

# HD74LVC00

## Quad. 2-input NAND Gates

REJ03D0341-0300Z  
 (Previous ADE-205-060B (Z))  
 Rev.3.00  
 Jul. 22, 2004

### 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  $\pm 24\text{ mA} (@V_{CC} = 3.0\text{ V to }5.5\text{ V})$
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LVC00FPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
HD74LVC00TELL	TSSOP-14 pin	TTP-14DV	T	ELL (2,000 pcs/reel)

Note: Please consult the sales office for the above package availability.

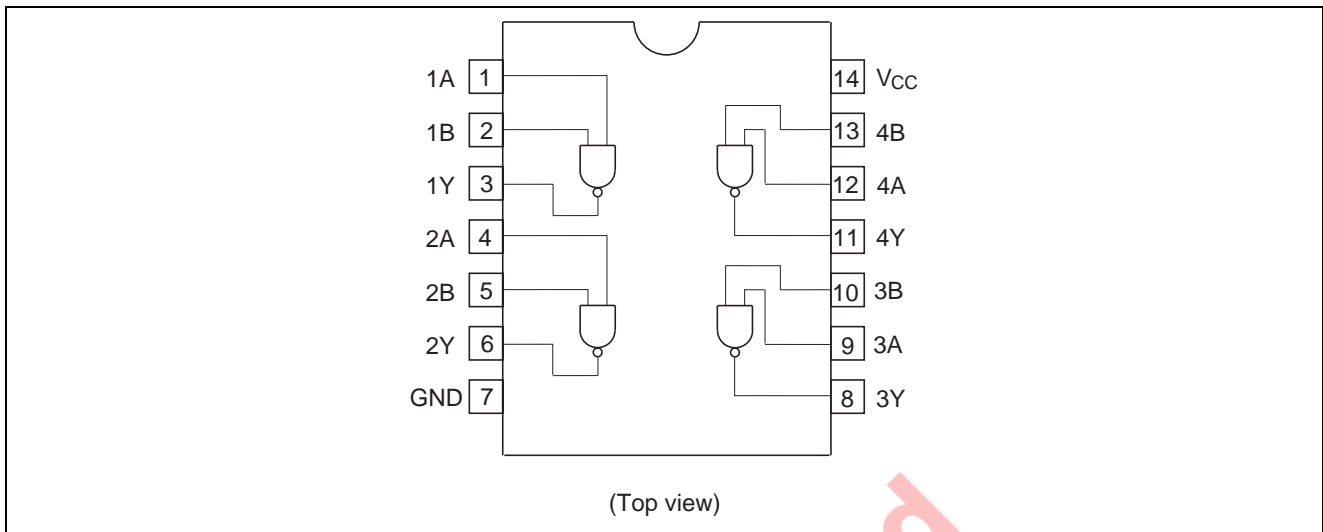
### Function Table

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

H: High level

L: Low level

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	$V_I = -0.5\text{ V}$
Input voltage	$V_I$	-0.5 to 6.0	V	
Output diode current	$I_{OK}$	-50	mA	$V_O = -0.5\text{ V}$
		50	mA	$V_O = V_{CC} + 0.5\text{ V}$
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	$T_{stg}$	-65 to +150	$^{\circ}\text{C}$	

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		At operation
Input / Output voltage	$V_I$	0 to 5.5	V	A, B
	$V_O$	0 to $V_{CC}$		Y
Operating temperature	$T_a$	-40 to 85	$^{\circ}\text{C}$	
Output current	$I_{OH}$	-12	mA	$V_{CC} = 2.7\text{ V}$
		$-24^{*2}$		$V_{CC} = 3.0\text{ V to } 5.5\text{ V}$
	$I_{OL}$	12		$V_{CC} = 2.7\text{ V}$
		$24^{*2}$		$V_{CC} = 3.0\text{ V to } 5.5\text{ V}$
Input rise / fall time <sup>*1</sup>	$t_r, t_f$	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  $\leq 50\%$ .

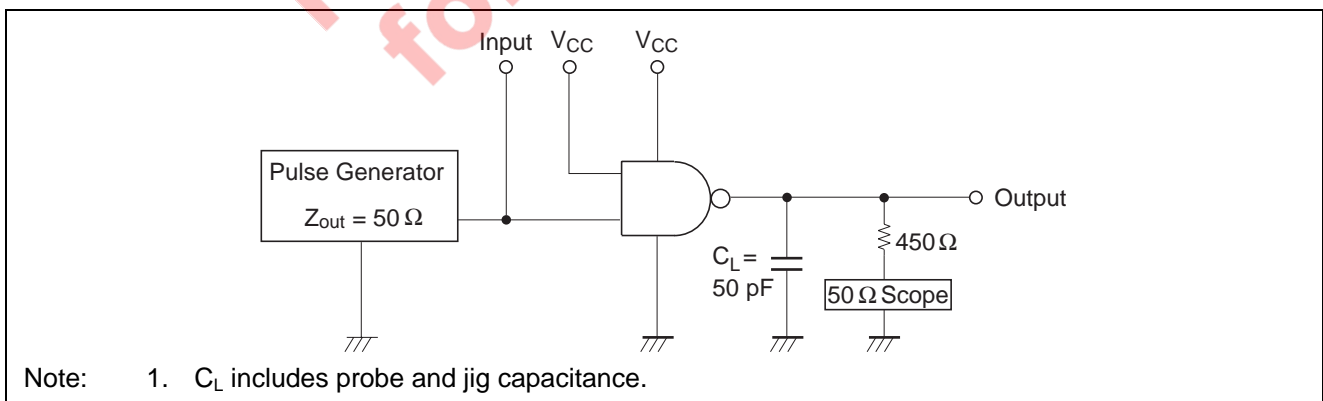
Electrical Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C		Unit	Test Conditions
			Min	Max		
Input voltage	V <sub>IH</sub>	2.7 to 3.6	2.0	—	V	
		4.5 to 5.5	V <sub>CC</sub> ×0.7	—		
	V <sub>IL</sub>	2.7 to 3.6	—	0.8		
		4.5 to 5.5	—	V <sub>CC</sub> ×0.3		
Output voltage	V <sub>OH</sub>	2.7 to 5.5	V <sub>CC</sub> -0.2	—	V	I <sub>OH</sub> = -100 μA
		2.7	2.2	—		I <sub>OH</sub> = -12 mA
		3.0	2.4	—		
		3.0	2.0	—		I <sub>OH</sub> = -24 mA
		4.5	3.8	—		
	V <sub>OL</sub>	2.7 to 5.5	—	0.2	V	I <sub>OL</sub> = 100 μA
		2.7	—	0.4		I <sub>OL</sub> = 12 mA
		3.0	—	0.55		I <sub>OL</sub> = 24 mA
		4.5	—	0.55		
	Input current	I <sub>IN</sub>	0 to 5.5	—	±5.0	μA
Quiescent supply current	I <sub>CC</sub>	5.5	—	20	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND
	ΔI <sub>CC</sub>	3.0 to 3.6	—	500	μA	V <sub>IN</sub> = one input at (V <sub>CC</sub> -0.6)V, other inputs at V <sub>CC</sub> or GND

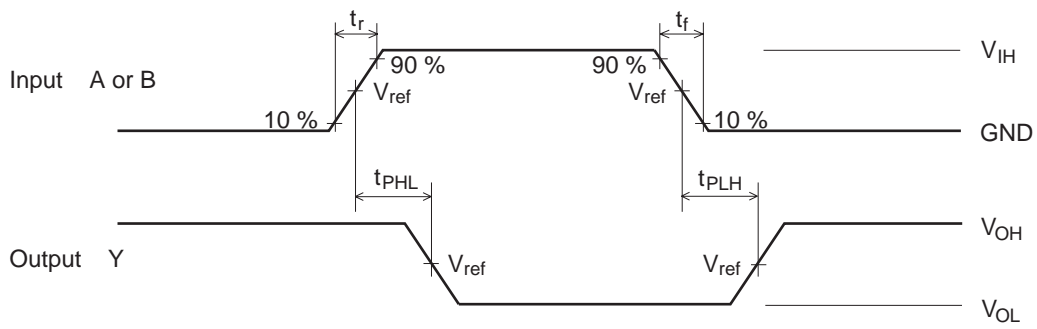
Switching Characteristics

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			
		5.0±0.5	—	3.0	5.5			
Input capacitance	C <sub>IN</sub>	2.7	—	3.0	—	pF		
Output capacitance	C <sub>O</sub>	2.7	—	15.0	—	pF		

Test Circuit



Waveforms



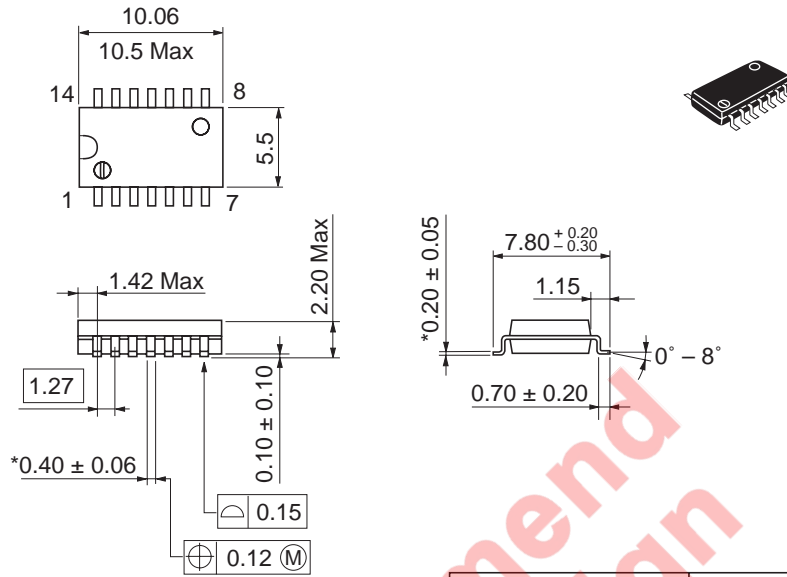
TEST	$V_{CC} = 2.7\text{ V},$ $3.3 \pm 0.3\text{ V}$	$V_{CC} = 5.0 \pm 0.5\text{ V}$
$V_{IH}$	2.7 V	$V_{CC}$
$V_{ref}$	1.5 V	50% $V_{CC}$

- Notes:
1.  $t_r = 2.5\text{ ns}, t_f = 2.5\text{ ns}$
  2. Input waveform : PRR = 10 MHz, duty cycle 50%

Not recommended for new design

Package Dimensions

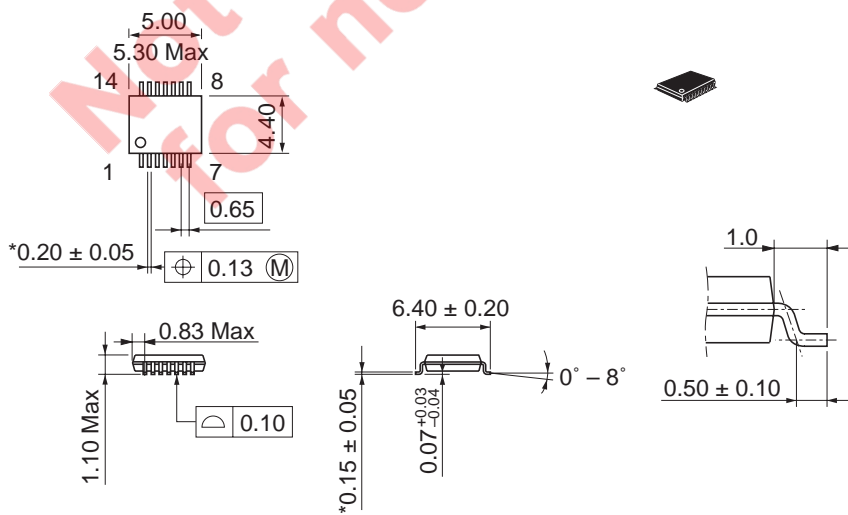
As of January, 2003  
Unit: mm



\*Ni/Pd/Au plating

Package Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

As of January, 2003  
Unit: mm



\*Ni/Pd/Au plating

Package Code	TTP-14DV
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

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