Dual Buffer with 3-State Outputs

The NL27WZ126 is a high performance dual noninverting buffer operating from a 1.65 V to 5.5 V supply.

Features

- Extremely High Speed: t_{PD} 2.6 ns (typical) at $V_{CC} = 5.0 \text{ V}$
- Designed for 1.65 V to 5.5 V V_{CC} Operation
- Over Voltage Tolerant Inputs and Outputs
- \bullet LVTTL Compatible Interface Capability With 5.0 V TTL Logic with V_{CC} = 3.0 V
- LVCMOS Compatible
- 24 mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- 3-State OE Input is Active-High
- Replacement for NC7WZ126
- Chip Complexity = 72 FETs
- Pb-Free Package is Available

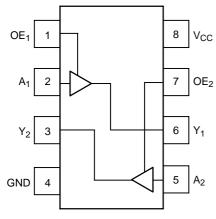


Figure 1. Pinout (Top View)

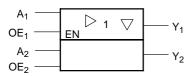


Figure 2. Logic Symbol



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US8 US SUFFIX CASE 493



M2 = Device Code M = Date Code* ■ Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

PIN ASSIGNMENT

Pin	Function
1	OE
2	A ₁
3	Y ₂
4	GND
5	A ₂
6	Y ₁
7	OE ₂
8	V _{CC}

FUNCTION TABLE

Inp	Input			
OE _n	OE _n A _n			
Н	Н	Н		
Н	L	L		
L	Х	Z		

X = Don't Caren = 1, 2

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage		-0.5 to +7.0	V
VI	DC Input Voltage		-0.5 to +7.0	V
Vo	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}		man Body Model (Note 2) Machine Model (Note 3) ed Device Model (Note 4)	> 2000 > 200 N/A	V

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.
- Tested to EIA/JESD22-A114-A.
 Tested to EIA/JESD22-A115-A.
- 4. Tested to JESD22-C101-A.

RECOMMENDED OPERATING CONDITIONS

Symbol	Paramet	Min	Max	Unit	
V _{CC}	Supply Voltage	Operating Data Retention Only	1.65 1.5	5.5 5.5	V
VI	Input Voltage	(Note 5)	0	5.5	V
Vo	Output Voltage	(HIGH or LOW State)	0	5.5	V
T _A	Operating Free–Air Temperature		-40	+ 85	°C
Δt/ΔV	Input Transition Rise or Fall Rate	$V_{CC} = 2.5 \text{ V } \pm 0.2 \text{ V}$ $V_{CC} = 3.0 \text{ V } \pm 0.3 \text{ V}$ $V_{CC} = 5.0 \text{ V } \pm 0.5 \text{ V}$	0 0 0	20 10 5	ns/V

^{5.} Unused inputs may not be left open. All inputs must be tied to a high- or low-logic input voltage level.

DC ELECTRICAL CHARACTERISTICS

			V _{CC}	T _A = 25°C		;	-40°C ≤	$T_A \leq 85^{\circ}C$	
Symbol	Parameter	Condition	(V)	Min	Тур	Max	Min	Max	Unit
V _{IH}	High-Level Input Voltage		1.65 to 5.5	0.7 V _{CC}			0.7 V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65 to 5.5			0.3 V _{CC}		0.3 V _{CC}	V
V _{OH}	High-Level Output Voltage $V_{IN} = V_{IH}$	$I_{OH} = 100 \mu A$ $I_{OH} = -8 \text{ mA}$ $I_{OH} = -12 \text{ mA}$ $I_{OH} = -16 \text{ mA}$ $I_{OH} = -24 \text{ mA}$ $I_{OH} = -32 \text{ mA}$	1.65 to 5.5 1.65 2.7 3.0 3.0 4.5	V _{CC} - 0.1 1.9 2.2 2.4 2.3 3.8	V _{CC} 2.1 2.4 2.7 2.5 4.0		V _{CC} - 0.1 1.9 2.2 2.4 2.3 3.8		V
V _{OL}	Low-Level Output Voltage $V_{IN} = V_{IH}$ or V_{IL}	$\begin{split} I_{OL} &= 100 \; \mu\text{A} \\ I_{OL} &= 8 \; \text{mA} \\ I_{OL} &= 12 \; \text{mA} \\ I_{OL} &= 16 \; \text{mA} \\ I_{OL} &= 24 \; \text{mA} \\ I_{OL} &= 32 \; \text{mA} \end{split}$	1.65 to 5.5 1.65 2.7 3.0 3.0 4.5		0.20 0.22 0.28 0.38 0.42	0.1 0.3 0.4 0.4 0.55 0.55		0.1 0.3 0.4 0.4 0.55 0.55	V
I _{IN}	Input Leakage Current	$V_{IN} = V_{CC}$ or GND	0 to 5.5			± 0.1		±1.0	μΑ
I _{OFF}	Power Off–Output Leakage Current	V _{OUT} = 5.5 V	0			1		10	μΑ
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5			1		10	μΑ
I _{OZ}	3-State Output Leakage	$V_{IN} = V_{IL} \text{ or } V_{IH}$ $0 \text{ V} \leq V_{OUT} \leq 5.5 \text{ V}$	1.65 to 5.5			± 0.5		±5	μΑ

AC ELECTRICAL CHARACTERISTICS ($t_R = t_F = 3.0 \text{ ns}$)

				V _{CC}	T _A = 25°C		С	$-40^{\circ}\text{C} \leq \text{T}_{\text{A}} \leq 85^{\circ}\text{C}$		
Symbol	Parameter	Cond	Condition		Min	Тур	Max	Min	Max	Unit
t _{PLH} t _{PHL}	Propagation Delay AN to YN	$R_L = 1 M\Omega$	C _L = 15 pF	1.8 ± 0.15 2.5 ± 0.2	2.0 1.0		12 7.5	2.0 1.0	13 8	ns
	(Figures 3 and 4, Table 1)	$R_L = 1 M\Omega$	C _L = 15 pF	3.3 ± 0.3	0.8		5.2	0.8	5.5	
		$R_L = 500 \Omega$	$C_L = 50 pF$		1.2		5.7	1.2	6.0	
		$R_L = 1 M\Omega$	C _L = 15 pF	5.0 ± 0.5	0.5		4.5	0.5	4.8	
		$R_L = 500 \Omega$	$C_L = 50 pF$		0.8		5.0	8.0	5.3	
toslh	Output to Output Skew	$R_L = 500 \Omega$	$C_{L} = 50 \text{ pF}$	3.3 ± 0.3			1.0		1.0	ns
toshl	(Note 6)	R _L = 500 Ω	$C_{L} = 50 \text{ pF}$	5.0 ± 0.5			0.8		0.8	
t _{PZH} t _{PZL}	Output Enable Time (Figures 5, 6 and 7, Table 1)	$R_L = 250 \Omega$	$C_L = 50 pF$	1.8 ± 0.15 2.5 ± 0.2	3.0 1.8		14 8.5	3.0 1.8	15 9.0	ns
	Table 1)			3.3 ± 0.3	1.2		6.2	1.2	6.5	
				5.0 ± 0.5	0.8		5.5	0.8	5.8	
t _{PHZ}	Output Enable Time (Figures 5, 6 and 7,	R _L and R1= 500	Ω C _L = 50 pF	1.8 ± 0.15 2.5 ± 0.2	2.5 1.5		12 8.0	2.5 1.5	13 8.5	ns
	Table 1)			3.3 ± 0.3	0.8		5.7	0.8	6.0	
				5.0 ± 0.5	0.3		4.7	0.3	5.0	

Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device.
 This specification applies to any outputs switching in the same direction, either HIGH-to-LOW (t_{OSHL}) or LOW-to-HIGH (t_{OSLH}); parameter guaranteed by design.

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Unit
C _{IN}	Input Capacitance	$V_{CC} = 5.5 \text{ V}, V_I = 0 \text{ V or } V_{CC}$	2.5	pF
C _{OUT}	Output Capacitance	$V_{CC} = 5.5 \text{ V}, V_{I} = 0 \text{ V or } V_{CC}$	2.5	pF
C _{PD}	Power Dissipation Capacitance	10 MHz, V_{CC} = 3.3 V, V_{I} = 0 V or V_{CC}	9	pF
	(Note 7)	10 MHz, V_{CC} = 5.5 V, V_{I} = 0 V or V_{CC}	11	

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} • V_{CC} • f_{in} + I_{CC}. C_{PD} is used to determine the no–load dynamic power consumption; P_D = C_{PD} • V_{CC}² • f_{in} + I_{CC} • V_{CC}.

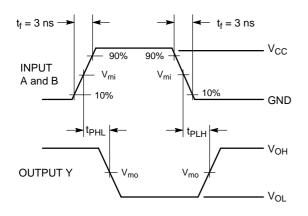
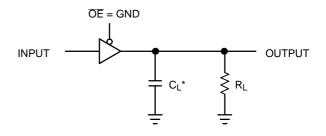


Figure 3. Switching Waveform



*Includes all probe and jig capacitance.

A 1 MHz square input wave is recommended for propagation delay tests.

Figure 4. t_{PLH} or t_{PHL}

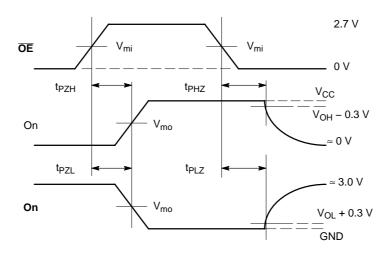
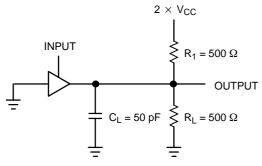


Figure 5. AC Output Enable and Disable Waveform

Table 1. Output Enable and Disable Times

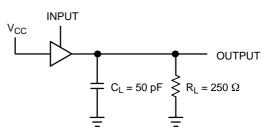
 t_R = t_F = 2.5 ns, 10% to 90%; f = 1 MHz; t_W = 500 nsv

	v _{cc}						
Symbol	3.3 V ± 0.3 V	2.7 V	$2.5~V~\pm~0.2~V$				
V _{mi}	1.5 V	1.5 V	V _{CC/} 2				
V _{mo}	1.5 V	1.5 V	V _{CC/} 2				



A 1 MHz square input wave is recommended for propagation delay tests.

Figure 6. t_{PZL} or t_{PLZ}



A 1 MHz square input wave is recommended for propagation delay tests.

Figure 7. t_{PZH} or t_{PHZ}

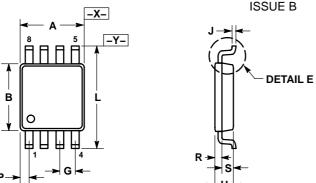
DEVICE ORDERING INFORMATION

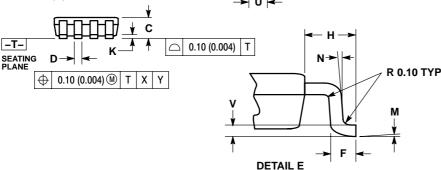
			Device No	menclature				
Device Order Number	Logic Circuit Indicator	No. of Gates per Package	Temp Range Identifier	Technology	Device Function	Package Suffix	Package Type	Tape and Reel Size [†]
NL27WZ126US	NL	2	7	WZ	126	US	US8	178 mm, 3000 Units
NL27WZ126USG	NL	2	7	WZ	126	USG	US8 (Pb-Free)	178 mm, 3000 Units

[†]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.

PACKAGE DIMENSIONS

US8 US SUFFIX CASE 493-02





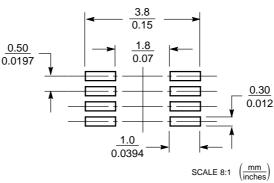
NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. DIMENSION "A" DOES NOT INCLUDE MOLD
- DIMENSION "A" DOES NOT INCLUDE MO FLASH, PROTRUSION OR GATE BURR. MOLD FLASH. PROTRUSION AND GATE BURR SHALL NOT EXCEED 0.140 MM (0.0055") PER SIDE
- (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
- ALL TOLERANCE UNLESS OTHERWISE SPECIFIED ±0.0508 (0.0002 ").

	MILLIN	IETERS	INC	HES	
DIM	MIN	MAX	MIN	MAX	
Α	1.90	2.10	0.075	0.083	
В	2.20	2.40	0.087	0.094	
С	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	
Н	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 °	
Р	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	

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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