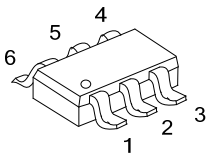
U74LVC1G57

CMOS IC

MULTIPLE-FUNCTION GATE



SOT-363

■ DESCRIPTION

The **U74LVC1G57** provides configurable multiple functions. The output state is determined by eight patterns of 3-bit input. The user can choose the logic functions AND, OR, NAND, NOR, XNOR, inverter,and buffer,All inputs can be connected to V_{CC} or GND.

This device functions as an independent gate, but because of Schmitt action, it may have different input threshold levels for positive-going (V_{T+}) and negative-going(V_{T-}) signals.

■ FEATURES

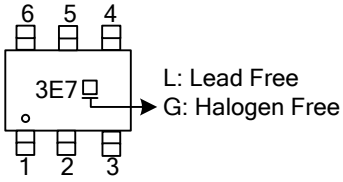
* Wide supply voltage range from 1.65V to 5.5V
* Inputs accept voltages up to 5.5V
* I_{OFF} supports partial-power-down mode
* Low static power consumption; I_{CC}=10μA (Max.)

■ ORDERING INFORMATION

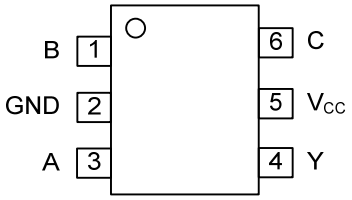
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G57L-AL6-R	U74LVC1G57G-AL6-R	SOT-363	Tape Reel

U74LVC1G57G-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



■ PIN DESCRIPTION

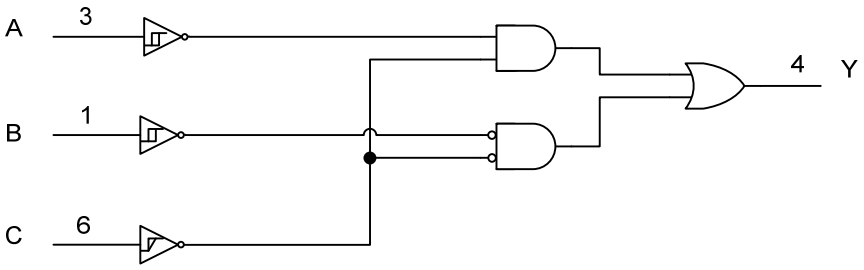
PIN NO.	PIN NAME	I/O	DESCRIPTION
1	B	I	Logic Input 1
2	GND	-	Ground
3	A	I	Logic Input 0
4	Y	O	Logic output
5	V_{CC}	-	Power
6	C	I	Logic Input 2

■ FUNCTION TABLE

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

Note: H: High voltage level; L: Low voltage level.

■ LOGIC DIAGRAM (positive logic)



■ FUNCTION SELECTION TABLE

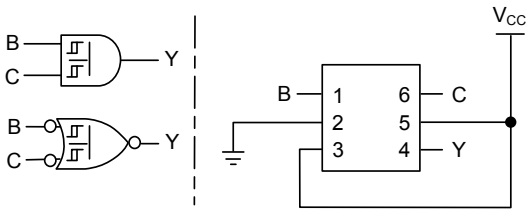


Figure 1. 2-Input AND Gate or 2-Input NOR Gate With Both Inputs Inverted

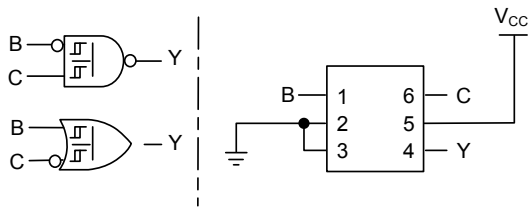


Figure 2. 2-Input NAND Gate With Inverted B Input or 2-Input OR Gate With Inverted C Input

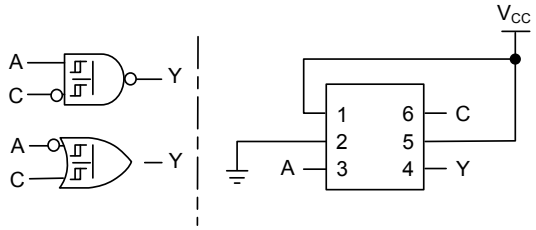


Figure 3. 2-Input NAND Gate With Inverted C Input or 2-Input OR Gate With Inverted A Input

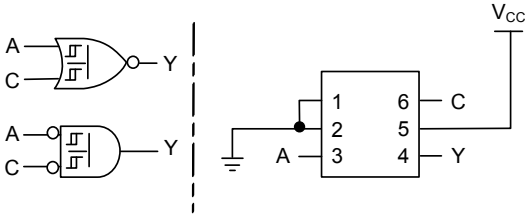


Figure 4. 2-Input NOR Gate or 2-Input AND Gate With Both Inputs Inverted

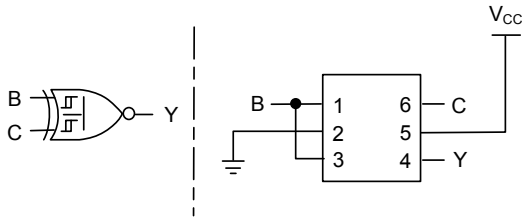


Figure 5. 2-Input XNOR Gate

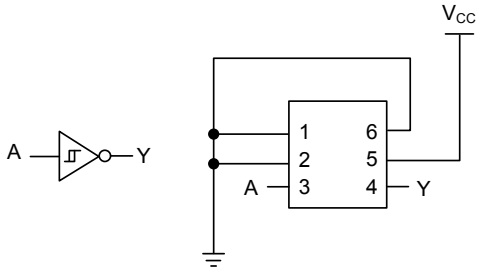


Figure 6. Inverter

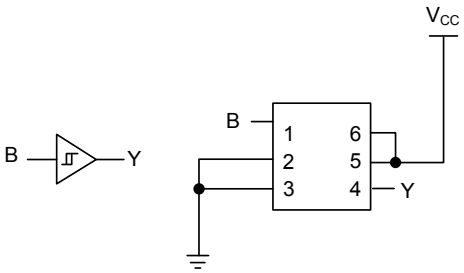


Figure 7. Buffer

■ ABSOLUTE MAXIMUM RATING

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 Power-off state	-0.5 ~ +6.5	V
		Output in the High or Low state	-0.5 ~ V_{CC}+0.5	V
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}	V_{OUT}=0V ~ V_{CC}	±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0V	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}>V_{CC} or 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

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
Operating Temperature	T_A		-40		85	°C

■ 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
		V_{CC}=3V		1.5		1.87	V
		V_{CC}=4.5V		2.16		2.74	V
		V_{CC}=5.5V		2.61		3.33	V
Negative-Going Input Threshold Voltage	V_{T-}	V_{CC}=1.65V		0.35		0.62	V
		V_{CC}=2.3V		0.58		0.87	V
		V_{CC}=3V		0.84		1.19	V
		V_{CC}=4.5V		1.41		1.9	V
		V_{CC}=5.5V		1.87		2.29	V
Hysteresis Voltage (V_{T+}-V_{T-})	$\triangle V_T$	V_{CC}=1.65V		0.3		0.62	V
		V_{CC}=2.3V		0.4		0.8	V
		V_{CC}=3V		0.53		0.87	V
		V_{CC}=4.5V		0.71		1.04	V
		V_{CC}=5.5V		0.71		1.11	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65 ~ 5.5V, I_{OH}=-100μA		V_{CC}-0.1			V
		V_{CC}=1.65V, I_{OH}=-4mA		1.2			V
		V_{CC}=2.3V, I_{OH}=-8mA		1.9			V
		V_{CC}=3.0V	I_{OH}=-16mA	2.4			V
			I_{OH}=-24mA	2.3			V
		V_{CC}=4.5V, I_{OH}=-32mA		3.8			V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65 ~ 5.5V, I_{OL}=100μA				0.1	V
		V_{CC}=1.65V, I_{OL}=4mA				0.45	V
		V_{CC}=2.3V, I_{OL}=8mA				0.3	V
		V_{CC}=3.0V	I_{OL}=16mA			0.4	V
			I_{OL}=24mA			0.55	V
		V_{CC}=4.5V, I_{OL}=32mA				0.55	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 5.5V, V_{IN}=5.5V 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_{CC}	V_{CC}=1.65 ~ 5.5V, V_{IN}=5.5V or GND, I_{OUT}=0A			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	μA
Input Capacitance	C_I	V_{CC}=3.3V, V_{IN}=V_{CC} or GND		3.5		pF

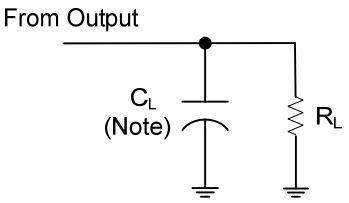
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output(Y)	t_{PD}	V_{CC}=1.8±0.15V,C_L=30pF, R_L=1kΩ	3.2		14.4	ns
		V_{CC}=2.5±0.2V,C_L=30pF, R_L=500Ω	2		8.3	ns
		V_{CC}=3.3±0.3V,C_L=50pF, R_L=500Ω	1.5		6.3	ns
		V_{CC}=5±0.5V,C_L=50pF, R_L=500Ω	1.1		5.1	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V		20		pF
		V_{CC}=2.5V		20		pF
		V_{CC}=3.3V		21		pF
		V_{CC}=5V		22		pF

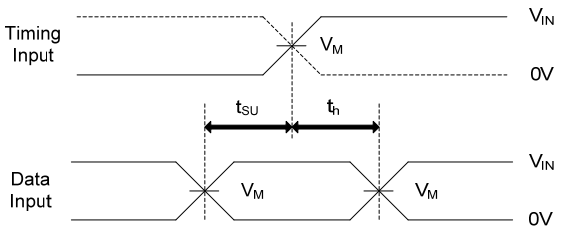
■ TEST CIRCUIT AND WAVEFORMS



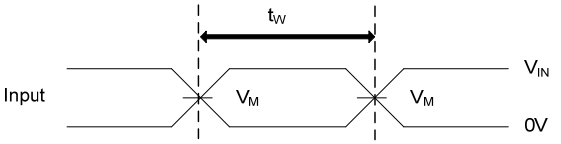
TEST CIRCUIT

Note: C_L includes probe and jig capacitance.

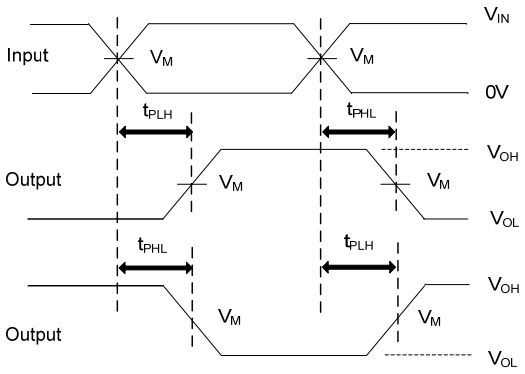
V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	1KΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	50pF	500Ω



SETUP TIME AND HOLD TIME



PULSE WIDTH



PROPAGATION DELAY 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.