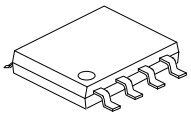
U74LVC2G02

CMOS IC

DUAL 2-INPUT POSITIVE-NOR GATE



SOP-8

■ 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

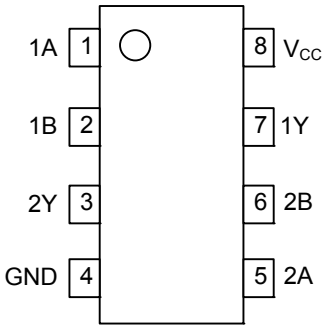
* Operation Voltage Range: 1.65~5.5V
* Low Power Dissipation: I_{CC}=10μA(Max)
* High Speed: tpd=4.9ns(V_{CC}=3.3V)
* Specified from -40 to +85°C

■ ORDERING INFORMATION

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

U74LVC2G02G-S08-R (1)Packing Type (2)Package Type (3)Lead Plating	(1) R: Tape Reel, T: Tube (2) S08: SOP-8 (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn

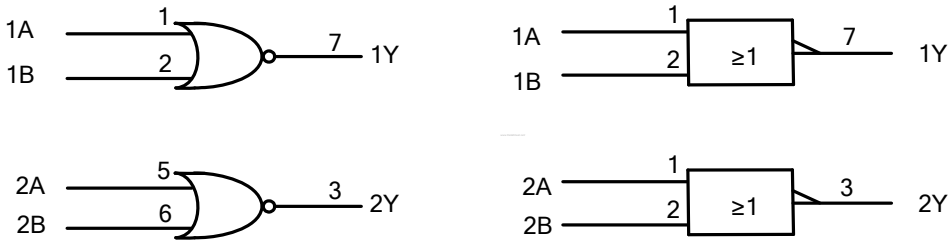
■ PIN CONFIGURATION



■ 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

■ ABSOLUTE MAXIMUM RATINGS (T_A =25°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}	±50	mA
V_{CC} or GND Current	I_{CC}	±100	mA
Storage Temperature	T_{STG}	-65 ~ +150	℃

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±0.15V,2.5V±0.2V			20	ns/V
		V_{CC}=3.3V±0.3V			10	
		V_{CC}=5V±0.5V			5	
Operating Temperature	T_A		-40	25	85	°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*Vcc			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*Vcc			
Low-Level Input Voltage	V_{IL}	V_{CC}=1.65V to 1.95V			0.35*Vcc	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*Vcc	
High-Level Output Voltage	V_{OH}	V_{CC}=1.65 to 5.5V, I_{OH}=-100μA	Vcc-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}=100μA			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			±5	μA
Power off Current	I_{off}	V_{CC}=0V, V_{IN} or Vo=5.5V			±10	μA

■ 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	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	V_{CC}=3 to 5.5V, One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND			500	uA
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±0.15V, C_L =30 pF, R_L=1KΩ	3.2		8.9	ns
		V_{CC}=2.5V±0.2V, C_L =30 pF, R_L=500Ω	1		5.4	
		V_{CC}=3.3V±0.3V, C_L =50 pF, R_L=500Ω	1		4.9	
		V_{CC}=5V±0.5V, C_L =50 pF, R_L=500Ω	1		4.4	

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

■ OPERATING CHARACTERISTICS

PARAMETER		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.)

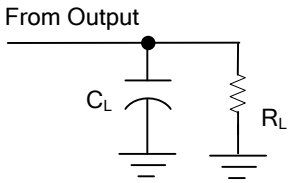


Fig.1 TEST CIRCUIT

V_{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

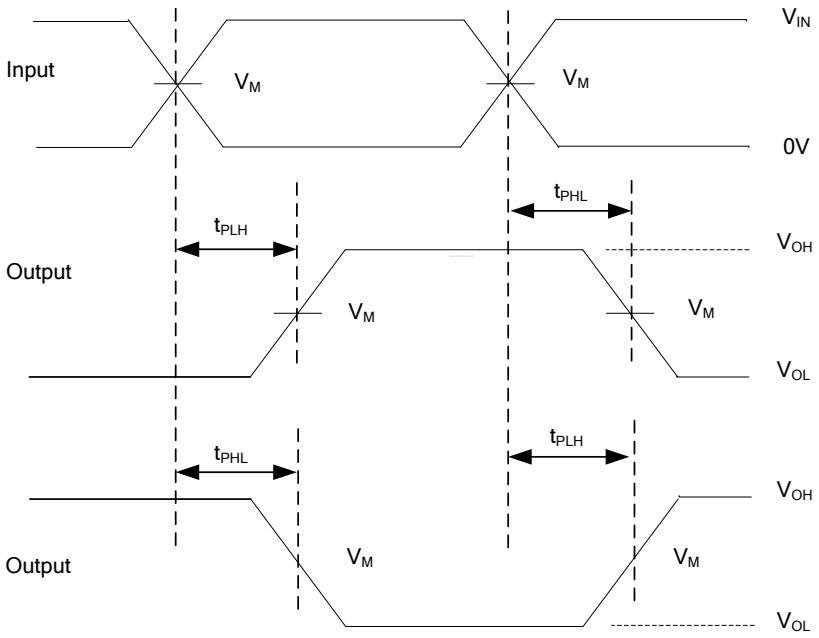


Fig.2 PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.
All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Zo = 50Ω.