



## U74HC00

CMOS IC

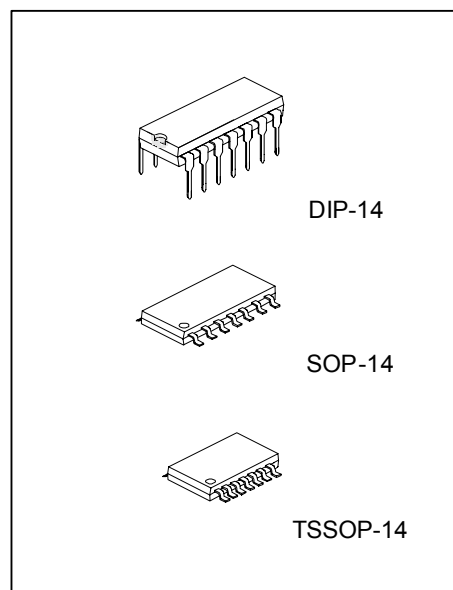
### QUADRUPLE 2-INPUT POSITIVE-NAND GATES

#### DESCRIPTION

The UTC **U74HC00** devices contain four independent 2-input NAND gates. They perform the Boolean function  $Y = \overline{A \cdot B}$  or  $Y = \overline{A} + \overline{B}$  in positive logic. The output Y is high when either of inputs A or B is low, or if neither is high.

#### FEATURES

- \* Operation Voltage Range: 1.0 V ~7.0 V
- \* Low Power Dissipation:  $I_{CC}=20\mu A(\text{Max})$
- \* High Speed:  $t_{pd}=16\text{ns}(\text{Typ})$



\*Pb-free plating product number: U74HC00L

#### ORDERING INFORMATION

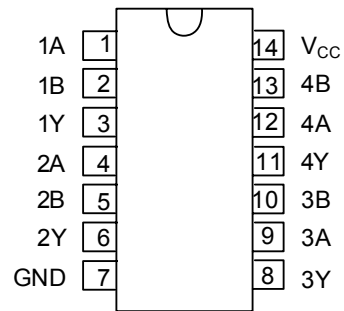
Order Number		Package	Packing
Normal	Lead Free Plating		
U74HC00-D14-T	U74HC00L-D14-T	DIP-14	Tube
U74HC00-S14-T	U74HC00L-S14-T	SOP-14	Tube
U74HC00-S14-R	U74HC00L-S14-R	SOP-14	Tape Reel
U74HC00-P14-T	U74HC00L-P14-T	TSSOP-14	Tube

U74HC00L-D14-T

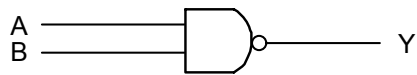
(1)Packing Type  
(2)Package Type  
(3)Lead Plating

(1) R: Tape Reel, T: Tube  
(2) D14: DIP-14, S14: SOP-14, P14: TSSOP-14  
(3) L: Lead Free Plating, Blank: Pb/Sn

## ■ PIN CONFIGURATION



## ■ LOGIC DIAGRAM (positive logic)



## ■ FUNCTION TABLE (each inverter)

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

■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	$V_{CC}$	1.0 ~ 7.0	V
Input Clamp Current	$I_{IK}$ ( $V_{IN} < 0$ or $V_{IN} > V_{CC}$ (see Note 1))	$\pm 20$	mA
Output Clamp Current	$I_{OK}$ ( $V_{OUT} < 0$ or $V_{OUT} > V_{CC}$ (see Note 1))	$\pm 20$	mA
Continuous Output Current	$I_O$ ( $V_{OUT} = 0$ to $V_{CC}$ )	$\pm 25$	mA
Continuous Current Through	$V_{CC}$ or GND	$\pm 50$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	

Note : 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 2. 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance Junction Ambient	SOP-14	86	/W
	DIP-14	80	/W
	TSSOP-14	113	/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2	4.5	6	V
High-Level Input Voltage	$V_{IH}$	$V_{CC} = 2\text{ V}$	1.4			V
		$V_{CC} = 4.5\text{ V}$	3.0			
		$V_{CC} = 6\text{ V}$	4.2			
Low-Level Input Voltage	$V_{IL}$	$V_{CC} = 2\text{ V}$			0.7	V
		$V_{CC} = 4.5\text{ V}$			1.5	
		$V_{CC} = 6\text{ V}$			2	
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$dt/dv$	$V_{CC} = 4.5\text{ V}$			500	ns
Operating Free-Air Temperature	$T_A$		-40		85	

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

■ ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ , unless otherwise specified)

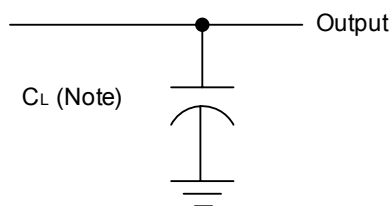
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	$V_{OH}$	$V_{CC} = 4.5\text{ V}$ , $V_{IN} = V_{IH}$ or $V_{IL}$ , $I_{OH} = -20\text{ }\mu\text{A}$	4.4	4.5		V
		$V_{CC} = 4.5\text{ V}$ , $V_{IN} = V_{IH}$ or $V_{IL}$ , $I_{OH} = -4\text{ mA}$	3.98	4.3		
Low-Level Output Voltage	$V_{OL}$	$V_{CC} = 4.5\text{ V}$ , $V_{IN} = V_{IH}$ or $V_{IL}$ , $I_{OL} = 20\text{ }\mu\text{A}$		0.001	0.1	V
		$V_{CC} = 4.5\text{ V}$ , $V_{IN} = V_{IH}$ or $V_{IL}$ , $I_{OL} = 4\text{ mA}$		0.17	0.26	
Input Current	$I_{IN}$	$V_{CC} = 6\text{ V}$ , $V_{IN} = V_{CC}$ or 0		$\pm 0.1$	$\pm 100$	nA
Quiescent Supply Current	$I_{CC}$	$V_{CC} = 6\text{ V}$ , $V_{IN} = V_{CC}$ or 0, $I_{OUT} = 0$			20	$\mu\text{A}$
<b>Operating Characteristics</b>						
Power Dissipation	Cpd	No load		20		pF
Capacitance Per Gate						

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

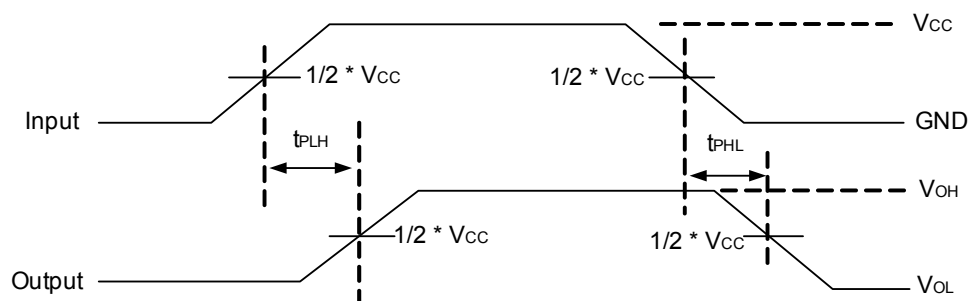
- SWITCHING CHARACTERISTICS OVER RECOMMENDED OPERATING FREE-AIR TEMPERATURE RANGE ( $T_a = 25^\circ\text{C}$ ,  $C_L = 50\text{ pF}$ , unless otherwise specified)

PARAMETER	SYMBOL	FROM(INPUT)	TO(OUTPUT)	$V_{CC}$	MIN	TYP	MAX	UNIT
Propagation Delay from A or B to Y	$t_{pd}$	A or B	Y	2V			35	ns
				4.5V			15	
				6V			12	
Output Rise and Fall Time	$t_T$		Y	2V			30	ns
				4.5V			19	
				6V			17	

## ■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.



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