



U74HCT20

CMOS IC

DUAL 4-INPUT NAND GATES

DESCRIPTION

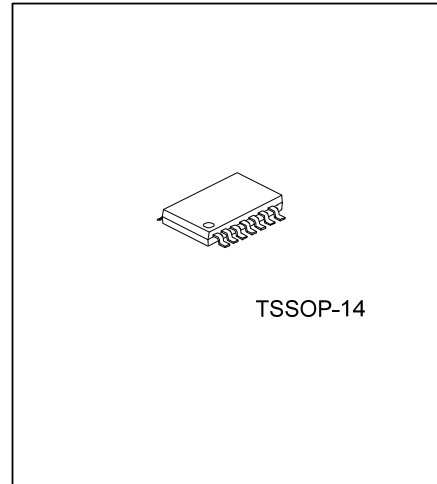
The **U74HCT20** contains two independent 4-input NAND gates.

They perform the Boolean function $Y=A \bullet B \bullet C \bullet D$ or

$Y=\overline{A + B + C + D}$ in positive logic.

FEATURES

- * Operation Voltage Range: 4.5V~5.5V
- * Low Quiescent Current: $I_{CC}=2\mu A(\text{Max})$
- * High Speed: $t_{PD}=16\text{ns @ }4.5\text{V}(\text{Typ})$
- * Low Input Current: 100nA Max
- * Inputs are TTL Voltage Compatible

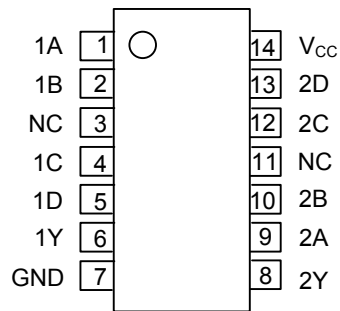


ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT20L-P14-T	U74HCT20G-P14-T	TSSOP-14	Tube
U74HCT20L-P14-R	U74HCT20G-P14-R	TSSOP-14	Tape Reel

<p>U74HCT20L-P14-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel, T: Tube (2) P14: TSSOP-14 (3) G: Halogen Free, L: Lead Free</p>
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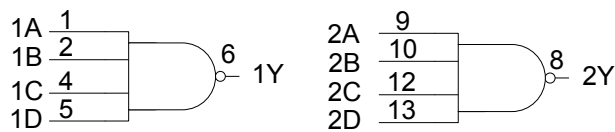
■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUT(A)	INPUT(B)	INPUT(C)	INPUT(D)	OUTPUT(Y)
H	H	H	H	L
L	X	X	X	H
X	L	X	X	H
X	X	L	X	H
X	X	X	L	H

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~7	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	$^{\circ}C$

Note: 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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		4.5		5.5	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	$V_{CC}=4.5V$			500	ns
Operating Temperature	T_A		-40		85	$^{\circ}C$

■ STATIC CHARACTERISTICS ($T_A = 25^{\circ}C$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	$V_{CC} = 4.5V$ to $5.5V$	2.0			V
Low-Level Input Voltage	V_{IL}	$V_{CC} = 4.5V$ to $5.5V$			0.8	V
High-Level Output Voltage	V_{OH}	$V_{CC} = 4.5V, I_O = -20\mu A$	4.4	4.999		V
		$V_{CC} = 4.5V, I_O = -4mA$	3.98	4.3		
Low-Level Output Voltage	V_{OL}	$V_{CC} = 4.5V, I_O = 20\mu A$		0.001	0.1	V
		$V_{CC} = 4.5V, I_O = 4mA$		0.17	0.26	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC} = 5.5V, V_{IN} = V_{CC}$ or GND		± 0.1	± 100	nA
Quiescent Supply Current	I_{CC}	$V_{CC} = 5.5V, V_{IN} = V_{CC}$ or GND, $I_O = 0$			2	μA
Additional Quiescent Supply Current	ΔI_{CC}	One input at $V_{CC} - 2.1V$, other inputs at 0 or V_{CC}		100	360	μA
Input Capacitance	C_{IN}	$V_{CC} = 4.5V \sim 5.5V$		3	10	pF

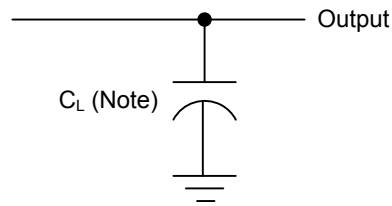
■ DYNAMIC CHARACTERISTICS ($T_A=25^{\circ}C$, Input: $t_R=t_F=6ns$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	t_{PLH}, t_{PHL}	$V_{CC}=4.5V, C_L=50pF$		16	28	ns
Output Transition Time	t_t	$V_{CC}=4.5V, C_L=50pF$		7	15	ns

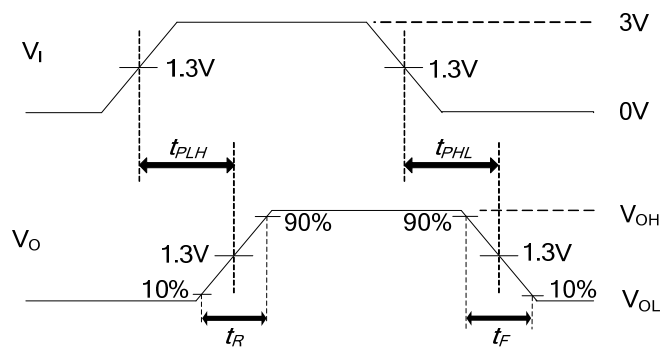
■ OPERATING CHARACTERISTICS ($T_A=25^{\circ}C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	RATINGS	UNIT
Power Dissipation Capacitance	C_{PD}	No Load	38	pF

■ TEST CIRCUIT AND WAVEFORMS



Note : C_L includes probe and jig capacitance.



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