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# HD74LVC00

Quad. 2-input NAND Gates

# HITACHI

ADE-205-060B(Z)

Rev.2

September 1995

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## Description

The HD74LVC00 has four 2-input NAND gates in a 14 pin package. Low voltage and high speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

## Features

- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- All inputs  $V_{IH}(\text{Max.}) = 5.5\text{ V}$  ( $@V_{CC} = 0\text{ V to }5.5\text{ V}$ )
- Typical  $V_{OL}$  ground bounce  $< 0.8\text{ V}$  ( $@V_{CC} = 3.3\text{ V}$ ,  $T_a = 25^\circ\text{C}$ )
- Typical  $V_{OH}$  undershoot  $> 2.0\text{ V}$  ( $@V_{CC} = 3.3\text{ V}$ ,  $T_a = 25^\circ\text{C}$ )
- High output current  $\pm 24\text{ mA}$  ( $@V_{CC} = 3.0\text{ V to }5.5\text{ V}$ )

## Function Table

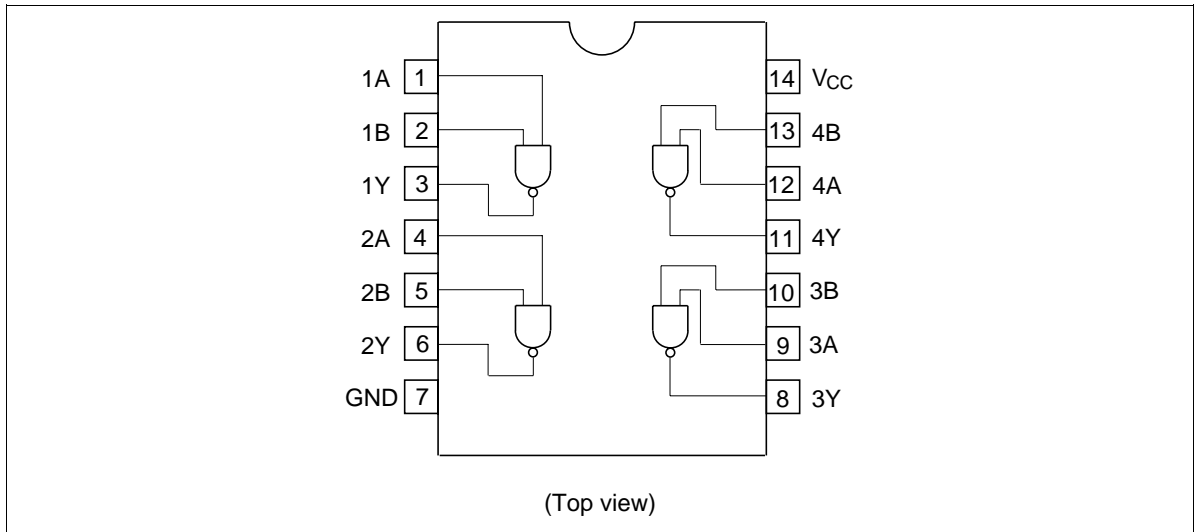
Inputs		Output Y
A	B	
L	L	H
L	H	H
H	L	H
H	H	L

H : High level

L : Low level

# HD74LVC00

## Pin Arrangement



## Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	$V_{CC}$	-0.5 to 6.0	V	
Input diode current	$I_{IK}$	-50	mA	$V_I = -0.5$ V
Input voltage	$V_I$	-0.5 to 6.0	V	
Output diode current	$I_{OK}$	-50	mA	$V_O = -0.5$ V
		50	mA	$V_O = V_{CC} + 0.5$ V
Output voltage	$V_O$	-0.5 to $V_{CC} + 0.5$	V	
Output current	$I_O$	$\pm 50$	mA	
$V_{CC}$ , GND current / pin	$I_{CC}$ or $I_{GND}$	100	mA	
Storage temperature	Tstg	-65 to +150	°C	

Note: The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

## Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	$V_{CC}$	1.5 to 5.5	V	Data retention
		2.0 to 5.5	V	At operation
Input / Output voltage	$V_I$	0 to 5.5	V	A, B
	$V_O$	0 to $V_{CC}$	V	Y
Operating temperature	$T_a$	-40 to 85	°C	
Output current	$I_{OH}$	-12	mA	$V_{CC} = 2.7\text{ V}$
		-24*2	mA	$V_{CC} = 3.0\text{ V to } 5.5\text{ V}$
	$I_{OL}$	12	mA	$V_{CC} = 2.7\text{ V}$
		24*2	mA	$V_{CC} = 3.0\text{ V to } 5.5\text{ V}$
Input rise / fall time *1	$t_r, t_f$	10	ns/V	

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform : Refer to test circuit of switching characteristics.

2. duty cycle ≤ 50%.

## Electrical Characteristics

Item	Symbol	$V_{CC}$ (V)	$T_a = -40\text{ to } 85^\circ\text{C}$		Unit	Test Conditions
			Min	Max		
Input voltage	$V_{IH}$	2.7 to 3.6	2.0	—	V	
		4.5 to 5.5	$V_{CC} \times 0.7$	—	V	
	$V_{IL}$	2.7 to 3.6	—	0.8	V	
		4.5 to 5.5	—	$V_{CC} \times 0.3$	V	
Output voltage	$V_{OH}$	2.7 to 5.5	$V_{CC} - 0.2$	—	V	$I_{OH} = -100\ \mu\text{A}$
		2.7	2.2	—	V	$I_{OH} = -12\ \text{mA}$
		3.0	2.4	—	V	
		3.0	2.0	—	V	$I_{OH} = -24\ \text{mA}$
		4.5	3.8	—	V	
	$V_{OL}$	2.7 to 5.5	—	0.2	V	$I_{OL} = 100\ \mu\text{A}$
		2.7	—	0.4	V	$I_{OL} = 12\ \text{mA}$
		3.0	—	0.55	V	$I_{OL} = 24\ \text{mA}$
4.5	—	0.55	V			
Input current	$I_{IN}$	0 to 5.5	—	±5.0	μA	$V_{IN} = 5.5\ \text{V or GND}$
Quiescent supply current	$I_{CC}$	5.5	—	20	μA	$V_{IN} = V_{CC}\ \text{or GND}$
	$\Delta I_{CC}$	3.0 to 3.6	—	500	μA	$V_{IN} = \text{one input at } (V_{CC} - 0.6)\text{V}, \text{ other inputs at } V_{CC}\ \text{or GND}$

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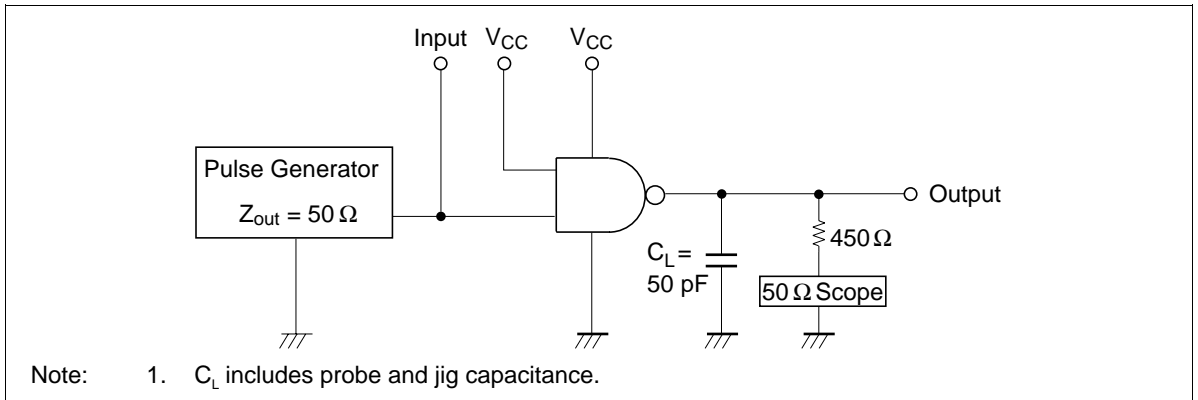
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## Switching Characteristics

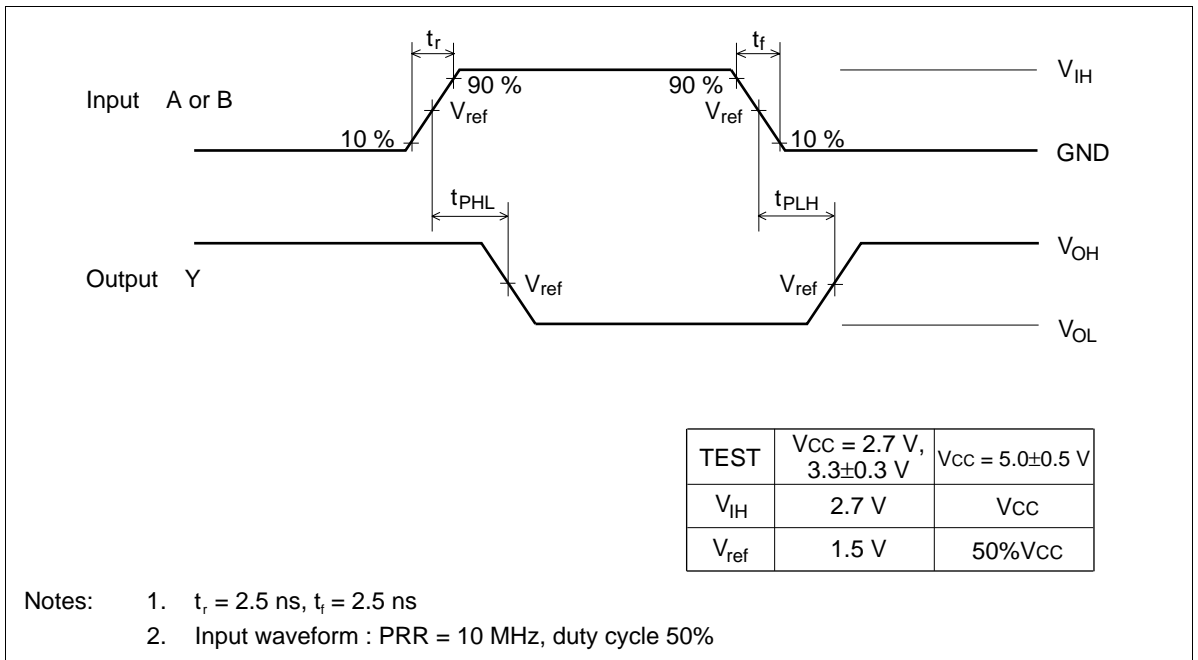
Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C			Unit	From (Input)	To (Output)
			Min	Typ	Max			
Propagation delay time	t <sub>PLH</sub>	2.7	—	4.5	7.0	ns	A or B	Y
	t <sub>PHL</sub>	3.3±0.3	1.5	3.5	6.0	ns		
		5.0±0.5	—	3.0	5.5	ns		
Input capacitance	C <sub>IN</sub>	2.7	—	3.0	—	pF		
Output capacitance	C <sub>O</sub>	2.7	—	15.0	—	pF		

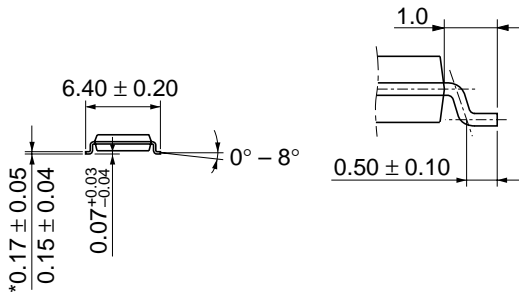
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Test Circuit



Waveforms





\*Dimension including the plating thickness  
 Base material dimension

Hitachi Code	TTP-14D
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 g

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