

NL17SZ126

Non-inverting 3-State Buffer

The NL17SZ126 is a high performance dual noninverting buffer operating from a 2.3 V to 5.5 V supply.

- Extremely High Speed: t_{PD} 2.6 ns (typical) at $V_{CC} = 5$ V
- Designed for 2.3 V to 5.5 V V_{CC} Operation
- Over Voltage Tolerant Inputs and Outputs
- 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
- 3-State OE Input is Active HIGH
- Replacement for NC7SZ126
- Chip Complexity = 36 Feet

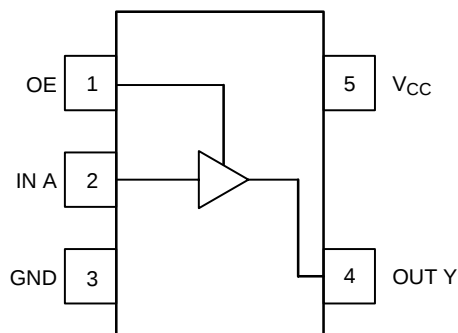


Figure 1. Pinout (Top View)

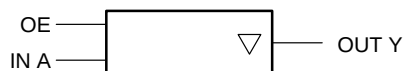


Figure 2. Logic Symbol



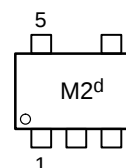
ON Semiconductor®

<http://onsemi.com>

MARKING DIAGRAMS



SC70-5/SC-88A/SOT-353
DF SUFFIX
CASE 419A



d = Date Code

PIN ASSIGNMENT

Pin	Assignment
1	OE
2	IN A
3	GND
4	OUT Y
5	V_{CC}

FUNCTION TABLE

OE Input	A Input	Y Output
H	L	L
H	H	H
L	X	Z

X = Don't Care

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

MAXIMUM RATINGS

Symbol	Parameter	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	− 50	mA
I _{OK}	DC Output Diode Current	− 50	mA
I _{OUT}	DC Output Sink Current	± 50	mA
I _{CC}	DC Supply Current per Supply 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	SC-70/SC-88A	°C/W
P _D	Power Dissipation in Still Air at 85°C	SC-70/SC-88A	mW
MSL	Moisture Sensitivity	Level 1	
F _R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
V _{ESD}	ESD Withstand Voltage	Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	> 2000 > 200 N/A

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 with 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	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	2.0	5.5	V
V _{IN}	DC Input Voltage	0	5.5	V
V _{OUT}	DC Output Voltage	0	5.5	V
T _A	Operating Temperature Range	− 40	+ 85	°C
t _r , t _f	Input Rise and Fall Time	V _{CC} = 3.0 V ± 0.3 V V _{CC} = 5.0 V ± 0.5 V		ns/V
		0	100	
		0	20	

DEVICE JUNCTION TEMPERATURE VERSUS TIME TO 0.1% BOND FAILURES

Junction Temperature °C	Time, Hours	Time, Years
80	1,032,200	117.8
90	419,300	47.9
100	178,700	20.4
110	79,600	9.4
120	37,000	4.2
130	17,800	2.0
140	8,900	1.0

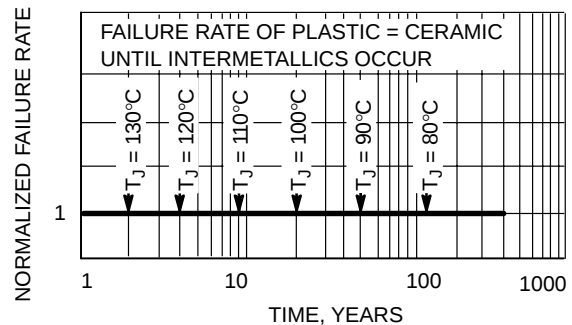


Figure 3. Failure Rate versus Time Junction Temperature

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			– 40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
V _{IH}	High-Level Input Voltage		2.3 to 5.5	0.7 V _{CC}			0.7 V _{CC}		V
V _{IL}	Low-Level Input Voltage		2.3 to 5.5			0.3 V _{CC}		0.3 V _{CC}	V
V _{OH}	High-Level Output Voltage V _{IN} = V _{IH}	I _{OH} = 100 μA I _{OH} = –8 mA I _{OH} = –12 mA I _{OH} = –16 mA I _{OH} = –24 mA I _{OH} = –32 mA	2.3 to 5.5 2.3 2.7 3.0 3.0 4.5	V _{CC} – 0.1 1.9 2.2 2.4 2.7 3.8	V _{CC} 2.1 2.4 2.7 2.5 4.0		V _{CC} – 0.1 1.9 2.2 2.4 2.3 3.8		V
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA I _{OL} = 8 mA I _{OL} = 12 mA I _{OL} = 16 mA I _{OL} = 24 mA I _{OL} = 32 mA	2.3 to 5.5 2.3 2.7 3.0 3.0 4.5		0.20 0.22 0.28 0.38 0.55 0.42	0.1 0.3 0.4 0.4 0.55 0.55		0.1 0.3 0.4 0.4 0.55 0.55	V
I _{IN}	Input Leakage Current	V _{IN} = V _{CC} or GND	0 to 5.5			± 0.1		± 1.0	μA
I _{OFF}	Power Off-Output Leakage Current	V _{OUT} = 5.5 V	0			1		10	μA
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5			1		10	μA
I _{OZ}	3-State Output Leakage	0 V ≤ V _{OUT} ≤ 5.5 V V _{IN} = V _{IL} or V _{IH}	2.3 to 5.5			± 0.5		± 5	μA

AC ELECTRICAL CHARACTERISTICS (t_R = t_F = 3.0 ns)

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			– 40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay AN to YN (Figures 4, and 5, Table 1)	R _L = 1 MΩ C _L = 15 pF	2.5 ± 0.2	1.0		7.5	1.0	8	ns
		R _L = 1 MΩ C _L = 15 pF	3.3 ± 0.3	0.8		5.2	0.8	5.5	
		R _L = 500 Ω C _L = 50 pF		1.2		5.7	1.2	6.0	
t _{PZH} t _{PZL}	Output Enable Time (Figures 6, 7 and 8, Table 1)	R _L = 1 MΩ C _L = 15 pF	5.0 ± 0.5	0.5		4.5	0.5	4.8	ns
		R _L = 500 Ω C _L = 50 pF		0.8		5.0	0.8	5.3	
t _{PZH} t _{PZL}	Output Enable Time (Figures 6, 7 and 8, Table 1)	R _L = 250 Ω C _L = 50 pF	2.5 ± 0.2	1.8		8.5	1.8	9.0	ns
			3.3 ± 0.3	1.2		6.2	1.2	6.5	
			5.0 ± 0.5	0.8		5.5	0.8	5.8	
t _{PZH} t _{PZL}	Output Enable Time (Figures 6, 7 and 8, Table 1)	R _L and R1 = 500 Ω C _L = 50 pF	2.5 ± 0.2	1.5		8.0	1.5	8.5	ns
			3.3 ± 0.3	0.8		5.7	0.8	6.0	
			5.0 ± 0.5	0.3		4.7	0.3	5.0	

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}	2.5	pF
C _{PD}	Power Dissipation Capacitance (Note 5)	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}	9 11	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} • V_{CC} • f_{in} + I_{CC}. C_{PD} is used to determine the no-load dynamic power consumption; P_D = C_{PD} • V_{CC}² • f_{in} + I_{CC} • V_{CC}.

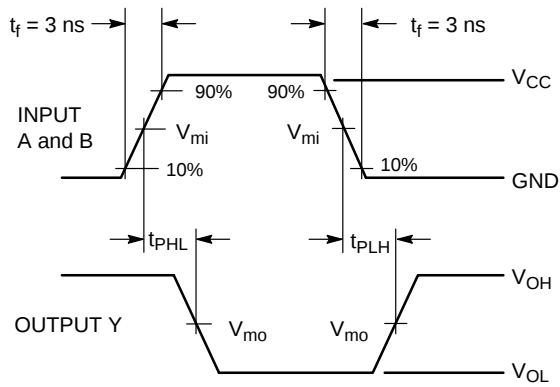
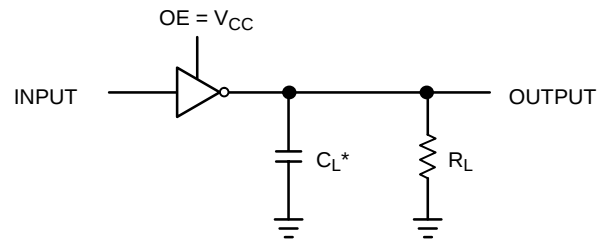
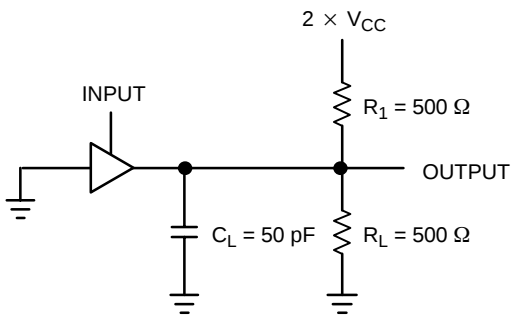


Figure 4. Switching Waveform



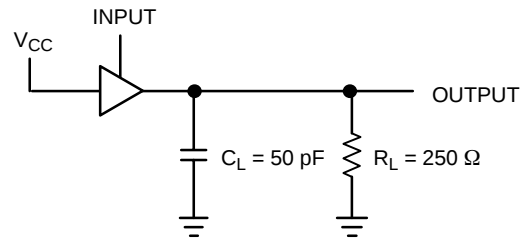
*Includes all probe and jig capacitance.
A 1-MHz square input wave is recommended for propagation delay tests.

Figure 5. T_{PLH} or T_{PHL}



A 1-MHz square input wave is recommended for propagation delay tests.

Figure 6. T_{PZL} or T_{PLZ}



A 1-MHz square input wave is recommended for propagation delay tests.

Figure 7. T_{PZH} or T_{PHZ}

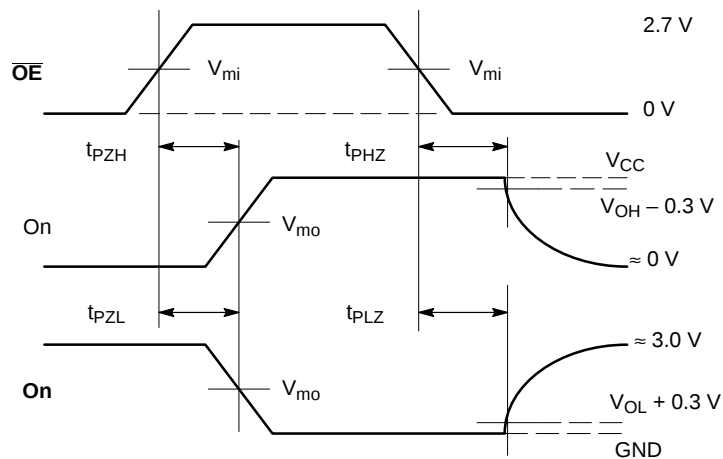


Figure 8. AC Output Enable and Disable Waveform

NL17SZ126

Table 1. Output Enable and Disable Times

$t_R = t_F = 2.5 \text{ ns}$, 10% to 90%; $f = 1 \text{ MHz}$; $t_W = 500 \text{ ns}$

Symbol	V_{CC}		
	$3.3 \text{ V} \pm 0.3 \text{ V}$	2.7 V	$2.5 \text{ V} \pm 0.2 \text{ V}$
V_{mi}	1.5 V	1.5 V	$V_{CC}/2$
V_{mo}	1.5 V	1.5 V	$V_{CC}/2$

DEVICE ORDERING INFORMATION

Device Order Number	Device Nomenclature							Package Type	Tape and Reel Size
	Logic Circuit Indicator	No. of Gates per Package	Temp Range Identifier	Technology	Device Function	Package Suffix	Tape and Reel Suffix		
NL17SZ126	NL	1	7	SZ	126	DF	T2	SC70-5/SC-88A/ SOT-353	178 mm (7"), 3000 Units

CAVITY TAPE

TOP TAPE

TAPE TRAILER
(Connected to Reel Hub)
NO COMPONENTS
160 mm MIN

COMPONENTS

TAPE LEADER
NO COMPONENTS
400 mm MIN

DIRECTION OF FEED

Technical drawing of a tape with dimensions and components. The drawing shows a rectangular tape with a width of 8.00 ± 0.30 mm. The tape has a series of components mounted on it, including a component labeled '1' and several circular features. Dimensions for the components and features are provided: a distance of 2.00 mm from the left edge to the first component, a distance of 4.00 mm between components, and a distance of 4.00 mm from the last component to the right edge. The diameter of the circular features is $\varnothing 1.50$ TYP. The diameter of the circular features is also specified as $\varnothing 1.00$ MIN. The distance from the bottom edge to the center of the circular features is 3.50 ± 0.50 mm. The direction of feed is indicated by an arrow pointing to the right.

<http://onsemi.com>

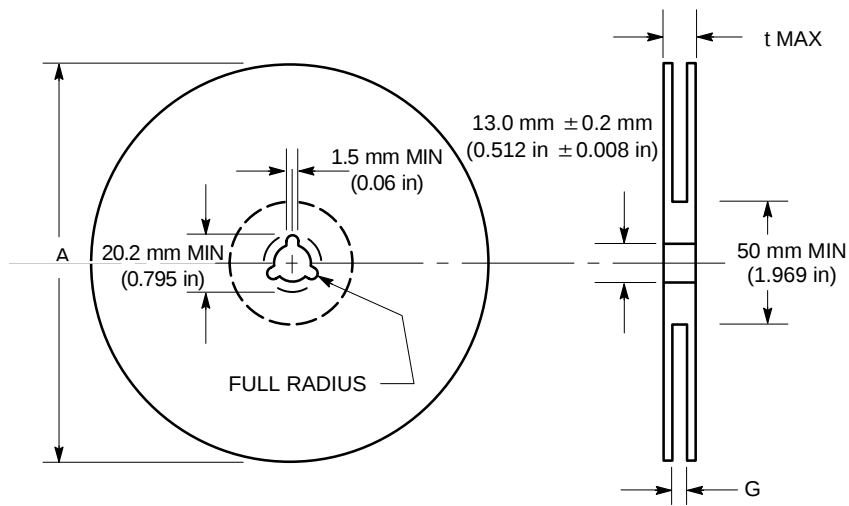


Figure 11. Reel Dimensions

REEL DIMENSIONS

Tape Size	T and R Suffix	A Max	G	t Max
8 mm	T1, T2	178 mm (7")	8.4 mm, + 1.5 mm, -0.0 (0.33 in + 0.059 in, -0.00)	14.4 mm (0.56 in)

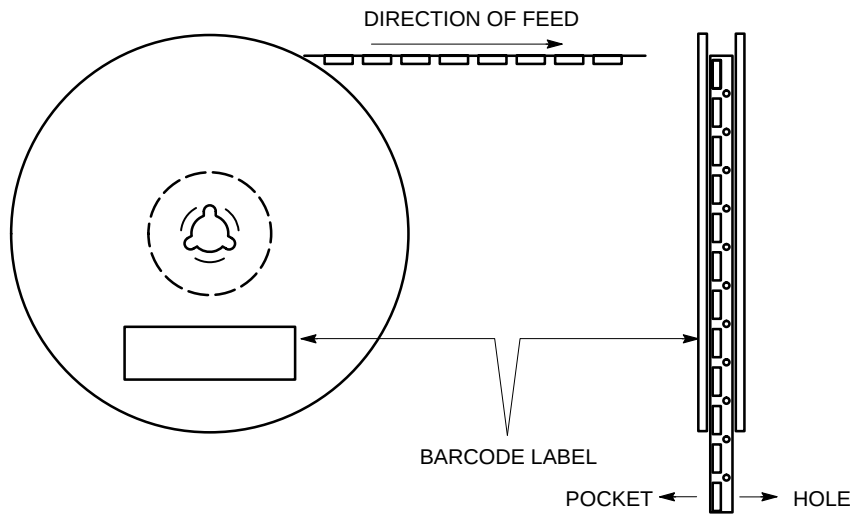
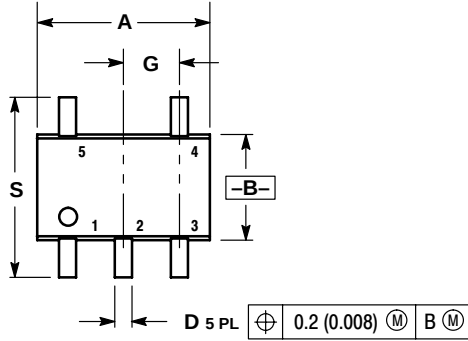


Figure 12. Reel Winding Direction

NL17SZ126

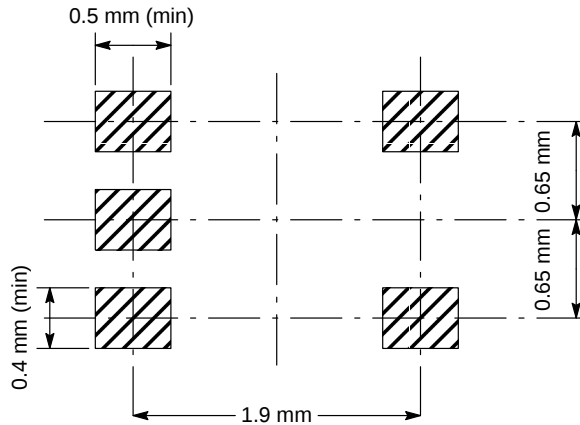
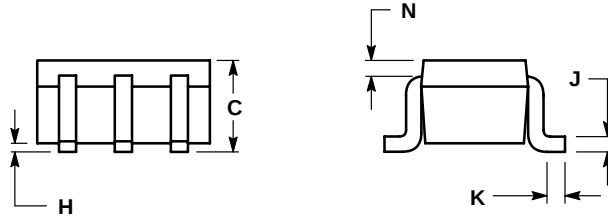
PACKAGE DIMENSIONS

SC70-5/SC-88A/SOT-353
DF SUFFIX
5-LEAD PACKAGE
CASE 419A-02
ISSUE F



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

DIM	INCHES		MILLIMETERS	
	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



ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

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: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.