



U74AHC20

CMOS IC

DUAL 4-INPUT NAND GATES

DESCRIPTION

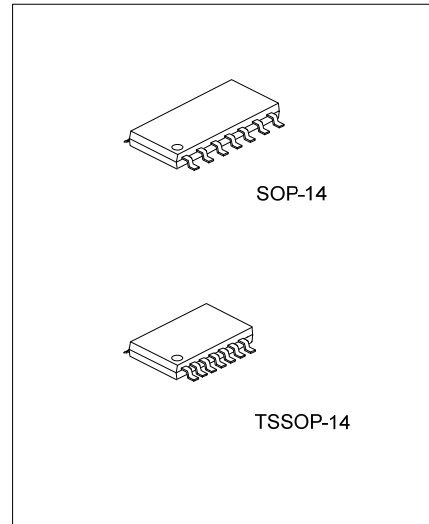
The **U74AHC20** contains two independent 4-input NAND gates.

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

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

FEATURES

- * Operation voltage range: 2~5.5V
- * Low power dissipation: $I_{CC}=2\mu A$ (Max.)
- * $\pm 8mA$ output drive at 5V

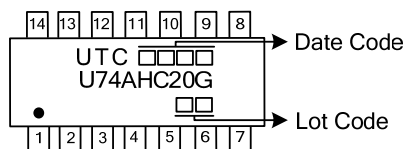


ORDERING INFORMATION

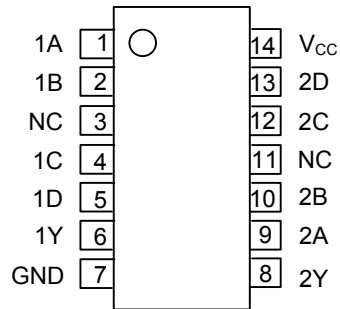
Ordering Number	Package	Packing
U74AHC20G-S14-R	SOP-14	Tape Reel
U74AHC20G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC20G-S14-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S14: SOP-14, P14: TSSOP-14</p> <p>(3) G: Halogen Free and Lead Free</p>
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MARKING



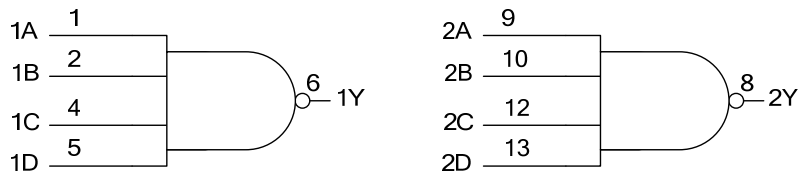
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

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 (T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	-0.5~7	V
Input Clamp Current(V _I <0)	I _{IK}	-20	mA
Output Clamp Current(V _O <0 or V _O >V _{CC})	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

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}		2		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 $\Delta t/\Delta V$	t _r , t _f	V _{CC} =3V±0.3V			100	ns
		V _{CC} =5V±0.5V			20	ns
Operating Temperature	T _A		-40		85	°C

■ 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} = 2 V	1.5			V
		V _{CC} = 3V	2.1			V
		V _{CC} = 5.5 V	3.85			V
Low-Level Input Voltage	V _{IL}	V _{CC} = 2 V			0.5	V
		V _{CC} = 3V			0.9	V
		V _{CC} = 5.5 V			1.65	V
High-Level Output Voltage	V _{OH}	V _{CC} = 2V, I _{OH} = 50μA	1.9			V
		V _{CC} = 3V, I _{OH} = 50μA	2.9			V
		V _{CC} = 4.5V, I _{OH} =50μA	4.4			V
		V _{CC} = 3V, I _{OH} = 4mA	2.58			V
		V _{CC} = 4.5V, I _{OH} = 8mA	3.94			V
Low-Level Output Voltage	V _{OL}	V _{CC} = 2V, I _{OH} = 50μA			0.1	V
		V _{CC} = 3V, I _{OH} = 50μA			0.1	V
		V _{CC} = 4.5V, I _{OH} =50μA			0.1	V
		V _{CC} = 3V, I _{OH} = 4mA			0.36	V
		V _{CC} = 4.5V, I _{OH} = 8mA			0.36	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} = 6V, V _{IN} = V _{CC} or GND			±0.1	uA
Quiescent Supply Current	I _{CC}	V _{CC} = 5.5V, V _{IN} = V _{CC} or GND, I _{OUT} = 0			2	μA
Input Capacitance	C _{IN}	V _{CC} =5V			4	pF

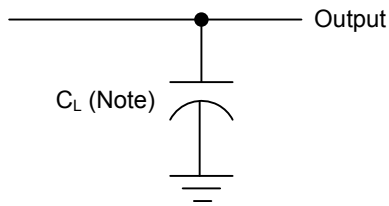
■ DYNAMIC CHARACTERISTICS (Input: t_r=t_f=3ns, 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT	
Propagation delay from input (A ,B,C,D) to output(Y)	t _{PLH}	V _{CC} =3.3±0.3V	C _L =15pF		6.2	8.8	ns
			C _L =50pF		8.7	12.3	ns
	t _{PHL}	V _{CC} =5±0.5V	C _L =15pF		4.5	5.9	ns
			C _L =50pF		5.8	7.9	ns

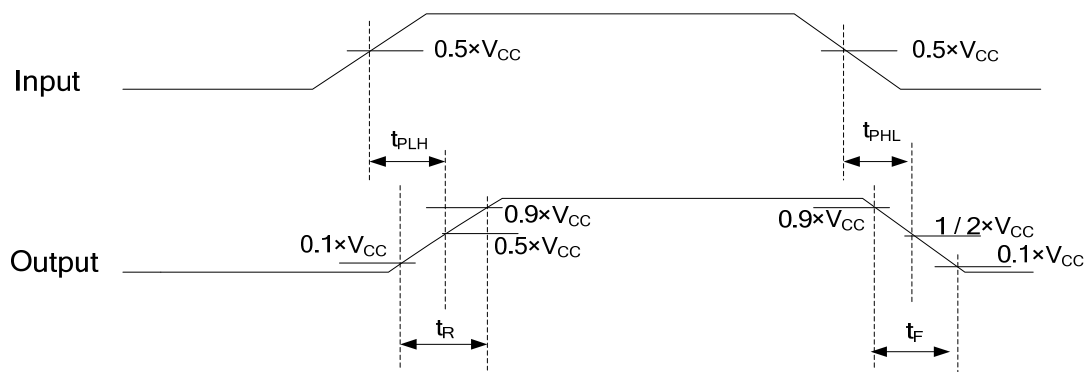
■ OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{pd}	No load, f=1MHz		18		pF

■ TEST CIRCUIT AND WAVEFORMS



Note : C_L includes probe and jig capacitance.



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