



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

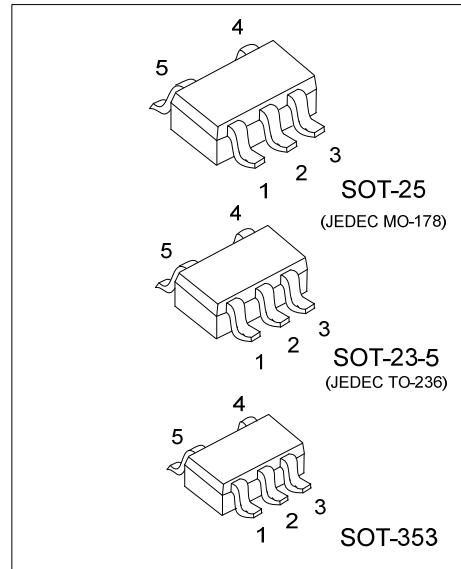
FEATURES

- * Supports 5V 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

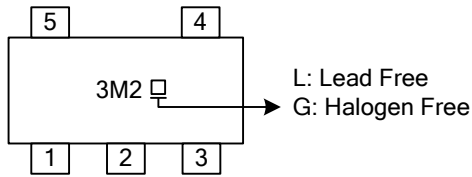
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G132L-AE5-R	U74LVC1G132G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G132L-AF5-R	U74LVC1G132G-AF5-R	SOT-25	Tape Reel
U74LVC1G132L-AL5-R	U74LVC1G132G-AL5-R	SOT-353	Tape Reel

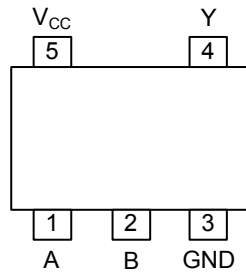
<p>U74LVC1G132G-AE5-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ PIN CONFIGURATION

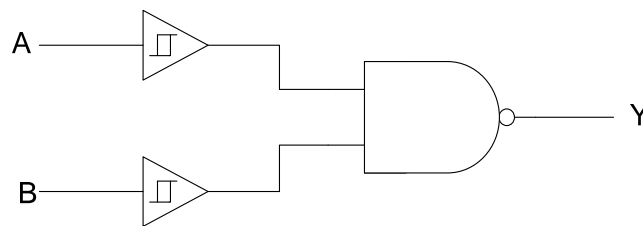


■ FUNCTION TABLE

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 (T_A=25°C , unless otherwise specified)

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
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 ~ +125	°C
Storage Temperature Range		T _{STG}	-65 ~ +150	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	θ _{JA}	280	°C/W
	SOT-25		230	°C/W
	SOT-353		350	°C/W

■ RECOMMENDED OPERATING CONDITIONS (T_A=25°C , unless otherwise specified)

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	
		V _{CC} =3V	1.5		1.87	V	
		V _{CC} =4.5V	2.16		2.74	V	
		V _{CC} =5.5V	2.61		3.33	V	
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	
		V _{CC} =3V	0.84		1.14	V	
		V _{CC} =4.5V	1.41		1.79	V	
		V _{CC} =5.5V	1.87		2.29	V	
Hysteresis (V _{T+} - V _{T-})	ΔV _T	V _{CC} =1.65V	0.37		0.62	V	
		V _{CC} =2.3V	0.48		0.77	V	
		V _{CC} =3V	0.56		0.87	V	
		V _{CC} =4.5V	0.71		1.04	V	
		V _{CC} =5.5V	0.71		1.11	V	
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	
		V _{CC} =2.3V, I _{OH} =-8mA	1.9			V	
		V _{CC} =3.0V	I _{OH} =-16mA	2.4			V
			I _{OH} =-24mA	2.3			V
V _{CC} =4.5V, I _{OH} =-32mA	3.8			V			

■ 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	
		$V_{CC}=2.3V, I_{OL}=8mA$			0.30	V	
		$V_{CC}=3.0V$	$I_{OL}=16mA$			0.40	V
			$I_{OL}=24mA$			0.55	V
		$V_{CC}=4.5V, I_{OL}=32mA$			0.55	V	
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	

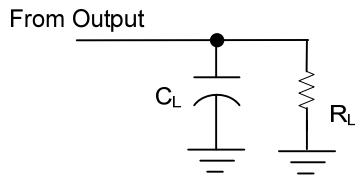
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified) (see Figure 1)

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

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

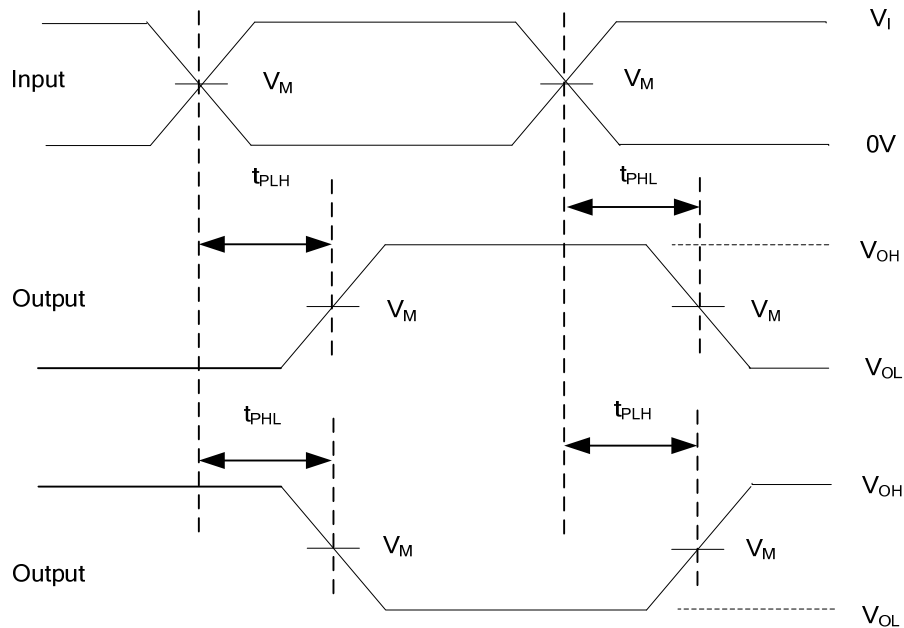
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$f=10MHz$	$V_{CC}=1.8V$		17	pF
			$V_{CC}=2.5V$		18	pF
			$V_{CC}=3.3V$		18	pF
			$V_{CC}=5.0V$		20	pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	INPUTS		V_M	C_L	R_L
	V_I	t_r / t_f			
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	15pF	1M Ω
				30pF	1K Ω
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	15pF	1M Ω
				30pF	500 Ω
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	15pF	1M Ω
				50pF	500 Ω
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	15pF	1M Ω
				50pF	500 Ω



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 $\leq 10MHz$, $Z_o=50\Omega$.

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