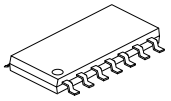
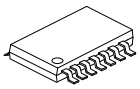
U74AHC02

CMOS IC

2-INPUT NOR GATE



SOP-14



TSSOP-14

■ DESCRIPTION

The UTC **U74AHC02** are independent 2-input NOR gates which provides the function $Y = \overline{A+B}$.

■ FEATURES

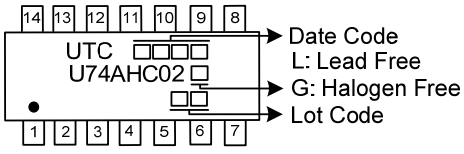
* Operation Voltage Range: 2.0~5.5V
* Low Power Dissipation
* High Noise Immunity
* Balanced Propagation Delays

■ ORDERING INFORMATION

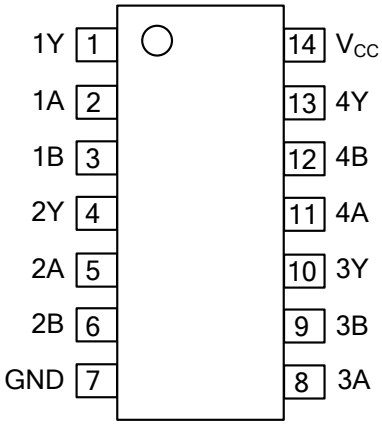
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC02L-S14-R	U74AHC02G-S14-R	SOP-14	Tape Reel
U74AHC02L-P14-R	U74AHC02G-P14-R	TSSOP-14	Tape Reel

U74AHC02G-S14-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S14: SOP-14, P14: TSSOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

■ LOGIC DIAGRAM (positive logic)

IEC logic symbol

■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~+7	V
Input Voltage	V_{IN}	-0.5~+7	V
Output Voltage	V_{OUT}	-0.5~V_{CC}+0.5	V
Input Clamp Current	I_{IK}	-20	mA
Output Clamp Current	I_{OK}	±20	mA
Continuous 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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CC}		2		5.5	V
Input Voltage		V_{IN}		0		5.5	V
Output Voltage		V_{OUT}	High or low state	0		V_{CC}	V
Input Voltage	High	V_{IH}	V_{CC}=2V	1.5			V
			V_{CC}=3V	2.1			V
			V_{CC}=5.5V	3.85			V
	Low	V_{IL}	V_{CC}=2V			0.5	V
			V_{CC}=3V			0.9	V
			V_{CC}=5.5V			1.65	V
Output Current	High	I_{OH}	V_{CC}=2V			-50	μA
			V_{CC}=3.3V±0.3V			-4	mA
			V_{CC}=5V±0.5V			-8	mA
	Low	I_{OL}	V_{CC}=2V			50	μA
			V_{CC}=3.3V±0.3V			4	mA
			V_{CC}=5V±0.5V			8	mA
Input Rise or Fall Times		$\frac{\Delta t}{\Delta V}$	V_{CC}=3.3V±0.3V			100	ns/V
			V_{CC}=5V±0.5V			20	ns/V
Operating Temperature		T_{OPR}		-40		125	°C

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	High	V_{OH}	V_{CC}=2.0V, I_{OH}=-50μA	1.9	2.0		V
			V_{CC}=3.0V, I_{OH}=-50μA	2.9	3.0		V
			V_{CC}=4.5V, I_{OH}=-50μA	4.4	4.5		V
			V_{CC}=3.0V, I_{OH}=-4mA	2.58			V
			V_{CC}=4.5V, I_{OH}=-8mA	3.94			V
	Low	V_{OL}	V_{CC}=2.0V, I_{OL}=50μA			0.1	V
			V_{CC}=3.0V, I_{OL}=50μA			0.1	V
			V_{CC}=4.5V, I_{OL}=50μA			0.1	V
			V_{CC}=3.0V, I_{OL}=4mA			0.36	V
			V_{CC}=4.5V, I_{OL}=8mA			0.36	V
Input Leakage Current		$I_{I(LEAK)}$	V_{CC}=0~5.5V, V_{IN}=5.5V or GND			±0.1	μA
Quiescent Supply Current		I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			2	μA
Input Capacitance		C_{IN}	V_{CC}=5.0V, V_{IN}=V_{CC} or GND		4	10	pF

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

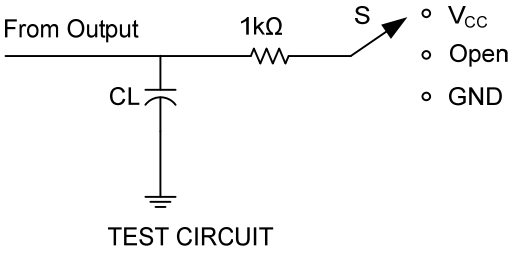
■ SWITCHING CHARACTERISTICS (see Test Circuit and Waveforms)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t_{PLH}/t_{PHL}	V_{CC}=3.3V±0.3V, C_L=15pF		5.6	7.9	ns
		V_{CC}=3.3V±0.3V, C_L=50pF		8.1	11.4	ns
	t_{PLH}/t_{PHL}	V_{CC}=5.0V±0.5V, C_L=15pF		3.6	5.5	ns
		V_{CC}=5.0V±0.5V, C_L=50pF		5.1	7.5	ns

■ OPERATING CHARACTERISTICS (V_{CC}=5V, T_a=25°C)

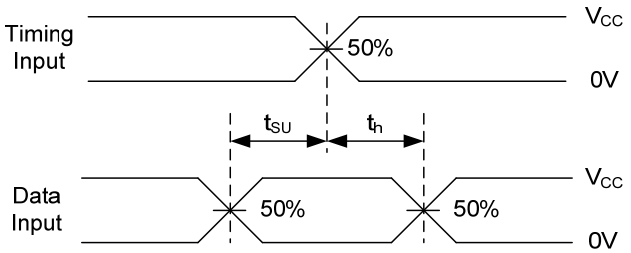
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, f=1MHz		15		pF

■ TEST CIRCUIT AND WAVEFORMS

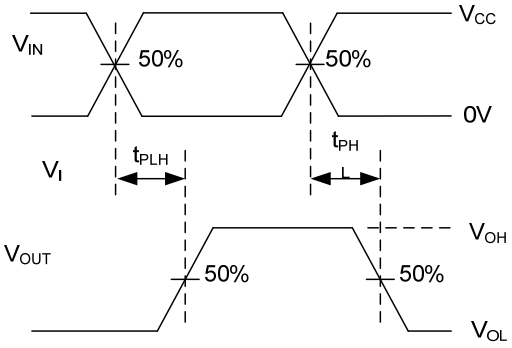


TEST CIRCUIT

TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{CC}



SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.
P_{RR} ≤1MHz, Z_O = 50Ω, t_R ≤3ns, t_F ≤3ns.