



# U74AHC1G132

CMOS IC

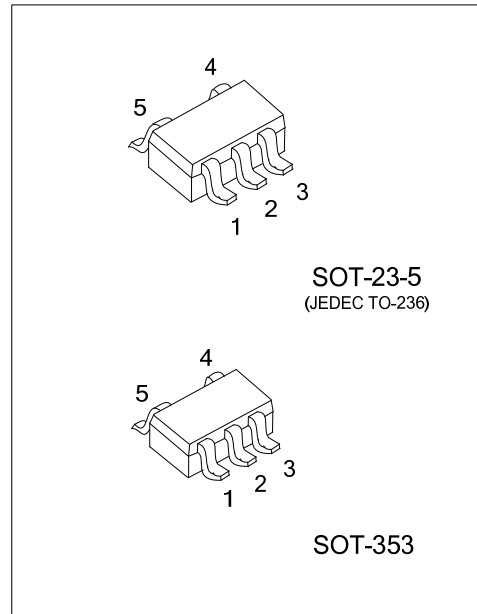
## SINGLE 2-INPUT NAND GATE WITH SCHMITT-TRIGGER INPUTS

### DESCRIPTION

The **U74AHC1G132** contains one 2-input NAND gate with Schmitt-trigger inputs designed for 2V to 5.5V  $V_{CC}$  operation and performs the Boolean function  $Y = \overline{A \cdot B}$  or  $Y = \overline{A} + \overline{B}$  in positive logic.

Because of Schmitt action, this device has different input threshold levels for positive-going ( $V_{T+}$ ) and negative-going ( $V_{T-}$ ) signals.

This device can be triggered from the slowest of input ramps and still give clean jitter-free output signals.



### FEATURES

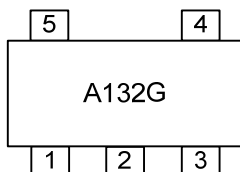
- \* Operation voltage range: 2 ~ 5.5V
- \* Max  $t_{pd}$  of 7.7 ns at 5 V
- \* Low static power consumption;  $I_{CC}=2\mu A$  (Max.)
- \*  $\pm 8mA$  output drive at 5 V

### ORDERING INFORMATION

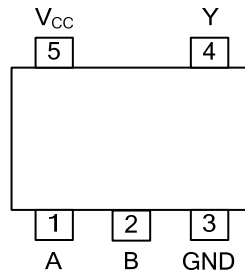
Ordering Number	Package	Packing
U74AHC1G132G-AE5-R	SOT-23-5	Tape Reel
U74AHC1G132G-AL5-R	SOT-353	Tape Reel

<p>U74AHC1G132G-AE5-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AE5: SOT-23-5, AL5: SOT-353</li> <li>(3) G: Halogen Free and Lead Free</li> </ul>
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### MARKING



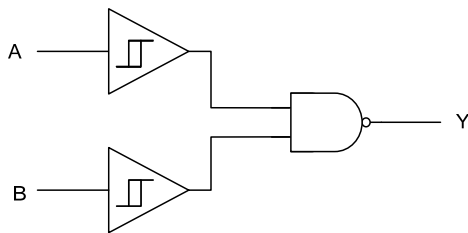
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (positive logic)



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ +7.0	V
Input Voltage	$V_{IN}$		-0.5 ~ +7.0	V
Output Voltage	$V_{OUT}$		-0.5 ~ $V_{CC} + 0.5$	V
Continuous $V_{CC}$ or GND Current	$I_{CC}$		±50	mA
Continuous Output Current	$I_{OUT}$	$V_{OUT}=0 \sim V_{CC}$	±25	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
Operating Temperature	$T_{OPR}$		-40 ~ + 85	°C
Storage Temperature Range	$T_{STG}$		-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	$V_{CC}$	Operating	2.0	5.0	5.5	V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
Operating Temperature	$T_A$		-40		+85	°C
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=3.3 \pm 0.3V$			100	ns/V
		$V_{CC}=5.0 \pm 0.5V$			20	ns/V

### ■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-going input threshold voltage	$V_{T+}$	$V_{CC}=3.0V$	1.2		2.2	V
		$V_{CC}=4.5V$	1.75		3.15	
		$V_{CC}=5.5V$	2.15		3.85	
Negative-going input threshold voltage	$V_{T-}$	$V_{CC}=3.0V$	0.9		1.9	V
		$V_{CC}=4.5V$	1.35		2.75	
		$V_{CC}=5.5V$	1.65		3.35	
Hysteresis ( $V_{T+} - V_{T-}$ )	$\Delta V_T$	$V_{CC}=3V$	0.3		1.2	V
		$V_{CC}=4.5V$	0.4		1.4	
		$V_{CC}=5.5V$	0.5		1.6	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=2.0V$	$I_{OH}=-50\mu A$	1.9	2.0	V
		$V_{CC}=3.0V$		2.9	3.0	
		$V_{CC}=4.5V$		4.4	4.5	
		$V_{CC}=3.0V, I_{OL}=-4mA$	2.58			
		$V_{CC}=4.5V, I_{OL}=-8mA$	3.94			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2.0V$	$I_{OH}=-50\mu A$		0.1	V
		$V_{CC}=3.0V$			0.1	
		$V_{CC}=4.5V$			0.1	
		$V_{CC}=3.0V, I_{OL}=-4mA$		0.36		
		$V_{CC}=4.5V, I_{OL}=-8mA$		0.36		
Input Leakage Current	$I_{(LEAK)}$	$V_{CC}=0V \sim 5.5V, V_{IN}=5.5V$ or GND			±0.1	μA
Quiescent Supply Current	$I_{CC}$	$V_{CC}=5.0V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			2	μA
Input Capacitance	$C_I$	$V_{CC}=5.0V, V_{IN}=V_{CC}$ or GND		2	10	pF

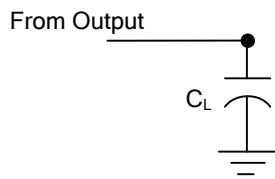
■ SWITCHING CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified) (see Figure 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output(Y)	$t_{PLH}/t_{PHL}$	$V_{CC}=3.0V\pm 3.6V$	$C_L=15pF$		5.6	11.9	ns
			$C_L=50pF$		7.6	15.4	
		$V_{CC}=4.5V\pm 5.5V$	$C_L=15pF$		3.9	7.7	ns
			$C_L=50pF$		5.3	9.7	

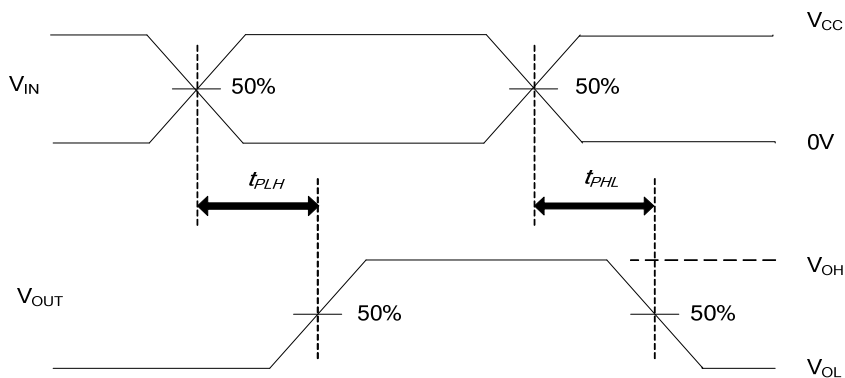
■ OPERATING CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	$V_{CC}=5.0V$ , $f=1\text{MHZ}$ , No load.		11		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT



PROPAGATION DELAY TIMES

- Notes: 1.  $C_L$  includes probe and jig capacitance.  
 2. All input pulses are supplied by generators having the following characteristics: PRR  $\leq 1\text{MHz}$ ,  $Z_o = 50\Omega$ ,  $t_r \leq 3\text{ns}$ ,  $t_f \leq 3\text{ns}$ .

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