

HD74LV00A

Quad. 2-input NAND Gates

REJ03D0225-0300Z (Previous ADE-205-240A (Z)) Rev.3.00 May 20, 2004

Description

The HD74LV00A has four two-input NAND gates in a 14-pin package.

Low-voltage and high-speed operation is suitable for the battery-powered products (e.g., notebook computers), and the low-power consumption extends the battery life.

Features

- $V_{CC} = 2.0 \text{ V}$ to 5.5 V operation
- All inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
- All outputs V_0 (Max.) = 5.5 V (@ V_{CC} = 0 V)
- Typical V_{OL} ground bounce < 0.8 V (@ V_{CC} = 3.3 V, Ta = 25°C)
- Typical V_{OH} undershoot > 2.3 V (@ V_{CC} = 3.3 V, Ta = 25°C)
- Output current $\pm 6 \text{ mA}$ (@V_{CC} = 3.0 V to 3.6 V), $\pm 12 \text{ mA}$ (@V_{CC} = 4.5 V to 5.5 V)
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV00AFPEL	SOP-14 pin(JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
HD74LV00ARPEL	SOP-14 pin(JEDEC)	FP-14DNV	RP	EL (2,500 pcs/reel)
HD74LV00ATELL	TSSOP-14 pin	TTP-14DV	Т	ELL (2,000 pcs/reel)

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

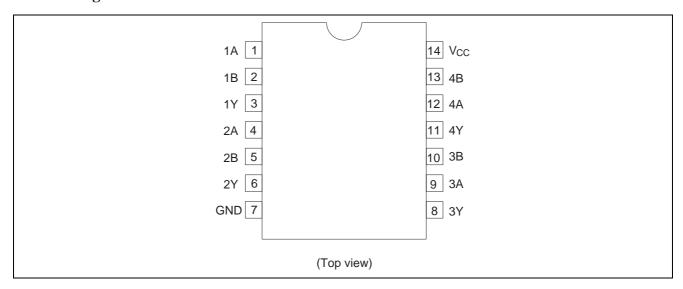
Function Table

Inputs

Α	В	Output Y
Н	Н	L
L	X	Н
X	L	Н

Note: H: High level L: Low level X: Immaterial

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	Vcc	-0.5 to 7.0	V	
Input voltage range*1	Vı	-0.5 to 7.0	V	
Output voltage range*1,2	Vo	-0.5 to $V_{CC} + 0.5$	V	Output: H or L
		-0.5 to 7.0		V _{CC} : OFF
Input clamp current	I _{IK}	-20	mA	V _I < 0
Output clamp current	I _{OK}	±50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	Io	±25	mA	$V_{O} = 0$ to V_{CC}
Continuous current through V _{CC} or GND	I _{CC} or I _{GND}	±50	mA	
Maximum power dissipation at	P _T	785	mW	SOP
Ta = 25°C (in still air)* ³		500		TSSOP
Storage temperature	Tstg	-65 to 150	°C	

Notes: 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.

- 1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- 2. This value is limited to 5.5 V maximum.
- 3. The maximum package power dissipation was calculated using a junction temperature of 150°C.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	Vcc	2.0	5.5	V	
Input voltage range	VI	0	5.5	V	
Output voltage range	Vo	0	V _{CC}	V	
Output current	I _{OH}	_	-50	μА	V _{CC} = 2.0 V
		_	-2	mA	V _{CC} = 2.3 to 2.7 V
		_	-6		V _{CC} = 3.0 to 3.6 V
		_	-12		V _{CC} = 4.5 to 5.5 V
	I _{OL}	_	50	μА	V _{CC} = 2.0 V
		_	2	mA	V _{CC} = 2.3 to 2.7 V
		_	6		V _{CC} = 3.0 to 3.6 V
		_	12		V _{CC} = 4.5 to 5.5 V
Input transition rise or fall rate	Δt /Δν	0	200	ns/V	V _{CC} = 2.3 to 2.7 V
		0	100		V _{CC} = 3.0 to 3.6 V
		0	20		V _{CC} = 4.5 to 5.5 V
Operating free-air temperature	Та	-40	85	°C	

Note: Unused or floating inputs must be held high or low.

Logic Diagram



DC Electrical Characteristics

 $Ta = -40 \text{ to } 85^{\circ}C$

Item	Symbol	V _{CC} (V)*	Min	Тур	Max	Unit	Test Conditions
Input voltage	V _{IH}	2.0	1.5	_	_	V	
		2.3 to 2.7	V _{CC} × 0.7	_	_		
		3.0 to 3.6	V _{CC} × 0.7	_	_		
		4.5 to 5.5	V _{CC} × 0.7	_	_		
	V _{IL}	2.0	_	_	0.5	<u> </u>	
		2.3 to 2.7	_	_	$V_{CC} \times 0.3$	<u> </u>	
		3.0 to 3.6	_	_	$V_{CC} \times 0.3$	<u> </u>	
		4.5 to 5.5	_	_	$V_{CC} \times 0.3$	<u> </u>	
Output voltage	V_{OH}	Min to Max	V _{CC} - 0.1	_	_	V	$I_{OH} = -50 \mu A$
		2.3	2.0	_	_	<u> </u>	$I_{OH} = -2 \text{ mA}$
		3.0	2.48	_	_	<u> </u>	$I_{OH} = -6 \text{ mA}$
		4.5	3.8	_	_		I _{OH} = -12 mA
	V _{OL}	Min to Max	_	_	0.1	<u> </u>	$I_{OL} = 50 \mu A$
		2.3	_	_	0.4	<u> </u>	I _{OL} = 2 mA
		3.0	_	_	0.44	<u> </u>	I _{OL} = 6 mA
		4.5	_	_	0.55	<u> </u>	I _{OL} = 12 mA
Input current	I _{IN}	0 to 5.5	_	_	±1	μΑ	$V_{IN} = 5.5 \text{ V or GND}$
Quiescent supply current	I _{CC}	5.5	_	_	20	μΑ	$V_{IN} = V_{CC}$ or GND, $I_O = 0$
Output leakage current	I _{OFF}	0	_	_	5	μΑ	V_I or $V_O = 0 V$ to 5.5 V
Input capacitance	C _{IN}	3.3	_	3.3	_	рF	$V_I = V_{CC}$ or GND

Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

 $V_{CC}=2.5\pm0.2\ V$

		Ta =	25°C		Ta = -4	40 to 85°C		Test	FROM	то
Item	Symbol	Min	Тур	Max	Min	Max	Unit	Conditions	(Input)	(Output)
Propagation	t _{PLH}	_	7.1	12.9	1.0	15.0	ns	C _L = 15 pF	A or B	Υ
delay time	t_{PHL}	_	9.6	16.6	1.0	20.0		$C_L = 50 \text{ pF}$		

 $V_{CC}=3.3\pm0.3\ V$

		Ta =	25°C		Ta = -4	40 to 85°C		Test	FROM	ТО
Item	Symbol	Min	Тур	Max	Min	Max	Unit	Conditions	(Input)	(Output)
Propagation	t _{PLH}	_	5.0	7.9	1.0	9.5	ns	C _L = 15 pF	A or B	Υ
delay time	t_PHL	_	6.9	11.4	1.0	13.0		$C_{L} = 50 \text{ pF}$		

 $V_{CC} = 5.0 \pm 0.5~V$

		Ta =	25°C		Ta = -	40 to 85°C		Test	FROM	то
Item	Symbol	Min	Тур	Max	Min	Max	Unit	Conditions	(Input)	(Output)
Propagation	t _{PLH}	_	3.6	5.5	1.0	6.5	ns	$C_L = 15 pF$	A or B	Υ
delay time	t _{PHL}	_	4.9	7.5	1.0	8.5		$C_L = 50 pF$		

Operating Characteristics

 $C_L = 50 pF$

1a = 25°

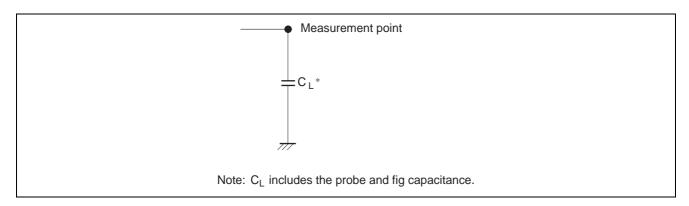
Item	Symbol	V _{CC} (V)	Min	Тур	Max	Unit	Test Conditions
Power dissipation capacitance	C _{PD}	3.3	_	9.5	_	pF	f = 10 MHz
		5.0	_	11.0	_		

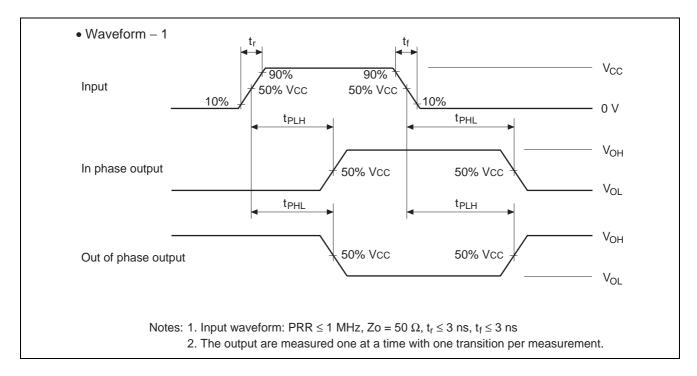
Noise Characteristics

 $C_L = 50 \text{ pF}$

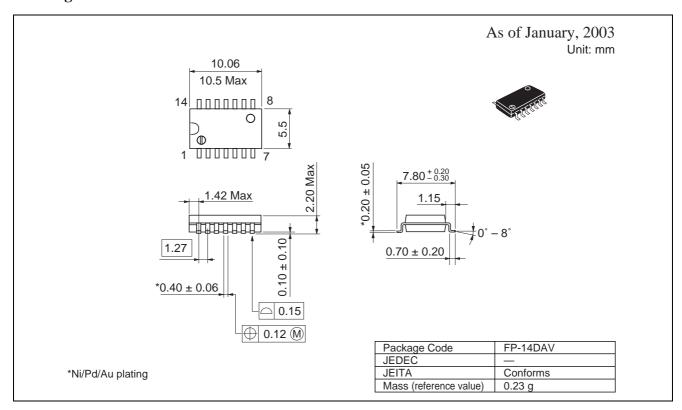
			Ta = 25	5°C			L
Item	Symbol	Vcc (V)	Min	Тур	Max	Unit	Test Conditions
Quiet output, maximum dynamic V _{OL}	V _{OL (P)}	3.3	_	0.2	0.8	V	
Quiet output, minimum dynamic V _{OL}	$V_{OL\ (V)}$	3.3	_	-0.1	-0.8	V	
Quiet output, minimum dynamic V _{OH}	V _{OH (V)}	3.3	_	3.1	_	V	
High-level dynamic input voltage	V _{IH (D)}	3.3	2.31	_	_	V	
Low-level dynamic input voltage	V _{IL (D)}	3.3	_	_	0.99	V	

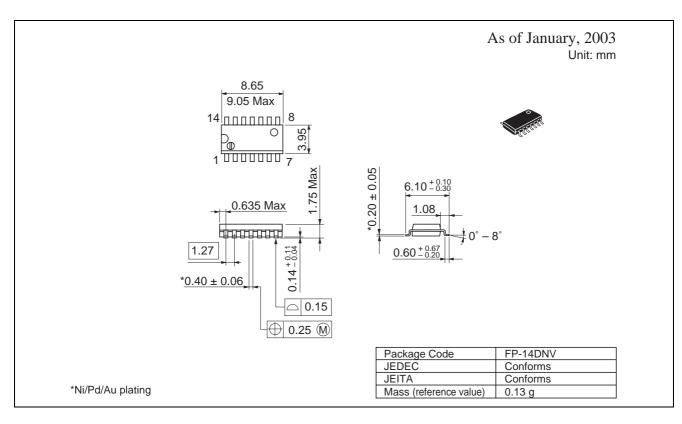
Test Circuit

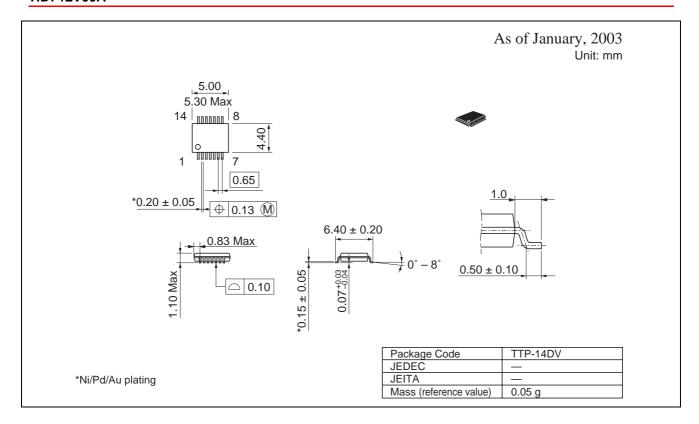




Package Dimensions







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