NL7SZ19

1-of-2 Decoder/ Demultiplexer

The NL7SZ19 is a high-performance 1-to-2 Decoder/Demultiplexer operating from a 1.65 V to 5.5 V supply. High impedance TTL compatible inputs significantly reduce current loading to input drivers while TTL compatible outputs offer improved switching noise performance. A V_1 specification of 5.5 V allows the inputs to be safely driven from 5.5 V devices. The NL7SZ19 is suitable for memory address decoding and other TTL level bus oriented applications.

Features

- High-Speed Propagation Delay
  t_{PD} 2.7 nS (Typ), Load 50 pF @ 5.0 V
- 32 mA Output Drive Capability
- Power Down Impedance
  Inputs/Outputs in High-Z
- Broad V_{CC} Operating Range
  1.65 V to 5.5 V
- Surface Mount Technology
  SC-70, 6-Lead Packaging
- OVT* on Inputs
  Facilitates 5.0 V to 3.0 V Translation

Typical Applications

- Cell Phones
- PDAs
- Digital Cameras
- Video Cameras
- Hand-Held Sound Devices

Important Information

- ESD Protection: HBM >2000 V, MM >200 V
- Latch-Up Max Rating: 200 mA
- Pin to Pin Compatible with Fairchild's NC7SC19

*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.

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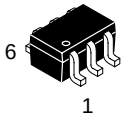
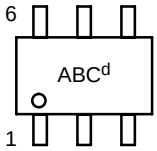
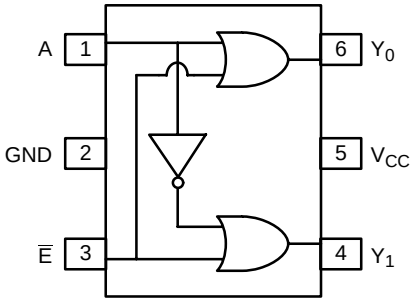


SOT-363/SC70-6/SC-88
DF SUFFIX
CASE 419B

MARKING DIAGRAM



ABC = Device Marking
d = Date Code



(TOP VIEW)

PIN/FUNCTION TABLE

Pin	Function
A	Data Input
$\overline{E}$	Decoder/Multiplexer Pin
Y_0	Output 0
Y_1	Output 1

TRUTH TABLE

$\overline{E}$	A	$Y_0 = A + \overline{E}$	$Y_1 = \overline{A} + \overline{E}$
L	L	L	H
L	H	H	L
H	X	H	H

X = Don't Care

ORDERING INFORMATION

Device	Package	Shipping
NL7SZ19DFT1	SOT-363/ SC70-6/ SC-88	3000 / Tape & Reel

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June, 2003 - Rev. 1
Publication Order Number:
NL7SZ19/D

MAXIMUM RATINGS

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

Maximum Ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute maximum-rated conditions is not implied. Functional operation should be restricted to the Recommended Operating Conditions.

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

Symbol	Rating		Value	Unit
V_{CC}	DC Supply Voltage		1.65 to 5.5	V
V_{CC}	DC Supply Voltage, Data Retention		1.5 to 5.5	V
V_{IN}	Input Voltage		0 to 5.5	V
V_{OUT}	Output Voltage		0 to 5.5	V
T_A	Operating Temperature		-40 to 85	°C
t_r, t_f	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	0 to 20 0 to 20 0 to 10 0 to 5	nS/V
θ_{JA}	Thermal Resistance		350	°C/W

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition		V_{CC} (V)	T_A = 25°C Min	T_A = 25°C Typ	T_A = 25°C Max	T_A = -40°C to 85°C Min	T_A = -40°C to 85°C Max	Unit
V_{IH}	High-Level Input Voltage			1.65 2.3 to 5.5	0.75 V_{CC} 0.70 V_{CC}			0.75 V_{CC} 0.70 V_{CC}		V
V_{IL}	Low-Level Output Voltage			1.65 2.3-5.5			0.25 V_{CC} 0.30 V_{CC}		0.25 V_{CC} 0.30 V_{CC}	V
V_{OH}	High-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}	I_{OH} = -100 μa	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} = -3.0 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	1.47 2.10 2.75 2.63 4.15		1.29 1.90 2.40 2.30 3.80		
V_{OL}	Low-Level Output Voltage	V_{IN} = V_{IL} or V_{IH}	I_{OL} = 100 μa	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} = 3.0 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		0.09 0.12 0.20 0.30 0.32	0.24 0.30 0.40 0.55 0.55		0.24 0.30 0.40 0.55 0.55	
I_{IN}	Input Leakage Current	V_{IN} = 5.5 V, GND		0.0 to 5.5			±0.1		±1.0	μA
I_{OFF}	Power-Off Leakage Current	V_{IN} or V_{OUT} = 5.5 V		0.0			1.0		10	μA
I_{CC}	Quiescent Supply Current	V_{IN} = 5.5 V, GND		1.65 to 5.5			1.0		10	μA

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V_{CC}	T_A = 25°C Min	T_A = 25°C Typ	T_A = 25°C Max	T_A = -40°C to 85°C Min	T_A = -40°C to 85°C Max	Unit	Figure
t_{PLH} t_{PHL}	Propagation Delay A or • to Y_0 or Y_1	C_L = 15 pF R_D = 1.0 MΩ	1.8 ± 0.15 2.5 ± 0.2 3.3 ± 0.3 5.0 ± 0.5	2.5 1.2 0.8 0.5	6.2 3.6 2.9 2.4	10.5 6.0 4.1 3.2	2.5 1.2 0.8 0.5	11 6.4 4.5 3.5	nS	Figures 1 & 3
		C_L = 50 pF R_D = 500 MΩ	3.3 ± 0.3 5.0 ± 0.5	1.2 0.8	3.2 2.7	5.1 4.0	1.2 0.8	5.4 4.3	nS	Figures 1 & 3
C_{IN}	Input Capacitance		0		2.3				pF	
C_{PD}	Power Dissipation Capacitance	Note 5	3.3 5.0		10.5 12.8				pF	Figure 2

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).

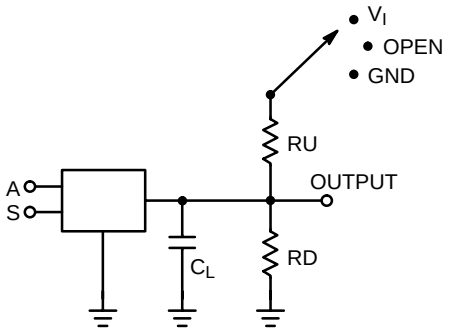


Figure 1. AC Test Circuit

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

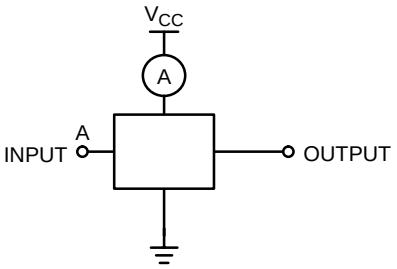


Figure 2. I_{CCD} Test Circuit

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

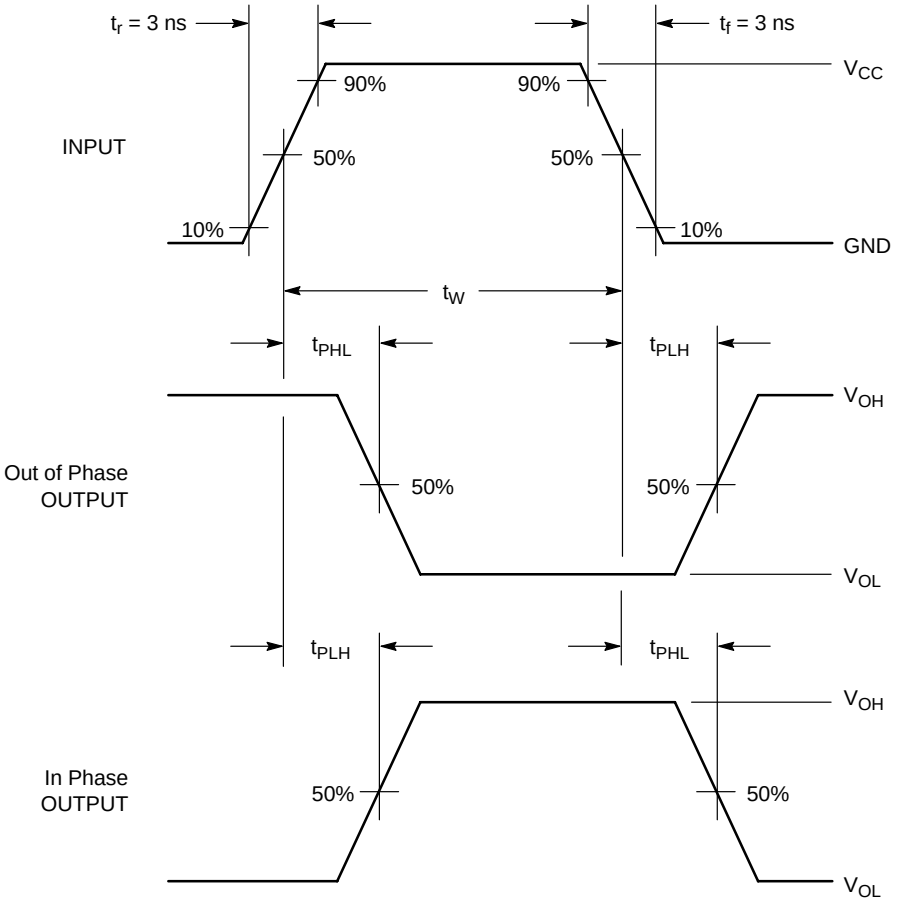
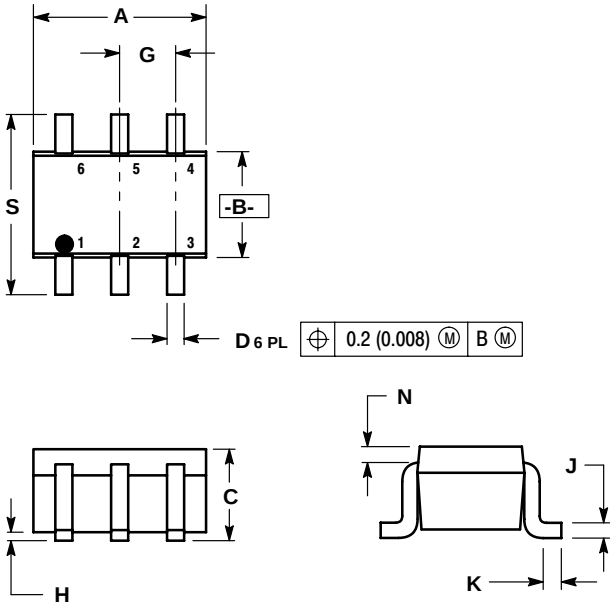


Figure 3. AC Waveforms

PACKAGE DIMENSIONS

SOT-363/SC70-6/SC-88
DF SUFFIX
6-LEAD PACKAGE
CASE 419B-02
ISSUE P



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

	INCHES		MILLIMETERS	
DIM	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

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