



U74LVC1G132

CMOS IC

SINGLE 2-INPUT NAND GATE WITH SCHMITT-TRIGGER INPUTS

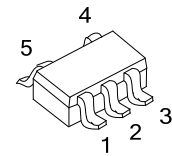
DESCRIPTION

The **U74LVC1G132** contains one 2-input NAND gate with Schmitt-trigger inputs designed for 1.65-V to 5.5V V_{CC} operation and performs the Boolean function $Y = \overline{A \cdot B}$ or $Y = \overline{\overline{A} + \overline{B}}$ 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.

The device is fully specified for partial-power-down applications using I_{OFF} . The I_{OFF} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.



SOT-23-5
(JEDEC TO-236)

FEATURES

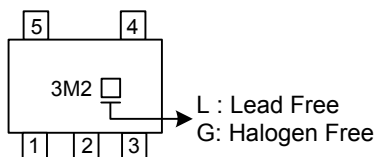
- * Supports 5-V V_{CC} Operation
- * Inputs Accept Voltages to 5.5V
- * Max t_{pd} of 5.3ns at 3.3V
- * Low power consumption, $I_{CC}=10\mu A$ (Max)
- * I_{off} supports Partial-Power-Down Mode
- * $\pm 24mA$ output drive at 3.3V

ORDERING INFORMATION

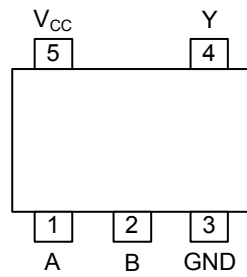
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G132L-AE5-R	U74LVC1G132G-AE5-R	SOT-23-5	Tape Reel

<p>U74LVC1G132L-AE5-R</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5 (3) L: Lead Free, G: Halogen Free</p>
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MARKING



■ PIN CONFIGURATION

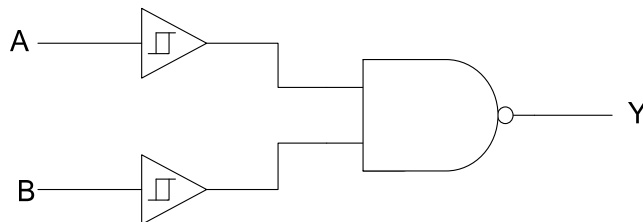


■ FUNCTION TABLE

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

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

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.5 ~ +6.5	V
Input Voltage		V_{IN}	-0.5 ~ +6.5	V
Output Voltage	Output in the high or low state	V_{OUT}	-0.5 ~ $V_{CC}+0.5$	V
	Output in the high-impedance or power-off state		-0.5 ~ +6.5	
V_{CC} or GND Current		I_{CC}	±100	mA
Continuous Output Current ($V_{OUT}=0$ to V_{CC})		I_{OUT}	±50	mA
Input Clamp Current ($V_{IN}<0$)		I_{IK}	-50	mA
Output Clamp Current ($V_{OUT}<0$)		I_{OK}	-50	mA
Operating Temperature		T_A	-40 ~ +85	°C
Storage Temperature Range		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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	252	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V

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

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-going input threshold voltage	V_{T+}	$V_{CC}=1.65\text{V}$	0.79		1.16	V
		$V_{CC}=2.3\text{V}$	1.11		1.56	
		$V_{CC}=3\text{V}$	1.5		1.87	
		$V_{CC}=4.5\text{V}$	2.16		2.74	
		$V_{CC}=5.5\text{V}$	2.61		3.33	
Negative-going input threshold voltage	V_{T-}	$V_{CC}=1.65\text{V}$	0.39		0.62	V
		$V_{CC}=2.3\text{V}$	0.58		0.87	
		$V_{CC}=3\text{V}$	0.84		1.14	
		$V_{CC}=4.5\text{V}$	1.41		1.79	
		$V_{CC}=5.5\text{V}$	1.87		2.29	
Hysteresis ($V_{T+} - V_{T-}$)	ΔV_T	$V_{CC}=1.65\text{V}$	0.37		0.62	V
		$V_{CC}=2.3\text{V}$	0.48		0.77	
		$V_{CC}=3\text{V}$	0.56		0.87	
		$V_{CC}=4.5\text{V}$	0.71		1.04	
		$V_{CC}=5.5\text{V}$	0.71		1.11	
High-Level Output Voltage	V_{OH}	$V_{CC}=1.65 \sim 5.5\text{V}$	$I_{OH}=-100\mu\text{A}$	$V_{CC}-0.1$		V
		$V_{CC}=1.65\text{V}$	$I_{OH}=-4\text{mA}$	1.2		
		$V_{CC}=2.3\text{V}$	$I_{OH}=-8\text{mA}$	1.9		
		$V_{CC}=3.0\text{V}$	$I_{OH}=-16\text{mA}$	2.4		
			$I_{OH}=-24\text{mA}$	2.3		
$V_{CC}=4.5\text{V}$	$I_{OH}=-32\text{mA}$	3.8				

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Low-Level Output Voltage	V_{OL}	$V_{CC}=1.65 \sim 5.5V$ $I_{OL}=100\mu A$			0.1	V	
		$V_{CC}=1.65V$ $I_{OL}=4mA$			0.45		
		$V_{CC}=2.3V$ $I_{OL}=8mA$			0.30		
		$V_{CC}=3.0V$	$I_{OL}=16mA$				0.40
			$I_{OL}=24mA$				0.55
$V_{CC}=4.5V$ $I_{OL}=32mA$				0.55			
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=5.5V$ or GND, $V_{CC}=1.65V \sim 5.5V$			± 1	μA	
Power OFF Leakage Current	I_{off}	V_{IN} or $V_{OUT}=5.5V$, $V_{CC}=0V$			± 10	μA	
Quiescent Supply Current	I_{CC}	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ $V_{CC}=1.65 \sim 5.5V$			10	μA	
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	$V_{CC}=3V \sim 5.5V$, One input at $V_{CC}=0.6V$, Other inputs at V_{CC} or GND			500	μA	
Input Capacitance	C_i	$V_{CC}=3.3V$, $V_{IN}=V_{CC}$ or GND		3.5		pF	

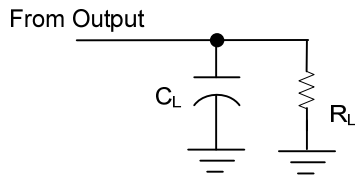
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$)(see Figure 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output(Y)	t_{PLH}/t_{PHL}	$V_{CC}=1.8V \pm 0.15V$	$C_L=15pF$	4		16	ns
			$C_L=30pF$	4		16	
		$V_{CC}=2.5V \pm 0.2V$	$C_L=15pF$	2.5		7	ns
			$C_L=30pF$	3		7.5	
		$V_{CC}=3.3V \pm 0.3V$	$C_L=15pF$	2		5.3	ns
			$C_L=50pF$	2		6	
		$V_{CC}=5V \pm 0.5V$	$C_L=15pF$	1.5		4.4	ns
			$C_L=50pF$	2		5	

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

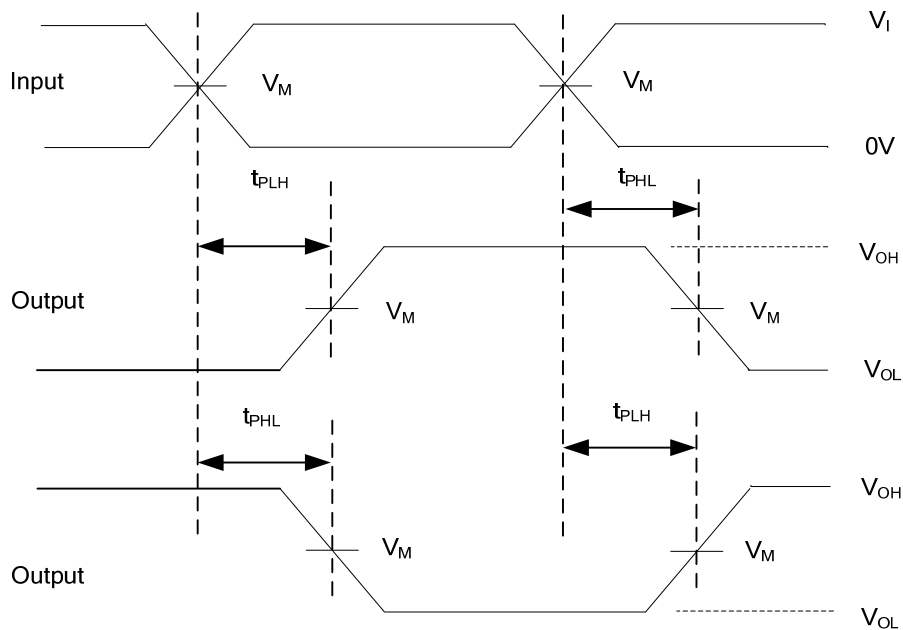
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$f=10MHz$	$V_{CC}=1.8V$		17	pF
			$V_{CC}=2.5V$		18	pF
			$V_{CC}=3.3V$		18	pF
			$V_{CC}=5.0V$		20	pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V _{CC}	INPUTS		V _M	C _L	R _L
	V _I	t _r / t _f			
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	15pF	1MΩ
				30pF	1KΩ
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	15pF	1MΩ
				30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
				50pF	500Ω
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	15pF	1MΩ
				50pF	500Ω



PROPAGATION DELAY TIMES

Figure 1. Test Circuit and Voltage Waveforms

Note: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Z₀=50Ω.

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