



U74LVC1G00

CMOS IC

SINGLE 2-INPUT NAND GATE

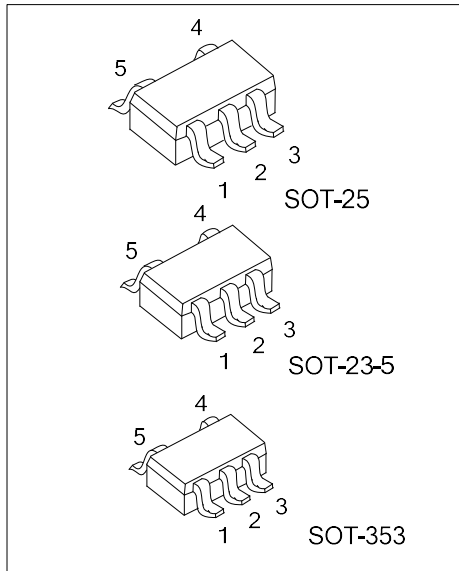
DESCRIPTION

The **U74LVC1G00** is a 2-input NAND gate device which provides the Function $Y=A \cdot B$ 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

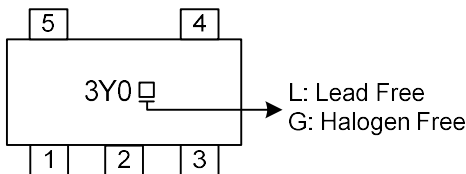


ORDERING INFORMATION

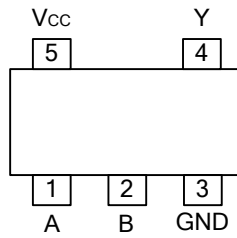
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G00L-AE5-R	U74LVC1G00G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G00L-AF5-R	U74LVC1G00G-AF5-R	SOT-25	Tape Reel
U74LVC1G00L-AL5-R	U74LVC1G00G-AL5-R	SOT-353	Tape Reel

<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

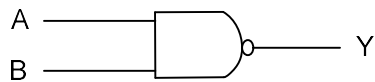


■ FUNCTION TABLE

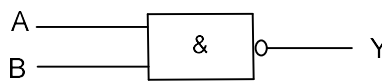
INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	H
L	H	H
L	L	H

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING (T_A=25°C , unless otherwise specified)

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~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
Input Transition Rise or Fall Rate	t _R / t _F	V _{CC} =1.8V±0.15V,2.5V±0.2V			20	ns/V
		V _{CC} =3.3V±0.3V			10	ns/V
		V _{CC} =5V±0.5V			5	ns/V
Operating Temperature	T _A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V _{IH}	V _{CC} =1.65V~1.95V	0.65 ×V _{CC}			0.65 ×V _{CC}			V
		V _{CC} =2.3V~2.7V	1.7			1.7			V
		V _{CC} =3V~3.6V	2			2			V
		V _{CC} =4.5V~5.5V	0.7 ×V _{CC}			0.7 ×V _{CC}			V
Low-Level Input Voltage	V _{IL}	V _{CC} =1.65V~1.95V			0.35 ×V _{CC}			0.35 ×V _{CC}	V
		V _{CC} =2.3V~2.7V			0.7			0.7	V
		V _{CC} =3V~3.6V			0.8			0.8	V
		V _{CC} =4.5V~5.5V			0.3 ×V _{CC}			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 _{CC} -0.1			V
		V _{CC} =1.65V, I _{OH} =-4mA	1.2			0.95			V
		V _{CC} =2.3V, I _{OH} =-8mA	1.9			1.7			V
		V _{CC} =3.0V, I _{OH} =-16mA	2.4			1.9			V
		V _{CC} =3.0V, I _{OH} =-24mA	2.3			2.0			V
		V _{CC} =4.5V, I _{OH} =-32mA	3.8			3.4			V
Low-Level Output Voltage	V _{OL}	V _{CC} =1.65~5.5V, I _{OL} =100μA			0.1			0.1	V
		V _{CC} =1.65V, I _{OL} =4mA			0.45			0.7	V
		V _{CC} =2.3V, I _{OL} =8mA			0.3			0.45	V
		V _{CC} =3.0V, I _{OL} =16mA			0.4			0.6	V
		V _{CC} =3.0V, I _{OL} =24mA			0.55			0.80	V
		V _{CC} =4.5V, I _{OL} =32mA			0.55			0.80	V
Input Leakage Current	I _{I(LEAK)}	V _{IN} =5.5V or GND, V _{CC} =0 ~ 5.5V			±5			±5	μA
Power OFF Leakage Current	I _{OFF}	V _{IN} or V _{OUT} =5.5V, V _{CC} =0V			±10			±10	μA
Quiescent Supply Current	I _Q	V _{IN} =V _{CC} or GND, I _{OUT} =0, V _{CC} =1.65~5.5V			10			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			500	μA

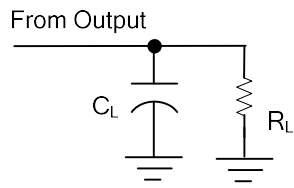
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
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	1.0		8.2	1.0		9.7	ns
		V _{CC} =2.5±0.2V		0.5		5.4	0.5		6.9	ns
		V _{CC} =3.3±0.3V		0.5		4.8	0.5		6.3	ns
		V _{CC} =5±0.5V		0.5		4.4	0.5		5.9	ns
		V _{CC} =1.8±0.15V, R _L =1KΩ	C _L =30pF	1.0		11	1.0		12	ns
		V _{CC} =2.5±0.2V, R _L =500Ω		0.5		7	0.5		9	ns
		V _{CC} =3.3±0.3V, R _L =500Ω		0.5		6.2	0.5		8.2	ns
		V _{CC} =5±0.5V, R _L =500Ω		0.5		5.1	0.5		6.5	ns

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

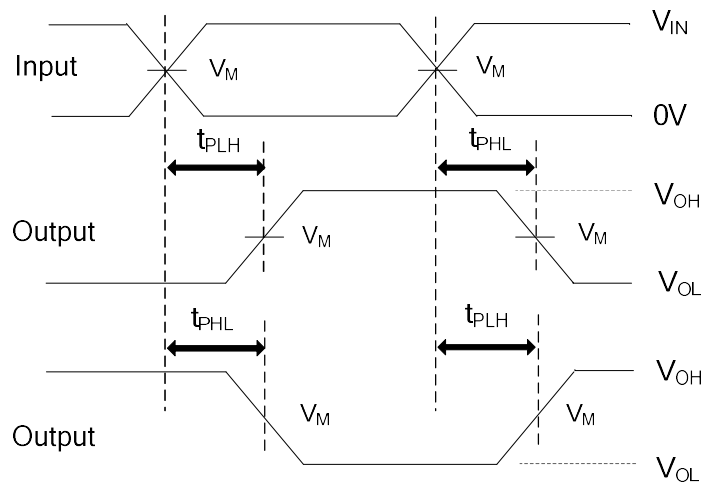
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _I	V _{CC} =3.3V, V _{IN} =V _{CC} or GND		4		pF
Power Dissipation Capacitance	C _{PD}	V _{CC} =1.8V		22		pF
		V _{CC} =2.5V		22		pF
		V _{CC} =3.3V		23		pF
		V _{CC} =5.0V		25		pF

■ 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

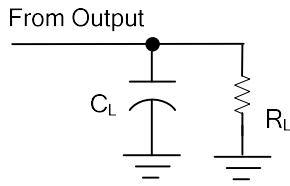


PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

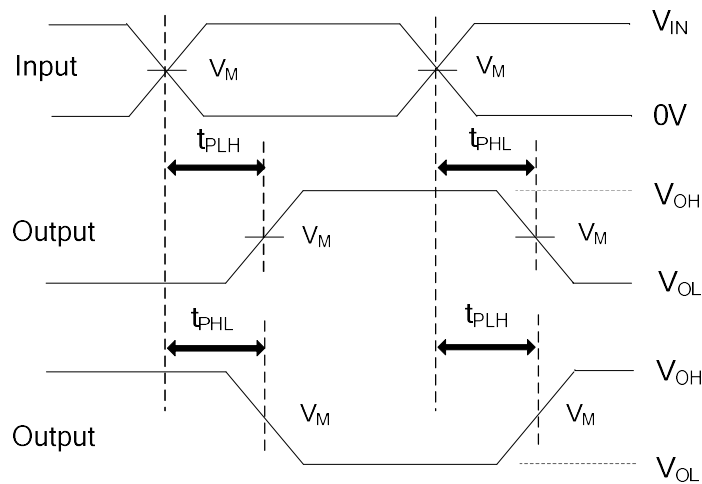
All input pulses are supplied by generators having the following characteristics: P_{RR} ≤10MHz, Z_O = 50Ω.

■ TEST CIRCUIT AND WAVEFORMS (Cont.)



TEST CIRCUIT

V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	1K Ω
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	500 Ω
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	50pF	500 Ω
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 Ω



PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

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

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