NL17SHT04P5T5G Datasheet
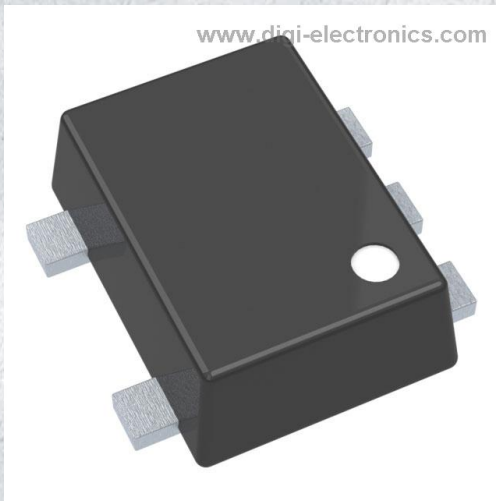
www.digi-electronics.com

DiGi Electronics Part Number	NL17SHT04P5T5G-DG
Manufacturer	onsemi
Manufacturer Product Number	NL17SHT04P5T5G
Description	IC INVERTER 1CH 1-INP SOT953
Detailed Description	Inverter IC 1 Channel SOT-953

https://www.DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	**Manufacturer:**
NL17SHT04P5T5G	onsemi
Series:	**Product Status:**
17SHT	Active
Logic Type:	**Number of Circuits:**
Inverter	1
Number of Inputs:	**Features:**
1	-
Voltage - Supply:	**Current - Quiescent (Max):**
3V ~ 5.5V	1 μA
Current - Output High, Low:	**Input Logic Level - Low:**
8mA, 8mA	0.53V ~ 0.8V
Input Logic Level - High:	**Max Propagation Delay @ V, Max CL:**
1.4V ~ 2V	7.7ns @ 5V, 50pF
Operating Temperature:	**Mounting Type:**
-55°C ~ 125°C	Surface Mount
Supplier Device Package:	**Package / Case:**
SOT-953	SOT-953
Base Product Number:	
17SHT04	

Environmental & Export classification

RoHS Status:	**Moisture Sensitivity Level (MSL):**
ROHS3 Compliant	1 (Unlimited)
REACH Status:	**ECCN:**
REACH Unaffected	EAR99
HTSUS:	
8542.39.0001	

NL17SHT04

Inverting Buffer / CMOS Logic Level Shifter
LSTTL−Compatible Inputs

The NL17SHT04 is a single gate inverting buffer fabricated with silicon gate CMOS technology. It achieves high speed operation similar to equivalent Bipolar Schottky TTL while maintaining CMOS low power dissipation.

The internal circuit is composed of three stages, including a buffer output which provides high noise immunity and stable output.

The device input is compatible with TTL−type input thresholds and the output has a full 5 V CMOS level output swing. The input protection circuitry on this device allows overvoltage tolerance on the input, allowing the device to be used as a logic−level translator from 3 V CMOS logic to 5 V CMOS Logic or from 1.8 V CMOS logic to 3 V CMOS Logic while operating at the high−voltage power supply.

The NL17SHT04 input structure provides protection when voltages up to 7.0 V are applied, regardless of the supply voltage. This allows the NL17SHT04 to be used to interface 5 V circuits to 3 V circuits. The output structures also provide protection when $V_{CC} = 0$ V. These input and output structures help prevent device destruction caused by supply voltage − input/output voltage mismatch, battery backup, hot insertion, etc.

Features
- High Speed: t_{PD} = 3.8 ns (Typ) at V_{CC} = 5 V
- Low Power Dissipation: I_{CC} = 1 μA (Max) at T_A = 25°C
- TTL−Compatible Inputs: V_{IL} = 0.8 V; V_{IH} = 2 V
- CMOS−Compatible Outputs: $V_{OH} > 0.8\ V_{CC}$; $V_{OL} < 0.1\ V_{CC}$ @ Load
- Power Down Protection Provided on Inputs and Outputs
- Balanced Propagation Delays
- Pin and Function Compatible with Other Standard Logic Families
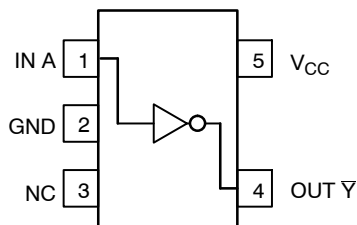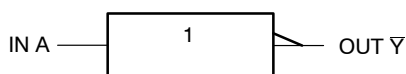- These are Pb−Free Devices

ON Semiconductor®

http://onsemi.com

MARKING DIAGRAM

SOT−953
CASE 527AE

LM

1
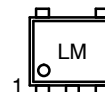
L = Specific Device Code
M = Month Code

PIN ASSIGNMENT

1	IN A
2	GND
3	NC
4	OUT $\overline{Y}$
5	V_{CC}

FUNCTION TABLE

A Input	$\overline{Y}$ Output
L	H
H	L

ORDERING INFORMATION

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

Figure 1. Pinout (Top View)

Figure 2. Logic Symbol

1

NL17SHT04

MAXIMUM RATINGS

Symbol	Characteristics		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	$V_{CC} = 0$ High or Low State	−0.5 to 7.0 −0.5 to V_{CC} + 0.5	V
I_{IK}	Input Diode Current		−20	mA
I_{OK}	Output Diode Current	V_{OUT} < GND; V_{OUT} > V_{CC}	±20	mA
I_{OUT}	DC Output Current		±25	mA
I_{CC}	DC Supply Current, V_{CC} and GND		50	mA
P_D	Power dissipation in still air		50	mW
T_L	Lead temperature, 1 mm from case for 10 s		260	°C
T_J	Junction temperature under bias		+150	°C
T_{stg}	Storage temperature		−65 to +150	°C
$I_{Latchup}$	Latchup Performance	Above V_{CC} and Below GND at 125°C (Note 1)	±100	mA

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. Tested to EIA/JESD78

RECOMMENDED OPERATING CONDITIONS

Symbol	Characteristics		Min	Max	Unit
V_{CC}	DC Supply Voltage		3.0	5.5	V
V_{IN}	DC Input Voltage		0.0	5.5	V
V_{OUT}	DC Output Voltage	$V_{CC} = 0$ High or Low State	0.0 0.0	5.5 V_{CC}	V
T_A	Operating Temperature Range		−55	+125	°C
t_r , t_f	Input Rise and Fall Time	V_{CC} = 3.3 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**

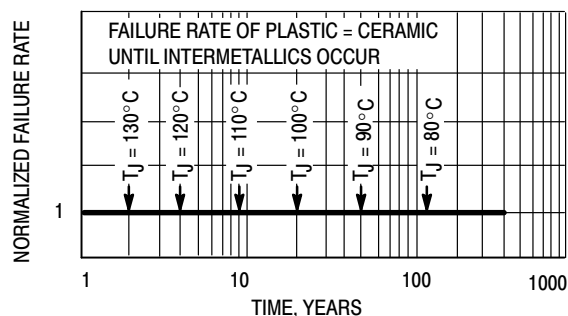| Junction Temperature °C	Time, Hours	Time, Years
80	1,032,200	117.8
90	419,300	47.9
100	178,700	20.4
110	79,600	9.4
120	37,000	4.2
130	17,800	2.0
140	8,900	1.0

Figure 3. Failure Rate vs. Time Junction Temperature

NL17SHT04

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	V_{CC} (V)	$T_A = 25°C$			$T_A \leq 85°C$		$-55 \leq T_A \leq 125°C$		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V_{IH}	Minimum High−Level Input Voltage		3.0 4.5 5.5	1.4 2.0 2.0			1.4 2.0 2.0		1.4 2.0 2.0		V
V_{IL}	Maximum Low−Level Input Voltage		3.0 4.5 5.5			0.53 0.8 0.8		0.53 0.8 0.8		0.53 0.8 0.8	V
V_{OH}	Minimum High−Level Output Voltage $V_{IN} = V_{IH}$ or V_{IL}	$V_{IN} = V_{IH}$ or V_{IL} $I_{OH} = -50$ μA	3.0 4.5	2.9 4.4	3.0 4.5		2.9 4.4		2.9 4.4		V
		$V_{IN} = V_{IH}$ or V_{IL} $I_{OH} = -4$ mA $I_{OH} = -8$ mA	3.0 4.5	2.58 3.94			2.48 3.80		2.34 3.66		V
V_{OL}	Maximum Low−Level Output Voltage $V_{IN} = V_{IH}$ or V_{IL}	$V_{IN} = V_{IH}$ or V_{IL} $I_{OL} = 50$ μA	3.0 4.5		0.0 0.0	0.1 0.1		0.1 0.1		0.1 0.1	V
		$V_{IN} = V_{IH}$ or V_{IL} $I_{OL} = 4.0$ mA $I_{OL} = 8.0$ mA	3.0 4.5			0.36 0.36		0.44 0.44		0.52 0.52	V
I_{IN}	Maximum Input Leakage Current	$V_{IN} = 5.5$ V or GND	0 to 5.5			±0.1		±1.0		±1.0	μA
I_{CC}	Maximum Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND	5.5			1.0		20		40	μA
I_{CCT}	Quiescent Supply Current	Input: $V_{IN} = 3.4$ V	5.5			1.35		1.50		1.65	mA
I_{OPD}	Output Leakage Current	$V_{OUT} = 5.5$ V	0.0			0.5		5.0		10	μA

AC ELECTRICAL CHARACTERISTICS $C_{load} = 50$ pF, Input $t_r = t_f = 3.0$ ns

Symbol	Parameter	Test Conditions		$T_A = 25°C$			$T_A \leq 85°C$		$-55 \leq T_A \leq 125°C$		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}, t_{PHL}	Maximum Propagation Delay, Input A to $\overline{Y}$	$V_{CC} = 3.3 \pm 0.3$ V	$C_L = 15$ pF $C_L = 50$ pF		5.0 6.2	10.0 13.5		11.0 15.0		13.0 17.5	ns
		$V_{CC} = 5.0 \pm 0.5$ V	$C_L = 15$ pF $C_L = 50$ pF		3.8 4.2	6.7 7.7		7.5 8.5		8.5 9.5	
C_{IN}	Maximum Input Capacitance				5.0	10		10		10	pF

			Typical @ 25°C, $V_{CC} = 5.0$ V	
C_{PD}	Power Dissipation Capacitance (Note 2)		10	pF

2. 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; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.
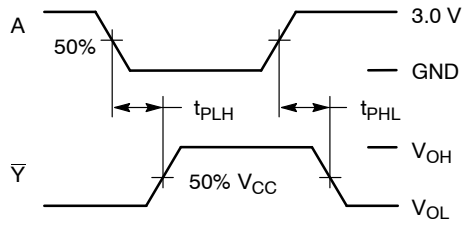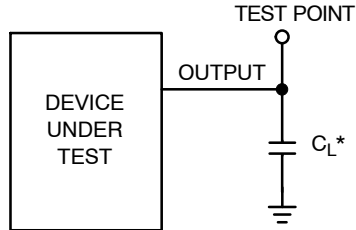
NL17SHT04

Figure 4. Switching Waveforms

*Includes all probe and jig capacitance

Figure 5. Test Circuit

ORDERING INFORMATION

Device	Package Type	Package†
NL17SHT04P5T5G	SOT−953 (Pb−Free)	4000 / 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.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical–documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales

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OUR CERTIFICATE

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