

NL17SZ06

Single Inverter with Open Drain Outputs

The NL17SZ06 is a high performance triple inverter 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 NL17SZ06 to be used to interface 5 V circuits to circuits of any voltage between V_{CC} and 7 V using an external resistor and power supply.

- Extremely High Speed: t_{PD} 2.5 ns (typical) at $V_{CC} = 5$ V
- Designed for 1.65 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
- LVC MOS Compatible
- 24 mA Output Sink Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- Chip Complexity: FET = 24

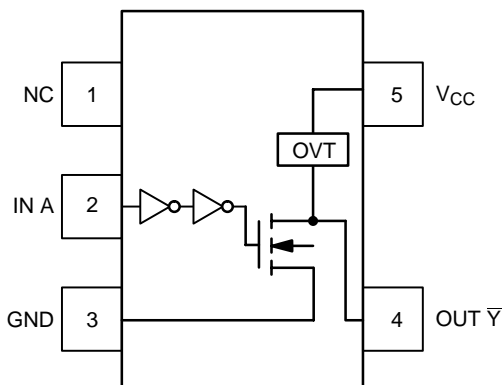


Figure 1. Pinout (Top View)

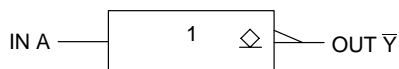


Figure 2. Logic Symbol



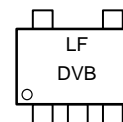
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MARKING DIAGRAM



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



Pin 1

D = Date Code

PIN ASSIGNMENT

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

FUNCTION TABLE

A Input	\bar{Y} Output
L	Z
H	L

ORDERING INFORMATION

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

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MAXIMUM RATINGS (Note 1)

Symbol	Characteristics	Value	Unit
V _{CC}	DC Supply Voltage	-0.5 to +7.0	V
V _I	DC Input Voltage	-0.5 ≤ V _I ≤ +7.0	V
V _O	DC Output Voltage Output in Z or LOW State (Note 2)	-0.5 ≤ V _O ≤ 7.0	V
I _{IK}	DC Input Diode Current V _I < GND	-50	mA
I _{OK}	DC Output Diode Current V _O < GND	-50	mA
I _O	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	150	mW
θ _{JA}	Thermal resistance SC-88	350	°C/W
T _L	Lead temperature, 1 mm from case for 10 s	260	°C
T _J	Junction temperature under bias	+150	°C
I _{Latch-Up}	Latch-Up Performance Above V _{CC} and Below GND at 85°C (Note 6)	±500	mA

1. Absolute maximum continuous 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.
2. I_O absolute maximum rating must be observed.
3. Tested to EIA/JESD22-A114-A
4. Tested to EIA/JESD22-A115-A
5. Tested to JESD22-C101-A
6. 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
V _I	Input Voltage	0	5.5	V
V _O	Output Voltage (Z or LOW State)	0	5.5	V
T _A	Operating Free-Air Temperature	-40	+85	°C
Δt/ΔV	Input Transition Rise or Fall Rate V _{CC} = 2.5 V ±0.2 V V _{CC} = 3.0 V ±0.3 V V _{CC} = 5.0 V ±0.5 V	0 0 0	20 10 5	ns/V

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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		1.65 to 1.95 2.3 to 5.5	0.75 V _{CC} 0.7 V _{CC}			0.75 V _{CC} 0.7 V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65 to 1.95 2.3 to 5.5			0.25 V _{CC} 0.3 V _{CC}		0.25 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	μA
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA	1.65 to 5.5		0.0	0.1		0.1	V
		I _{OL} = 4 mA	1.65		0.08	0.24		0.24	
		I _{OL} = 8 mA	2.3		0.22	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	μA
I _{OFF}	Power Off-Output Leakage Current	V _{OUT} = 5.5 V	0			1.0		10	μA
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5			1.0		10	μA

AC ELECTRICAL CHARACTERISTICS t_R = t_F = 2.5 ns; C_L = 50 pF; R_L = 500 Ω

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
t _{PZL}	Propagation Delay (Figure 3 and 4)	R _L = R ₁ = 500 Ω, C _L = 50 pF	1.65	0.8	5.3	11.6	0.8	12.0	ns
			2.5 ± 0.2	0.8	3.0	3.6	0.8	4.1	
			3.3 ± 0.3	0.8	2.4	3.2	0.8	3.7	
			5.0 ± 0.5	0.5	2.4	3.0	0.5	3.5	
t _{PLZ}	Propagation Delay (Figure 3 and 4)	R _L = R ₁ = 500 Ω, C _L = 50 pF	1.65	0.8	5.3	11.6	0.8	12.0	ns
			2.5 ± 0.2	0.8	2.5	3.6	0.8	4.1	
			3.3 ± 0.3	0.8	2.1	3.2	0.8	3.7	
			5.0 ± 0.5	0.5	1.2	3.0	0.5	3.5	

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 7)	10 MHz, V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	4.0	pF

7. 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}.

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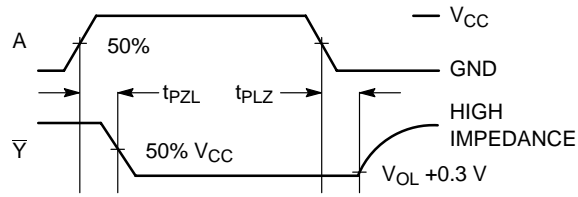
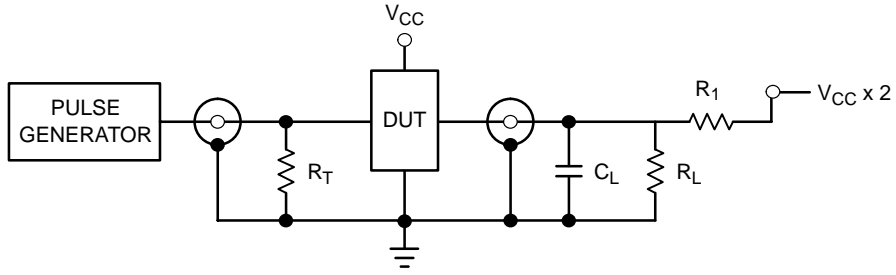


Figure 3. Switching Waveforms



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

Figure 4. Test Circuit

DEVICE ORDERING INFORMATION

Device Order Number	Device Nomenclature							Package Type (Name/SOT#/Common Name)	Tape and Reel Size
	Logic Circuit Indicator	No. of Gates per Package	Temp Range Identifier	Technology	Device Function	Package Suffix	Tape & Reel Suffix		
NL17SZ06DFT2	NL	1	7	SZ	06	DF	T2	SC-88 / SOT-363 / SC-70	178 mm (7") 3000 Unit

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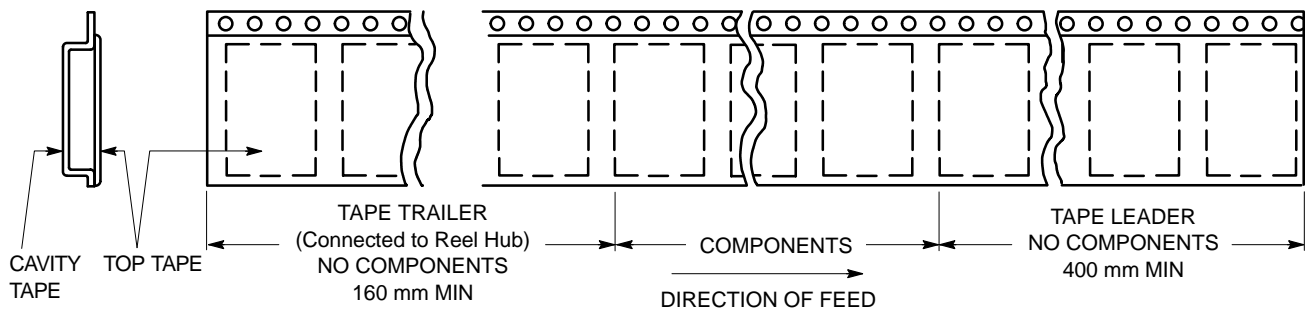


Figure 5. Tape Ends for Finished Goods

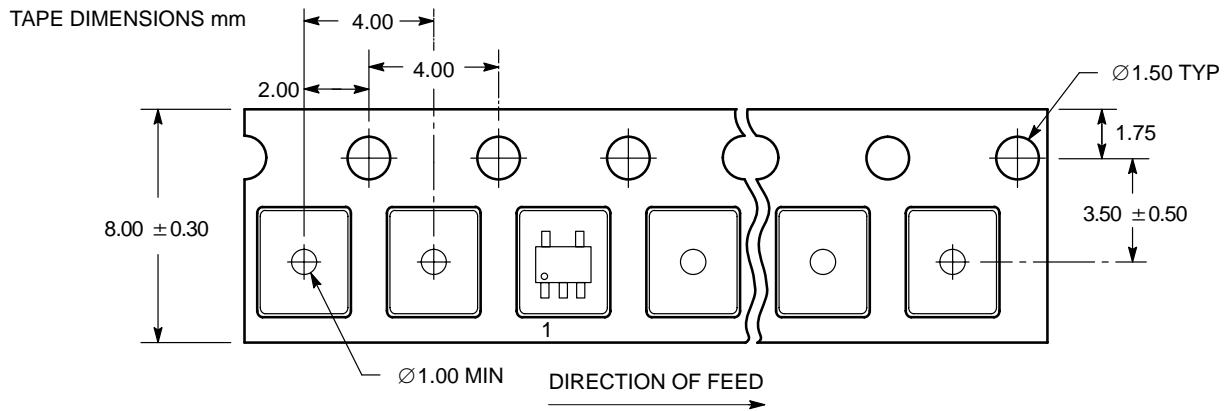


Figure 6. SC-70/SC-88A/SOT-353 DFT2 Reel Configuration/Orientation

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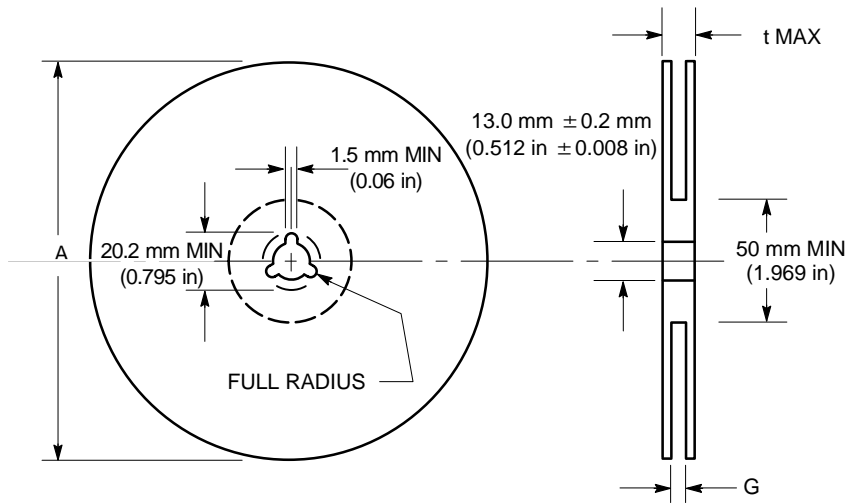


Figure 7. Reel Dimensions

REEL DIMENSIONS

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

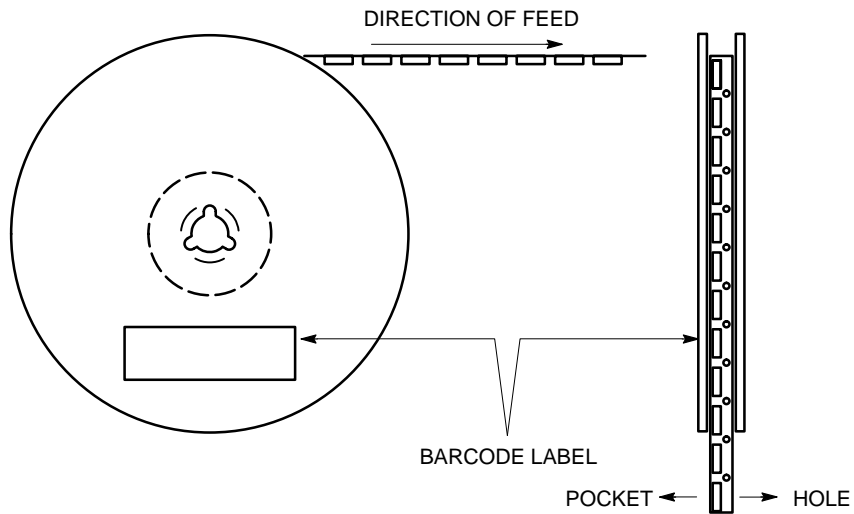
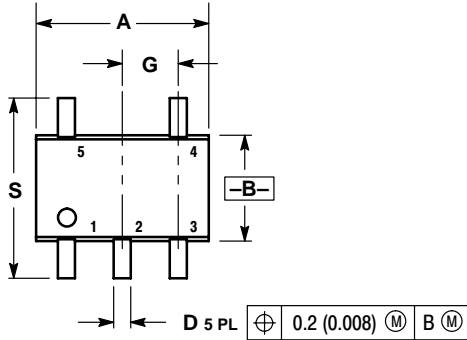


Figure 8. Reel Winding Direction

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PACKAGE DIMENSIONS

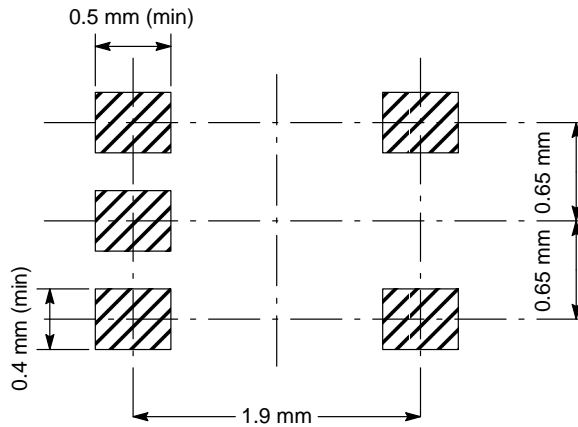
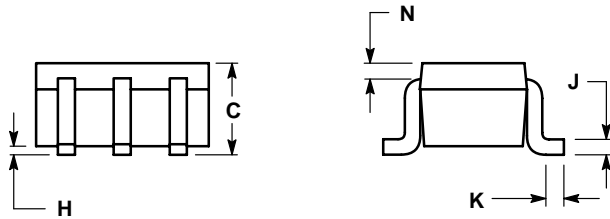
SC70-5/SC-88A/SOT-353
 DF SUFFIX
 5-LEAD PACKAGE
 CASE 419A-02
 ISSUE F




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



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