



U74LVC1G00

CMOS IC

SINGLE 2-INPUT NAND GATE

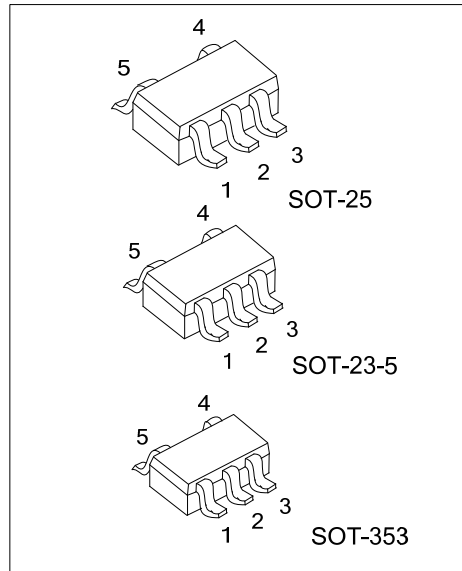
DESCRIPTION

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

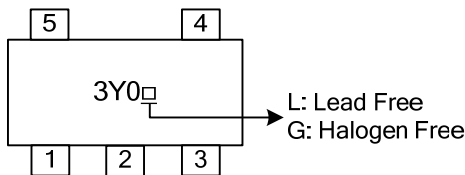


ORDERING INFORMATION

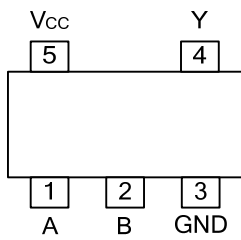
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G00L-AE5-R	U74LVC1G00G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G00L-AF5-R	U74LVC1G00G-AF5-R	SOT-25	Tape Reel
U74LVC1G00L-AL5-R	U74LVC1G00G-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G00L-AE5-R</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) L: Lead Free, G: Halogen Free</p>
---	--

MARKING



■ PIN CONFIGURATION

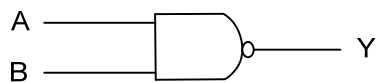


■ FUNCTION TABLE

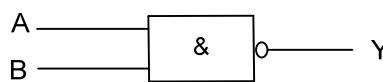
INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	H
L	H	H
L	L	H

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING (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 ~ +0.5	V
	Output in the high-impedance or power-off state		-0.5 ~ +6.5	V
V_{CC} or GND Current (Output in the power-off state)		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
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	θ_{JA}	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		85	°C
Input Transition Rise or Fall Rate	t_R / t_F	$V_{CC}=1.8V\pm0.15V, 2.5V\pm0.2V$			20	ns/V
		$V_{CC}=3.3V\pm0.3V$			10	ns/V
		$V_{CC}=5V\pm0.5V$			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}	I _{OH} =-100μA, V _{CC} =1.65 ~ 5.5V	V _{CC} -0.1			V
		I _{OH} =-4mA, V _{CC} =1.65V	1.2			V
		I _{OH} =-8mA, V _{CC} =2.3V	1.9			V
		I _{OH} =-16mA, V _{CC} =3.0V	2.4			V
		I _{OH} =-24mA, V _{CC} =3.0V	2.3			V
		I _{OH} =-32mA, V _{CC} =4.5V	3.8			V
Low-Level Output Voltage	V _{OL}	I _{OL} =100μA, V _{CC} =1.65 ~ 5.5V			0.1	V
		I _{OL} =4mA, V _{CC} =1.65V			0.45	V
		I _{OL} =8mA, V _{CC} =2.3V			0.3	V
		I _{OL} =16mA, V _{CC} =3.0V			0.4	V
		I _{OL} =24mA, V _{CC} =3.0V			0.55	V
		I _{OL} =32mA, V _{CC} =4.5V			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

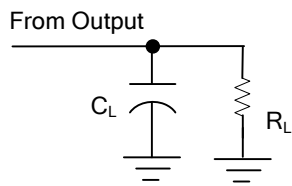
■ SWITCHING CHARACTERISTICS (T_A=25°C)

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 (T_A=25°C)

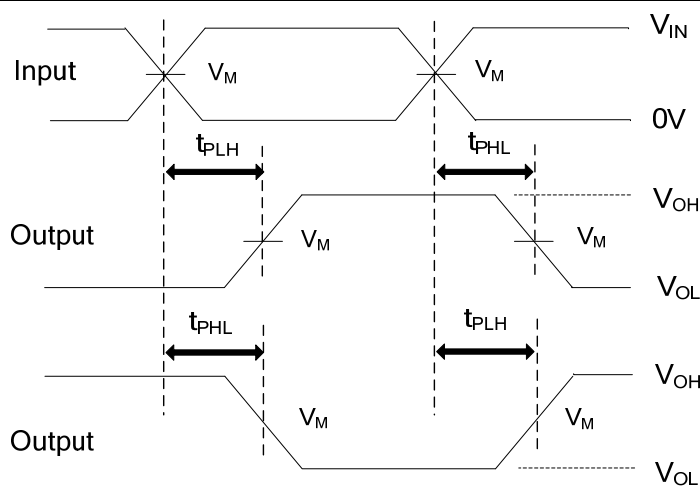
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =1.8V	f=10MHz	22		pF
		V _{CC} =2.5V		22		
		V _{CC} =3.3V		23		
		V _{CC} =5.0V		25		

■ 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

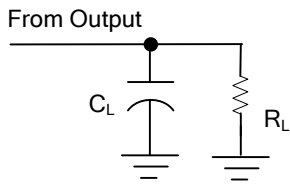


PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

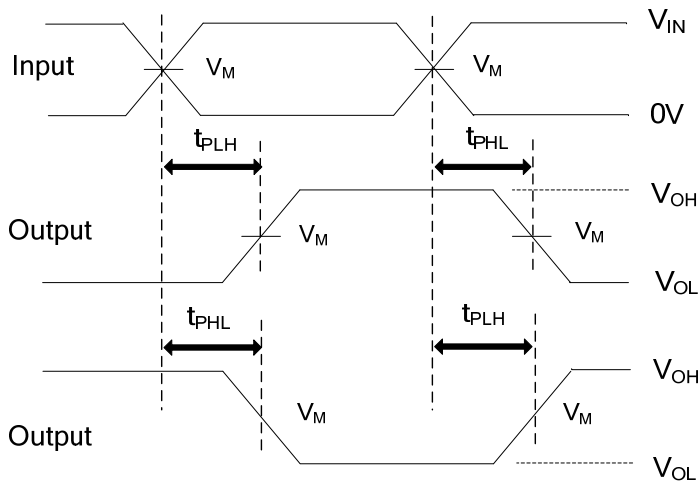
All input pulses are supplied by generators having the following characteristics: P_{RR} ≤10MHz, Z_O = 50Ω.

■ 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.

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.