

74HC00D-HX/74HC00N-HX QUADRUPLE 2-INPUT POSITIVE-NAND GATES

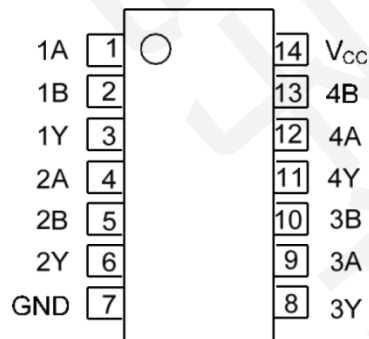
DESCRIPTION

The 74HC00D-HX/74HC00N-HX is a Quadruple 2-input positive-NAND gate that implements the logic function $Y = A \times B$ (i.e., $Y = \text{NOT}(A \text{ AND } B)$), or equivalently, $Y = A + B$ in negative-logic notation. Encapsulated with SOP-14, DIP-14.

FEATURES

- ★ Operation voltage range: 2.0 V ~ 6.0 V
- ★ Low Quiescent Current: $I_{cc}=2\mu\text{A}$ (Max.)

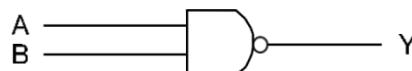
PIN CONFIGURATION



FUNCTION TABLE

INPUT		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

LOGIC DIAGRAM (positive logic)



ABSOLUTE MAXIMUM RATINGS (Note 2)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	-0.5 ~ 7.0	V
Input Clamp Current	I _{IK}	±20	mA
Output Clamp Current	I _{OK}	±20	mA
Output Current	I _{OUT}	±25	mA
VCC or GND Current	I _{CC}	±50	mA
Storage Temperature	T _{STG}	-65 ~ +150	°C

Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-14	θJA	90
	SOP-14U		95
			°C/W

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}		2		6	V
Input Voltage	V _{IN}		0		V _{CC}	V
Output Voltage	V _{OUT}		0		V _{CC}	V
Input Transition Rise or Fall Rate	tr, tf	V _{CC} = 2 V			1000	ns
		V _{CC} = 4.5V			500	ns
		V _{CC} = 6 V			400	ns
Operating Temperature	T _A		-40		+125	°C

Note: All unused inputs of the device must be held at VCC or GND to ensure proper device operation.

STATIC CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V _{IH}	V _{CC} =2V	1.5			V
		V _{CC} =4.5V	3.15			V
		V _{CC} =6V	4.2			V
Low-Level Input Voltage	V _{IL}	V _{CC} =2V			0.5	V
		V _{CC} =4.5V			1.35	V
		V _{CC} =6V			1.8	V
High-Level Output Voltage	V _{OH}	V _{CC} =2V, V _{IN} =V _{IH} or V _{IL} , I _{OH} = 20μA	1.9	1.998		V
		V _{CC} =4.5V, V _{IN} =V _{IH} or V _{IL} , I _{OH} =20μA	4.4	4.499		V
		V _{CC} =6V, V _{IN} =V _{IH} or V _{IL} , I _{OH} = 20μA	5.9	5.999		V
		V _{CC} =4.5V, V _{IN} =V _{IH} or V _{IL} , I _{OH} = 4mA	3.98	4.3		V
		V _{CC} =6V, V _{IN} =V _{IH} or V _{IL} , I _{OH} = 5.2mA	5.48	5.8		V
Low-Level Output Voltage	V _{OL}	V _{CC} =2V, V _{IN} =V _{IH} or V _{IL} , I _{OL} =20μA		0.002	0.1	V
		V _{CC} =4.5V, V _{IN} =V _{IH} or V _{IL} , I _{OL} =20μA		0.001	0.1	V
		V _{CC} =6V, V _{IN} =V _{IH} or V _{IL} , I _{OL} =20μA		0.001	0.1	V
		V _{CC} =4.5V, V _{IN} =V _{IH} or V _{IL} , I _{OL} =4mA		0.17	0.26	V
		V _{CC} =6V, V _{IN} =V _{IH} or V _{IL} , I _{OL} =5.2mA		0.15	0.26	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =6V, V _{IN} =V _{CC} or 0		±0.1	±100	nA
Quiescent Supply Current	I _Q	V _{CC} =6V, V _{IN} =V _{CC} or 0, I _{OUT} =0			2	μA
Input Capacitance	C _{IN}	V _{CC} =2V~6V		3	10	pF

DYNAMIC CHARACTERISTICS

(T_A=25°C, Input: t_r=t_f=6ns; PRR ≤ 1MHz, unless otherwise specified)

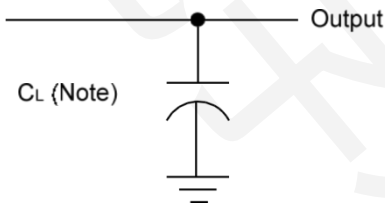
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay, (A) or (B) to (Y)	t _{PLH} , t _{PHL}	V _{CC} =2V, C _L =50pF		45	90	ns
		V _{CC} =4.5V, C _L =50pF		9	18	ns
		V _{CC} =6V, C _L =50pF		8	15	ns
Output Transition Times	t _{TLH} , t _{THL}	V _{CC} =2V, C _L =50pF		38	75	ns
		V _{CC} =4.5V, C _L =50pF		8	15	ns
		V _{CC} =6V, C _L =50pF		6	13	ns

OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

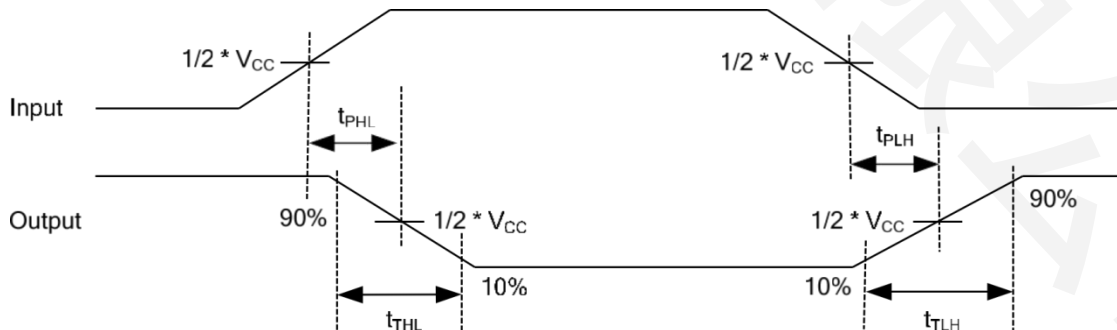
PARAMETER	SYMBOL	TEST CONDITION	RATINGS	UNIT
Power Dissipation Capacitance	C _{PD}	No Load	20	pF

Note: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

TEST CIRCUIT AND WAVEFORMS

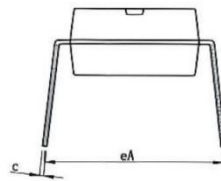
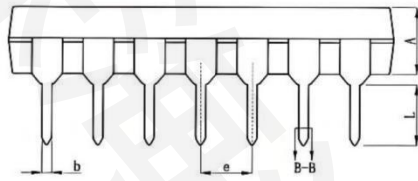


Note: C_L includes probe and jig capacitance.

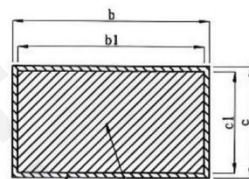
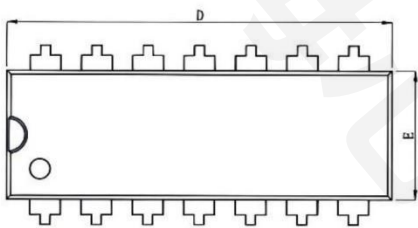


PACKAGE INFORMATION

74HC00N-HX DIP 14 package information



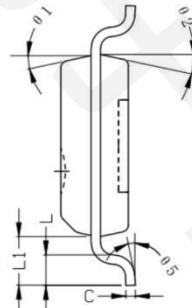
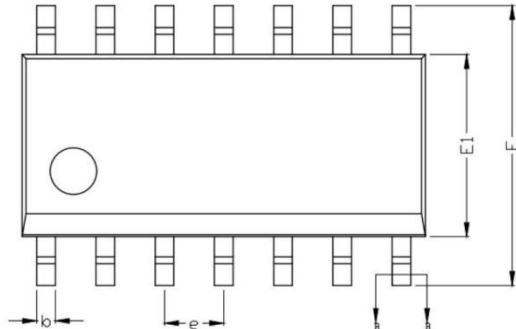
Symbol	Millimeter		
	Min	Nom	Max
A	3.20	3.30	3.40
b	0.44	---	0.53
b1	0.43	0.46	0.49
c	0.25	---	0.30
c1	0.24	0.25	0.26
D	18.95	19.05	19.15
E	6.25	6.35	6.45
e	2.54(BSC)		
eA	7.62	---	9.50
L	3.00	---	---



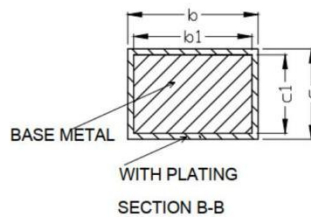
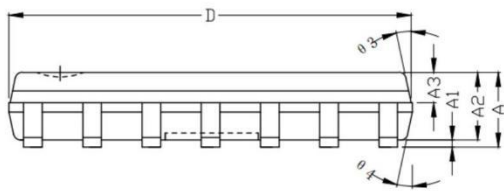
WITH PLATING BASE METAL

SECTION B-B

74HC00D-HX SOP 14 package information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	--	--	1.70
A1	0.10	0.15	0.21
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.33	--	0.47
b1	0.32	0.41	0.44
c	0.20	--	0.24
c1	0.19	0.20	0.21
D	8.45	8.60	8.75
E	5.80	6.00	6.20
E1	3.85	3.90	4.00
e	1.27(BSC)		
L	0.50	0.60	0.70
L1	1.10(BSC)		
θ1	8°	~	15°
θ2	8°	~	15°
θ3	8°	~	15°
θ4	8°	~	15°
θ5	0°	~	6°



BASE METAL
WITH PLATING
SECTION B-B