



U74LVC1G00

CMOS IC

SINGLE 2-INPUT NAND GATE

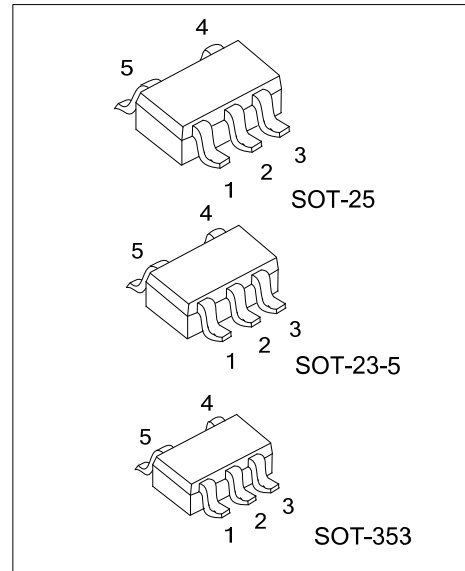
DESCRIPTION

The **U74LVC1G00** is a 2-input NAND gate device which provides the Function $Y=A \bullet B$ or $Y=\overline{A + B}$ in positive logic.

This device has power-down protective circuit preventing device from destruction when it is powered down.

FEATURES

- * Operate From 1.65V to 5.5V
- * Inputs Accept Voltages To 5.5V
- * High Noise Immunity
- * Low Power Dissipation
- * Max t_{PD} of 3.8 ns at 3.3V

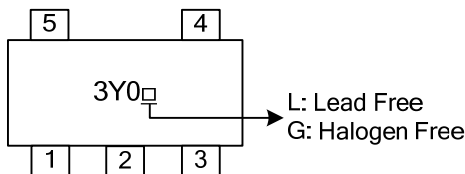


ORDERING INFORMATION

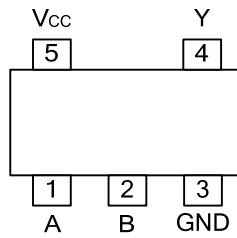
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G00L-AE5-R	U74LVC1G00G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G00L-AF5-R	U74LVC1G00G-AF5-R	SOT-25	Tape Reel
U74LVC1G00L-AL5-R	U74LVC1G00G-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G00G-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

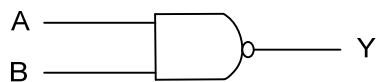


■ FUNCTION TABLE

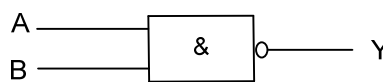
INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	H
L	H	H
L	L	H

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the Power-off state	-0.5 ~ +6.5	V
		Output in the High or Low state	-0.5 ~ $V_{CC}+0.5$	V
V_{CC} or GND Current	I_{CC}	Output in the Power-off state	±100	mA
Continuous Output Current	I_{OUT}	$V_{OUT}=0\sim V_{CC}$	±50	mA
Input Clamp Current	I_{IK}	$V_{IN}<0$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT}<0$	-50	mA
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	SOT-23-5	280	°C/W
	SOT-25	230	
	SOT-353	350	

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or Low state	0		V_{CC}	V
High-level Output Current	I_{OH}	$V_{CC}=1.65V$			-4	mA
		$V_{CC}=2.3V$			-8	mA
		$V_{CC}=3V$			-16	mA
		$V_{CC}=3V$			-24	mA
		$V_{CC}=4.5V$			-32	mA
Low-level Output Current	I_{OL}	$V_{CC}=1.65V$			4	mA
		$V_{CC}=2.3V$			8	mA
		$V_{CC}=3V$			16	mA
		$V_{CC}=3V$			24	mA
		$V_{CC}=4.5V$			32	mA
Operating Temperature	T_A		-40		125	°C
Input Transition Rise or Fall Rate	t_R / t_F	$V_{CC}=1.8V\pm 0.15V, 2.5V\pm 0.2V$			20	ns/V
		$V_{CC}=3.3V\pm 0.3V$			10	ns/V
		$V_{CC}=5V\pm 0.5V$			5	ns/V

■ ELECTRICAL CHARACTERISTICS (T_A =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V _{IH}	V _{CC} =1.65V~1.95V	0.65×V _{CC}			V
		V _{CC} =2.3V~2.7V	1.7			V
		V _{CC} =3V~3.6V	2			V
		V _{CC} =4.5V~5.5V	0.7×V _{CC}			V
Low-Level Input Voltage	V _{IL}	V _{CC} =1.65V~1.95V			0.35×V _{CC}	V
		V _{CC} =2.3V~2.7V			0.7	V
		V _{CC} =3V~3.6V			0.8	V
		V _{CC} =4.5V~5.5V			0.3×V _{CC}	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
		V _{CC} =3.0V, I _{OH} =-24mA	2.3			V
		V _{CC} =4.5V, I _{OH} =-32mA	3.8			V
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
		V _{CC} =2.3V, I _{OL} =8mA			0.3	V
		V _{CC} =3.0V, I _{OL} =16mA			0.4	V
		V _{CC} =3.0V, 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} =0 ~ 5.5V			±5	μA
Power OFF Leakage Current	I _{OFF}	V _{IN} or V _{OUT} =5.5V, V _{CC} =0V			±10	μA
Quiescent Supply Current	I _Q	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 _Q	V _{CC} =3~5.5V, 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		4		pF

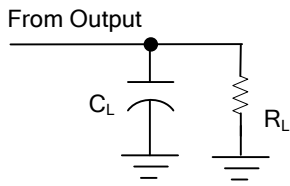
■ SWITCHING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t _{PLH} / t _{PHL}	V _{CC} =1.8±0.15V	C _L =15pF R _L =1MΩ	2.2	7.2	ns
		V _{CC} =2.5±0.2V		0.9	4.4	ns
		V _{CC} =3.3±0.3V		0.8	3.8	ns
		V _{CC} =5±0.5V		0.8	3.4	ns
		V _{CC} =1.8±0.15V, R _L =1KΩ	C _L =30pF	3.1	9	ns
		V _{CC} =2.5±0.2V, R _L =500Ω		1.3	5.5	ns
		V _{CC} =3.3±0.3V, R _L =500Ω		1	4.7	ns
		V _{CC} =5±0.5V, R _L =500Ω		1	4	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A=25°C, unless otherwise specified)

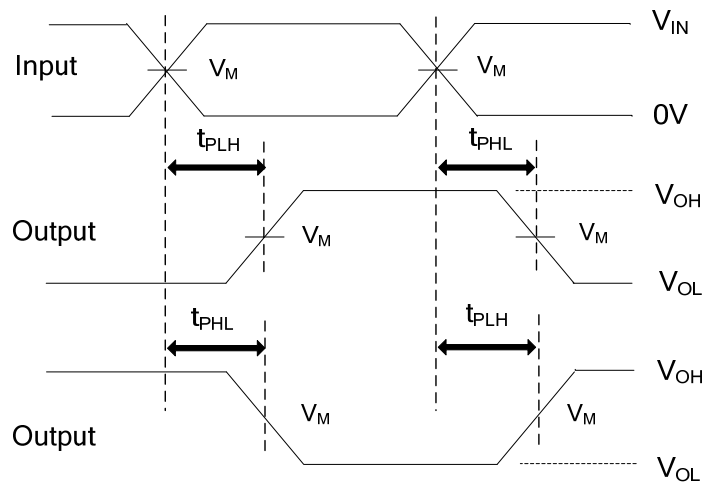
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =1.8V		22		pF
		V _{CC} =2.5V		22		
		V _{CC} =3.3V		23		
		V _{CC} =5.0V		25		

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	15pF	1MΩ

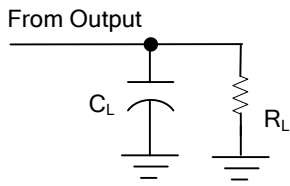


PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

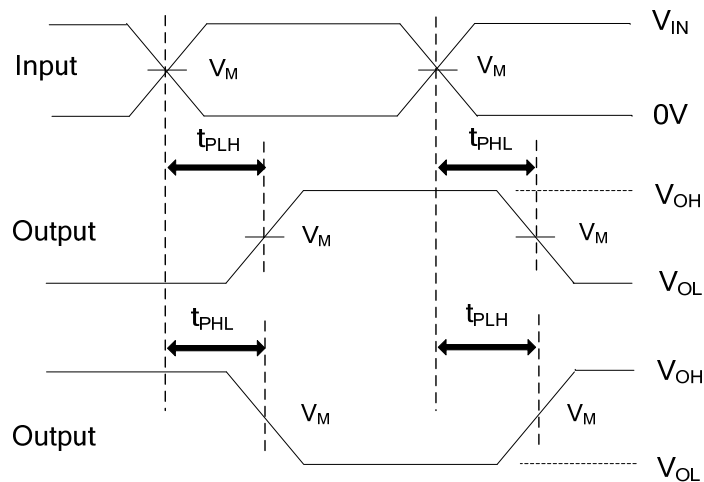
All input pulses are supplied by generators having the following characteristics: $P_{RR} \leq 10\text{MHz}$, $Z_O = 50\Omega$.

■ TEST CIRCUIT AND WAVEFORMS (Cont.)



TEST CIRCUIT

V _{CC}	Inputs		V _M	C _L	R _L
	V _{IN}	t _R , t _F			
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	30pF	1KΩ
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	50pF	500Ω



PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: P_{RR} ≤10MHz, Z_O = 50Ω.

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