Dual Buffer with 3-State Outputs

The NL27WZ125 is a high performance dual noninverting buffer operating from a 1.65 V to 5.5 V supply.

- Extremely High Speed: t_{PD} 2.6 ns (typical) at $V_{CC} = 5 \text{ V}$
- 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 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
- 3-State OE Input is Active-Low
- Replacement for NC7WZ125
- Chip Complexity = 72 FETs

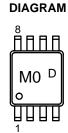


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US8 US SUFFIX CASE 493-01



MARKING

D = Date Code

ORDERING INFORMATION

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

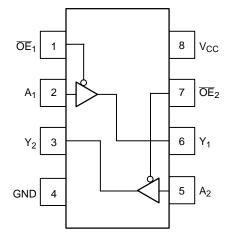


Figure 1. Pinout (Top View)

$\begin{array}{c|c} A_1 & & \\ \hline OE_1 & & EN \end{array}$

Figure 2. Logic Symbol

PIN ASSIGNMENT

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

FUNCTION TABLE

Inp	Output	
ŌE _n	A _n	Yn
L	L	L
L	Н	Н
Н	Х	Z

X = Don't Caren = 1, 2

1

 $\frac{A_2}{OE_2}$

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
V _O	DC Output Voltage Output in High Impedance State Output in HIGH or LOW State	-0.5 to +7.0 -0.5 to V _{CC} + 0.5	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
Icc	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
TL	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C
TJ	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

Maximum Ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute maximum–rated conditions is not implied. Functional operation should be restricted to the Recommended Operating Conditions.

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

RECOMMENDED OPERATING CONDITIONS

Symbol	Paramete	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 ≤ 85°C		
Symbol	Parameter	Condition	(V)	Min	Тур	Max	Min	Max	Unit
V _{IH}	High-Level Input Voltage		1.65 2.3 to 5.5	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 2.3 to 5.5			0.25 V _{CC} 0.3 V _{CC}		0.25 V _{CC} 0.3 V _{CC}	V
V _{OH}	High–Level Output Voltage V _{IN} = V _{IL} or V _{IH}	$\begin{split} I_{OH} &= 100 \; \mu\text{A} \\ I_{OH} &= -3 \; \text{mA} \\ I_{OH} &= -8 \; \text{mA} \\ I_{OH} &= -12 \; \text{mA} \\ I_{OH} &= -16 \; \text{mA} \\ I_{OH} &= -24 \; \text{mA} \\ I_{OH} &= -32 \; \text{mA} \end{split}$	1.65 to 5.5 1.65 2.3 2.7 3.0 3.0 4.5	V _{CC} - 0.1 1.29 1.9 2.2 2.4 2.3 3.8	V _{CC} 1.52 2.1 2.4 2.7 2.5 4.0		V _{CC} -0.1 1.29 1.9 2.2 2.4 2.3 3.8		V
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IL}	$\begin{split} &I_{OL} = 100 \; \mu\text{A} \\ &I_{OL} = 3 \; \text{mA} \\ &I_{OL} = 8 \; \text{mA} \\ &I_{OL} = 12 \; \text{mA} \\ &I_{OL} = 16 \; \text{mA} \\ &I_{OL} = 24 \; \text{mA} \\ &I_{OL} = 32 \; \text{mA} \end{split}$	2.3 2.7 3.0 3.0 4.5		0.08 0.20 0.22 0.28 0.38 0.42	0.1 0.24 0.3 0.4 0.4 0.55 0.55		0.1 0.24 0.3 0.4 0.4 0.55 0.55	V
I _{IN}	Input Leakage Current	$V_{IN} = V_{CC}$ or GND	5.5			±0.1		±1.0	μΑ
I _{OFF}	Power Off Leakage Current	V _{OUT} = 5.5 V V _{IN} = 5.5 V	0			1.0		10	μΑ
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5			1.0		10	μΑ
I _{OZ}	3-State Output Leakage	$V_{IN} = V_{IL} \text{ or } V_{IH}$ $0V \le V_{OUT} \le 5.5 \text{ V}$	2.3 to 5.5			±0.5		±5	μΑ

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

				V _{CC}	T _A = 25°C		$T_A = 25^{\circ}C$ $-40^{\circ}C \leq T_A \leq 85^{\circ}C$			
Symbol	Parameter	Cond	lition	(V)	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)	$R_L = 1 M\Omega$	C _L = 15 pF	3.3 ± 0.3	0.8		5.2	0.8	5.5	
		$R_L = 500 \Omega$	$C_{L} = 50 \text{ pF}$		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	
		$R_L = 500 \Omega$	$C_{L} = 50 \text{ pF}$		0.8		5.0	0.8	5.3	
toslh	Output to Output Skew	$R_L = 500 \Omega$	C _L = 50 pF	3.3 ± 0.3			1.0		1.0	ns
toshl	(Note 6)	$R_L = 500 \Omega$	C _L = 50 pF	5.0 ± 0.5			0.8		0.8	
t _{PZH} t _{PZL}	Output Enable Time (Figures 5, 6 and 7)			1.8 ± 0.15 2.5 ± 0.2	3.0 1.8		14 8.5	3.0 1.8	15 9.0	ns
				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)			1.8 ± 0.15 2.5 ± 0.2	2.5 1.5		12 8.0	2.5 1.5	13 8.5	ns
				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	$V_{CC} = 5.5 \text{ V}, V_I = 0 \text{ V or } V_{CC}$	7.0	pF
C _{OUT}	Output Capacitance	V_{CC} = 5.5 V, V_{I} = 0 V or V_{CC}	7.0	pF
C _{PD}	Power Dissipation Capacitance (Note 7)	10 MHz, $V_{CC} = 3.3 \text{ V}$, $V_{I} = 0 \text{ V or } V_{CC}$ 10 MHz, $V_{CC} = 5.5 \text{ V}$, $V_{I} = 0 \text{ V or } V_{CC}$	18 27	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} • 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}.

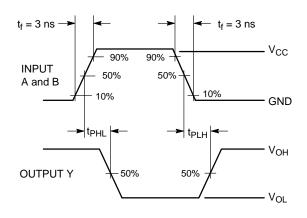
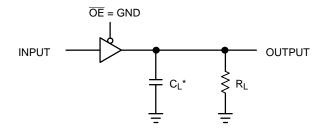


Figure 3. Switching Waveform



*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}

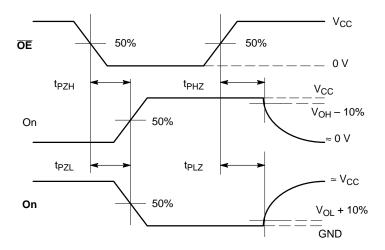
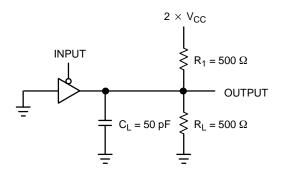
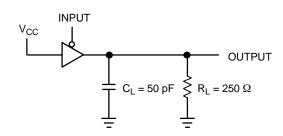


Figure 5. AC Output Enable and Disable Waveform





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

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

Figure 6. T_{PZL} or T_{PL}

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

DEVICE ORDERING INFORMATION

	Device Nomenclature							
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
NL27WZ125US	NL	2	7	WZ	125	US	US8	178 mm, 3000 Unit

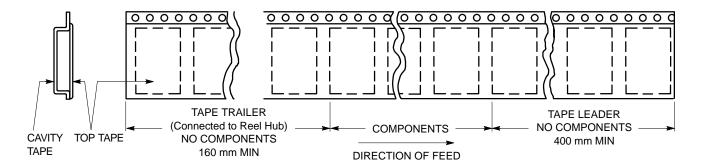


Figure 8. Tape Ends for Finished Goods

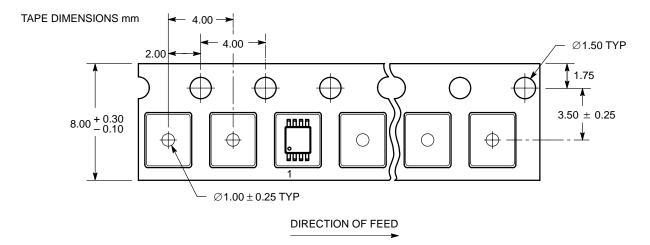


Figure 9. US8 Reel Configuration/Orientation

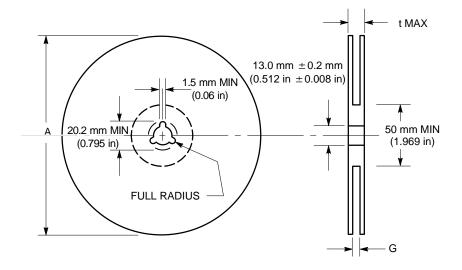


Figure 10. Reel Dimensions

REEL DIMENSIONS

Tape Size	T and R Suffix	A Max	G	t Max
8 mm	US	178 mm (7 in)	8.4 mm, + 1.5 mm, -0.0 (0.33 in + 0.059 in, -0.00)	14.4 mm (0.56 in)

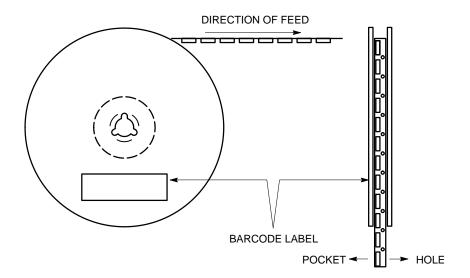


Figure 11. Reel Winding Direction

PACKAGE DIMENSIONS

US8

US SUFFIX CASE 493-01 **ISSUE O** DETAIL E В -T-0.10 (0.004) SEATING PLANE

NOTES:

R 0.10 TYP

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14 5M 1982
- 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.
- NOT EXCEED 0.140 MM (0.0055) PEH SIDE.

 DIMENSION "8" DOES NOT INCLUDE

 INTER-LEAD FLASH OR PROTRUSION.

 INTER-LEAD FLASH AND PROTRUSION SHALL

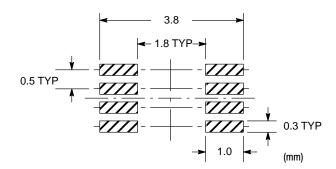
 NOT E3XCEED 0.140 (0.0055") PER SIDE.

 LEAD FINISH IS SOLDER PLATING WITH

 THICKNESS OF 0.0076-0. 0203 MM. (300-800
- mINCH).

 6. 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 °		
P	0.28	0.44	0.011	0.017		
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		



DETAIL E

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