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

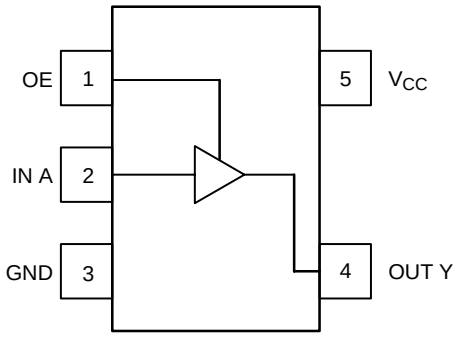


Figure 1. Pinout (Top View)

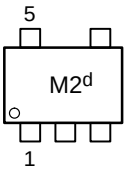
Figure 2. Logic Symbol

ON Semiconductor®

http://onsemi.com

MARKING DIAGRAMS

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



d = Date Code

PIN ASSIGNMENT	
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	350	°C/W
P_D	Power Dissipation in Still Air at 85°C	SC–70/SC–88A	150	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	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 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	0 0	100 20	ns/V

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

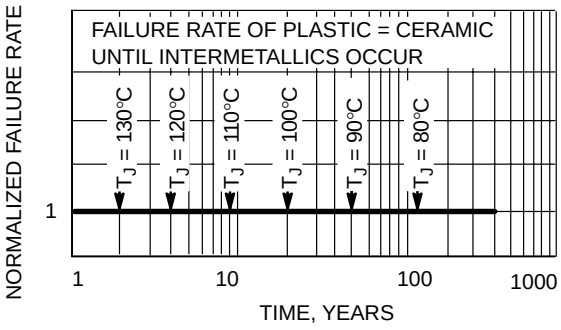


Figure 3. Failure Rate versus Time Junction Temperature

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 2.3 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 0.42	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 VIN = 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 R_L = 500 Ω C_L = 50 pF	3.3 ± 0.3	0.8 1.2		5.2 5.7	0.8 1.2	5.5 6.0	
		R_L = 1 MΩ C_L = 15 pF R_L = 500 Ω C_L = 50 pF	5.0 ± 0.5	0.5 0.8		4.5 5.0	0.5 0.8	4.8 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: $I_{CC(OPR)} = C_{PD} \bullet V_{CC} \bullet f_{in} + I_{CC}$. C_{PD} is used to determine the no–load dynamic power consumption; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.

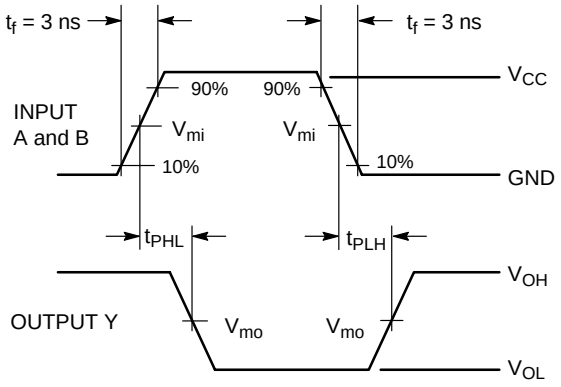
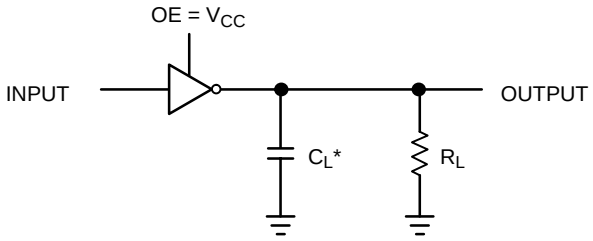
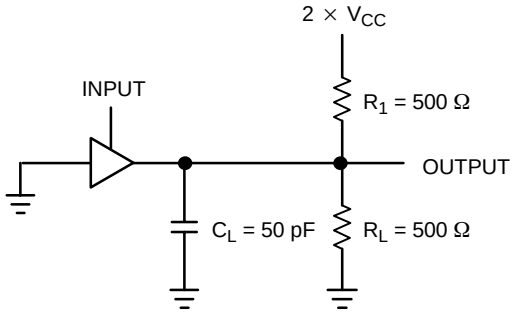


Figure 4. Switching Waveform



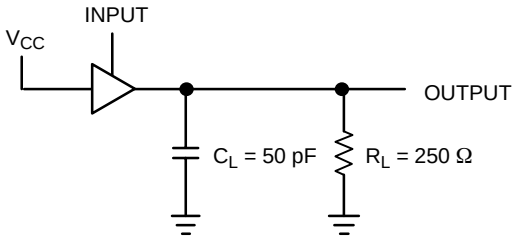
*Includes all probe and jig capacitance.
A 1–MHz square input wave is recommended for propagation delay tests.

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}

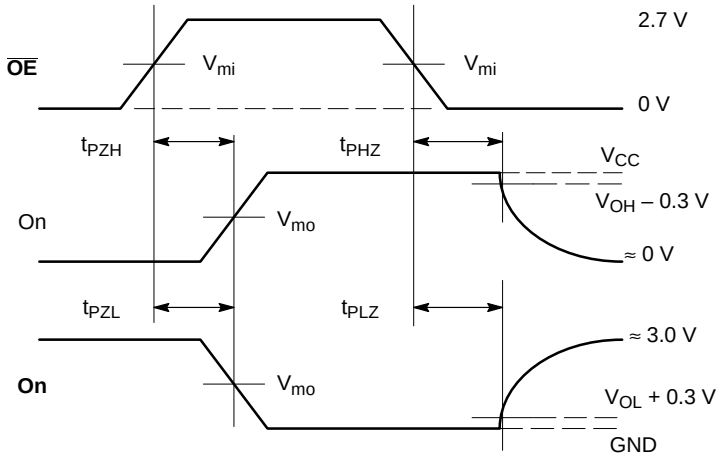


Figure 8. AC Output Enable and Disable Waveform

Table 1. Output Enable and Disable Times
$t_R = t_F$ = 2.5 ns, 10% to 90%; f = 1 MHz; t_W = 500 ns

Symbol	V_{CC}		
	3.3 V ± 0.3 V	**2.7 V**	**2.5 V ± 0.2 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

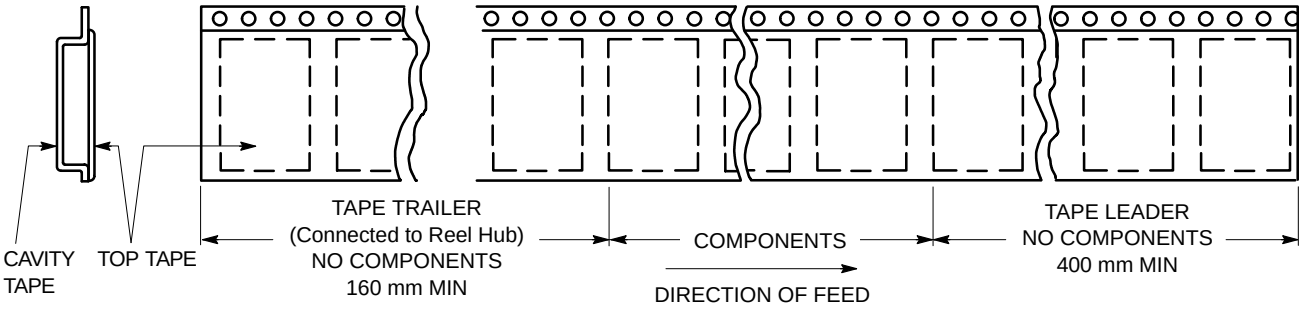


Figure 9. Tape Ends for Finished Goods

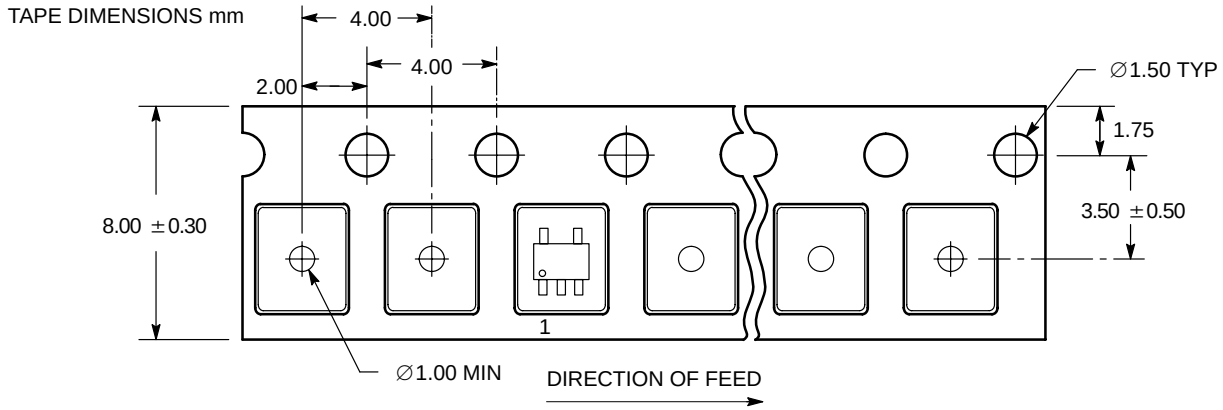


Figure 10. SC−70/SC−88A/SOT−353 DFT2 Reel Configuration/Orientation

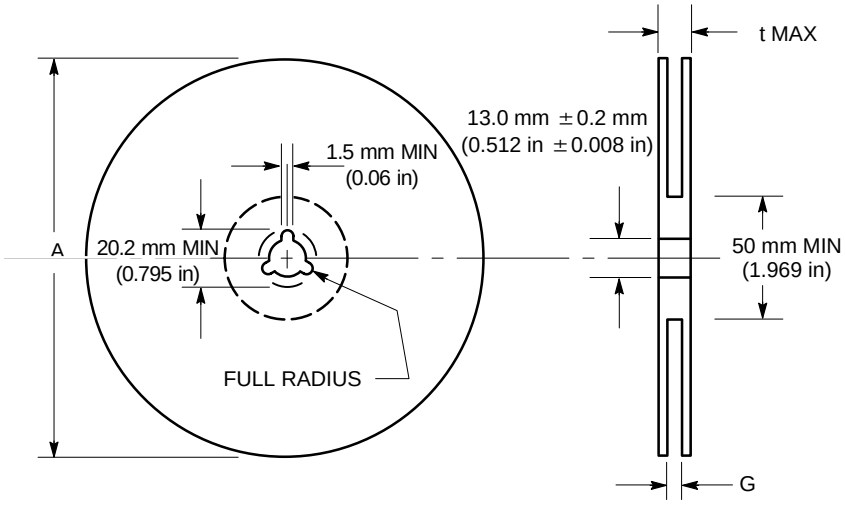


Figure 11. Reel Dimensions

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)

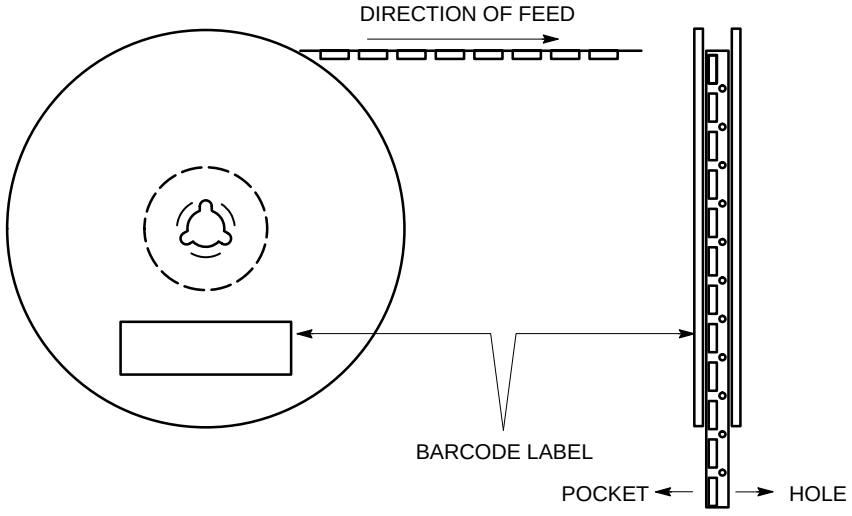
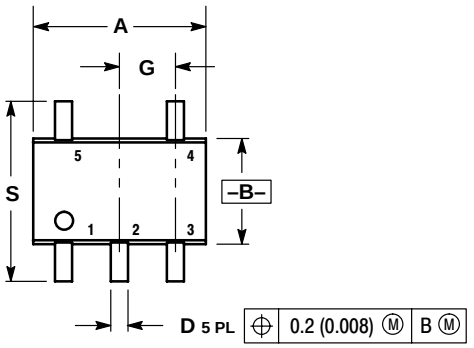
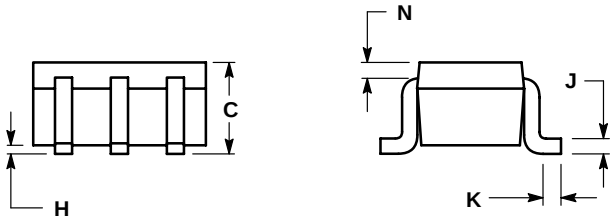


Figure 12. Reel Winding Direction

PACKAGE DIMENSIONS

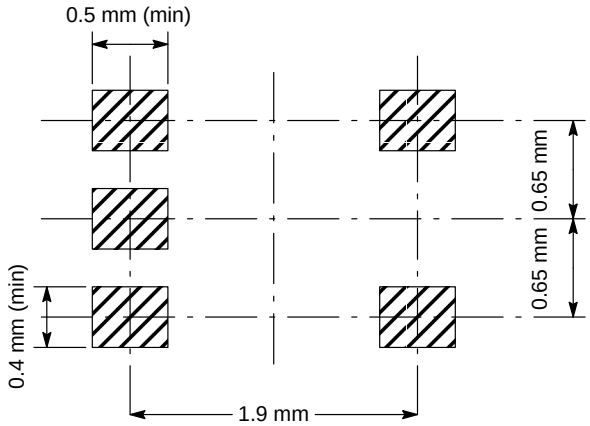
SC70–5/SC–88A/SOT–353
DF SUFFIX
5–LEAD PACKAGE
CASE 419A–02
ISSUE F





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

	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



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.