NL27WZ16

Dual Buffer

The NL27WZ16 is a high performance dual buffer operating from a 1.65 to 5.5 V supply. At V_{CC} = 3 V, high impedance TTL compatible inputs significantly reduce current loading to input drivers while TTL compatible outputs offer improved switching noise performance.

Features

- Extremely High Speed: t_{PD} 2.0 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
- Chip Complexity: FET = 72; Equivalent Gate = 18
- Pb−Free Packages are Available

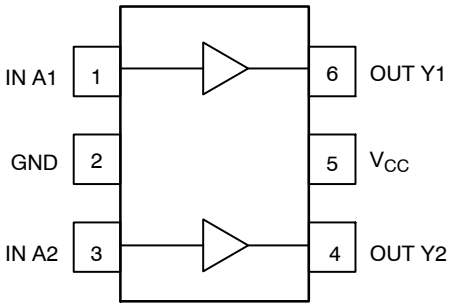


Figure 1. Pinout (Top View)

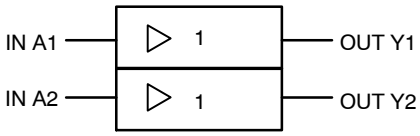


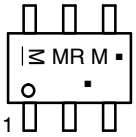
Figure 2. Logic Symbol

ON Semiconductor®

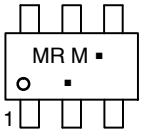
http://onsemi.com

MARKING DIAGRAMS

SC−88/SC−70−6/SOT−363
DF SUFFIX
CASE 419B



TSOP−6
DT SUFFIX
CASE 318G



MR = Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

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

PIN ASSIGNMENT

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

FUNCTION TABLE

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

ORDERING INFORMATION

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

MAXIMUM RATINGS

Characteristics		Symbol	Value	Unit
DC Supply Voltage		V_{CC}	−0.5 to +7.0	V
DC Input Voltage		V_I	$-0.5 \le V_I \le +7.0$	V
DC Output Voltage	Output in Z or LOW State (Note 1)	V_O	$-0.5 \le V_O \le 7.0$	V
DC Input Diode Current	V_I < GND	I_{IK}	−50	mA
DC Output Diode Current	V_O < GND	I_{OK}	−50	mA
DC Output Sink Current		I_O	±50	mA
DC Supply Current per Supply Pin		I_{CC}	±100	mA
DC Ground Current per Ground Pin		I_{GND}	±100	mA
Storage Temperature Range		T_{STG}	−65 to +150	°C
Power Dissipation in Still Air	SC−88, TSOP−6	P_D	200	mW
Thermal Resistance	SC−88, TSOP−6	θ_{JA}	333	°C/W
Lead Temperature, 1 mm from Case for 10 Seconds		T_L	260	°C
Junction Temperature Under Bias		T_J	+150	°C
ESD Withstand Voltage	Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	V_{ESD}	> 2000 > 200 N/A	V
Latchup Performance	Above V_{CC} and Below GND at 85°C (Note 5)	$I_{Latchup}$	±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. I_O 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

Parameter		Symbol	Min	Max	Unit
Supply Voltage	Operating Data Retention Only	V_{CC}	1.65 1.5	5.5 5.5	V
Input Voltage		V_I	0	5.5	V
Output Voltage	(High or LOW State)	V_O	0	5.5	V
Operating Free−Air Temperature		T_A	−55	+125	°C
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	$\Delta t/\Delta V$	0 0 0 0	20 20 10 5	ns/V

DC ELECTRICAL CHARACTERISTICS

Parameter	Condition	Symbol	V_{CC} (V)	T_A = 25°C			−55°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
High−Level Input Voltage		V_{IH}	1.65 to 1.95 2.3 to 5.5	0.75 V_{CC} 0.7 V_{CC}			0.75 V_{CC} 0.7 V_{CC}		V
Low−Level Input Voltage		V_{IL}	1.65 to 1.95 2.3 to 5.5			0.25 V_{CC} 0.3 V_{CC}		0.25 V_{CC} 0.3 V_{CC}	V
High−Level Output Voltage V_{IN} = V_{IH}	I_{OH} = −100 μA	V_{OH}	1.65 1.8 2.3 3.0 4.5	1.55 1.7 2.2 2.9 4.4	1.65 1.8 2.3 3.0 4.5		1.55 1.7 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 2.80 2.68 4.20		1.29 1.9 2.4 2.3 3.8		V
Low−Level Output Voltage V_{IN} = V_{IL}	I_{OL} = 100 μA	V_{OL}	1.65 1.8 2.3 3.0 4.5		0.0 0.0 0.0 0.0 0.0	0.1 0.1 0.1 0.1 0.1		0.1 0.1 0.1 0.1 0.1	V
	I_{OL} = 4 mA I_{OL} = 8 mA I_{OL} = 16 mA I_{OL} = 24 mA I_{OL} = 32 mA		1.65 2.3 3.0 3.0 4.5		0.08 0.10 0.15 0.22 0.22	0.24 0.30 0.40 0.55 0.55		0.24 0.30 0.40 0.55 0.55	V
Input Leakage Current	0 V ≤ V_{IN} ≤ 5.5 V	I_{IN}	0 to 5.5			±1.0		±1.0	μA
Power Off Leakage Current	V_{IN} or V_{OUT} = 5.5 V	I_{OFF}	0.0			1.0		10	μA
Quiescent Supply Current	V_{IN} = 5.5 V, GND	I_{CC}	1.65 to 5.5			1.0		10	μA

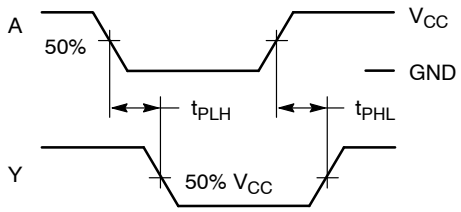
AC ELECTRICAL CHARACTERISTICS $t_R = t_F$ = 2.5 ns; C_L = 50 pF; R_L = 500 Ω

Parameter	Condition	Symbol	V_{CC} (V)	T_A = 25°C			−55°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
Propagation Delay (Figure 3 and 4)	R_L = 1 MΩ, C_L = 15 pF	t_{PLH} t_{PHL}	1.8 ± 0.15	1.8	8.0	9.6	1.8	10.2	ns
	R_L = 1 MΩ, C_L = 15 pF		2.5 ± 0.2	1.0	3.0	5.2	1.0	5.8	
	R_L = 1 MΩ, C_L = 15 pF		3.3 ± 0.3	0.8	2.3	3.6	0.8	4.0	
	R_L = 500 Ω, C_L = 50 pF			1.2	3.0	4.6	1.2	5.1	
	R_L = 1 MΩ, C_L = 15 pF		5.0 ± 0.5	0.5	1.8	2.9	0.5	3.2	
	R_L = 500 Ω, C_L = 50 pF			0.8	2.4	3.8	0.8	4.2	

CAPACITIVE CHARACTERISTICS

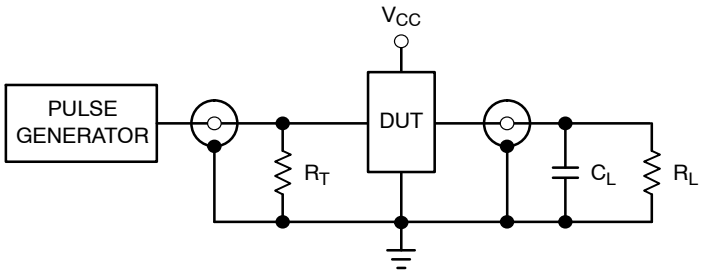
Parameter	Condition	Symbol	Typical	Unit
Input Capacitance	V_{CC} = 5.5 V, V_I = 0 V or V_{CC}	C_{IN}	7.0	pF
Power Dissipation Capacitance (Note 6)	10 MHz, V_{CC} = 3.3 V, V_I = 0 V or V_{CC} 10 MHz, V_{CC} = 5.5 V, V_I = 0 V or V_{CC}	C_{PD}	9 11	pF

6. 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; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.



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

Figure 3. Switching Waveforms



R_T = Z_{OUT} of pulse generator (typically 50 Ω)

Figure 4. Test Circuit

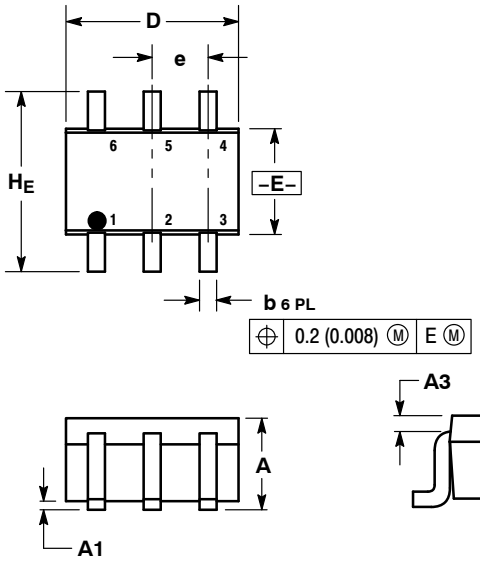
ORDERING INFORMATION

Device	Package	Shipping†
NL27WZ16DFT2	SC−88/SC−70/SOT−363	3000 /Tape & Reel
NL27WZ16DFT2G	SC−88/SC−70/SOT−363 (Pb−Free)	
NL27WZ16DTT1	TSOP−6	
NL27WZ16DTT1G	TSOP−6 (Pb−Free)	

†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

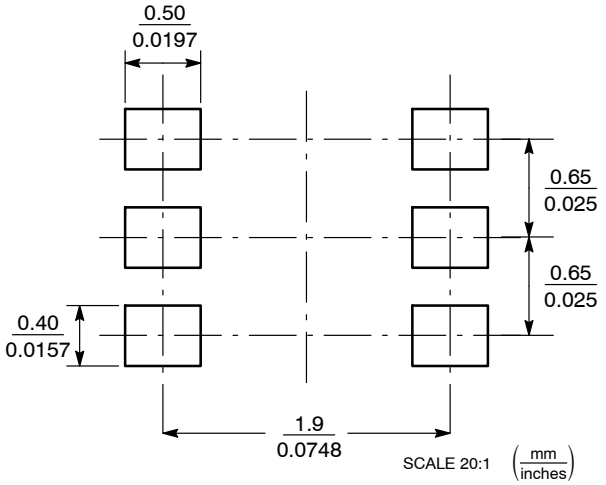
SC−88/SC70−6/SOT−363
CASE 419B−02
ISSUE W



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

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.20 REF			0.008 REF		
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
H_E	2.00	2.10	2.20	0.078	0.082	0.086

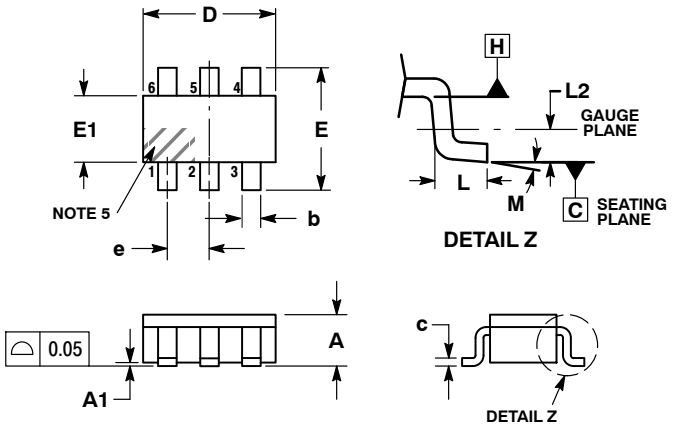
SOLDERING FOOTPRINT*



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

PACKAGE DIMENSIONS

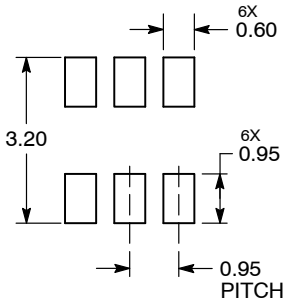
TSOP−6
CASE 318G−02
ISSUE U



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
5. PIN ONE INDICATOR MUST BE LOCATED IN THE INDICATED ZONE.

	MILLIMETERS		
DIM	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.90	3.00	3.10
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.85	0.95	1.05
L	0.20	0.40	0.60
L2		0.25 BSC	
M	0°	–	10°

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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Phone: 421 33 790 2910
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