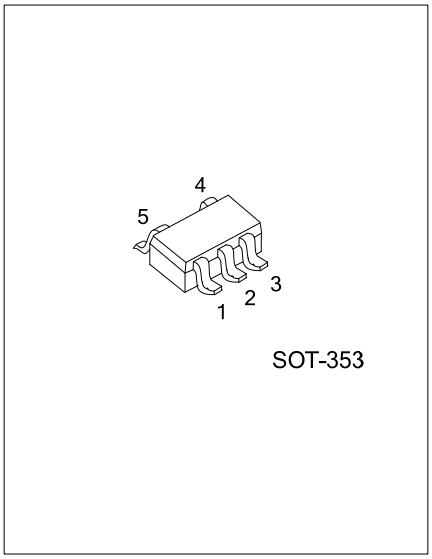
U74LVC1G240

CMOS IC

SINGLE BUFFER/DRIVER WITH 3-STATE OUTPUT



SOT-353

■ DESCRIPTION

The **U74LVC1G240** is a single line driver with a 3-state output. The output is disabled when the output-enable ($\overline{OE}$) input is high.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor, the minimum value of the resistor is determined by the current-sinking capability of the driver.

■ 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.)

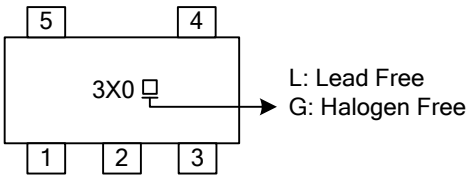
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G240L-AL5-R	U74LVC1G240G-AL5-R	SOT-353	Tape Reel

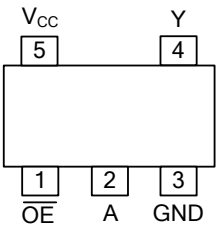
U74LVC1G240G-AL5-R
- (1)Packing Type
- (2)Packing Type
- (3)Green Package

(1) R: Tape Reel
(2) AL5: SOT-353
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION

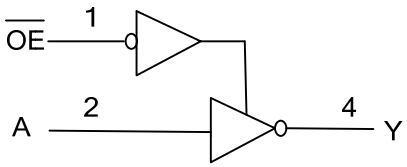


■ FUNCTION TABLE

INPUT($\overline{OE}$)	INPUT(A)	OUTPUT(Y)
L	H	L
L	L	H
H	X	Z

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol

■ 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 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}	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
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			5	ns/V

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

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-level Input Voltage	V_{IH}	V_{CC}=1.8±0.15V		0.65×V_{CC}			V
		V_{CC}=2.5±0.2V		1.7			V
		V_{CC}=3.3±0.3V		2			V
		V_{CC}=5±0.5V		0.7×V_{CC}			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.8±0.15V				0.35×V_{CC}	V
		V_{CC}=2.5±0.2V				0.7	V
		V_{CC}=3.3±0.3V				0.8	V
		V_{CC}=5±0.5V				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
		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
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 5.5V, V_{IN}=5.5V or GND				±5	μA
Power OFF Leakage Current	I_{off}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V				±10	μA
OFF-state output current	I_{OZ}	V_{CC}=3.6V, V_{IN} = V_{IH} or V_{IL}, V_{OUT}=5.5V or GND				10	μA

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Supply Current	I_{CC}	V_{CC}=1.65 ~ 5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			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		4.0		pF

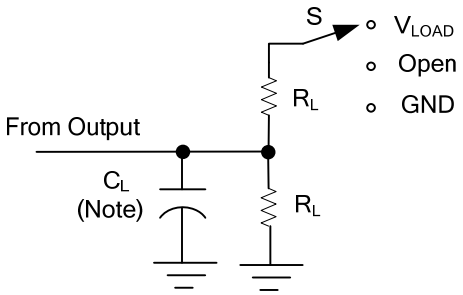
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output(Y)	t_{PD}	C_L=15pF, R_L=1MΩ	V_{CC}=1.8V±0.15V	2.1		6.9	ns
			V_{CC}=2.5V±0.2V	0.9		4.6	ns
			V_{CC}=3.3V±0.3V	0.7		3.7	ns
			V_{CC}=5.0V±0.5V	0.5		3.4	ns
		C_L=30pF, R_L=1kΩ	V_{CC}=1.8V±0.15V	3		8.6	ns
		C_L=30pF R_L=500Ω	V_{CC}=2.5V±0.2V	1.4		5.5	ns
		C_L=50pF R_L=500Ω	V_{CC}=3.3V±0.3V	1.1		4.5	ns
			V_{CC}=5.0V±0.5V	1		4	ns
Propagation delay from input ($\overline{OE}$) to output(Y)	t_{en}	C_L=30pF, R_L=1kΩ	V_{CC}=1.8V±0.15V	3.8		10	ns
		C_L=30pF R_L=500Ω	V_{CC}=2.5V±0.2V	2.1		6.5	ns
		C_L=50pF R_L=500Ω	V_{CC}=3.3V±0.3V	1.4		5.4	ns
			V_{CC}=5.0V±0.5V	1.1		5.2	ns
Propagation delay from input ($\overline{OE}$) to output(Y)	t_{dis}	C_L=30pF, R_L=1kΩ	V_{CC}=1.8V±0.15V	2.1		9.4	ns
		C_L=30pF R_L=500Ω	V_{CC}=2.5V±0.2V	1		4.9	ns
		C_L=50pF R_L=500Ω	V_{CC}=3.3V±0.3V	1.4		5.2	ns
			V_{CC}=5.0V±0.5V	1		4.1	ns

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Output enabled	C_{PD}	V_{CC}=1.8V		17		pF
			V_{CC}=2.5V		17		pF
			V_{CC}=3.3V		18		pF
			V_{CC}=5V		20		pF
	Output disabled		V_{CC}=1.8V		1		pF
			V_{CC}=2.5V		1		pF
			V_{CC}=3.3V		1		pF
			V_{CC}=5V		3		pF

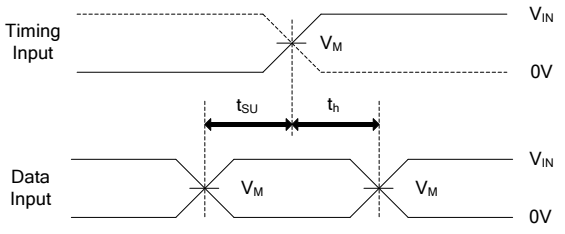
■ TEST CIRCUIT AND WAVEFORMS



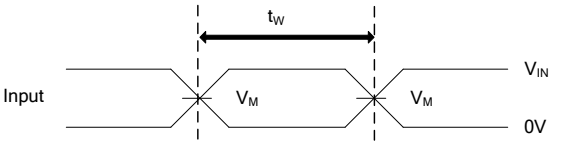
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Note: C_L includes probe and jig capacitance.

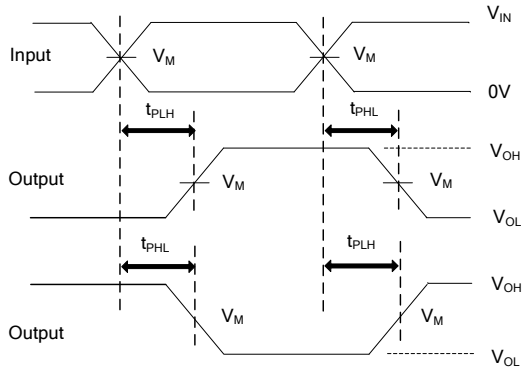
V_{CC}	V_{IN}	t_R / t_F	V_M	V_{LOAD}	C_L	R_L	V_Δ
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	2×V_{CC}	30pF	1KΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2×V_{CC}	30pF	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2×V_{CC}	50pF	500Ω	0.3V



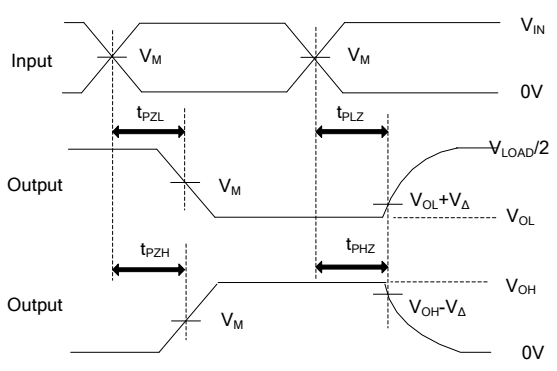
SETUP TIME AND HOLD TIME



PULSE WIDTH



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.