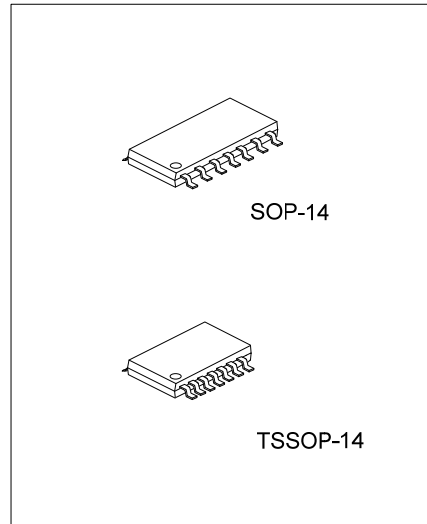




## U74AHC132

CMOS IC

### QUADRUPLE POSITIVE-NAND GATES WITH SCHMITT-TRIGGER INPUTS



#### DESCRIPTION

The **U74AHC132** is a device is a quadruple positive NAND gate designed for 2V to 5.5V  $V_{CC}$  operation. This device performs the Boolean function  $Y = \overline{A \times B}$  or  $Y = \overline{A + B}$  in positive logic.

#### FEATURES

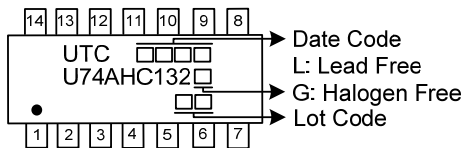
- \* Operate from 2V to 5.5V
- \* Operation form very slow input transitions
- \* Temperature-Compensated threshold levels
- \* Balanced propagation delays

#### ORDERING INFORMATION

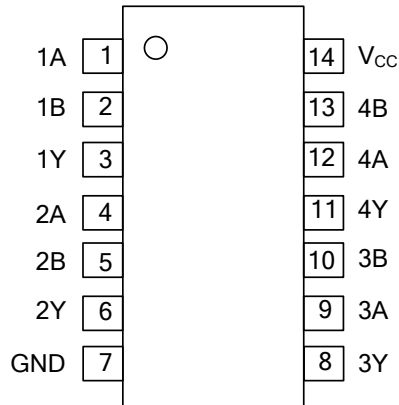
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC132L-S14-R	U74AHC132G-S14-R	SOP-14	Tape Reel
U74AHC132L-P14-R	U74AHC132G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC132G-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, L: Lead Free</p>
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#### MARKING



## ■ PIN CONFIGURATION

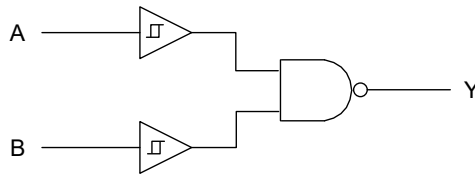


## ■ FUNCTION TABLE

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

H = High voltage level ; L = Low voltage level ; X = Don't care

## ■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ 7	V
Input Voltage	$V_{IN}$	$V_{OUT} < 0$ or $V_{OUT} > V_{CC}$	-0.5 ~ 7	V
Output Voltage	$V_{OUT}$		-0.5 ~ $V_{CC} + 0.5$	V
Continuous Current through $V_{CC}$ or GND	$I_{CC}$		±50	mA
Input Clamp Current	$I_{IK}$	$V_{IN} < 0$	-20	mA
Output Clamp Current	$I_{OK}$	$V_{OUT} < 0$ or $V_{OUT} > V_{CC}$	±20	mA
Continuous Output Current	$I_{OUT}$	$V_{OUT} < 0$ or $V_{CC}$	±25	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 (Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2		5.5	V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Operating Temperature	$T_A$		-40		+125	°C

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

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A = 25^\circ\text{C}$			$T_A = -40 \sim +125^\circ\text{C}$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Positive-Going Input Threshold Voltage	$V_{T+}$	$V_{CC} = 3.0\text{V}$	1.2		2.2	1.2		2.2	V
		$V_{CC} = 4.5\text{V}$	1.75		3.15	1.75		3.15	V
		$V_{CC} = 5.5\text{V}$	2.15		3.85	2.15		3.85	V
Negative-Going Input Threshold Voltage	$V_{T-}$	$V_{CC} = 3.0\text{V}$	0.9		1.9	0.9		1.9	V
		$V_{CC} = 4.5\text{V}$	1.35		2.75	1.35		2.75	V
		$V_{CC} = 5.5\text{V}$	1.65		3.35	1.65		3.35	V
Hysteresis ( $V_{T+} - V_{T-}$ )	$\Delta V_T$	$V_{CC} = 3.0\text{V}$	0.3		1.2	0.25		1.2	V
		$V_{CC} = 4.5\text{V}$	0.4		1.4	0.35		1.4	V
		$V_{CC} = 5.5\text{V}$	0.5		1.6	0.45		1.6	V
High-Level Output Voltage	$V_{OH}$	$V_{CC} = 2\text{V}$	1.9	2.0		1.9			V
		$V_{CC} = 3\text{V}$							2.9
		$V_{CC} = 4.5\text{V}$	4.4	4.5		4.4		V	
		$V_{CC} = 3\text{V}, I_{OH} = -4\text{mA}$	2.58			2.4		V	
		$V_{CC} = 4.5\text{V}, I_{OH} = -8\text{mA}$	3.94			3.7		V	
Low-Level Output Voltage	$V_{OL}$	$V_{CC} = 2\text{V}$			0.1			0.1	V
		$V_{CC} = 3\text{V}$						0.1	
		$V_{CC} = 4.5\text{V}$			0.1		0.1	V	
		$V_{CC} = 3\text{V}, I_{OL} = 4\text{mA}$			0.36		0.55	V	
		$V_{CC} = 4.5\text{V}, I_{OL} = 8\text{mA}$			0.36		0.55	V	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC} = 0 \sim 5.5\text{V}, V_{IN} = 5.5\text{V}$ or GND			±0.1			±2	µA
Quiescent Supply Current	$I_Q$	$V_{CC} = 5.5\text{V}, V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0\text{A}$			2			40	µA

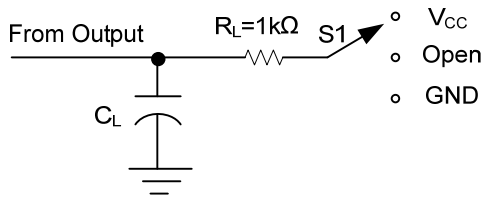
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Propagation Delay From Input (A or B) to Output (Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	V <sub>CC</sub> =3.3V±0.3V	C <sub>L</sub> =15pF		5.6	11.9	1		15	ns
			C <sub>L</sub> =50pF		8.8	15.4	1		19.5	ns
		V <sub>CC</sub> =5V±0.5V	C <sub>L</sub> =15pF		3.9	7.7	1		10	ns
			C <sub>L</sub> =50pF		5.2	9.7	1		12.5	ns

■ OPERATING CHARACTERISTICS (Unless otherwise specified)

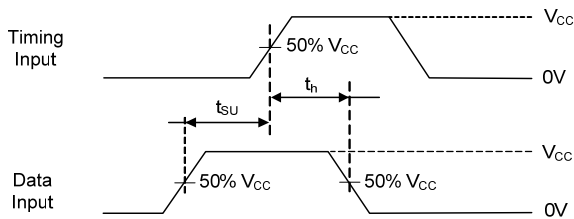
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> =5.0V, V <sub>IN</sub> =V <sub>CC</sub> or GND		1.9	10	pF
Power Dissipation Capacitance Per Flip-Flop	C <sub>PD</sub>	V <sub>CC</sub> =5V, f=1MHz, No load.		11		pF

## TEST CIRCUIT AND WAVEFORMS

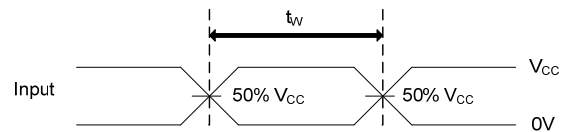


**TEST CIRCUIT**

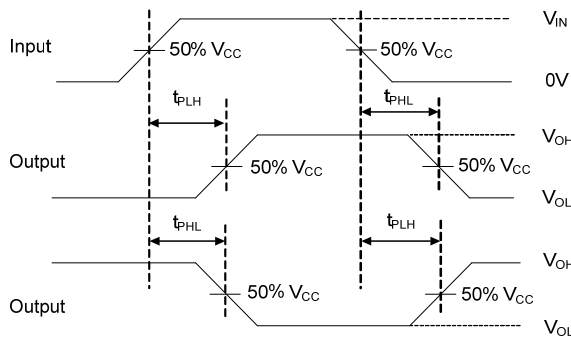
TEST	S1
$t_{PLZ}/t_{PZL}$	$V_{CC}$
$t_{PLH}/t_{PHL}$	Open
$t_{PHZ}/t_{PZH}$	GND
Open Drain	$V_{CC}$



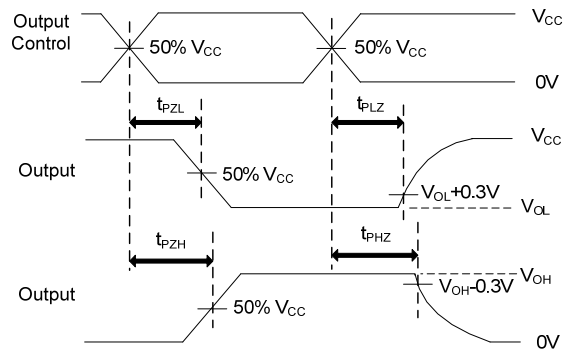
**SETUP TIME AND HOLD TIME**



**PULSE WIDTH**



**PROPAGATION DELAY TIMES**



**ENABLE AND DISABLE TIMES**

Notes: 1.  $C_L$  includes probe and jig capacitance.

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

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