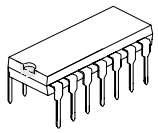
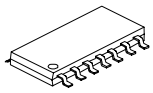
U74HC00

CMOS IC

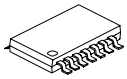
QUADRUPLE 2-INPUT POSITIVE-NAND GATES



DIP-14



SOP-14



TSSOP-14

*Pb-free plating product number: U74HC00L

■ 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}=20μA(Max)
* High Speed: tpd=16ns(Typ)

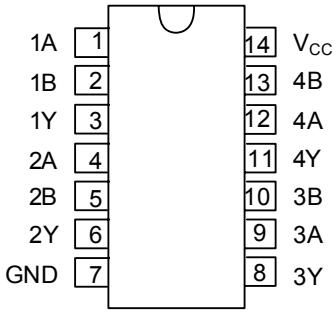
■ ORDERING INFORMATION

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

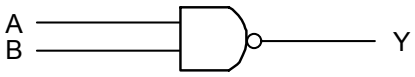
U74HC00L-D14-T
(1)Packing Type
(2)Package Type
(3)Lead Plating

(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)	±20	mA
Output Clamp Current	I_{OK} (V_{OUT}< 0 or V_{OUT} > V_{CC}(see Note 1)	±20	mA
Continuous Output Current	I_O(V_{OUT} = 0 to V_{CC})	±25	mA
Continuous Current Through	V_{CC} or GND	±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	θ_{JA}	86	°C/W
	DIP-14		80	°C/W
	TSSOP-14		113	°C/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 V	1.4			V
		V_{CC} = 4.5V	3.0			
		V_{CC} = 6 V	4.2			
Low-Level Input Voltage	V_{IL}	V_{CC} = 2 V			0.7	V
		V_{CC} = 4.5 V			1.5	
		V_{CC} = 6 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} = 4.5V			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 (Ta = 25°C, unless otherwise specified)

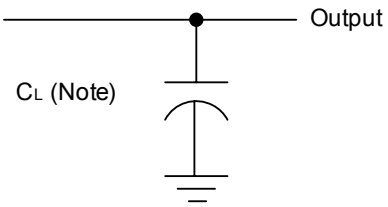
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	V_{CC}= 4.5V, V_{IN} = V_{IH} or V_{IL}, I_{OH} = −20 μA	4.4	4.5		V
		V_{CC}= 4.5V, V_{IN} = V_{IH} or V_{IL}, I_{OH} = −4 mA	3.98	4.3		
Low-Level Output Voltage	V_{OL}	V_{CC}= 4.5V, V_{IN} = V_{IH} or V_{IL}, I_{OL} =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

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 (Ta = 25°C, C_L = 50 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.