

**U74LVC1G99****CMOS IC****ULTRA-CONFIGURABLE
MULTIPLE- FUNCTION GATE
WITH 3-STATE OUTPUT****■ DESCRIPTION**

The **U74LVC1G99** is a configurable multiple functions with 3-state output device, and when output-enable (OE) input is high ,the output is disabled, when OE is low, the output state is determined by 16 patterns of 4-bit input. The user can choose different logic functions

Such as AND ,OR ,NAND ,NOR ,XOR ,XNOR,MUX, inverter, and buffer, by changing the inputs' logic state. All inputs can be connected to VCC or GND.

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
- * All inputs have Schmitt-trigger action
- * I_{off} supports partial-power-down mode
- * Low power dissipation: $I_{CC}=10\mu A(Max.)$
- * Max t_{PD} of 6.7 ns at 3.3V
- * $\pm 24mA$ output drive($V_{CC}=3.3V$)
- * Offers nine different logic functions in a single package

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G99L-S08-R	U74LVC1G99G-S08-R	SOP-8	Tape Reel
U74LVC1G99L-S08-T	U74LVC1G99G-S08-T	SOP-8	Tube
U74LVC1G99L-SM1-R	U74LVC1G99G-SM1-R	MSOP-8	Tape Reel
U74LVC1G99L-SM1-T	U74LVC1G99G-SM1-T	MSOP-8	Tube

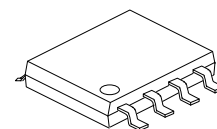
U74LVC1G99L-S08-R

- (1)Packing Type
- (2)Package Type
- (3)Lead Plating

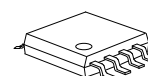
(1) R: Tape Reel, T: Tube

(2) S08: SOP-8, SM1: MSOP-8

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

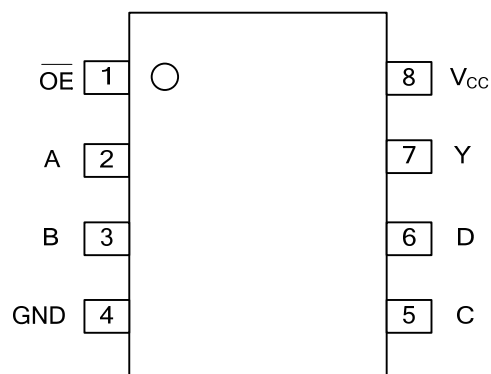


SOP-8



MSOP-8

PIN CONFIGURATION

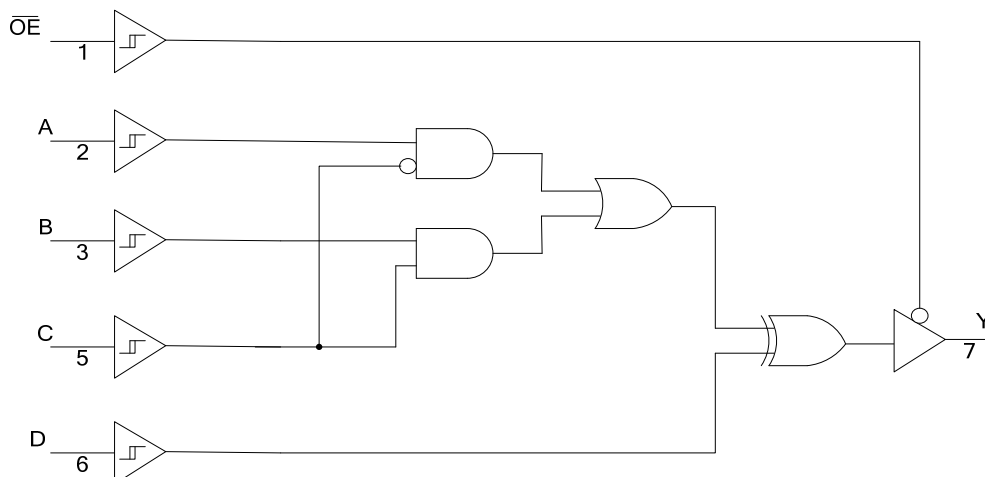


FUNCTION TABLE (EACH GATE)

INPUTS					OUTPUT
OE	D	C	B	A	Y
L	L	L	L	L	L
L	L	L	L	H	H
L	L	L	H	L	L
L	L	L	H	H	H
L	L	H	L	L	L
L	L	H	L	H	L
L	L	H	H	L	H
L	L	H	H	H	H
L	H	L	L	L	H
L	H	L	L	H	L
L	H	L	H	L	H
L	H	L	H	H	L
L	H	H	L	L	H
L	H	H	L	H	H
L	H	H	H	L	L
L	H	H	H	H	L
H	H or L	H or L	H or L	H or L	Z

Note: H: HIGH voltage level; L: LOW voltage level; Z: HIGH impedance state

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
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	$\Delta t/\Delta v$	$V_{CC}=1.8V\pm0.15V, 2.5V\pm0.2V$			20	ns/V
		$V_{CC}=3.3V\pm0.3V$			10	ns/V
		$V_{CC}=5V\pm0.5V$			5	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		1.26	V
		V _{CC} =2.3V	1.11		1.66	
		V _{CC} =3.0V	1.5		1.97	
		V _{CC} =4.5V	2.16		2.84	
		V _{CC} =5.5V	2.61		3.43	
Negative-Going Input Threshold Voltage	V _{T-}	V _{CC} =1.65V	0.39		0.72	V
		V _{CC} =2.3V	0.58		0.97	
		V _{CC} =3.0V	0.84		1.24	
		V _{CC} =4.5V	1.41		1.89	
		V _{CC} =5.5V	1.87		2.39	
Hysteresis Voltage (V _{T+} -V _{T-})	ΔV _T	V _{CC} =1.65V	0.37		0.72	V
		V _{CC} =2.3V	0.48		0.87	
		V _{CC} =3.0V	0.56		0.97	
		V _{CC} =4.5V	0.71		1.14	
		V _{CC} =5.5V	0.71		1.21	
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	I _{I(LEAK)}	V _{CC} =0V ~ 5.5V, V _{IN} =V _{CC} or GND			±5	μA
Power OFF Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{OUT} =5.5V			±10	μA
High Impedance Output Leakage Current	I _{OZ}	V _{OUT} =V _{CC} or GND, V _{CC} =1.65V ~5.5V			±10	μA
Quiescent Supply Current	I _{CC}	V _{CC} =1.65V ~ 5.5V, V _{IN} =5.5V or GND I _{OUT} =0			±10	μA
Additional Quiescent Supply Current	ΔI _{CC}	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
Output Capacitance	C _{OUT}	V _{CC} =3.3V, V _{IN} =V _{CC} or GND		6		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 _{PLH} /t _{PHL} (A to Y)	V _{CC} =1.8V±0.15V, C _L =15pF	4.5		30.1	ns
		V _{CC} =2.5V±0.2V, C _L =15pF	2.5		11.3	
		V _{CC} =3.3V±0.3V, C _L =15pF	1.8		7.5	
		V _{CC} =5V±0.5V, C _L =15pF	1.3		4.8	
Propagation delay from input (B) to output(Y)	t _{PLH} /t _{PHL} (B to Y)	V _{CC} =1.8V±0.15V, C _L =15pF	4.4		28.3	ns
		V _{CC} =2.5V±0.2V, C _L =15pF	2.4		10.8	
		V _{CC} =3.3V±0.3V, C _L =15pF	1.8		7.2	
		V _{CC} =5V±0.5V, C _L =15pF	1.3		4.7	
Propagation delay from input (C) to output(Y)	t _{PLH} /t _{PHL} (C to Y)	V _{CC} =1.8V±0.15V, C _L =15pF	4.4		29.1	ns
		V _{CC} =2.5V±0.2V, C _L =15pF	2.4		11.7	
		V _{CC} =3.3V±0.3V, C _L =15pF	1.9		7.6	
		V _{CC} =5V±0.5V, C _L =15pF	1.3		5.0	
Propagation delay from input (D) to output(Y)	t _{PLH} /t _{PHL} (D to Y)	V _{CC} =1.8V±0.15V, C _L =15pF	4.3		25.1	ns
		V _{CC} =2.5V±0.2V, C _L =15pF	2.4		10.2	
		V _{CC} =3.3V±0.3V, C _L =15pF	1.7		6.7	
		V _{CC} =5V±0.5V, C _L =15pF	1.3		4.5	
Propagation delay from Output-enable(OE) to output(Y)	t _{PZL} /t _{PZH}	V _{CC} =1.8V±0.15V, C _L =15pF	3.4		24.7	ns
		V _{CC} =2.5V±0.2V, C _L =15pF	2.1		10.0	
		V _{CC} =3.3V±0.3V, C _L =15pF	1.3		5.8	
		V _{CC} =5V±0.5V, C _L =15pF	1.0		3.8	
Propagation delay from Output-enable(OE) to output(Y)	t _{PZL} /t _{PZH}	V _{CC} =1.8V±0.15V, C _L =15pF	4.0		15.5	ns
		V _{CC} =2.5V±0.2V, C _L =15pF	2.7		7.5	
		V _{CC} =3.3V±0.3V, C _L =15pF	3.5		7.0	
		V _{CC} =5V±0.5V, C _L =15pF	2		5.5	

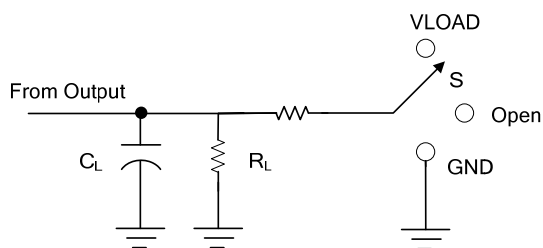
■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output(Y)	t_{PLH}/t_{PHL} (A to Y)	$V_{CC}=1.8V\pm0.15V, C_L=50pF$	4.6		30.8	ns
		$V_{CC}=2.5V\pm0.2V, C_L=50pF$	2.6		11.7	
		$V_{CC}=3.3V\pm0.3V, C_L=50pF$	2.4		8.4	
		$V_{CC}=5V\pm0.5V, C_L=50pF$	1.8		5.5	
Propagation delay from input (B) to output(Y)	t_{PLH}/t_{PHL} (B to Y)	$V_{CC}=1.8V\pm0.15V, C_L=50pF$	4.6		28.9	ns
		$V_{CC}=2.5V\pm0.2V, C_L=50pF$	2.6		11.3	
		$V_{CC}=3.3V\pm0.3V, C_L=50pF$	2.3		8.2	
		$V_{CC}=5V\pm0.5V, C_L=50pF$	1.8		5.4	
Propagation delay from input (C) to output(Y)	t_{PLH}/t_{PHL} (C to Y)	$V_{CC}=1.8V\pm0.15V, C_L=50pF$	4.4		29.8	ns
		$V_{CC}=2.5V\pm0.2V, C_L=50pF$	2.5		12.3	
		$V_{CC}=3.3V\pm0.3V, C_L=50pF$	2.5		8.6	
		$V_{CC}=5V\pm0.5V, C_L=50pF$	1.8		5.7	
Propagation delay from input (D) to output(Y)	t_{PLH}/t_{PHL} (D to Y)	$V_{CC}=1.8V\pm0.15V, C_L=50pF$	4.3		25.7	ns
		$V_{CC}=2.5V\pm0.2V, C_L=50pF$	2.5		10.7	
		$V_{CC}=3.3V\pm0.3V, C_L=50pF$	2.4		7.6	
		$V_{CC}=5V\pm0.5V, C_L=50pF$	1.6		5.2	
Propagation delay from Output-enable(OE) to output(Y)	t_{PZL}/t_{PZH}	$V_{CC}=1.8V\pm0.15V, C_L=50pF$	4.2		25.2	ns
		$V_{CC}=2.5V\pm0.2V, C_L=50pF$	2.4		11.3	
		$V_{CC}=3.3V\pm0.3V, C_L=50pF$	2.0		7.0	
		$V_{CC}=5V\pm0.5V, C_L=50pF$	1.7		4.7	
Propagation delay from Output-enable(OE) to output(Y)	t_{PZL}/t_{PZH}	$V_{CC}=1.8V\pm0.15V, C_L=50pF$	3.7		15	ns
		$V_{CC}=2.5V\pm0.2V, C_L=50pF$	2		5.8	
		$V_{CC}=3.3V\pm0.3V, C_L=50pF$	2.1		5.6	
		$V_{CC}=5V\pm0.5V, C_L=50pF$	1.0		4.5	

■ OPERATING CHARACTERISTICS ($T_A=25^{\circ}C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$V_{CC}=3.3V, f=10MHz$		22		pF

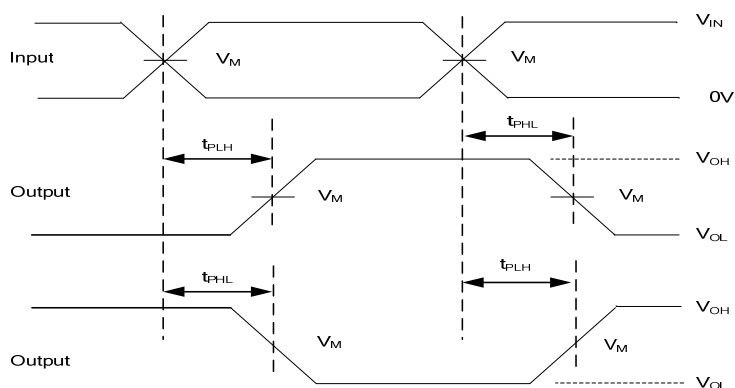
■ TEST CIRCUIT AND WAVEFORMS



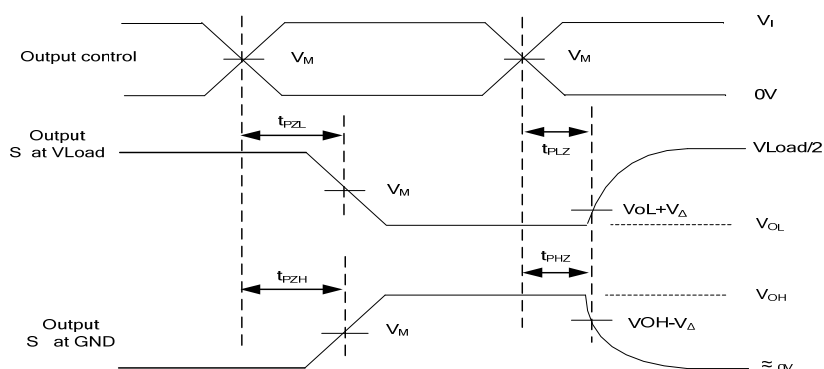
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	VLOAD
t_{PZH}/t_{PHZ}	GND

TEST CIRCUIT

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_{IN}	t_R, t_F					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2*V_{CC}$	15pF	1M Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2*V_{CC}$	15pF	1M Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	15pF	1M Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2*V_{CC}$	15pF	1M Ω	0.3V
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2*V_{CC}$	30pF	1K Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2*V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2*V_{CC}$	50pF	500 Ω	0.3V



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note: 1. C_L includes probe and jig capacitance.

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

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