



U74AHCT02

CMOS IC

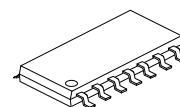
QUADRUPLE 2-INPUT POSITIVE-NOR GATES

■ DESCRIPTION

The **U74AHCT02** contains four independent 2-input NOR gates. Each gate provides the function $Y = \overline{A+B}$ in positive logic.

■ FEATURES

- * Inputs Are TTL-Voltage Compatible
- * Low Power Dissipation
- * Balanced Propagation Delays

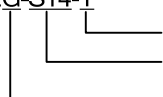


SOP-14

■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74AHCT02G-S14-R	SOP-14	Tape Reel

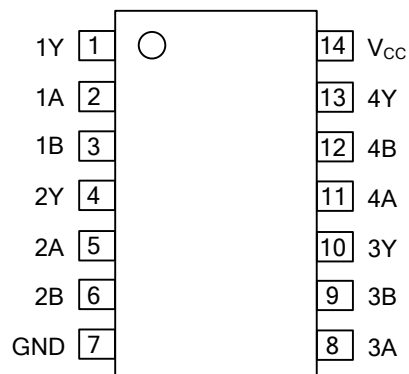
U74AHCT02G-S14-T



- (1) Packing Type
- (2) Package Type
- (3) Halogen Free

- (1) R: Tape Reel
- (2) S14: SOP-14
- (3) G: Halogen Free

PIN CONFIGURATION

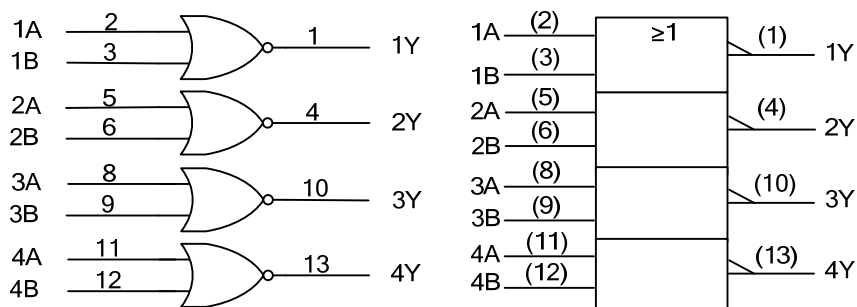


FUNCTION TABLE (Each Gate)

INPUTS A	INPUTS B	OUTPUT Y
L	L	H
L	H	L
H	L	L
H	H	L

Note: H: HIGH voltage level; L: LOW voltage level.

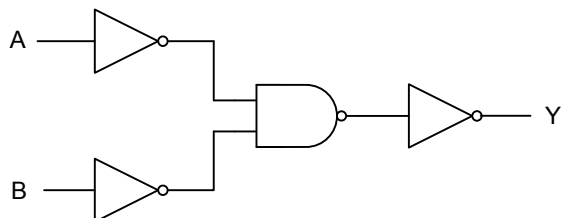
LOGIC SYMBOL (Positive Logic)



Logic Symbol

IEC Logic Symbol

LOGIC DIAGRAM (One Gate)



■ ABSOLUTE MAXIMUM RATING

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
V_{CC} or GND Current	I_{CC}	±50	mA
Output Current ($V_{OUT}=0 \sim V_{CC}$)	I_{OUT}	±25	mA
Input Clamping Current ($V_{IN} < 0V$)	I_{IK}	-20	mA
Output Clamping Current ($V_{OUT} < 0$ or $V_{OUT} > V_{CC}$)	I_{OK}	±20	mA
Storage Temperature	T_{STG}	-65 ~ + 150	°C

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
Junction to Ambient	θ_{JA}	76	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		4.5	5.0	5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
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 Input Current	I_{OH}				-8	mA
Low-Level Input Current	I_{OL}				8	mA
Input Transition Rise or Fall Rate	t_R / t_F	$V_{CC} = 5.0 \pm 0.5V$			20	ns/V
Ambient Operating Temperature	T_{OPR}		-40		+85	°C

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

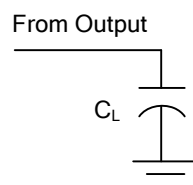
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	$I_{OH} = -50\mu A$, $V_{CC} = 4.5V$	4.4	4.5		V
		$I_{OH} = -8mA$, $V_{CC} = 4.5V$	3.94			V
Low-Level Output Voltage	V_{OL}	$I_{OL} = 50\mu A$, $V_{CC} = 4.5V$			0.1	V
		$I_{OL} = 8mA$, $V_{CC} = 4.5V$			0.36	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN} = V_{CC}$ or GND, $V_{CC} = 0V$ to $5.5V$			±0.1	μA
Quiescent Supply Current	I_Q	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$, $V_{CC} = 5.5V$			2	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_Q	One input at 3.4V, other inputs at V_{CC} or GND, $I_{OUT} = 0$, $V_{CC} = 5.5V$			1.35	mA
Input Capacitance	C_{IN}	$V_{IN} = V_{CC}$ or GND, $V_{CC} = 5V$		4	10	pF

■ SWITCHING CHARACTERISTICS ($T_A = 25^\circ C$)

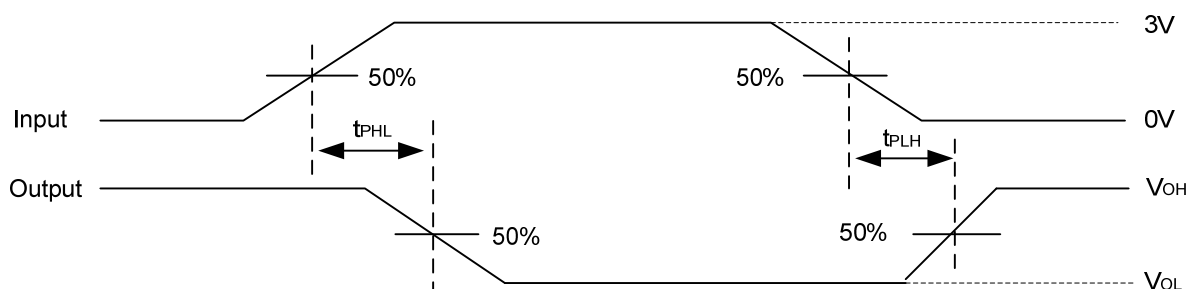
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay, From Input(A and B) To Output(Y)	t_{PLH} / t_{PHL}	$V_{CC} = 5 \pm 0.5V$, $C_L = 15pF$			5.5	ns
		$C_L = 50pF$			7.5	
Power Dissipation Capacitance	C_{PD}	$f = 1MHz$, No load		17		pF

■ TEST CIRCUIT AND WAVEFORMS

Test circuit for measuring propagation delay



Waveforms showing the Input(A and B) to Output(Y) propagation delays



Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{MHz}$, $Z_o = 50\Omega$, $t_R \leq 3\text{ns}$, $t_F \leq 3\text{ns}$.

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