



## U74LVC2G02

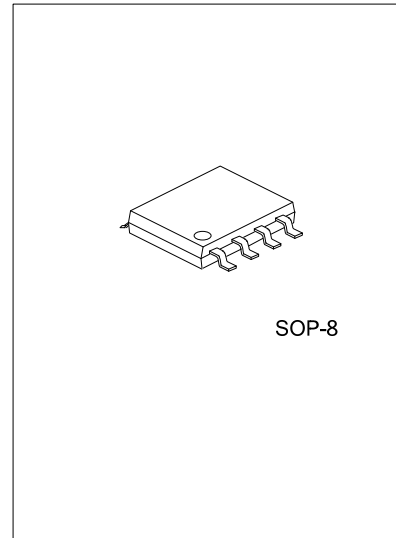
CMOS IC

### DUAL 2-INPUT POSITIVE-NOR GATE

#### DESCRIPTION

The UTC **U74LVC2G02** is a dual 2-input positive-NOR gate which provides the function  $Y=\overline{A+B}$  or  $Y=\overline{A}\overline{B}$ .

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



#### FEATURES

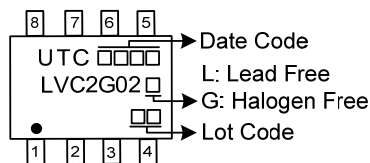
- \* Operation Voltage Range: 1.65~5.5V
- \* Low Power Dissipation:  $I_{CC}=10\mu A(\text{Max})$
- \* High Speed:  $t_{pd}=4.9ns(V_{CC}=3.3V)$
- \* Specified from -40 to +85°C

#### ORDERING INFORMATION

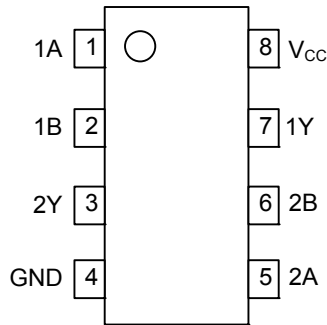
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC2G02L-S08-R	U74LVC2G02G-S08-R	SOP-8	Tape Reel

<p>U74LVC2G02G-S08-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



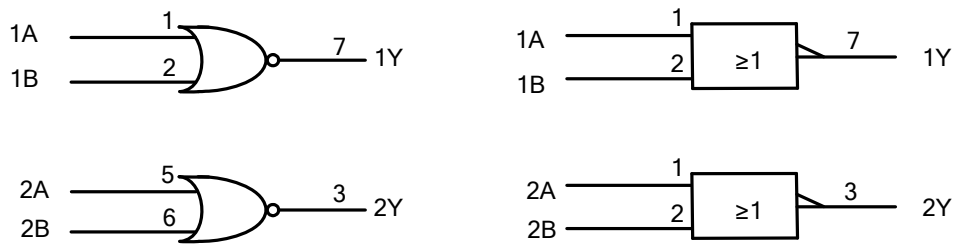
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

■ LOGIC DIAGRAM (positive logic)



IEC logic symbol

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■ ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~6.5	V
Input Voltage	$V_{IN}$	-0.5~6.5	V
Output Voltage	$V_{OUT}$	-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	$^\circ\text{C}$

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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		1.65	3.3	5.5	V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
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	
		$V_{CC}=5V\pm 0.5V$			5	
Operating Temperature	$T_A$		-40	25	85	$^\circ\text{C}$

■ STATIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=1.65V$ to $1.95V$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3V$ to $2.7V$	1.7			
		$V_{CC}=3V$ to $3.6V$	2			
		$V_{CC}=4.5V$ to $5.5V$	$0.7 \times V_{CC}$			
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=1.65V$ to $1.95V$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3V$ to $2.7V$			0.7	
		$V_{CC}=3V$ to $3.6V$			0.8	
		$V_{CC}=4.5V$ to $5.5V$			$0.3 \times V_{CC}$	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=1.65$ to $5.5V, I_{OH}=-100\mu A$	$V_{CC}-0.1$			V
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.2			
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			
		$V_{CC}=3V, I_{OH}=-16mA$	2.4			
		$V_{CC}=3V, I_{OH}=-24mA$	2.3			
		$V_{CC}=4.5V, I_{OH}=-32mA$	3.8			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65$ to $5.5V, I_{OL}=100\mu A$			0.1	V
		$V_{CC}=1.65V, I_{OL}=4mA$			0.45	
		$V_{CC}=2.3V, I_{OL}=8mA$			0.3	
		$V_{CC}=3V, I_{OL}=16mA$			0.4	
		$V_{CC}=3V, I_{OL}=24mA$			0.55	
		$V_{CC}=4.5V, I_{OL}=32mA$			0.55	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0$ to $5.5V, V_{IN}=5.5V$ or GND			$\pm 5$	$\mu A$
Power off Current	$I_{off}$	$V_{CC}=0V, V_{IN}$ or $V_o=5.5V$			$\pm 10$	$\mu A$

### ■ STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Supply Current		$V_{CC}=1.65$ to $5.5V$ , $V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			10	$\mu A$
Additional Quiescent Supply Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=3$ to $5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND			500	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=3.3V$ , $V_{IN}=V_{CC}$ or GND		5		pF

### ■ DYNAMIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A or B) to Output(Y)	$t_{PHL} / t_{PLH}$	$V_{CC} = 1.8V \pm 0.15V$ , $C_L = 30$ pF, $R_L = 1K\Omega$	3.2		8.9	ns
		$V_{CC} = 2.5V \pm 0.2V$ , $C_L = 30$ pF, $R_L = 500\Omega$	1		5.4	
		$V_{CC} = 3.3V \pm 0.3V$ , $C_L = 50$ pF, $R_L = 500\Omega$	1		4.9	
		$V_{CC} = 5V \pm 0.5V$ , $C_L = 50$ pF, $R_L = 500\Omega$	1		4.4	

Note: See Fig. 1 and Fig. 2 for test circuit and waveforms.

### ■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Cpd Power Dissipation Capacitance	$C_{PD}$	$V_{CC}=3.3V$ , $f=10MHz$		19		pF

■ TEST CIRCUIT AND WAVEFORMS(Cont.)

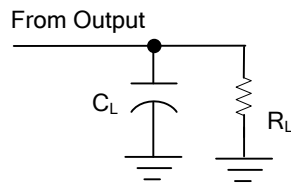


Fig.1 TEST CIRCUIT

V <sub>CC</sub>	Inputs		V <sub>M</sub>	C <sub>L</sub>	R <sub>L</sub>
	V <sub>IN</sub>	t <sub>r</sub> , t <sub>f</sub>			
1.8V±0.15V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	1KΩ
2.5V±0.2V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V <sub>CC</sub>	≤2.5ns	V <sub>CC</sub> /2	50pF	500Ω

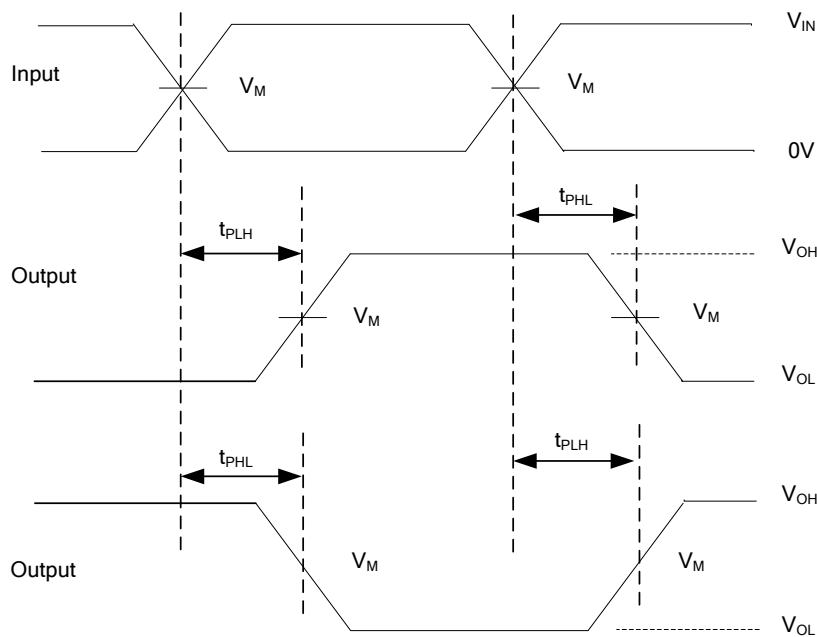


Fig.2 PROPAGATION DELAY TIMES

Note: C<sub>L</sub> includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Zo = 50Ω.

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