.55 0.55			
I_{IN}	Input Leakage Current	V_{IN} = 5.5 V or GND	0 to 5.5			±0.1		±1.0	µA
I_{OFF}	Power Off Leakage Current	V_{IN} = 5.5 V or V_{OUT} = 5.5 V	0			1.0		10	
I_{CC}	Quiescent Supply Current	V_{IN} = 5.5 V or GND	5.5			1.0		10	µA

AC ELECTRICAL CHARACTERISTICS $t_R = t_F$ = 3.0 ns

Symbol	Parameter	Condition	V_{CC} (V)	T_A = 25°C Min	Typ	Max	−40°C ≤ T_A ≤ 85°C Min	Max	Units
t_{PLH} t_{PHL}	Propagation Delay (Figure 3 and 4)	R_L = 1 MΩ, C_L = 15 pF	1.8 ± 0.15 2.5 ± 0.2	2.0 1.0	8.0 3.5	9.5 5.8	2.0 1.0	10.5 6.2	ns
		R_L = 1 MΩ, C_L = 15 pF R_L = 500 Ω, C_L = 50 pF	3.3 ± 0.3	0.8 1.2	2.6 3.2	3.9 4.8	0.8 1.2	4.3 5.2	
		R_L = 1 MΩ, C_L = 15 pF R_L = 500 Ω, C_L = 50 pF	5.0 ± 0.5	0.5 0.8	1.9 2.5	3.1 3.7	0.5 0.8	3.3 4.0	

CAPACITIVE CHARACTERISTICS

| Symbol	Parameter	Condition	Typical	Units
C_{IN}	Input Capacitance	V_{CC} = 5.5 V, V_I = 0 V or V_{CC}	2.5	pF
C_{PD}	Power Dissipation Capacitance (Note 7)	10 MHz, V_{CC} = 3.3 V, V_I = 0 V or V_{CC} 10 MHz, V_{CC} = 5.5 V, V_I = 0 V or V_{CC}	9 11	pF

7. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)} = C_{PD} \bullet V_{CC} \bullet f_{in} + I_{CC}$. C_{PD} is used to determine the no−load dynamic power consumption; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.

NL27WZ32
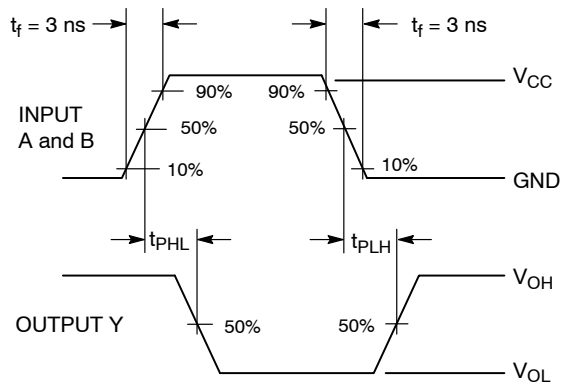
Figure 3. Switching Waveform
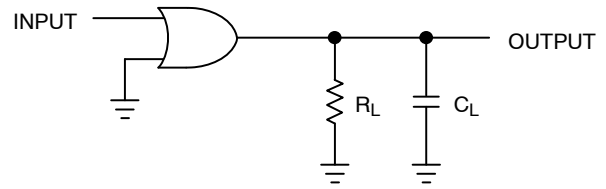
A 1–MHz square input wave is recommended for propagation delay tests.

Figure 4. Test Circuit

DEVICE ORDERING INFORMATION

Device Order Number	Package	Shipping[†]
NL27WZ32USG	US8 (Pb–Free)	3000 / 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.

NL27WZ32

PACKAGE DIMENSIONS

US8
US SUFFIX
CASE 493–02
ISSUE B
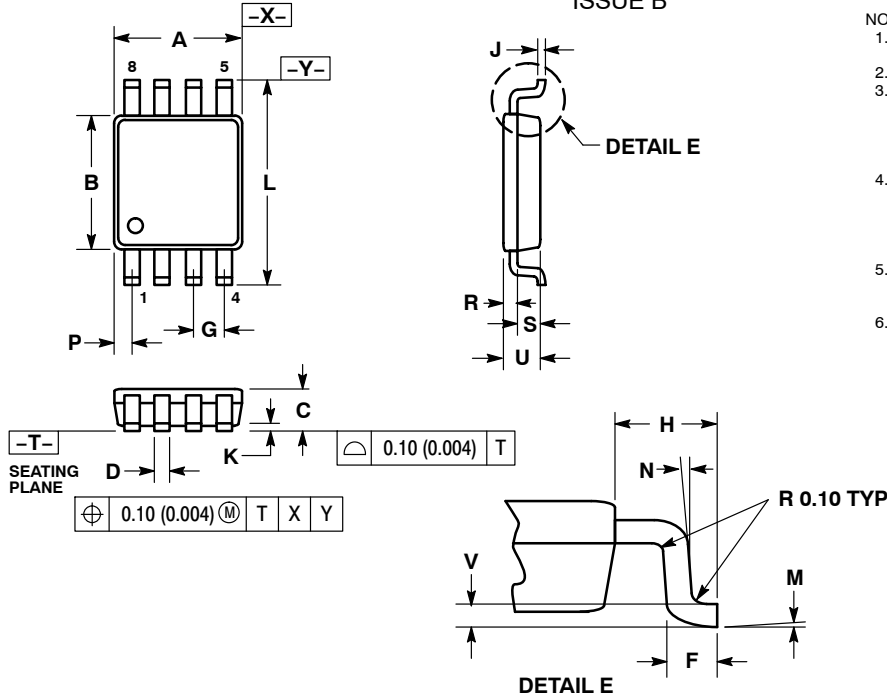
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION "A" DOES NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURR. MOLD FLASH. PROTRUSION AND GATE BURR SHALL NOT EXCEED 0.140 MM (0.0055") PER SIDE.
4. DIMENSION "B" DOES NOT INCLUDE INTER–LEAD FLASH OR PROTRUSION. INTER–LEAD FLASH AND PROTRUSION SHALL NOT E3XCEED 0.140 (0.0055") PER SIDE.
5. LEAD FINISH IS SOLDER PLATING WITH THICKNESS OF 0.0076–0.0203 MM. (300–800 ").
6. ALL TOLERANCE UNLESS OTHERWISE SPECIFIED ±0.0508 (0.0002 ").

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.90	2.10	0.075	0.083
B	2.20	2.40	0.087	0.094
C	0.60	0.90	0.024	0.035
D	0.17	0.25	0.007	0.010
F	0.20	0.35	0.008	0.014
G	0.50 BSC		0.020 BSC	
H	0.40 REF		0.016 REF	
J	0.10	0.18	0.004	0.007
K	0.00	0.10	0.000	0.004
L	3.00	3.20	0.118	0.126
M	0 °	6 °	0 °	6 °
N	5 °	10 °	5 °	10 °
P	0.23	0.34	0.010	0.013
R	0.23	0.33	0.009	0.013
S	0.37	0.47	0.015	0.019
U	0.60	0.80	0.024	0.031
V	0.12 BSC		0.005 BSC	

� 0.10 (0.004) T

⊕ 0.10 (0.004) Ⓜ T X Y

SEATING PLANE

R 0.10 TYP

DETAIL E

SOLDERING FOOTPRINT*

3.8 / 0.15

1.8 / 0.07

0.50 / 0.0197

0.30 / 0.012

1.0 / 0.0394

SCALE 8:1 (mm / inches)
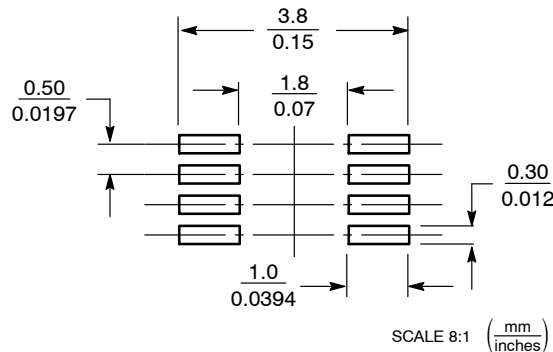
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.