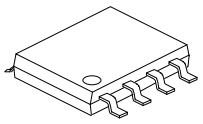
U74LVC2G132

CMOS IC

DUAL 2-INPUT NAND GATE WITH SCHMITT-TRIGGER INPUTS



SOP-8

■ DESCRIPTION

The **U74LVC2G132** is a dual 2-input NAND gate with Schmitt-trigger inputs circuit and it contains two inverters that perform the function $Y=\overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$

The device have different input threshold levels for positive-going (V_{T+}) and negative-going(V_{T-}) signals because of the Schmitt-trigger action in the input.

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

■ FEATURES

* Operate from 1.65V to 5.5V
* Inputs accept voltages to 5.5V
* I_{off} supports partial-power-down mode
* Low power dissipation: I_{CC}=10μA (Max)
* Max t_{PD} of 5.3 ns at 3.3V
* ±24mA output drive(V_{CC}=3.3V)

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free Plating	Halogen Free		
U74LVC2G132L-S08-R	U74LVC2G132G-S08-R	SOP-8	Tape Reel
U74LVC2G132L-S08-T	U74LVC2G132G-S08-T	SOP-8	Tube

U74LVC2G132G-S08-R

(1)Packing Type

(2)Package Type

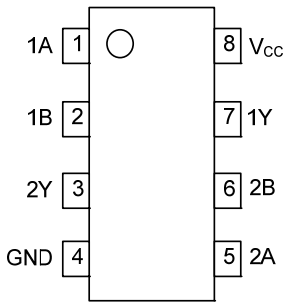
(3)Lead Plating

(1) R: Tape Reel, T: Tube

(2) S08: SOP-8

(3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn

■ PIN CONFIGURATION

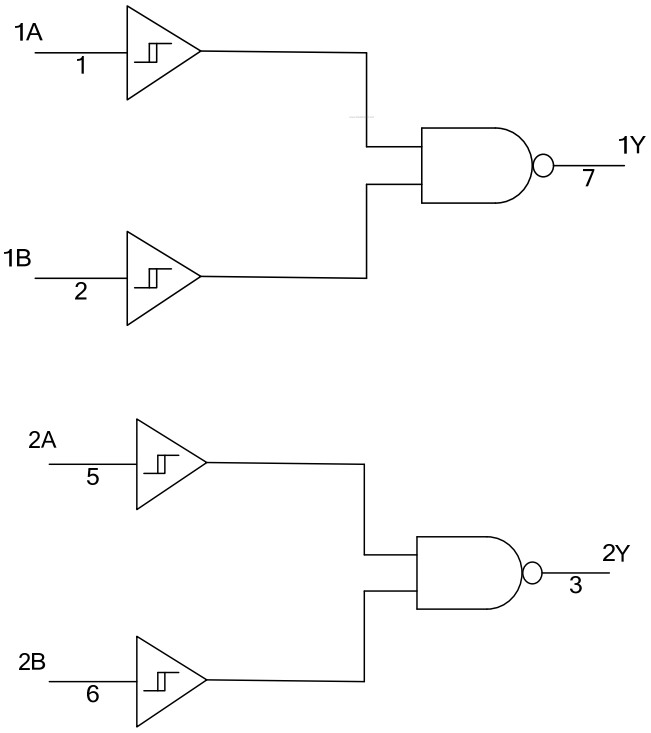


■ FUNCTION TABLE (EACH GATE)

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

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

■ LOGIC DIAGRAM (positive logic)



IEC logic 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	Output in the high or low state	V_{OUT}	-0.5 ~ V_{CC}+0.5	V
	Output in the high-impedance or power-off state		-0.5 ~ +6.5	V
V_{CC} or GND Current		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.

■ 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	Δt/Δv	V_{CC}=1.8V±0.15V, 2.5V±0.2V			20	ns/V
		V_{CC}=3.3V±0.3V, V_{CC}=5V±0.5V			10	ns/V

■ ELECTRICAL CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-Going Input Threshold Voltage	V_{T+}	V_{CC} =1.65V	0.79		1.16	V
		V_{CC} =2.3V	1.11		1.56	
		V_{CC} =3.0V	1.5		1.87	
		V_{CC} =4.5V	2.16		2.74	
		V_{CC} =5.5V	2.61		3.33	
Negative-Going Input Threshold Voltage	V_{T-}	V_{CC} =1.65V	0.39		0.62	V
		V_{CC} =2.3V	0.58		0.87	
		V_{CC} =3.0V	0.84		1.14	
		V_{CC} =4.5V	1.41		1.79	
		V_{CC} =5.5V	1.87		2.29	
Hysteresis Voltage (V_{T+}-V_{T-})	$\triangle V_T$	V_{CC} =1.65V	0.37		0.62	
		V_{CC} =2.3V	0.48		0.77	
		V_{CC} =3.0V	0.56		0.87	
		V_{CC} =4.5V	0.71		1.04	
		V_{CC} =5.5V	0.71		1.11	

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	V_{CC} =1.65V ~ 5.5V, I_{OH}=-100μA	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} =3.0V, I_{OH}=-16mA	2.4			
		V_{CC} =3.0V, I_{OH}=-24mA	2.3			
		V_{CC} =4.5V, I_{OH}=-32mA	3.8			
Low-Level Output Voltage	V_{OL}	V_{CC} =1.65V ~ 5.5V, I_{OH}=100μA			0.1	V
		V_{CC} =1.65V, I_{OH}=4mA			0.45	
		V_{CC} =2.3V, I_{OH}=8mA			0.3	
		V_{CC} =3.0V, I_{OH}=16mA			0.4	
		V_{CC} =3.0V, I_{OH}=24mA			0.55	
		V_{CC} =4.5V, I_{OH}=32mA			0.55	
Input Leakage Current (A or B port)	$I_{I(LEAK)}$	V_{CC} =1.65V ~ 5.5V, V_{IN}=V_{CC} or GND			±1	μA
Power OFF Leakage Current	I_{OFF}	V_{CC} =0V, V_{IN} or V_{OUT}=5.5V			±10	μA
Quiescent Supply Current	I_Q	V_{CC} =1.65V ~ 5.5V, V_{IN}=5.5V or GND, I_{OUT}=0			10	μA
Additional Quiescent Supply Current	ΔI_Q	V_{CC} =3V ~ 5.5V, One input at V_{CC}-0.6V, other inputs at V_{CC} or GND			500	μA
Input Capacitance	C_{IN}	V_{CC} =3.3V, V_{IN}=V_{CC} or GND		3.5		pF

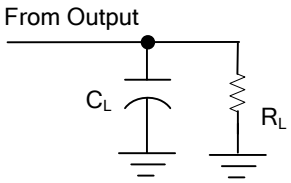
■ SWITCHING CHARACTERISTICS (T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t_{PLH}/t_{PHL}	V_{CC}=1.8V±0.15V, C_L=15pF	4		16	ns
		V_{CC}=1.8V±0.15V, C_L=30pF	4		16	ns
		V_{CC}=2.5V±0.2V, C_L=15pF	2.5		7	ns
		V_{CC}=2.5V±0.2V, C_L=30pF	3		7.5	ns
		V_{CC}=3.3V±0.3V, C_L=15pF	2		5.3	ns
		V_{CC}=3.3V±0.3V, C_L= 50pF	2		6	ns
		V_{CC}=5V±0.5V, C_L=15pF	1.5		4.4	ns
		V_{CC}=5V±0.5V, C_L= 50pF	2		5	ns

■ OPERATING CHARACTERISTICS (T_A=25°C)

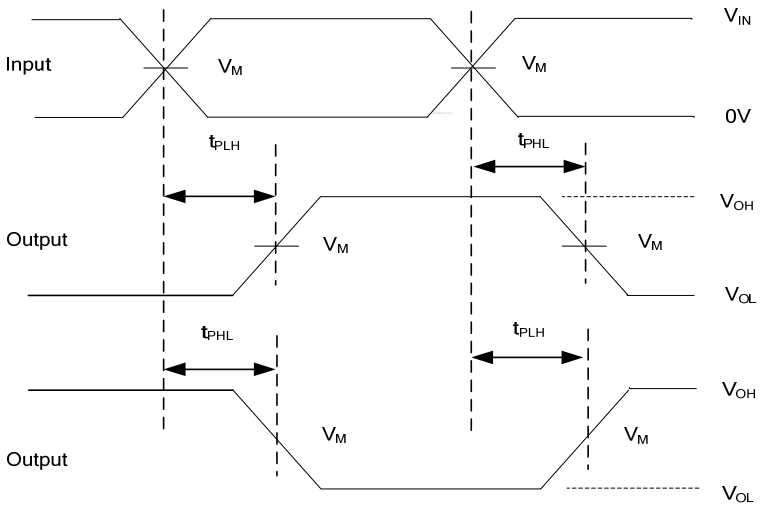
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=3.3V, f=10MH$_Z$		18		pF

■ 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/30pF	1MΩ/1KΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	15pF/30pF	1MΩ/500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF/50pF	1MΩ/500Ω
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	15pF/50pF	1MΩ/500Ω



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.