

# NL27WZ17

## Dual Non-Inverting Schmitt Trigger Buffer

The NL27WZ17 is a high performance dual buffer operating from a 1.65 to 5.5 V supply. At  $V_{CC} = 3.0$  V, high impedance TTL compatible inputs significantly reduce current loading to input drivers while the TTL compatible outputs offer improved switching noise performance.

### Features

- Extremely High Speed:  $t_{PD}$  2.0 ns (typical) at  $V_{CC} = 5.0$  V
- Designed for 1.65 V to 5.5 V  $V_{CC}$  Operation
- Overvoltage Tolerant Inputs
- LVTTL Compatible – Interface Capability with 5.0 V TTL Logic with  $V_{CC} = 3.0$  V (2.7–3.3)
- LVC MOS Compatible
- 24 mA Balanced Output Sink and Source Capability at  $V_{CC} = 3.0$  V
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- Chip Complexity: FET = 72; Equivalent Gate = 18
- Pb-Free Package is Available

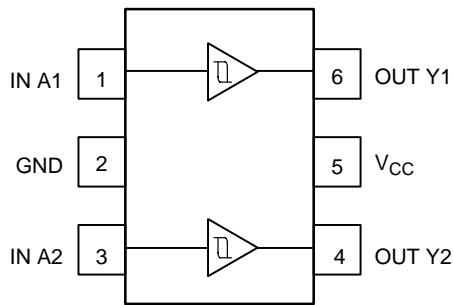


Figure 1. Pinout (Top View)

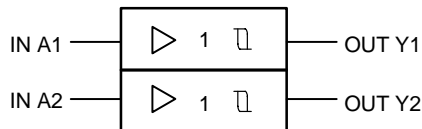


Figure 2. Logic Symbol

### PIN ASSIGNMENT

1	IN A1
2	GND
3	IN A2
4	OUT Y2
5	$V_{CC}$
6	OUT Y1

### FUNCTION TABLE

A Input	$\bar{Y}$ Output
L	L
H	H



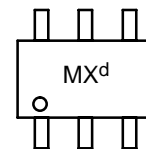
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<http://onsemi.com>



SC-88/SOT-363/SC-70  
DF SUFFIX  
CASE 419B

### MARKING DIAGRAM



Pin 1  
d = Date Code

### ORDERING INFORMATION

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

# NL27WZ17

## MAXIMUM RATINGS

Symbol	Characteristics	Value	Unit
V <sub>CC</sub>	DC Supply Voltage	-0.5 to +7.0	V
V <sub>I</sub>	DC Input Voltage	-0.5 ≤ V <sub>I</sub> ≤ +7.0	V
V <sub>O</sub>	DC Output Voltage Output in Z or LOW State (Note 1)	-0.5 ≤ V <sub>O</sub> ≤ 7.0	V
I <sub>IK</sub>	DC Input Diode Current V <sub>I</sub> < GND	-50	mA
I <sub>OK</sub>	DC Output Diode Current V <sub>O</sub> < GND	-50	mA
I <sub>O</sub>	DC Output Sink Current	±50	mA
I <sub>CC</sub>	DC Supply Current per Supply Pin	±100	mA
I <sub>GND</sub>	DC Ground Current per Ground Pin	±100	mA
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Power Dissipation in Still Air	200	mW
θ <sub>JA</sub>	Thermal Resistance	333	°C/W
T <sub>L</sub>	Lead Temperature, 1 mm from case for 10 s	260	°C
T <sub>J</sub>	Junction Temperature under Bias	+150	°C
V <sub>ESD</sub>	ESD Withstand Voltage Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	> 2000 150 N/A	V
I <sub>Latch- Up</sub>	Latch-Up Performance Above V <sub>CC</sub> and Below GND at 85°C (Note 5)	±500	mA

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. I<sub>O</sub> absolute maximum rating must be observed.
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	Unit
V <sub>CC</sub>	Supply Voltage Operating Data Retention Only	1.65 1.5	5.5 5.5	V
V <sub>I</sub>	Input Voltage	0	5.5	V
V <sub>O</sub>	Output Voltage (High or LOW State)	0	5.5	V
T <sub>A</sub>	Operating Free-Air Temperature	-40	+85	°C
Δt/ΔV	Input Transition Rise or Fall Rate V <sub>CC</sub> = 2.5 V ± 0.2 V V <sub>CC</sub> = 3.0 V ± 0.3 V V <sub>CC</sub> = 5.0 V ± 0.5 V	0 0 0	No Limit No Limit No Limit	ns/V

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## DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-40°C ≤ T <sub>A</sub> ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
V <sub>T+</sub>	Positive Input Threshold Voltage		1.65	0.6	1.0	1.4	0.6	1.4	V
			2.3	1.0	1.5	1.8	1.0	1.8	
			2.7	1.2	1.7	2.0	1.2	2.0	
			3.0	1.3	1.9	2.2	1.3	2.2	
			4.5	1.9	2.7	3.1	1.9	3.1	
			5.5	2.2	3.3	3.6	2.2	3.6	
V <sub>T-</sub>	Negative Input Threshold Voltage		1.65	0.2	0.5	0.8	0.2	0.8	V
			2.3	0.4	0.75	1.15	0.4	1.15	
			2.7	0.5	0.87	1.4	0.5	1.4	
			3.0	0.6	1.0	1.5	0.6	1.5	
			4.5	1.0	1.5	2.0	1.0	2.0	
			5.5	1.2	1.9	2.3	1.2	2.3	
V <sub>H</sub>	Input Hysteresis Voltage		1.65	0.1	0.48	0.9	0.1	0.9	V
			2.3	0.25	0.75	1.1	1.25	1.1	
			2.7	0.3	0.83	1.15	0.3	1.15	
			3.0	0.4	0.93	1.2	0.4	1.2	
			4.5	0.6	1.2	1.5	0.6	1.5	
			5.5	0.7	1.4	1.7	0.7	1.7	
V <sub>OH</sub>	High-Level Output Voltage V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -100 μA I <sub>OH</sub> = -3.0 mA I <sub>OH</sub> = -8.0 mA I <sub>OH</sub> = -12 mA I <sub>OH</sub> = -16 mA I <sub>OH</sub> = -24 mA I <sub>OH</sub> = -32 mA	1.65-5.5	V <sub>CC</sub>	V <sub>CC</sub>		V <sub>CC</sub>		V
			1.65	-0.1	1.52		-0.1		
			2.3	1.29	2.1		1.29		
			2.7	1.9	2.4		1.9		
			3.0	2.2	2.7		2.2		
			3.0	2.4	2.5		2.4		
			4.5	2.3	4.0		2.3		
				3.8			3.8		
V <sub>OL</sub>	Low-Level Output Voltage V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 100 μA I <sub>OL</sub> = 4.0 mA I <sub>OL</sub> = 8.0 mA I <sub>OL</sub> = 12 mA I <sub>OL</sub> = 16 mA I <sub>OL</sub> = 24 mA I <sub>OL</sub> = 32 mA	1.65-5.5		0.1		0.1	V	
			1.65		0.08	0.24	0.24		
			2.3		0.2	0.3	0.3		
			2.7		0.22	0.4	0.4		
			3.0		0.28	0.4	0.4		
			3.0		0.38	0.55	0.55		
			4.5		0.42	0.55	0.55		
I <sub>IN</sub>	Input Leakage Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	0 to 5.5		±0.1		±1.0	μA	
I <sub>OFF</sub>	Power Off-Output Leakage Current	V <sub>OUT</sub> = 5.5 V	0		1.0		10	μA	
I <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5		1.0		10	μA	

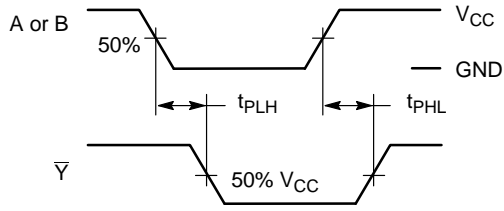
## AC ELECTRICAL CHARACTERISTICS (Input t<sub>r</sub> = t<sub>f</sub> = 3.0 ns)

Symbol	Parameter	Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-40°C ≤ T <sub>A</sub> ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Input A to Y	R <sub>L</sub> = 1.0 MΩ, C <sub>L</sub> = 15 pF	1.65	2.0	9.1	15	2.0	15.6	ns
			1.8	2.0	7.6	12.5	2.0	13	
			2.5 ± 0.2	1.0	5.0	9.0	1.0	9.5	
			3.3 ± 0.3	1.0	3.7	6.3	1.0	6.5	
			5.0 ± 0.5	0.5	3.1	5.2	0.5	5.5	
			3.3 ± 0.3	1.5	4.4	7.2	1.5	7.5	
		5.0 ± 0.5	0.8	3.7	5.9	0.8	6.2		
		R <sub>L</sub> = 500 Ω, C <sub>L</sub> = 50 pF							

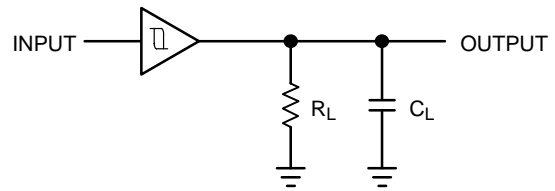
## CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>	7.0	pF
C <sub>PD</sub>	Power Dissipation Capacitance	10 MHz, V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub> 10 MHz, V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>	9.0 11	pF

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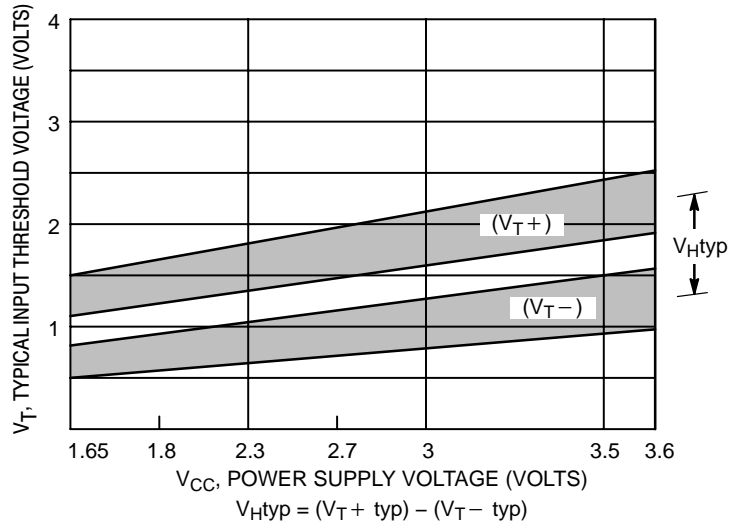


**Figure 3. Switching Waveforms**

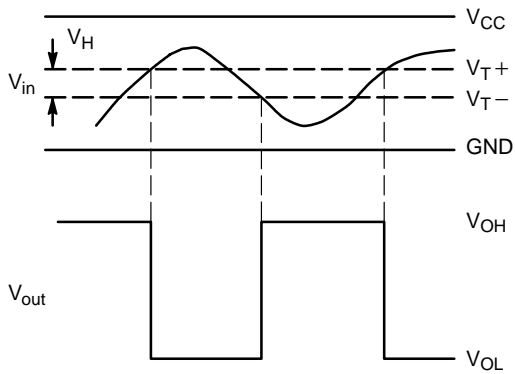


A 1-MHz square input wave is recommended for propagation delay tests.

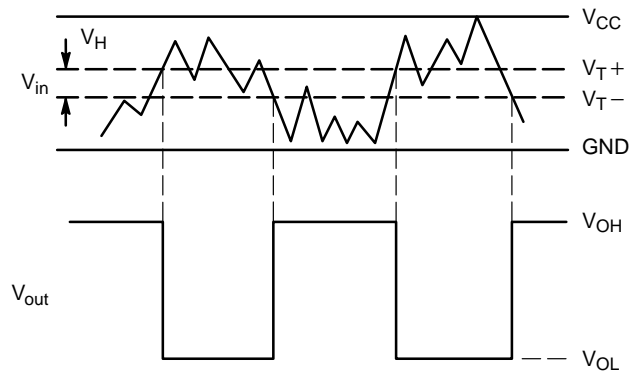
**Figure 4. Test Circuit**



**Figure 5. Typical Input Threshold,  $V_{T+}$ ,  $V_{T-}$  versus Power Supply Voltage**



(a) A Schmitt-Trigger Squares Up Inputs With Slow Rise and Fall Times



(b) A Schmitt-Trigger Offers Maximum Noise Immunity

**Figure 6. Typical Schmitt-Trigger Applications**

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## ORDERING INFORMATION

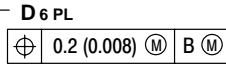
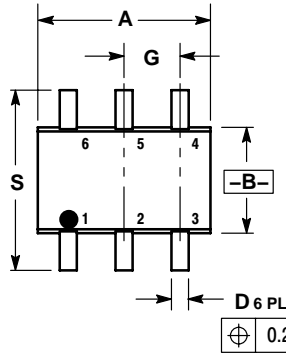
Device	Device Nomenclature						Package	Shipping†
	Logic Circuit Indicator	No. of Gates per Package	Temp Range Identifier	Technology	Device Function	Package Suffix		
NL27WZ17DFT2	NL	2	7	WZ	17	DFT2	SC-88	3000 / Tape & Reel
NL27WZ17DFT2G	NL	2	7	WZ	17	DFT2	SC-88	3000 / Tape & Reel

†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.

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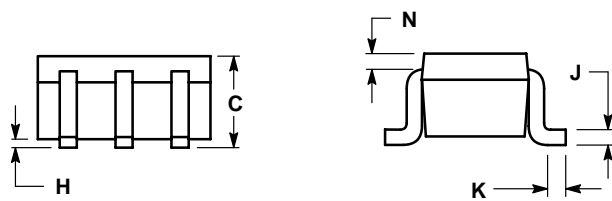
## PACKAGE DIMENSIONS

SC-88/SOT-363/SC-70  
DF SUFFIX  
CASE 419B-02  
ISSUE 02U

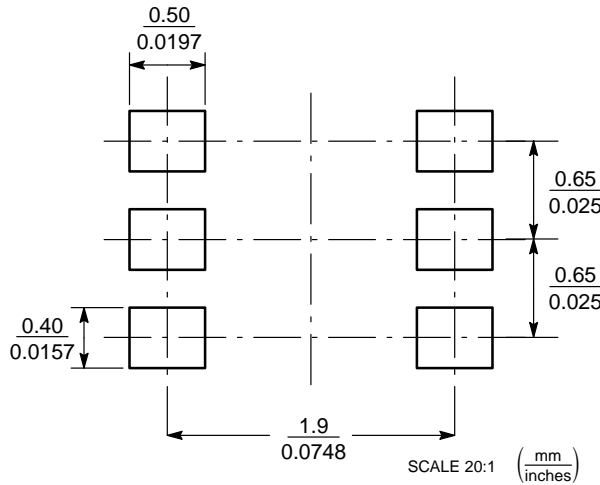


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.  
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20



### SOLDERING FOOTPRINT\*



SC-88/SC70-6/SOT363

\*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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