



# U74HC00

**CMOS IC**

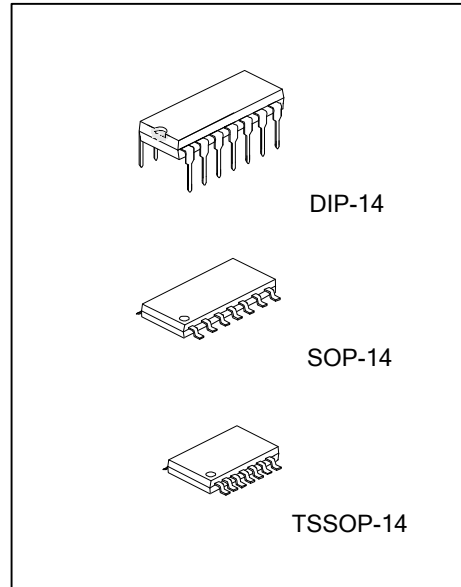
## QUADRUPLE 2-INPUT POSITIVE-NAND GATES

■ DESCRIPTION

The **U74HC00** is a Quadruple 2-input positive-NAND gate with provides the function  $Y = A \cdot B$  or  $Y = \overline{A + B}$ .

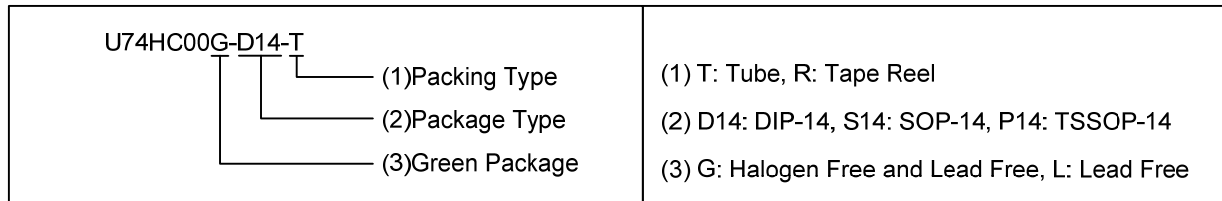
■ FEATURES

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

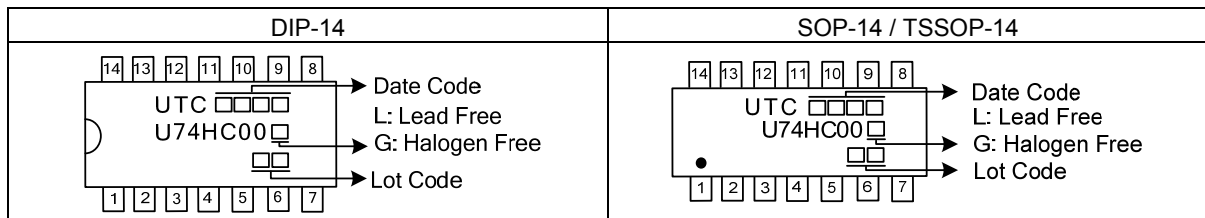


■ ORDERING INFORMATION

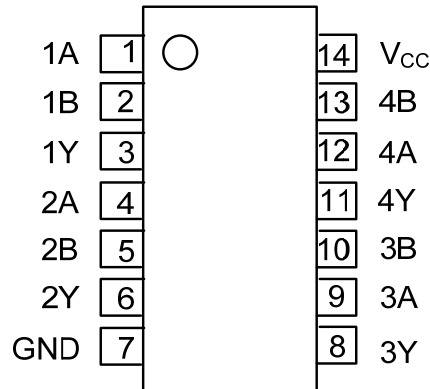
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC00L-D14-T	U74HC00G-D14-T	DIP-14	Tube
U74HC00L-S14-R	U74HC00G-S14-R	SOP-14	Tape Reel
U74HC00L-P14-R	U74HC00G-P14-R	TSSOP-14	Tape Reel



■ MARKING



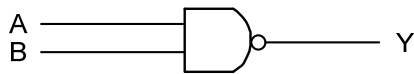
■ PIN CONFIGURATION



■ 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
$V_{CC}$ 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	SOP-14	86	°C/W
	DIP-14	80	
	TSSOP-14	113	

## ■ 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	$t_R, t_F$	$V_{CC}=2V$			1000	ns
		$V_{CC}=4.5V$			500	
		$V_{CC}=6V$			400	
Operating Temperature	$T_A$		-40		+125	°C

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

## ■ STATIC CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , 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			
		$V_{CC}=6V$	4.2			
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=2V$			0.5	V
		$V_{CC}=4.5V$			1.35	
		$V_{CC}=6V$			1.8	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=2V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu\text{A}$	1.9	1.998		V
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu\text{A}$	4.4	4.499		
		$V_{CC}=6V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu\text{A}$	5.9	5.999		
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-4\text{mA}$	3.98	4.3		
		$V_{CC}=6V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-5.2\text{mA}$	5.48	5.8		
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu\text{A}$		0.002	0.1	V
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu\text{A}$		0.001	0.1	
		$V_{CC}=6V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu\text{A}$		0.001	0.1	
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=4\text{mA}$		0.17	0.26	
		$V_{CC}=6V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=5.2\text{mA}$		0.15	0.26	
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	$C_{IN}$	$V_{CC}=2V\sim 6V$		3	10	pF

■ DYNAMIC CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , Input:  $t_R=t_F=6\text{ns}$ ;  $\text{PRR}\leq 1\text{MHz}$ , unless otherwise specified )

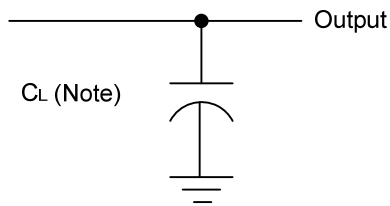
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay, (A) or (B) to (Y)	$t_{PLH}, t_{PHL}$	$V_{CC}=2\text{V}, C_L=50\text{pF}$		45	90	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$		9	18	
		$V_{CC}=6\text{V}, C_L=50\text{pF}$		8	15	
Output Transition Times	$t_{TLH}, t_{THL}$	$V_{CC}=2\text{V},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

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

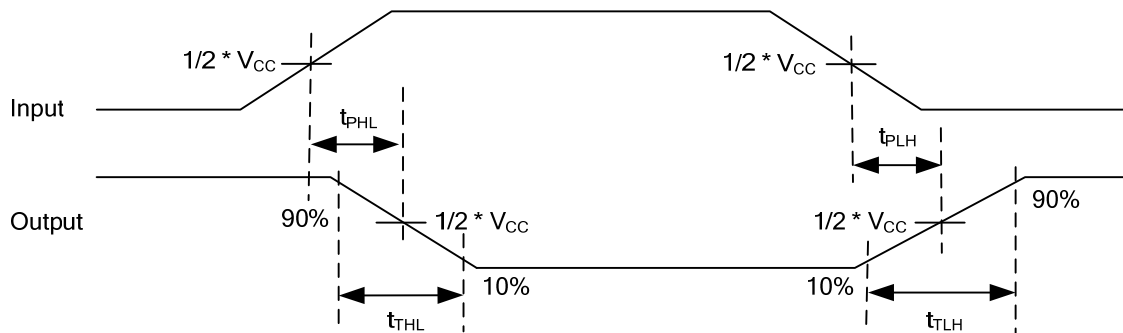
PARAMETER	SYMBOL	TEST CONDITION	RATINGS	UNIT
Power Dissipation Capacitance	$C_{PD}$	No Load	20	pF

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: CL includes probe and jig capacitance.



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