



U74HC02

CMOS IC

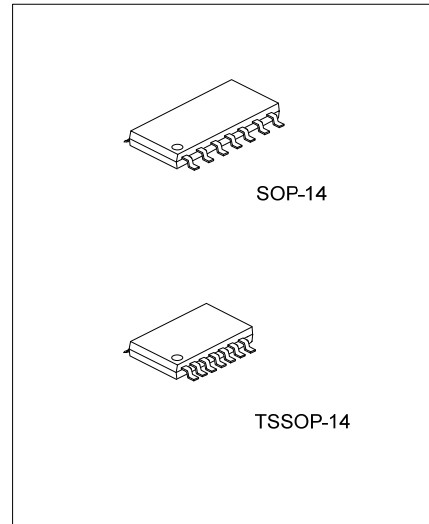
HCQUADRUPLE 2-INPUT NOR GATES

DESCRIPTION

The **U74HC02** contains four independent 2-input NOR gates, which provides the Function $Y = \overline{A+B}$ in positive logic.

FEATURES

- * Operation voltage range: 2~6V
- * Low Quiescent Current: $I_{CC} = 2\mu A(\text{Max})$
- * High speed: $t_{PD} = 8\text{ns}(\text{Typ}) V_{CC} = 6V$
- * Low input current: 100nA Max

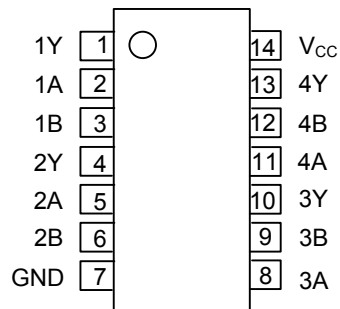


ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC02L-S14-T	U74HC02G-S14-T	SOP-14	Tube
U74HC02L-S14-R	U74HC02G-S14-R	SOP-14	Tape Reel
U74HC02L-P14-T	U74HC02G-P14-T	TSSOP-14	Tube
U74HC02L-P14-R	U74HC02G-P14-R	TSSOP-14	Tape Reel

<p>U74HC02L-S14-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel, T: Tube (2) S14: SOP-14, P14: TSSOP-14 (3) G: Halogen Free, L: Lead Free</p>
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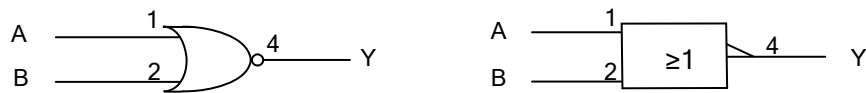
■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUT(A)	INPUT(B)	OUTPUT(Y)
L	L	H
L	H	L
H	L	L
H	H	L

■ LOGIC DIAGRAM



■ 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}		2	5	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		85	$^{\circ}C$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	$V_{CC}=2V$	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}	$V_{CC}=2V, I_{OH}=20\mu A$	$V_{IN}=V_{IH}$ or V_{IL}	1.9	1.998	V
		$V_{CC}=4.5V, I_{OH}=20\mu A$		4.4	4.999	
		$V_{CC}=6V, I_{OH}=20\mu A$		5.9	5.999	
		$V_{CC}=4.5V, I_{OH}=4mA$		3.98	4.3	
		$V_{CC}=6V, I_{OH}=5.2mA$		5.48	5.8	
Low-Level Output Voltage	V_{OL}	$V_{CC}=2V, I_{OL}=20\mu A$	$V_{IN}=V_{IH}$ or V_{IL}		0.002	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$			0.001	
		$V_{CC}=6V, I_{OL}=20\mu A$			0.001	
		$V_{CC}=4.5V, I_{OL}=4mA$			0.17	
		$V_{CC}=6V, I_{OL}=5.2mA$			0.15	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		± 0.1	± 100	nA
Quiescent Supply Current	I_Q	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			2	μA
Input Capacitance	C_{IN}	$V_{CC}=2V\sim 6V$		3	10	pF

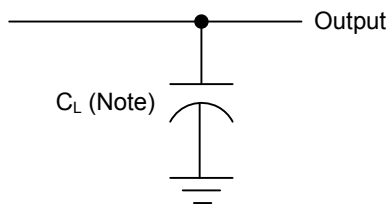
■ DYNAMIC CHARACTERISTICS ($T_a=25^\circ\text{C}$, Input: $t_R=t_F=6\text{ns}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	t_{PLH}, t_{PHL}	$V_{CC}=2\text{V}, C_L=50\text{pF}$		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 Time	t_T	$V_{CC}=2\text{V}$		38	75	ns
		$V_{CC}=4.5\text{V}$		8	15	
		$V_{CC}=6\text{V}$		6	13	

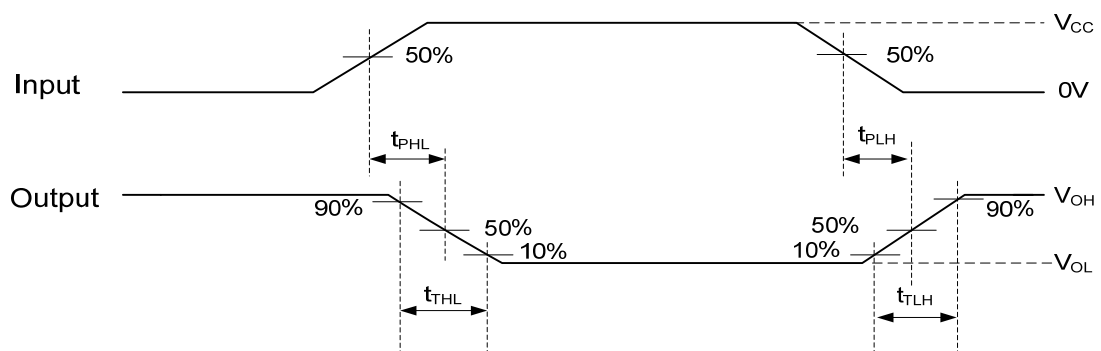
■ OPERATING CHARACTERISTICS ($T_a=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	RATINGS	UNIT
Power Dissipation Capacitance	C_{PD}	No Load	22	pF

■ TEST CIRCUIT AND WAVEFORMS



Note : C_L includes probe and jig capacitance.



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