



U74LVC1G10

CMOS IC

SINGLE 3-INPUT POSITIVE-NAND GATE

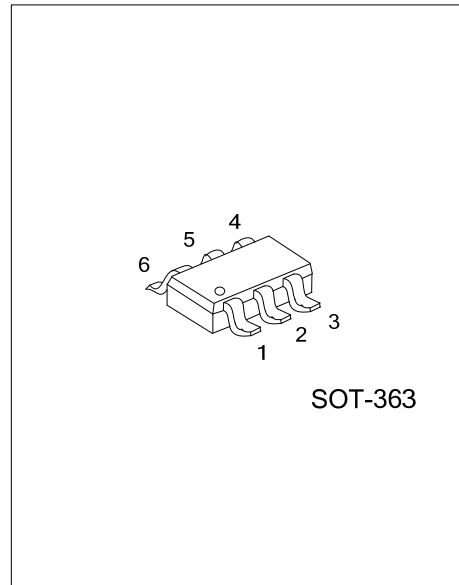
DESCRIPTION

The **U74LVC1G10** performs the Boolean function $Y = \overline{A \cdot B \cdot C}$ or $Y = \overline{A} + \overline{B} + \overline{C}$ in positive logic.

The device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

FEATURES

- * Supports 5-V V_{CC} Operation
- * Inputs Accept Voltages to 5.5V
- * Max t_{pd} of 3.8ns at 3.3V
- * Low power consumption, I_{CC}=10μA (Max)
- * I_{off} supports Partial-Power-Down Mode
- * ±24mA output drive at 3.3V

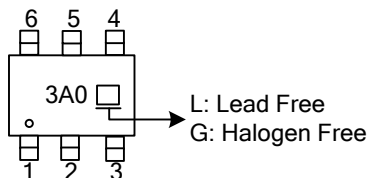


ORDERING INFORMATION

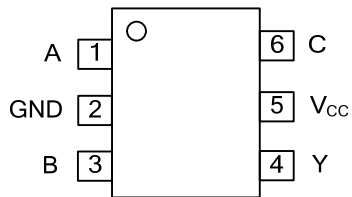
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G10L-AL6-R	U74LVC1G10G-AL6-R	SOT-363	Tape Reel

<p>U74LVC1G10L-AL6-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) R: Tape Reel</p> <p>(2) AL6: SOT-363</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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MARKING



■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUTS			OUTPUT Y
A	B	C	
H	H	H	L
L	X	X	H
X	L	X	H
X	X	L	H

Note: H: HIGH voltage level; L: LOW voltage level; X: Don't care.

■ LOGIC DIAGRAM (positive logic)



■ 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
Operating Temperature		T_A	-40 ~ +85	°C
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	θ_{JA}	350	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
High-level input voltage	V_{IH}	$V_{CC}=1.65V$ to $1.95V$	$0.65V_{CC}$			V
		$V_{CC}=2.3V$ to $2.7V$	1.7			
		$V_{CC}=3V$ to $3.6V$	2			
		$V_{CC}=4.5V$ to $5.5V$	$0.7V_{CC}$			
Low-level input voltage	V_{IL}	$V_{CC}=1.65V$ to $1.95V$			$0.35V_{CC}$	V
		$V_{CC}=2.3V$ to $2.7V$			0.7	
		$V_{CC}=3V$ to $3.6V$			0.8	
		$V_{CC}=4.5V$ to $5.5V$			$0.3V_{CC}$	
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=1.8V\pm 0.15V$, $2.5V\pm 0.2V$			20	ns/V
		$V_{CC}=3.3V\pm 0.3V$			10	
		$V_{CC}=5V\pm 0.5V$			10	

Note: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V _{OH}	I _{OH} =-100μA, V _{CC} =1.65 ~ 5.5V	V _{CC} -0.1			V
		I _{OH} =-4mA, V _{CC} =1.65V	1.2			V
		I _{OH} =-8mA, V _{CC} =2.3V	1.9			V
		I _{OH} =-16mA, V _{CC} =3.0V	2.4			V
		I _{OH} =-24mA, V _{CC} =3.0V	2.3			V
		I _{OH} =-32mA, V _{CC} =4.5V	3.8			V
Low-Level Output Voltage	V _{OL}	I _{OL} =100μA, V _{CC} =1.65 ~ 5.5V			0.1	V
		I _{OL} =4mA, V _{CC} =1.65V			0.45	V
		I _{OL} =8mA, V _{CC} =2.3V			0.30	V
		I _{OL} =16mA, V _{CC} =3.0V			0.40	V
		I _{OL} =24mA, V _{CC} =3.0V			0.55	V
		I _{OL} =32mA, V _{CC} =4.5V			0.55	V
Input Leakage Current	I _{I(LEAK)}	V _{IN} =5.5V or GND, V _{CC} =0 ~ 5.5V			±5	μA
Power OFF Leakage Current	I _{off}	V _{IN} or V _{OUT} =5.5V, V _{CC} =0V			±10	μA
Quiescent Supply Current	I _{CC}	V _{IN} =5.5V or GND, I _{OUT} =0 V _{CC} =1.65 ~ 5.5V			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI _{CC}	V _{CC} =3 V~ 5.5V, One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND			500	μA
Input Capacitance	C _I	V _{CC} =3.3V, V _{IN} =V _{CC} or GND		3.5		pF

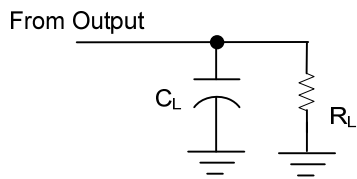
■ SWITCHING CHARACTERISTICS (T_A=25°C)(see Figure 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A,B or C) to output(Y)	t _{PLH} /t _{PHL}	V _{CC} =1.8V±0.15V	C _L =15pF	2		14.8	ns
			C _L =30pF	2.5		18	
		V _{CC} =2.5V±0.2V	C _L =15pF	1.3		5.5	ns
			C _L =30pF	1.6		6.5	
		V _{CC} =3.3V±0.3V	C _L =15pF	0.8		3.8	ns
			C _L =50pF	1.4		5	
		V _{CC} =5V±0.5V, C _L =50pF	C _L =15pF	0.6		2.7	ns
			C _L =50pF	1		3.6	

■ OPERATING CHARACTERISTICS (T_A=25°C)

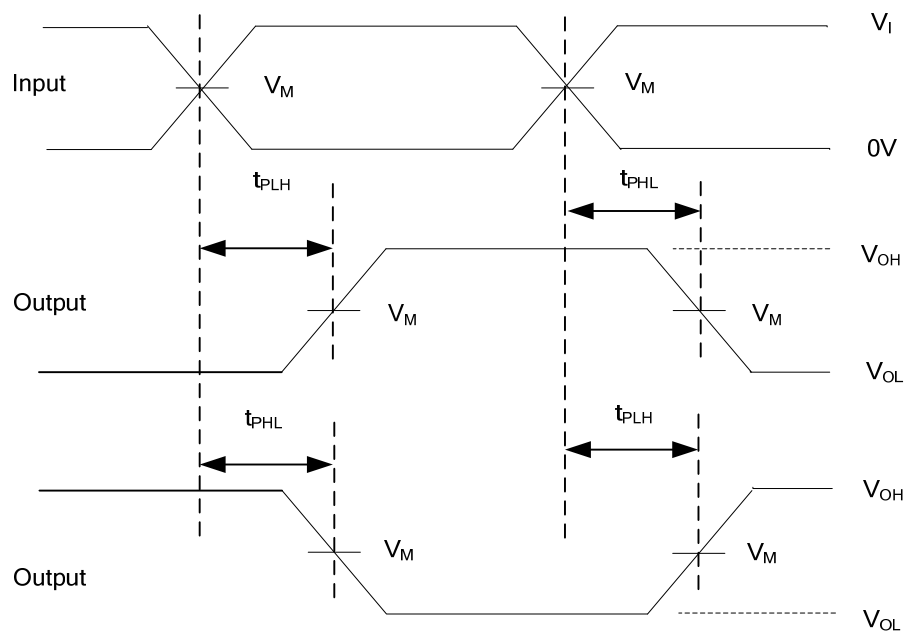
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	f=10MHZ	V _{CC} =1.8V		17	pF
			V _{CC} =2.5V		18	pF
			V _{CC} =3.3V		19	pF
			V _{CC} =5.0V		22	pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	INPUTS		V_M	C_L	R_L
	V_I	t_r / t_f			
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
				30pF	1KΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
				30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
				50pF	500Ω
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	15pF	1MΩ
				50pF	500Ω



PROPAGATION DELAY TIMES

Figure 1. Test Circuit and Voltage Waveforms

Note: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, $Z_o=50\Omega$.

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