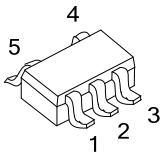
U74LVC1G132

CMOS IC

SINGLE 2-INPUT NAND GATE WITH SCHMITT-TRIGGER INPUTS



SOT-23-5
(JEDEC TO-236)

■ 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 $Y = \overline{A} + \overline{B}$ 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.

■ 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}=10μA (Max)
* I_{off} supports Partial-Power-Down Mode
* ±24mA output drive at 3.3V

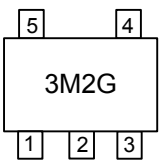
■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74LVC1G132G-AE5-R	SOT-23-5	Tape Reel

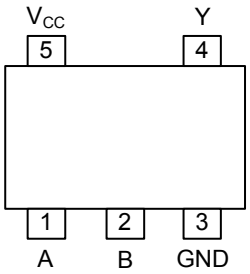
U74LVC1G132G-AE5-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AE5: SOT-23-5
(3) G: Halogen Free and Lead Free

■ MARKING



■ PIN CONFIGURATION

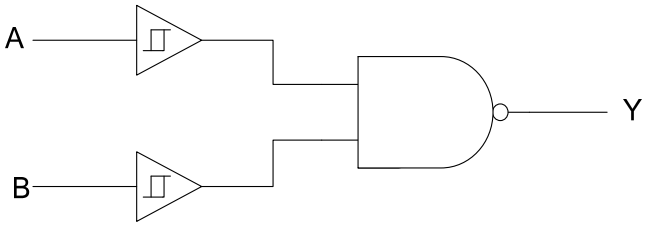


■ FUNCTION TABLE

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°C , unless otherwise specified)

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

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65 ~ 5.5V	I_{OL}=100μA			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 ~ 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 ~ 5.5V				10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	V_{CC}=3 V~ 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

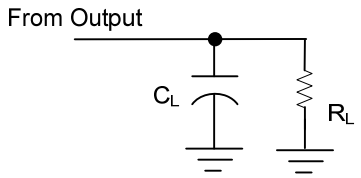
■ SWITCHING CHARACTERISTICS (T_A=25°C)(see Figure 1)

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±0.15V	C_L=15pF	4		16	ns
			C_L=30pF	4		16	
		V_{CC}=2.5V±0.2V	C_L=15pF	2.5		7	ns
			C_L=30pF	3		7.5	
		V_{CC}=3.3V±0.3V	C_L=15pF	2		5.3	ns
			C_L=50pF	2		6	
		V_{CC}=5V±0.5V	C_L=15pF	1.5		4.4	ns
			C_L=50pF	2		5	

■ OPERATING CHARACTERISTICS (T_A=25°C)

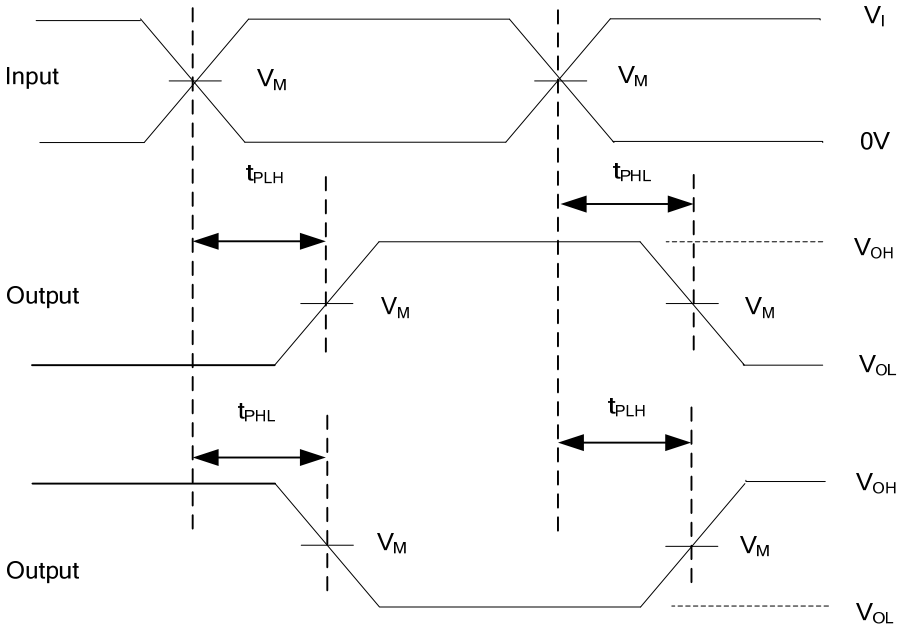
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	f=10MHZ	V_{CC}=1.8V		17		pF
			V_{CC}=2.5V		18		pF
			V_{CC}=3.3V		18		pF
			V_{CC}=5.0V		20		pF

■ 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, Z_O=50Ω.