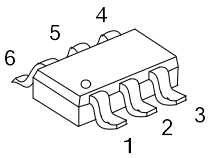
U74LVC1G27

Preliminary | ***CMOS IC***

SINGLE 3-INPUT POSITIVE-NOR GATE



SOT-363

■ DESCRIPTION

The **U74LVC1G27** device performs the Boolean function $Y=\overline{A+B+C}$ or $Y=\overline{A}\cdot\overline{B}\cdot\overline{C}$ in positive logic.

This 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

* Wide supply voltage range from 1.65V to 5.5V
* Inputs accept voltages up to 5.5V
* I_{OFF} supports live insertion, partial-power-down mode, back-drive protection
* Supports Down Translation to V_{CC}
* Low static power consumption; I_{CC}=±10μA (Max.)
* ±24mA Output Drive at 3.3V

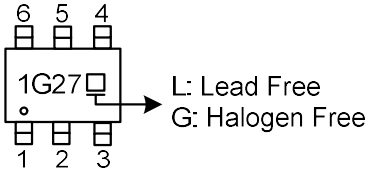
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G27L-AL6-R	U74LVC1G27G-AL6-R	SOT-363	Tape Reel

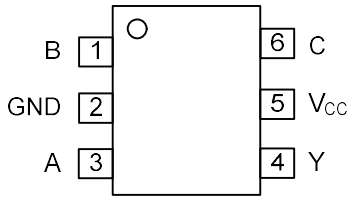
U74LVC1G27G-AL6-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AL6: SOT-363
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION

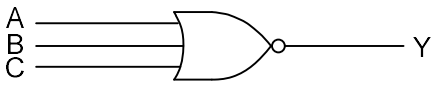


■ FUNCTION TABLE

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

Note: H: HIGH voltage level, L: LOW voltage level, X = Valid H or L

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ V_{CC} +0.5	V
		Output in the power-off state	-0.5 ~ +6.5	V
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}		±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0V	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0V	-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 (T_A=25°C, unless otherwise specified)

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}		0		V_{CC}	V
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			10	ns/V
		V_{CC}=5V±0.5V			10	ns/V
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-level Input Voltage	V_{IH}	V_{CC}=1.8±0.15V	0.65× V_{CC}			0.65× V_{CC}			V
		V_{CC}=2.5±0.2V	1.7			1.7			V
		V_{CC}=3.3±0.3V	2			2			V
		V_{CC}=5±0.5V	0.7× V_{CC}			0.7× V_{CC}			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.8±0.15V			0.35× V_{CC}			0.35× V_{CC}	V
		V_{CC}=2.5±0.2V			0.7			0.7	V
		V_{CC}=3.3±0.3V			0.8			0.8	V
		V_{CC}=5±0.5V			0.3× V_{CC}			0.3× V_{CC}	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65 ~ 5.5V, I_{OH}=-100μA	V_{CC}- 0.1			V_{CC}- 0.1			V
		V_{CC}=1.65V, I_{OH}=-4mA	1.2			0.95			V
		V_{CC}=2.3V, I_{OH}=-8mA	1.9			1.7			V
		V_{CC}=3.0V, I_{OH}=-16mA	2.4			2.2			V
		V_{CC}=3.0V, I_{OH}=-24mA	2.3			2.0			V
		V_{CC}=4.5V, I_{OH}=-32mA	3.8			3.4			V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65 ~ 5.5V, I_{OL}=100μA			0.1			0.1	V
		V_{CC}=1.65V, I_{OL}=4mA			0.45			0.7	V
		V_{CC}=2.3V, I_{OL}=8mA			0.3			0.45	V
		V_{CC}=3.0V, I_{OH}=16mA			0.4			0.6	V
		V_{CC}=3.0V, I_{OH}=24mA			0.55			0.8	V
		V_{CC}=4.5V, I_{OL}=32mA			0.55			0.8	V
Input Leakage Current (All Input)	$I_{I(LEAK)}$	V_{CC}=0V ~ 5.5V V_{IN}=5.5V or GND			±5			±5	μA
Power Off Leakage Current	I_{OFF}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V			±10			±10	μA
Quiescent Supply Current	I_{CC}	V_{CC}=1.65 ~ 5.5V, V_{IN}=5.5V or GND, I_{OUT}=0			10			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	V_{CC}=3 ~ 5.5V, One input at V_{CC}-0.6V, other inputs at V_{CC} or GND			500			500	μA

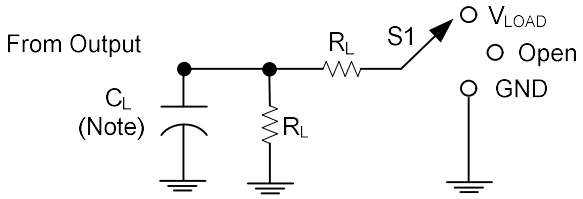
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40°C~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A, B or C) to output (Y)	t_{PD}	V_{CC}=1.8V±0.15V	C_L=15pF	2		18.2	1		20	ns
		V_{CC}=2.5V±0.2V		1.2		8	1		9.5	ns
		V_{CC}=3.3V±0.3V		1		6	1		7.5	ns
		V_{CC}=5V±0.5V		0.8		4.5	0.5		5.5	ns
		V_{CC}=1.8V±0.15V	C_L=30pF or 50pF	2.2		20.5	1		23.3	ns
		V_{CC}=2.5V±0.2V		1.4		9.5	1		11	ns
		V_{CC}=3.3V±0.3V		1.3		7.5	1		9	ns
		V_{CC}=5V±0.5V		1		5.5	1		6.5	ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}	V_{CC}=3.3V, V_{IN}=V_{CC} or GND		3.5		pF
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V, f=10MHz		17		pF
		V_{CC}=2.5V, f=10MHz		18		pF
		V_{CC}=3.3V, f=10MHz		19		pF
		V_{CC}=5V, f=10MHz		22		pF

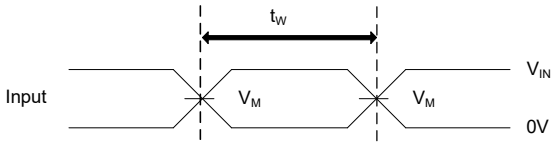
■ TEST CIRCUIT AND WAVEFORMS



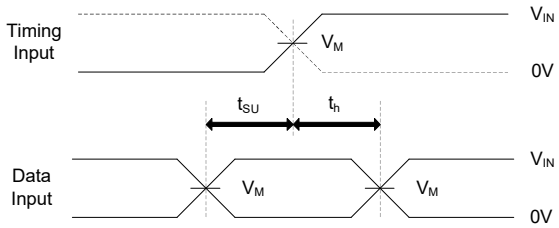
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Note: C_L includes probe and jig capacitance.

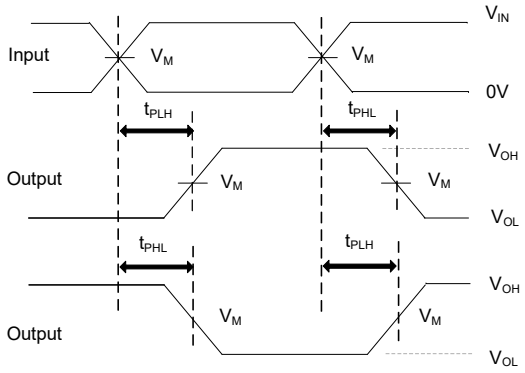
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_{IN}	t_R / t_F					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	1MΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	1MΩ	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	15pF	1MΩ	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	1MΩ	0.3V



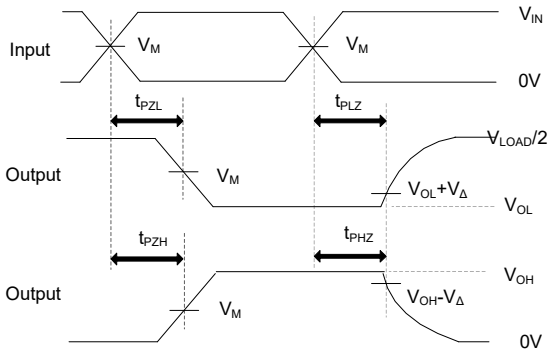
PULSE WIDTH



SETUP TIME AND HOLD TIME



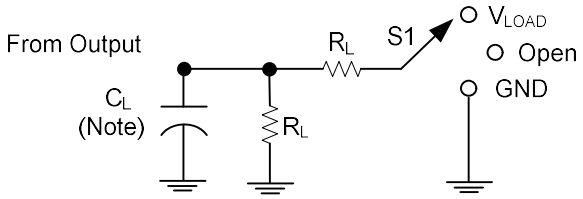
PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

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

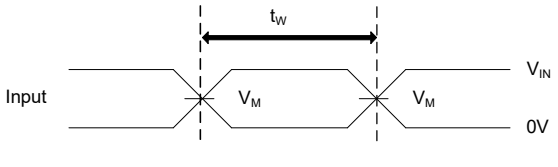
■ TEST CIRCUIT AND WAVEFORMS (Cont.)



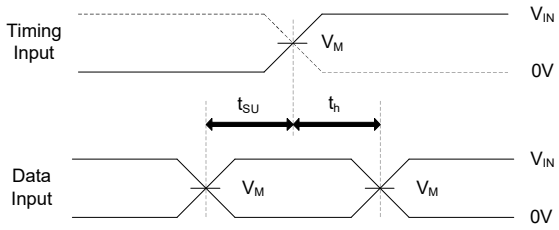
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Note: C_L includes probe and jig capacitance.

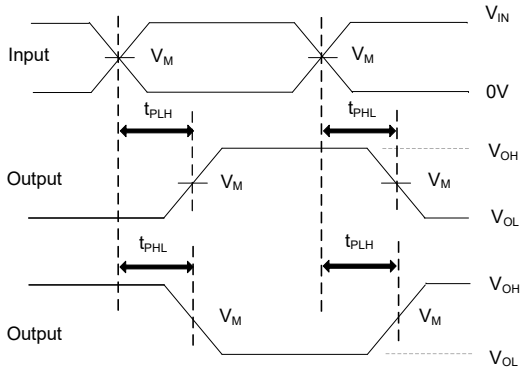
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_{IN}	t_R / t_F					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	30pF	1KΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	30pF	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	$2\times V_{CC}$	50pF	500Ω	0.3V



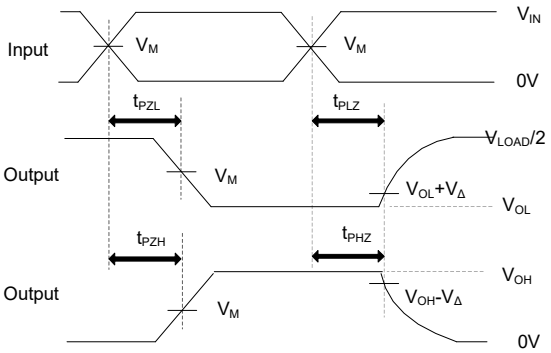
PULSE WIDTH



SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

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