



## U74LVC2G00

CMOS IC

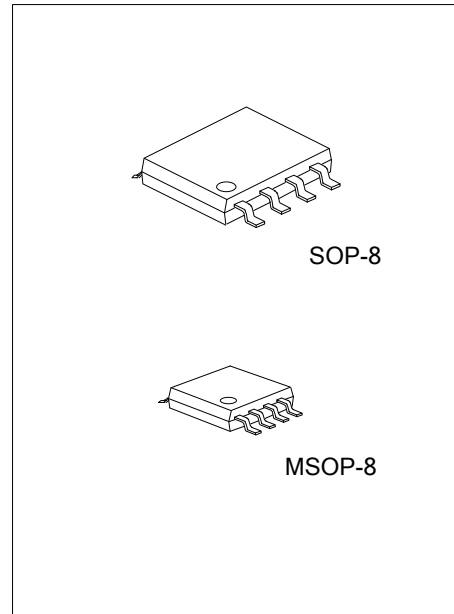
### DUAL 2-INPUT POSITIVE-NAND GATE

#### DESCRIPTION

The **U74LVC2G00** is a dual 2-input NAND gate which performs the function  $Y = \overline{A \cdot B}$  or  $Y = \overline{A} + \overline{B}$ . It is designed for 1.65V to 5.5V operation.

#### FEATURES

- \* Wide Supply Voltage Range from 1.65V to 5.5V
- \* Max  $t_{PD}$  of 4.3 ns at 3.3V
- \* Up to 5.5V Inputs Accept Voltages
- \* Low Power Consumption,  $I_{CC} = 10 \mu A$  (Max.)
- \*  $\pm 24$  mA Output Driver at 3.3V
- \* Typical  $V_{OLP}$  (Output Ground Bounce) < 0.8V,  $V_{CC} = 3.3$  V,  $T_A = 25$  °C
- \* Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot) > 2V,  $V_{CC} = 3.3$  V,  $T_A = 25$  °C

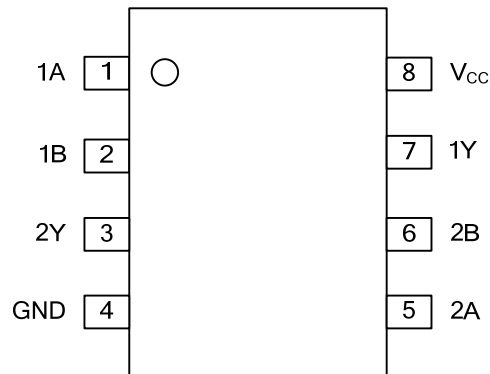


#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC2G00L-S08-R	U74LVC2G00G-S08-R	SOP-8	Tape Reel
U74LVC2G00L-S08-T	U74LVC2G00G-S08-T	SOP-8	Tube
U74LVC2G00L-SM1-R	U74LVC2G00G-SM1-R	MSOP-8	Tape Reel
U74LVC2G00L-SM1-T	U74LVC2G00G-SM1-T	MSOP-8	Tube

<p>U74LVC2G08G-SM1-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Halogen Free</p>	<p>(1) R: Tape Reel</p> <p>(2) SM1: MSOP-8, S08: SOP-8</p> <p>(3) G: Halogen Free</p>
--	---

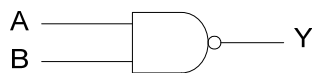
■ PIN CONFIGURATION



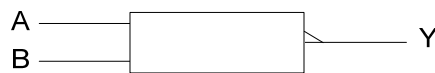
■ FUNCTION TABLE (Each Gate)

INPUTS		OUTPUT
A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

■ LOGIC DIAGRAM (Positive Logic)



Logic symbol



IEC symbol

### ■ 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 (any output in the high-impedance or power-off state)	$V_{OUT}$	-0.5~6.5	V
Output Voltage (any output in the high or low state)	$V_{OUT}$	-0.5~ $V_{CC}+0.5$	V
Input Clamp Current	$I_{IK}$	-50	mA
Output Clamp Current	$I_{OK}$	-50	mA
Output Current	$I_{OUT}$	$\pm 50$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 100$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	$^{\circ}C$

Note: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 2. 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	MSOP-8	220	$^{\circ}C/W$
	SOP-8	150	

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	1.65		5.5	V
		Data retention only	1.5			
High-Level Input Voltage	$V_{IH}$	$V_{CC} = 1.65V$ to $1.95V$	$0.65 * V_{CC}$			V
		$V_{CC} = 2.3V$ to $2.7V$	1.7			
		$V_{CC} = 3V$ to $3.6V$	2			
		$V_{CC} = 4.5V$ to $5.5V$	$0.7 * V_{CC}$			
Low-Level Input Voltage	$V_{IL}$	$V_{CC} = 1.65V$ to $1.95V$			$0.35 * V_{CC}$	V
		$V_{CC} = 2.3V$ to $2.7V$			0.7	
		$V_{CC} = 3V$ to $3.6V$			0.8	
		$V_{CC} = 4.5V$ to $5.5V$			$0.3 * V_{CC}$	
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
High-level Output Current	$I_{OH}$	$V_{CC}=1.65V$			-4	mA
		$V_{CC}=2.3V$			-8	
		$V_{CC}=3V$			-16	
		$V_{CC}=4.5V$			-24	
Low-level Output Current	$I_{OL}$	$V_{CC}=1.65V$			4	mA
		$V_{CC}=2.3V$			8	
		$V_{CC}=3V$			16	
		$V_{CC}=4.5V$			24	
Input Transition Rise or Fall Rate	$t_R / t_F$	$V_{CC}=1.8\pm 0.15V, 2.5\pm 0.2V$			20	ns/V
		$V_{CC}=3.3\pm 0.3V$			10	
		$V_{CC}=5.0\pm 0.5V$			5	
Ambient Operating Temperature	$T_{OPR}$		-40		85	$^{\circ}C$

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> =25°C, V<sub>CC</sub> = 3.3 V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -100 μA V <sub>CC</sub> = 1.65V to 5.5V	V <sub>CC</sub> -0.1			V
		I <sub>OH</sub> = -4 mA V <sub>CC</sub> = 1.65V	1.2			
		I <sub>OH</sub> = -8 mA V <sub>CC</sub> = 2.3V	1.9			
		I <sub>OH</sub> = -16 mA V <sub>CC</sub> = 3V	2.4			
		I <sub>OH</sub> = -24 mA V <sub>CC</sub> = 3V	2.3			
		I <sub>OH</sub> = -32 mA V <sub>CC</sub> = 4.5V	3.8			
Low-Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 100 μA V <sub>CC</sub> = 1.65V to 5.5V			0.1	V
		I <sub>OL</sub> = 4 mA V <sub>CC</sub> = 1.65V			0.45	
		I <sub>OL</sub> = 8 mA V <sub>CC</sub> = 2.3V			0.3	
		I <sub>OL</sub> = 16 mA V <sub>CC</sub> = 3V			0.4	
		I <sub>OL</sub> = 24 mA V <sub>CC</sub> = 3V			0.55	
		I <sub>OL</sub> = 32 mA V <sub>CC</sub> = 4.5V			0.55	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>IN</sub> = 5.5V or GND, V <sub>CC</sub> = 0 to 5.5V			±5	μA
OFF-State Current	I <sub>OFF</sub>	V <sub>IN</sub> or V <sub>O</sub> = 5.5V, V <sub>CC</sub> = 0V			±10	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>IN</sub> = 5.5V or GND, I <sub>OUT</sub> = 0, V <sub>CC</sub> = 1.65V to 5.5V			10	μA
Additional Quiescent Supply Current	Δ I <sub>Q</sub>	One input at V <sub>CC</sub> - 0.6V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> =3V to 5.5V			500	μA
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> =3.3V		5		pF

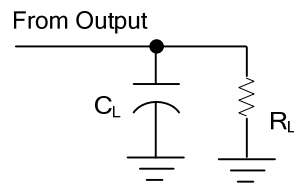
■ SWITCHING CHARACTERISTICS (T<sub>A</sub> =25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output (Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	V <sub>CC</sub> =1.8±0.15V, R <sub>L</sub> =1KΩ	C <sub>L</sub> =30pF	3.7		8.6	ns
		V <sub>CC</sub> =2.5±0.2V, R <sub>L</sub> =500Ω		1.6		4.8	
		V <sub>CC</sub> =3.3±0.3V, R <sub>L</sub> =500Ω	C <sub>L</sub> =50pF	1.1		4.3	
		V <sub>CC</sub> =5±0.5V, R <sub>L</sub> =500Ω		1		3.3	

■ OPERATING CHARACTERISTICS (T<sub>A</sub> =25°C)

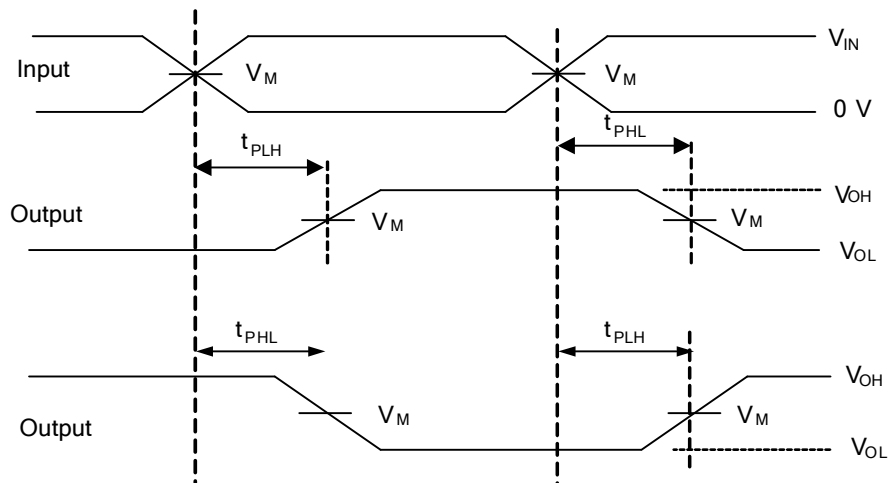
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> = 1.8V	f=10MHz		19	pF
		V <sub>CC</sub> = 2.5V			19	
		V <sub>CC</sub> = 3.3V			20	
		V <sub>CC</sub> = 5V			22	

■ TEST CIRCUIT AND WAVEFORMS



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 $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	500 $\Omega$
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 $\Omega$



PROPAGATION DELAY TIMES

- Notes: 1.  $C_L$  includes probe and jig capacitance.  
 2. All input pulses are supplied by generators having the following characteristics: PRR  $\leq 10MHz$ ,  $Z_O = 50\Omega$ .

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.