NL7SZ18

1-to-2 Demultiplexer with 3-State Deselected Output

The NL7SZ18 is a high−performance non−inverting 1−to−2 demultiplexer. With the Select input [S] at Low, data at A is passed to Y0 and Y1 is set to high impedance. With the Select input [S] at High, data at A is passed to Y1 and Y0 is set to high impedance. The device operates over the voltage range from 1.65 V to 5.5 V.

This device has been optimized for on−board buffering applications and offers mixed (1.65 V, 2.3 V, 3.0 V and 5.5 V) voltage capability by providing over voltage tolerance (OVT*) circuitry on I/O pins.

Features

- High−Speed Propagation Delay
  t_{PD} 2.5 nS (Typ), Load 50 pF @ 5.0 V
- Power Down Impedance
  Outputs in High−Z
- Output Drive Capability
  32 mA @ 5.0 V
- Broad V_{CC} Operating Range
  1.65 V to 5.5 V
- Surface Mount Technology
  SC−70, 6−Lead and UDFN6 Packaging
- OVT* on Inputs/Outputs
- Pb−Free Package is Available

Typical Applications

- Cell Phones
- PDAs
- Digital Cameras
- Video Cameras

Important Information

- ESD Protection: MM >200 V, Human Body Model >2000 V
- Latch−Up Max Rating: 300 mA
- Pin−to−Pin Compatible with NC7SZ18

*Over Voltage Tolerance (OVT) enables input and output pins to function outside (higher) of their operating voltages, with no damage to the devices or to signal integrity.

PIN/FUNCTION TABLE

Pin	Function
A	Data Input
S	Demultiplexer Select
Y_0	Output 1
Y_1	Output 2

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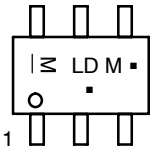
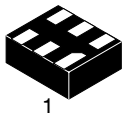
MARKING DIAGRAMS

SOT−363/SC70−6/SC−88
DF SUFFIX
CASE 419B



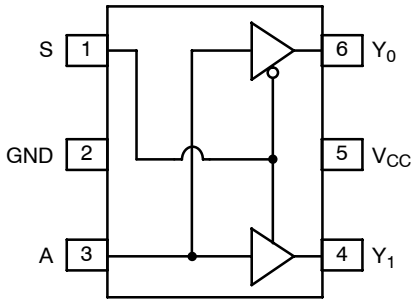


UDFN6
MU SUFFIX
CASE 517AA

LD, T = Device Marking
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



(TOP VIEW)

TRUTH TABLE

Input		Output	
S	**A**	**Y_0**	**Y_1**
L	L	L	Z
L	H	H	Z
H	L	Z	L
H	H	Z	H

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
DC Supply Voltage		V_{CC}	−0.5 to +7.0	V
DC Input Voltage		V_{IN}	−0.5 to +7.0	V
DC Output Voltage		V_{OUT}	−0.5 to +7.0	V
DC Input Diode Current @ $V_1 < -0.5$ V		I_{IK}	−50	mA
DC Output Diode Current @ $V_1 < -0.5$ V		I_{OK}	−50	mA
DC Output Sink Current		I_{OUT}	±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
Lead Temperature, 1 mm from Case for 10 Seconds		T_L	260	°C
Junction Temperature Under Bias		T_J	+150	°C
Thermal Resistance (Note 1)		θ_{JA}	250	°C/W
Power Dissipation in Still Air at 85°C		P_D	180	mW
Moisture Sensitivity		MSL	Level 1	–
Flammability Rating	Oxygen Index: 28 to 34	F_R	UL 94 V−0 @ 0125 in	–
ESD Withstand Voltage	Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	V_{ESD}	> 2000 > 200 n/a	V

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. Measured with minimum pad spacing on an FR4 board, using 10 mm−by−1 inch, 2 ounce copper trace no air flow.
2. Tested to EIA/JESD22−A114−A.
3. Tested to EIA/JESD22−A115−A.
4. Tested to JESD22−C101−A.

RECOMMENDED OPERATING CONDITIONS

Rating		Symbol	Value	Unit
DC Supply Voltage		V_{CC}	1.65 to 5.5	V
DC Supply Voltage, Data Retention		V_{CC}	1.5 to 5.5	V
Input Voltage		V_{IN}	0 to 5.5	V
Output Voltage		V_{OUT}	0 to 5.5	V
Operating Temperature		T_A	−40 to 85	°C
Input Rise and Fall Times	V_{CC} @ 1.8 ± 0.15 V V_{CC} @ 2.5 ± 0.2 V V_{CC} @ 3.3 ± 0.3 V V_{CC} @ 5.0 ± 0.5 V	t_r, t_f	0 to 20 0 to 20 0 to 10 0 to 5	nS/V
Thermal Resistance		θ_{JA}	350	°C/W

ORDERING INFORMATION

Device Order Number	Package	Shipping†
NL7SZ18DFT2	SC70−6	3000 / Tape & Reel
NL7SZ18DFT2G	SC70−6 (Pb−Free)	3000 / Tape & Reel
NL7SZ18MUR2G	UDFN6 (Pb−Free)	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.

DC ELECTRICAL CHARACTERISTICS

Parameter	Condition		Symbol	V_{CC} (V)	T_A = 25°C			T_A = −40°C to 85°C		Unit
					Min	Typ	Max	Min	Max	
High−Level Input Voltage			V_{IH}	1.65−1.95 2.3−5.5	0.75 V_{CC} 0.70 V_{CC}			0.75 V_{CC} 0.70 V_{CC}		V
Low−Level Output Voltage			V_{IL}	1.65−1.95 2.3−5.5			0.25 V_{CC} 0.30 V_{CC}		0.25 V_{CC} 0.30 V_{CC}	V
High−Level Output Voltage	V_{IN} = V_{IH}	I_{OH} = −100 μa	V_{OH}	1.65 2.3 3.0 4.5	1.55 2.20 2.90 4.40	1.65 2.30 3.00 4.50		1.55 2.20 2.90 4.40		V
		I_{OH} = −4.0 mA I_{OH} = −8.0 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 1.90 2.40 2.30 3.80	1.52 2.15 2.80 2.68 4.20		1.29 1.90 2.40 2.30 3.80		
Low−Level Output Voltage	V_{IN} = V_{IL}	I_{OL} = 100 μa	V_{OL}	1.65 2.3 3.0 4.5		0.0 0.0 0.0 0.0	0.10 0.10 0.10 0.10		0.10 0.10 0.10 0.10	V
		I_{OL} = 4.0 mA I_{OL} = 8.0 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	
Input Leakage Current	V_{IN} = 5.5 V, GND		I_{IN}	0.0 to 5.5			±0.1		±1.0	μA
Output High−Z Current	V_{IN} = V_{IH} or V_{IL} 0 < V_{out} ≤ 5.5 V		I_{OZ}	1.65 to 5.5			±0.5		±5.0	μA
Power−Off Leakage Current	V_{IN} or V_{CC} = 5.5 V		I_{OFF}	0.0			1.0		10	μA
Quiescent Supply Current	V_{IN} = 5.5 V, GND		I_{CC}	1.8 to 5.5			1.0		10	μA

AC ELECTRICAL CHARACTERISTICS

Parameter	Condition	Figure	Symbol	V_{CC}	T_A = 25°C			T_A = −40°C to 85°C		Unit
					Min	Typ	Max	Min	Max	
Propagation Delay A to Y_0 or Y_1	C_L = 15 pF R_D = 1.0 MΩ S = OPEN	Figures 1 & 3	t_{PLH} t_{PHL}	1.8 ± 0.15 2.5 ± 0.2 3.3 ± 0.3 5.0 ± 0.5	2.0 1.0 0.8 0.5	6.3 3.6 2.7 2.0	10.1 5.7 4.0 3.1	2.0 1.0 0.8 0.5	10.5 6.0 4.3 3.3	nS
	C_L = 50 pF R_D = 500 Ω S = OPEN	Figures 1 & 3		3.3 ± 0.3 5.0 ± 0.5	1.2 0.8	3.4 2.5	4.9 3.9	1.2 0.8	5.4 4.2	nS
Output Enable Time	C_L = 50 pF R_D, R_U = 500 Ω S = GND for t_{PZH} S = V_{IN} for t_{PZL} V_I = 2 x V_{CC}	Figures 1 & 3	t_{PZL} t_{PZH}	1.8 ± 0.15 2.5 ± 0.2 3.3 ± 0.3 5.0 ± 0.5	3.0 1.8 1.2 0.8	6.9 4.2 3.2 2.5	12 6.8 5.0 4.0	3.0 1.8 1.2 0.8	12.5 7.3 5.5 4.3	nS
	C_L = 50 pF R_D, R_D = 500 Ω S = GND for t_{PHZ} S = V_{IN} for t_{PLZ} V_I = 2 x V_{CC}	Figures 1 & 3	t_{PLZ} t_{PHZ}	1.8 ± 0.15 2.5 ± 0.2 3.3 ± 0.3 5.0 ± 0.5	2.5 1.5 0.8 0.3	6.0 4.0 2.9 1.8	10 6.8 4.9 3.5	2.5 1.5 0.8 0.3	10.5 7.1 5.3 3.7	nS
Input Capacitance Output Capacitance			C_{IN} C_{OUT}	OPEN 3.3		2.5 4.0				pF
Power Dissipation Capacitance	Note 5	Figure 2	C_{PD}	3.3 5.0		16 19.5				pF

5. C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle (see Figure 2). C_{PD} is related to I_{CCD} dynamic operating current by the expression: I_{CCD} = (C_{PD}) (V_{CC}) (f_{IN}) + (I_{CCD}static).

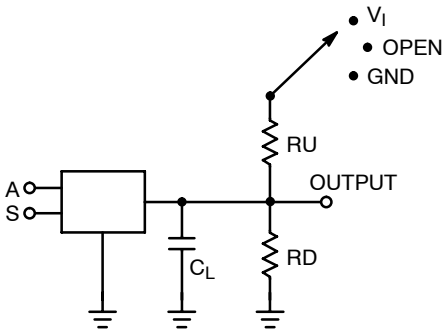


Figure 1. AC Test Circuit

C_L Includes Load and Stray Capacitance
Input PRR = 1.0 MHz; t_W = 500 nS

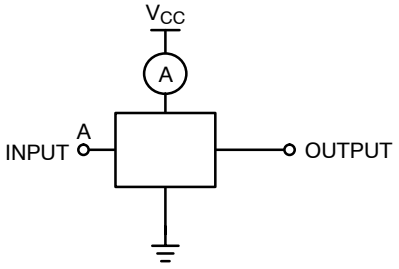


Figure 2. I_{CCD} Test Circuit

Input = AC Waveform; t_r = t_f = 1.8 nS
PRR = 10 MHz; Duty Cycle = 50%
S Input = GND or x

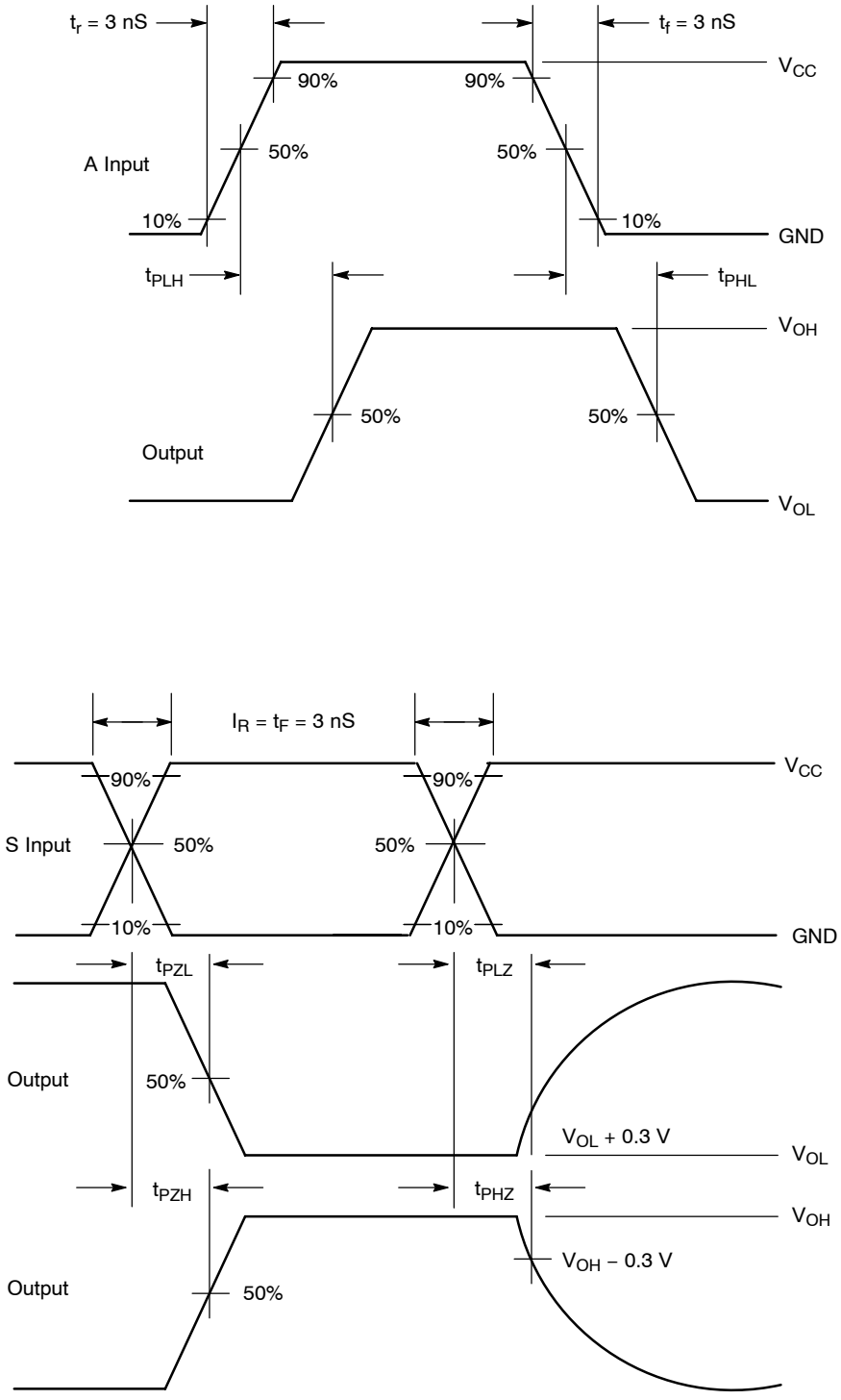
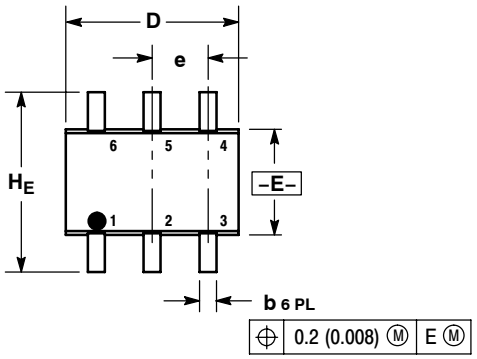
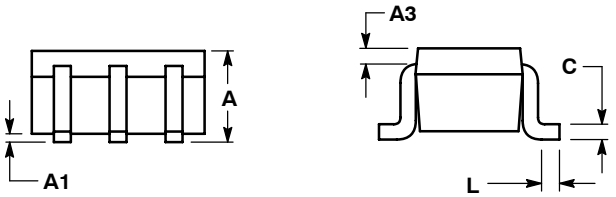


Figure 3. AC Waveforms

PACKAGE DIMENSIONS

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

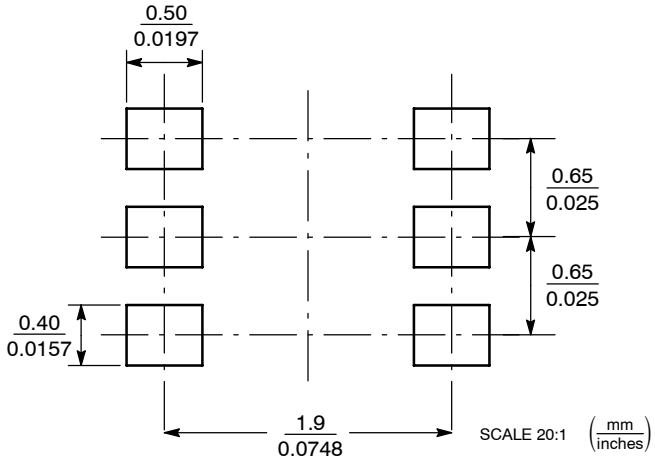




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	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

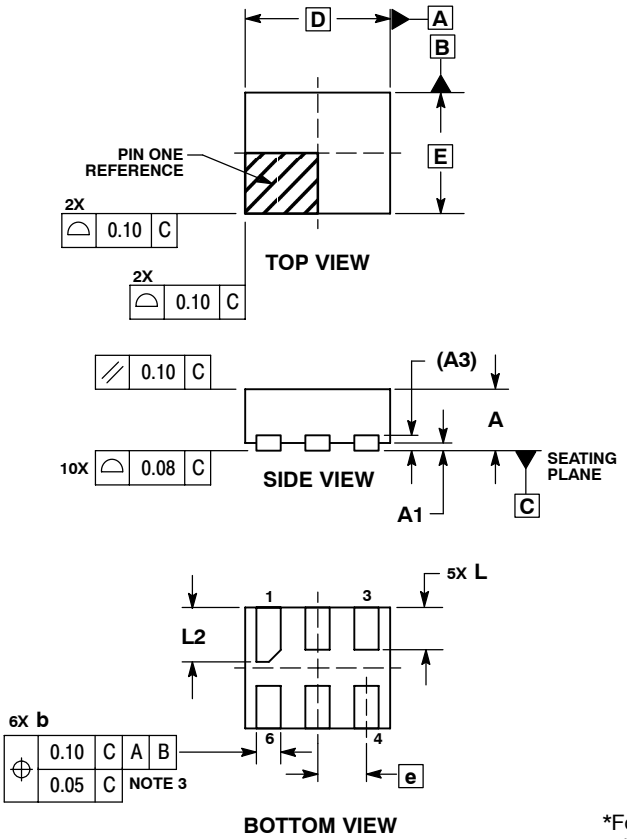
SOLDERING FOOTPRINT*



*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

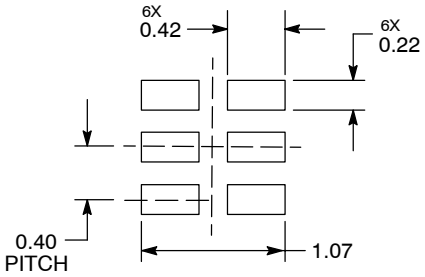
UDFN6, 1.2x1.0, 0.4P
CASE 517AA−01
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.127 REF	
b	0.15	0.25
D	1.00 BSC	
E	1.20 BSC	
e	0.40 BSC	
L	0.30	0.40
L2	0.40	0.50

MOUNTING 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:
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