

Schmitt Trigger Buffer, Dual, Non-Inverting

NLV27WZ17

The NLV27WZ17 is a high performance dual buffer with Schmitt-Trigger inputs operating from a 1.65 to 5.5 V supply.

Features

- Designed for 1.65 V to 5.5 V V_{CC} Operation
- 3.7 ns t_{PD} at $V_{CC} = 5$ V (Typ)
- Inputs/Outputs Overvoltage Tolerant up to 5.5 V
- I_{OFF} Supports Partial Power Down Protection
- Sink 32 mA at 4.5 V
- Available in SC-88 Package
- Chip Complexity < 100 FETs
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

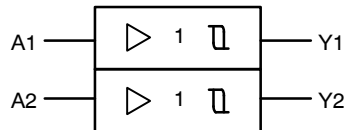
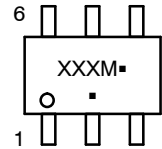


Figure 1. Logic Symbol



SC-88
DF SUFFIX
CASE 419B-02

MARKING DIAGRAMS



XXX = Specific Device Code
M = Date Code*
▪ = Pb-Free Package

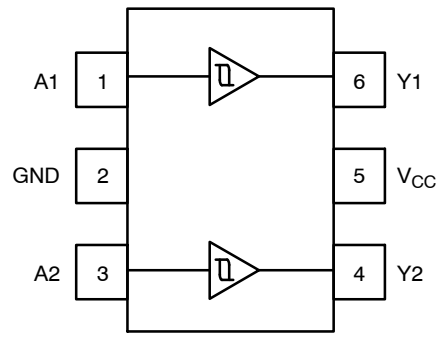
(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

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(SC-88)

Figure 2. Pinout (Top View)

PIN ASSIGNMENT

Pin	Function
1	A1
2	GND
3	A2
4	Y2
5	V _{CC}
6	Y1

FUNCTION TABLE

A Input	Y Output
L	L
H	H

MAXIMUM RATINGS

Symbol	Characteristics	Value	Units
V _{CC}	DC Supply Voltage	-0.5 to +7.0	V
V _{IN}	DC Input Voltage	-0.5 to +7.0	V
V _{OUT}	DC Output Voltage Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V _{CC} = 0 V)	-0.5 to V _{CC} +0.5 -0.5 to +7.0 -0.5 to +7.0	V
I _{IK}	DC Input Diode Current, V _{IN} < GND	-50	mA
I _{OK}	DC Output Diode Current, V _{OUT} < GND	-50	mA
I _{OUT}	DC Output Source/Sink Current	±50	mA
I _{CC} or I _{GND}	DC Supply Current per Supply Pin or Ground Pin	±100	mA
T _{STG}	Storage Temperature Range	-65 to +150	°C
T _L	Lead Temperature, 1 mm from Case for 10 secs	260	°C
T _J	Junction Temperature under Bias	+150	°C
θ _{JA}	Thermal Resistance (Note 2)	SC-88 377	°C/W
P _D	Power Dissipation in Still Air	SC-88 332	mW
MSL	Moisture Sensitivity	Level 1	-
F _R	Flameability Rating	Oxygen Index: 28 to 34 UL 94-V-0 @ 0.125 in	-
V _{ESD}	ESD Withstand Voltage (Note 3)	Human Body Model Charged Device Model 2000 N/A	V
I _{LATCHUP}	Latchup Performance (Note 4)	±500	mA

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. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to ANSI/ESDA/JEDEC JS-001-2017. CDM tested to EIA/JESD22-C101-F. JEDEC recommends that ESD qualification to EIA/JESD22-A115-A (Machine Model) be discontinued per JEDEC/JEP172A.
4. Tested to EIA/JESD78 Class II.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Positive DC Supply Voltage	1.65	5.5	V
V _{IN}	DC Input Voltage	0	5.5	V
V _{OUT}	DC Output Voltage Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V _{CC} = 0 V)	0 0 0	V _{CC} 5.5 5.5	V
T _A	Operating Temperature Range	-55	+125	°C
t _r , t _f	Input Transition Rise or Fall Rate V _{CC} = 1.65 V to 1.95 V V _{CC} = 2.3 V to 2.7 V V _{CC} = 3.0 V to 3.6 V V _{CC} = 4.5 V to 5.5 V	0 0 0 0	No Limit No Limit No Limit No Limit	ns

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

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DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		-55°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V _{T+}	Positive Input Threshold Voltage		1.65	0.6	1.0	1.4	0.6	1.4	0.6	1.4	V
			2.3	1.0	1.5	1.8	1.0	1.8	1.0	1.8	
			2.7	1.2	1.7	2.0	1.2	2.0	1.2	2.0	
			3.0	1.3	1.9	2.2	1.3	2.2	1.3	2.2	
			4.5	1.9	2.7	3.1	1.9	3.1	1.9	3.1	
			5.5	2.2	3.3	3.6	2.2	3.6	2.2	3.6	
V _{T-}	Negative Input Threshold Voltage		1.65	0.2	0.5	0.8	0.2	0.8	0.2	0.8	V
			2.3	0.4	0.75	1.15	0.4	1.15	0.4	1.15	
			2.7	0.5	0.87	1.4	0.5	1.4	0.5	1.4	
			3.0	0.6	1.0	1.5	0.6	1.5	0.6	1.5	
			4.5	1.0	1.5	2.0	1.0	2.0	1.0	2.0	
			5.5	1.2	1.9	2.3	1.2	2.3	1.2	2.3	
V _H	Input Hysteresis Voltage		1.65	0.1	0.48	0.9	0.1	0.9	0.1	0.9	V
			2.3	0.25	0.75	1.1	0.25	1.1	0.25	1.1	
			2.7	0.3	0.83	1.15	0.3	1.15	0.3	1.15	
			3	0.4	0.93	1.2	0.4	1.2	0.4	1.2	
			4.5	0.6	1.2	1.5	0.6	1.5	0.6	1.5	
			5.5	0.7	1.4	1.7	0.7	1.7	0.7	1.7	
V _{OH}	High-Level Output Voltage V _{IN} = V _{IH} or V _{IL}	I _{OH} = -100 μA	1.65 to 5.5	V _{CC} - 0.1	V _{CC}	-	V _{CC} - 0.1	-	V _{CC} - 0.1	-	V
		I _{OH} = -4 mA	1.65	1.29	1.52	-	1.29	-	1.29	-	
		I _{OH} = -8 mA	2.3	1.9	2.1	-	1.9	-	1.9	-	
		I _{OH} = -12 mA	2.7	2.2	2.4	-	2.2	-	2.2	-	
		I _{OH} = -16 mA	3	2.4	2.7	-	2.4	-	2.4	-	
		I _{OH} = -24 mA	3	2.3	2.5	-	2.3	-	2.3	-	
		I _{OH} = -32 mA	4.5	3.8	4	-	3.8	-	3.8	-	
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA	1.65 to 5.5	-	-	0.1	-	0.1	-	0.1	V
		I _{OL} = 4 mA	1.65	-	0.08	0.24	-	0.24	-	0.24	
		I _{OL} = 8 mA	2.3	-	0.2	0.3	-	0.3	-	0.3	
		I _{OL} = 12 mA	2.7	-	0.22	0.4	-	0.4	-	0.4	
		I _{OL} = 16 mA	3	-	0.28	0.4	-	0.4	-	0.4	
		I _{OL} = 24 mA	3	-	0.38	0.55	-	0.55	-	0.55	
		I _{OL} = 32 mA	4.5	-	0.42	0.55	-	0.55	-	0.55	
I _{IN}	Input Leakage Current	V _{IN} = 5.5 V or GND	1.65 to 5.5	-	-	±0.1	-	±1.0	-	±1.0	μA
I _{OFF}	Power Off Leakage Current	V _{IN} = 5.5 V or V _{OUT} = 5.5 V	0	-	-	1	-	10	-	10	μA
I _{CC}	Quiescent Supply Current	V _{IN} = 5.5 V or GND	5.5	-	-	1	-	10	-	10	μA

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		-55°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{PLH} , t _{PHL}	Propagation Delay, A to Y (Figures 3 and 4)	RL = 1 MΩ, CL = 15 pF	1.65 to 1.95	-	9.1	15	-	15.6	-	15.6	ns
			2.3 to 2.7	-	5.0	9.0	-	9.5	-	9.5	
		3.0 to 3.6	-	3.7	6.3	-	6.5	-	6.5		
			-	3.1	5.2	-	5.5	-	5.5		
		RL = 500 Ω, CL = 50 pF	3.0 to 3.6	-	4.4	7.2	-	7.5	-	7.5	
			4.5 to 5.5	-	3.7	5.9	-	6.2	-	6.2	

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Unit
C _{IN}	Input Capacitance	V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	2.5	pF
C _{OUT}	Output Capacitance	V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	4.0	pF
C _{PD}	Power Dissipation Capacitance (Note 5)	10 MHz, V _{CC} = 3.3 V, V _{IN} = 0 V or V _{CC} 10 MHz, V _{CC} = 5.0 V, V _{IN} = 0 V or V _{CC}	11 12.5	pF

5. 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: $I_{CC(OPR)} = C_{PD} \cdot V_{CC} \cdot f_{in} \cdot I_{CC}$. C_{PD} is used to determine the no-load dynamic power consumption; $P_D = C_{PD} \cdot V_{CC}^2 \cdot f_{in} \cdot I_{CC} \cdot V_{CC}$.

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C_L includes probe and jig capacitance
 R_T is Z_{OUT} of pulse generator (typically 50 Ω)
 $f = 1$ MHz

Figure 3. Test Circuit

Test	Switch Position	C_L , pF	R_L , Ω	R_1 , Ω
t_{PLH} / t_{PHL}	Open	See AC Characteristics Table		
t_{PLZ} / t_{PZL}	$2 \times V_{CC}$	-	-	-
		See AC Characteristics Table		
t_{PHZ} / t_{PZH}	GND	-	-	-
		See AC Characteristics Table		

X = Don't Care



Figure 4. Switching Waveforms

V_{CC} , V	V_{mi} , V	V_{mo} , V		V_Y , V
		t_{PLH} , t_{PHL}	t_{PZL} , t_{PLZ} , t_{PZH} , t_{PHZ}	
1.65 to 1.95	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.15
2.3 to 2.7	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.15
3.0 to 3.6	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.3
4.5 to 5.5	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.3

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ORDERING INFORMATION

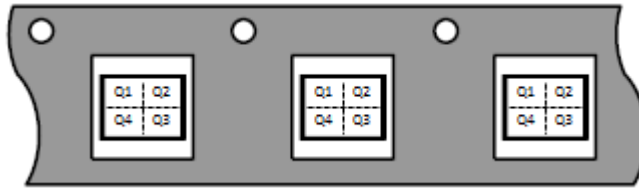
Device	Package	Specific Device Code	Pin1 Orientation (See below)	Shipping [†]
NL27WZ17DFT2G-L22348	SC-88	MX	Q4	3000 / Tape & Reel
NLV27WZ17DFT2G*	SC-88	MX	Q4	3000 / Tape & Reel

[†]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.

*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

Pin 1 Orientation in Tape and Reel

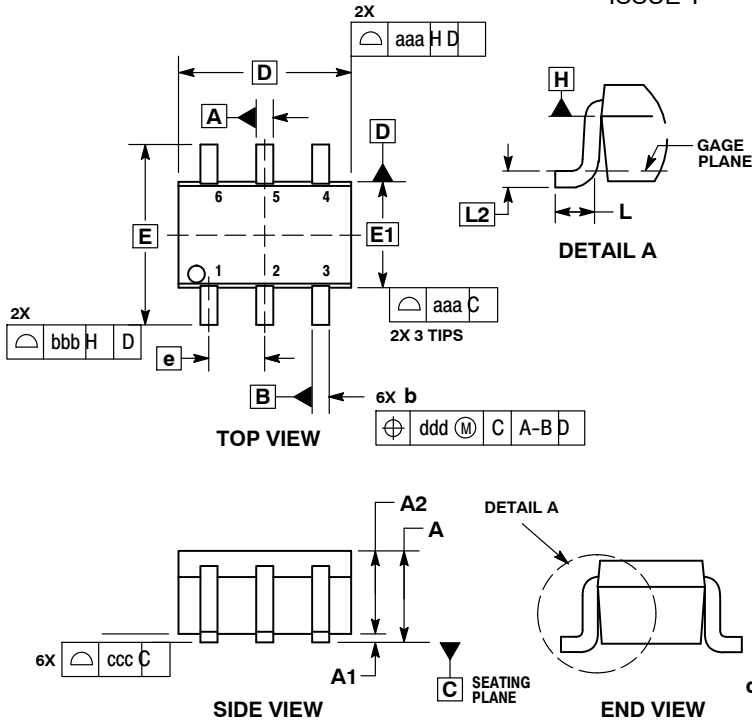
Direction of Feed



NLV27WZ17

PACKAGE DIMENSIONS

SC – 88/SC70 – 6/SOT – 363
CASE 419B – 02
ISSUE Y

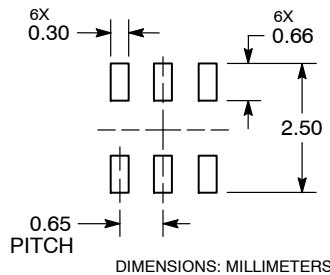


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	--	--	1.10	--	--	0.043
A1	0.00	--	0.10	0.000	--	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.070	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.006		
bbb	0.30			0.012		
ccc	0.10			0.004		
ddd	0.10			0.004		

RECOMMENDED SOLDERING FOOTPRINT*



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

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