Dual Buffer with Open Drain Outputs

The NL27WZ07 is a high performance dual buffer with open drain outputs operating from a 1.65 to 5.5 V supply.

The internal circuit is composed of multiple stages, including an open drain output which provides the capability to set output switching level. This allows the NL27WZ07 to be used to interface 5 V circuits to circuits of any voltage between $V_{\rm CC}$ and 7 V using an external resistor and power supply.

Features

- Extremely High Speed: t_{PD} 2.3 ns (typical) at $V_{CC} = 5 \text{ V}$
- Designed for 1.65 V to 5.5 V V_{CC} Operation, CMOS compatible
- Over Voltage Tolerant Inputs
- LVTTL Compatible Interface Capability with 5 V TTL Logic with V_{CC} = 3 V
- LVCMOS Compatible
- 24 mA Output Sink Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- Chip Complexity: FET = 72; Equivalent Gate = 18
- Pb-Free Packages are Available

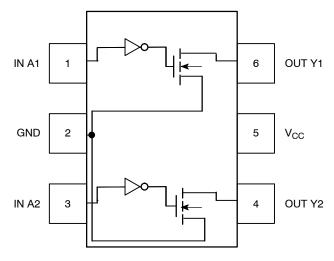


Figure 1. Pinout (Top View)

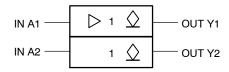


Figure 2. Logic Symbol



ON Semiconductor®

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MARKING DIAGRAMS



SC-88 DF SUFFIX CASE 419B





TSOP-6 DT SUFFIX CASE 318G



M7 = 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.

PIN ASSIGNMENT

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

FUNCTION TABLE

A Input	Y Output
L	L
Н	Z
Н	Z

ORDERING INFORMATION

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

MAXIMUM RATINGS

Symbol	Cha	aracteristics	Value	Unit
V _{CC}	DC Supply Voltage		-0.5 to +7.0	V
VI	DC Input Voltage		$-0.5 \leq V_{l} \leq +7.0$	V
Vo	DC Output Voltage	Output in Z or LOW State (Note 1)	$-0.5 \le V_O \le 7.0$	V
I _{IK}	DC Input Diode Current	-50	mA	
I _{OK}	DC Output Diode Current	-50	mA	
ΙO	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
P_{D}	Power Dissipation in Still Air	SC-88, TSOP-6	200	mW
$\theta_{\sf JA}$	Thermal Resistance	SC-88, TSOP-6	333	°C/W
T _L	Lead Temperature, 1 mm from case	for 10 s	260	°C
T_J	Junction Temperature under Bias		+ 150	°C
I _{Latchup}	Latchup Performance	Above V _{CC} and Below GND at 85°C (Note 5)	± 500	mA
MSL	Moisture Sensitivity		Level 1	
F _R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	
V _{ESD}	ESD Classification	Human Body Model (Note 3) Machine Model (Note 4) Charged Device Model (Note 5)	> 2000 > 200 N/A	

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, rated to EIA/JESD22-A114-B.
 3. Tested to EIA/JESD22-A115-A, rated 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 _{CC}	Supply Voltage	Operating Data Retention Only	1.65 1.5	5.5 5.5	V
VI	Input Voltage		0	5.5	V
V _O	Output Voltage	(Z or LOW State)	0	5.5	V
T _A	Operating Free-Air Temperature		-55	+125	°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

DC ELECTRICAL CHARACTERISTICS

			V _{CC}	T _A = 25°C		-55°C ≤T _A	\ ≤ 125°C		
Symbol	Parameter	Condition	(V)	Min	Тур	Max	Min	Max	Unit
V _{IH}	High-Level Input Voltage		1.65 to 1.95 2.3 to 5.5	0.75 V _{CC} 0.75 V _{CC}			0.75 V _{CC} 0.75 V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65 to 1.95 2.3 to 5.5			0.3 V _{CC} 0.3 V _{CC}		0.3 V _{CC} 0.3 V _{CC}	V
I _{LKG}	Z-State Output Leakage Current	$V_{IN} = V_{IL}$ $V_{OUT} = V_{CC}$ or GND	2.3 to 5.5			±5.0		± 10.0	μΑ
V _{OL}	Low-Level Output Voltage	I _{OL} = 100 μA	1.65 to 5.5		0.0	0.1		0.1	V
	$V_{IN} = V_{IL}$	I _{OL} = 4 mA	1.65		0.08	0.24		0.24	
		I _{OL} = 8 mA	2.3		0.20	0.3		0.3	
		I _{OL} = 12 mA	2.7		0.22	0.4		0.4	
		I _{OL} = 16 mA	3.0		0.28	0.4		0.4	
		I _{OL} = 24 mA	3.0		0.38	0.55		0.55	
		I _{OL} = 32 mA	4.5		0.42	0.55		0.55	
I _{IN}	Input Leakage Current	V _{IN} or V _{OUT} = V _{CC} or GND	0 to 5.5			± 0.1		±1.0	μΑ
l _{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

AC ELECTRICAL CHARACTERISTICS $t_R = t_F = 2.5 \text{ ns; } C_L = 50 \text{ pF; } R_L = 500 \ \Omega$

			$T_A = 25^{\circ}C$ $-55^{\circ}C \le T_A \le$		T _A = 25°C		λ ≤ 125°C		
Symbol	Parameter	Condition	V _{CC} (V)	Min	Тур	Max	Min	Max	Unit
t _{PZL}	Propagation Delay	$R_{L} = R_1 = 5000 \Omega, C_L = 15 pF$	1.8 ± 0.15	1.8	5.3	11.5	1.8	12.0	ns
	(Figure 3 and 4)		2.5 ± 0.2	1.2	3.7	5.8	1.2	6.4	
		$R_{L} = R_1 = 500 \Omega, C_L = 50 pF$	3.3 ± 0.3	0.8	2.9	4.4	0.8	4.8	
			5.0 ± 0.5	0.5	2.3	3.5	0.5	3.9	
t _{PLZ}	Propagation Delay	$R_{L} = R_1 = 5000 \Omega, C_L = 15 pF$	1.8 ± 0.15	1.8	5.3	11.5	1.8	12.0	ns
	(Figure 3 and 4)		2.5 ± 0.2	1.2	2.8	5.8	1.2	6.4	
		$R_{L} = R_{1} = 500 \Omega, C_{L} = 50 pF$	3.3 ± 0.3	0.8	2.1	4.4	0.8	4.8	
			5.0 ± 0.5	0.5	1.4	3.5	0.5	3.9	

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 6)	10 MHz, V_{CC} = 5.5 V, V_{I} = 0 V or V_{CC}	4.0	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: $I_{CC(OPR)} = C_{PD} \cdot V_{CC} \cdot f_{in} + I_{CC}$. C_{PD} is used to determine the no–load dynamic power consumption; $P_D = C_{PD} \cdot V_{CC}^2 \cdot f_{in} + I_{CC} \cdot V_{CC}$.

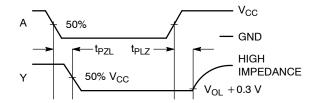
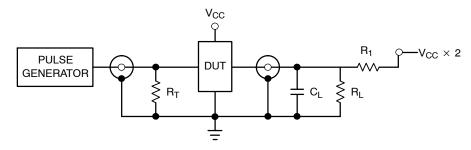


Figure 3. Switching Waveforms



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

Figure 4. Test Circuit

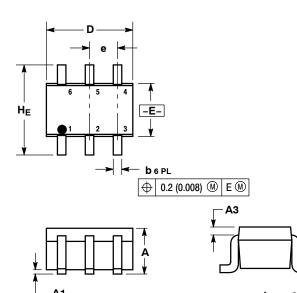
ORDERING INFORMATION

Device	Package	Shipping [†]
NL27WZ07DFT2	SC-88 / SOT-363 / SC-70	
NL27WZ07DFT2G	SC-88 / SOT-363 / SC-70 (Pb-Free)	3000 / Tape & Reel
NL27WZ07DTT1	TSOP-6 / SOT-23 / SC-59	3000 / Tape & neer
NL27WZ07DTT1G	TSOP-6 / SOT-23 / SC-59 (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

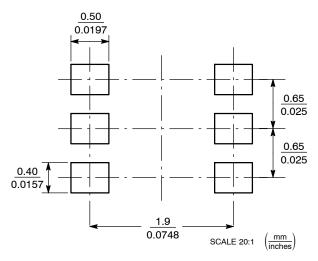
SC-88/SC70-6/SOT-363 CASE 419B-02 **ISSUE W**



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

	MIL	LIMETE	ERS	INCHES			
DIM	MIN	NOM	MAX	MIN	NOM	MAX	
Α	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	
АЗ		0.20 RE	F		0.008 RI	EF	
b	0.10	0.21	0.30	0.004	0.008	0.012	
С	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	
е		0.65 BS	С	0.026 BSC			
L	0.10	0.20	0.30	0.004	0.008	0.012	
He	2.00	2.10	2.20	0.078	0.082	0.086	

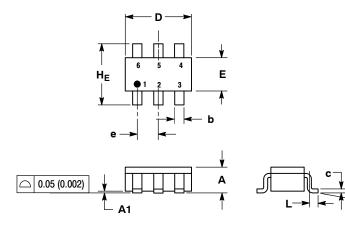
SOLDERING FOOTPRINT*



*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

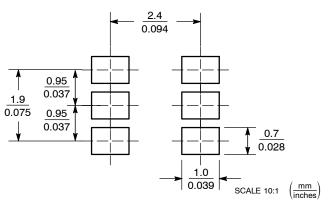
TSOP-6 CASE 318G-02 **ISSUE T**



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. CONTROLLING DIMENSION: MILLIMETER.
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL
- DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE

	MILLIMETERS				INCHES	
DIM	MIN	NOM	MAX	MIN	NOM	MAX
Α	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
С	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
е	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	-	10°	0°	-	10°

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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