



# U74LVC157

CMOS IC

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

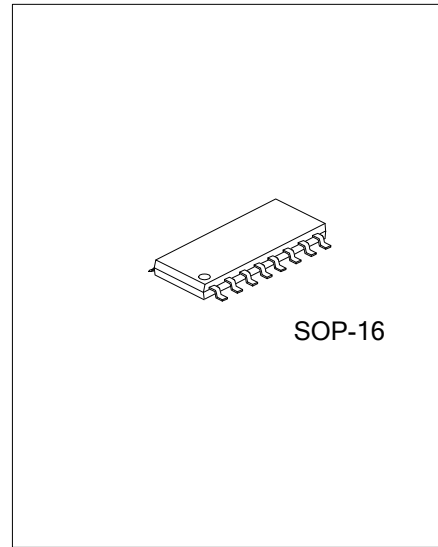
### DESCRIPTION

The **U74LVC157** is designed for 1.65V to 3.6V  $V_{CC}$  operation.

The device features a common strobe ( $\bar{G}$ ) input. When ( $\bar{G}$ ) is high, all outputs are low. When  $\bar{G}$  is low, a 4-bit word is selected from one of two sources and is routed to the four outputs.

### FEATURES

- \* Operate From 1.65V to 3.6V
- \* Inputs Accept Voltages to 5.5V
- \* Max  $t_{pd}$  of 5.2ns at 3.3V
- \* Typical  $V_{OLP}$  (Output Ground Bounce) $<0.8V$  at  $V_{CC}=3.3V, T_A=25^\circ C$
- \* Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot) $>2V$  at  $V_{CC}=3.3V, T_A=25^\circ C$

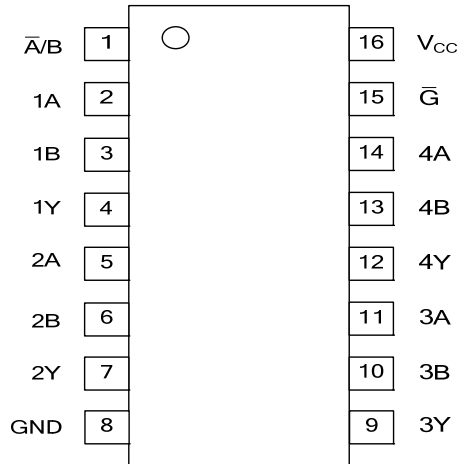


### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC157L-S16-T	U74LVC157G-S16-T	SOP-16	Tube
U74LVC157L-S16-R	U74LVC157G-S16-R	SOP-16	Tape Reel

<p>U74LVC157L-S16-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Halogen Free</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) S16: SOP-16</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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■ PIN CONFIGURATION

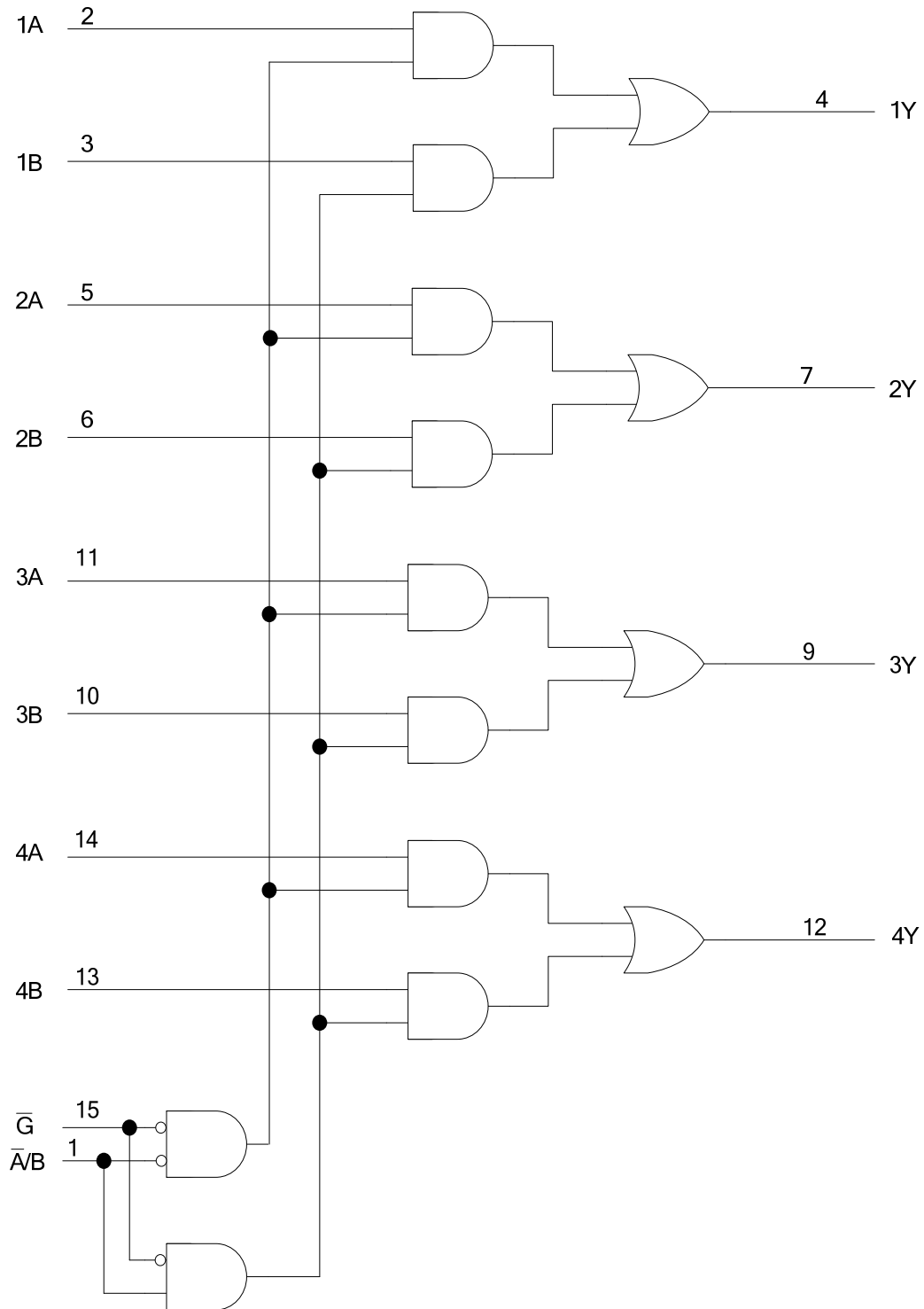


■ FUNCTION TABLE

INPUTS				OUTPUT Y
$\bar{G}$	$\bar{A/B}$	A	B	
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	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	$V_{OUT}$	-0.5 ~ $V_{CC}+0.5$	V
$V_{CC}$ or GND Current	$I_{CC}$	±100	mA
Continuous Output Current	$I_{OUT}$	±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 ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	1.65		3.6	V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
High-level input voltage	$V_{IH}$	$V_{CC}=1.65\text{V}\sim 1.95\text{V}$	$0.65\times V_{CC}$			V
		$V_{CC}=2.3\text{V}\sim 2.7\text{V}$	1.7			
		$V_{CC}=2.7\text{V}\sim 3.6\text{V}$	2			
Low-level input voltage	$V_{IL}$	$V_{CC}=1.65\text{V}\sim 1.95\text{V}$			$0.35\times V_{CC}$	V
		$V_{CC}=2.3\text{V}\sim 2.7\text{V}$			0.7	
		$V_{CC}=2.7\text{V}\sim 3.6\text{V}$			0.8	
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$				10	ns/V
Operating Temperature	$T_A$		-40		85	°C

3Note: All unused inputs of the device must be held at  $V_{CC}$  or GND to ensure proper device operation.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	$V_{OH}$	$V_{CC}=1.65\sim 3.6\text{V}$ , $I_{OH}=-100\mu\text{A}$	$V_{CC}-0.2$			V
		$V_{CC}=1.65\text{V}$ , $I_{OH}=-4\text{mA}$	1.29			
		$V_{CC}=2.3\text{V}$ , $I_{OH}=-8\text{mA}$	1.9			
		$V_{CC}=2.7\text{V}$ , $I_{OH}=-12\text{mA}$	2.2			
		$V_{CC}=3.0\text{V}$ , $I_{OH}=-12\text{mA}$	2.4			
		$V_{CC}=3\text{V}$ , $I_{OH}=-24\text{mA}$	2.3			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.6\sim 3.6\text{V}$ , $I_{OL}=100\mu\text{A}$			0.1	V
		$V_{CC}=1.65\text{V}$ , $I_{OL}=4\text{mA}$			0.24	
		$V_{CC}=2.3\text{V}$ , $I_{OL}=8\text{mA}$			0.30	
		$V_{CC}=2.7\text{V}$ , $I_{OL}=12\text{mA}$			0.40	
		$V_{CC}=3\text{V}$ , $I_{OL}=24\text{mA}$			0.55	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=3.6\text{V}$ , $V_{IN}=5.5\text{V}$ or GND			±1	μA
Quiescent Supply Current	$I_{CC}$	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ $V_{CC}=3.6\text{V}$			1	μA
Additional Quiescent Supply Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=2.7\text{V}\sim 3.6\text{V}$ , One input at $V_{CC}-0.6\text{V}$ , Other inputs at $V_{CC}$ or GND			500	μA
Input Capacitance	$C_I$	$V_{CC}=3.3\text{V}$ , $V_{IN}=V_{CC}$ or GND		5		pF

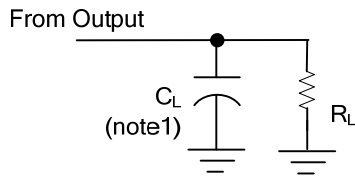
■ SWITCHING CHARACTERISTICS (T<sub>A</sub> =25°C , unless otherwise specified)(see Figure 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> =1.8V±0.15V, C <sub>L</sub> =30pF	1	5.5	13.5	ns
		V <sub>CC</sub> =2.5V±0.2V, C <sub>L</sub> =30pF	1	3.2	7.4	
		V <sub>CC</sub> =2.7V, C <sub>L</sub> =50pF	1	3.6	5.7	
		V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =50pF	1	3	5	
Propagation delay from input ( $\bar{A}$ / $\bar{B}$ ) to output(Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> =1.8V±0.15V, C <sub>L</sub> =30pF	1	6	15.5	ns
		V <sub>CC</sub> =2.5V±0.2V, C <sub>L</sub> =30pF	1	3.7	9.6	
		V <sub>CC</sub> =2.7V, C <sub>L</sub> =50pF	1	4.1	7.9	
		V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =50pF	1	3.4	6.6	
Propagation delay from input ( $\bar{G}$ ) to output(Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> =1.8V±0.15V, C <sub>L</sub> =30pF	1	5.9	13.5	ns
		V <sub>CC</sub> =2.5V±0.2V, C <sub>L</sub> =30pF	1	3.5	9.3	
		V <sub>CC</sub> =2.7V, C <sub>L</sub> =50pF	1	3.9	7.6	
		V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =50pF	1	3.3	6.3	

■ OPERATING CHARACTERISTICS (T<sub>A</sub> =25°C , unless otherwise specified)

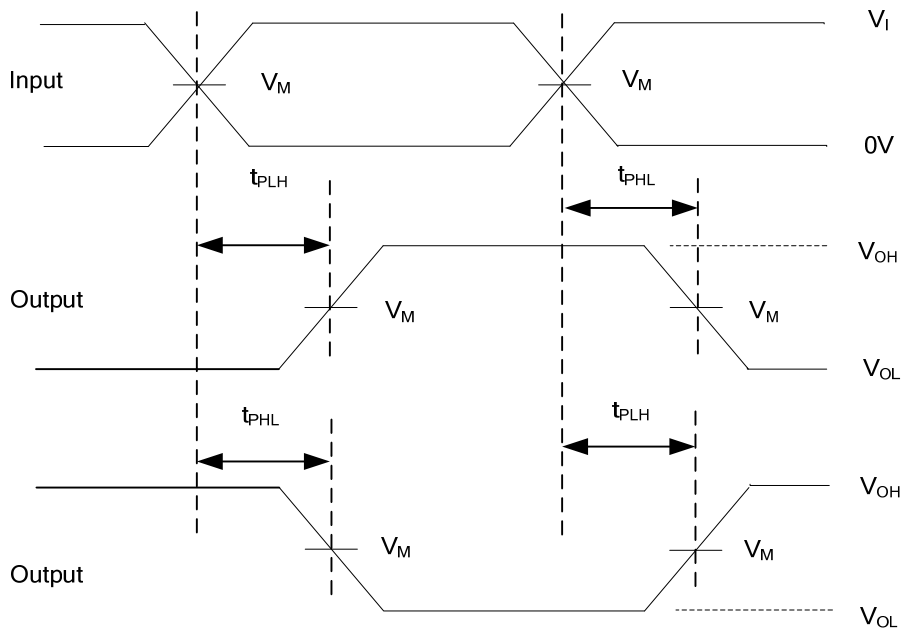
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	f=10MHZ	V <sub>CC</sub> =1.8V		14	pF
			V <sub>CC</sub> =2.5V		15	
			V <sub>CC</sub> =3.3V		16	

## ■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

$V_{CC}$	INPUTS		$V_M$	$C_L$	$R_L$
	$V_I$	$t_r / t_f$			
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	1K $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	500 $\Omega$
2.7V	2.7V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$



PROPAGATION DELAY TIMES

Note: 1.  $C_L$  includes probe and jig capacitance.

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

Figure 1. Test Circuit and Voltage Waveforms

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