



## U74LVC1G18

CMOS IC

### 1-OF-2 NON-INVERTING DEMULTIPLEXER WITH 3-STATE DESELECTED OUTPUT

#### DESCRIPTION

The **U74LVC1G18** is a 1-of-2 non-inverting demultiplexer with 3-state output. When the select input S is low data passes from A (input) to Y0 (output) and Y1 (output) is in the high-impedance state. When the select input S is high data passes from A (input) to Y1 (output) and Y0 (output) is in the high-impedance state.

The **U74LVC1G18** is designed for 1.65V to 5.5V operation and it can be driven from either 3.3V or 5.5V devices. Therefore, it can be used in a mixed 3.3V and 5V environment.

The **U74LVC1G18** is fully specified for partial-power-down applications using I<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the outputs and prevents damaging current backflow through the device when it is powered down.

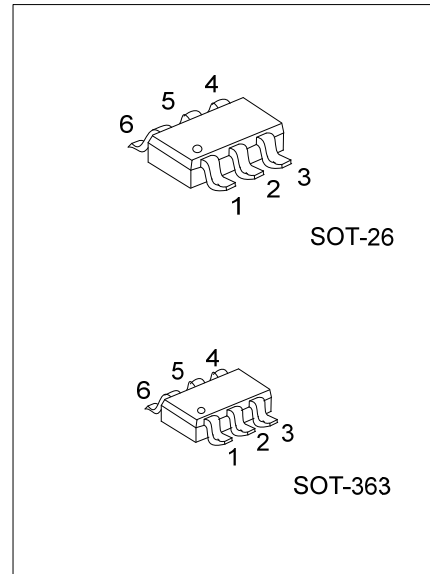
#### FEATURES

- \* Wide supply voltage range from 1.65V to 5.5V
- \* Max t<sub>PD</sub> of 3.4 ns at 3.3V
- \* Up to 5.5V inputs accept voltages
- \* Low power consumption, I<sub>CC</sub> = 10 μA (Max.)
- \* ±24 mA output driver at 3.3V
- \* Typical V<sub>OLP</sub> (Output Ground Bounce) < 0.8V, V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25 °C
- \* Typical V<sub>OHV</sub> (Output V<sub>OH</sub> undershoot) > 2V, V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25 °C
- \* I<sub>OFF</sub> supports partial-power-down mode operation

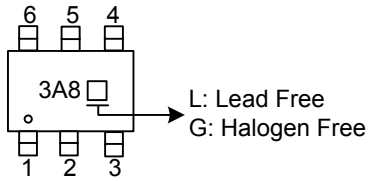
#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G18L-AL6-R	U74LVC1G18G-AL6-R	SOT-363	Tape Reel
U74LVC1G18L-AG6-R	U74LVC1G18G-AG6-R	SOT-26	Tape Reel

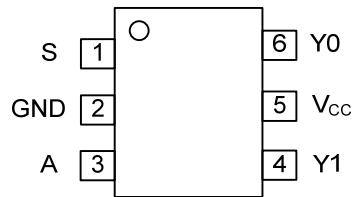
<p>U74LVC1G18G-AL6-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AL6: SOT-363, AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ PIN CONFIGURATION

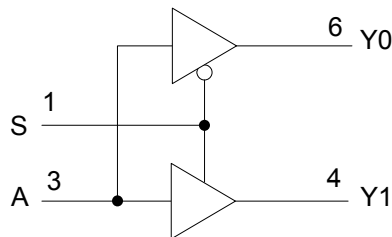


■ FUNCTION TABLE

INPUTS		OUTPUT	
S	A	Y <sub>0</sub>	Y <sub>1</sub>
L	L	L	Z
L	H	H	Z
H	L	Z	L
H	H	Z	H

H=High Level  
L=Low Level

■ LOGIC DIAGRAM (positive logic)



### ■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		$V_{CC}$	-0.5 ~ 6.5	V
Input Voltage		$V_{IN}$	-0.5 ~ 6.5	V
Output Voltage (any output in the high-impedance or power-off state)		$V_{OUT}$	-0.5 ~ 6.5	V
Output Voltage (any output in the high or low state)		$V_{OUT}$	-0.5 ~ $V_{CC}+0.5$	V
Input Clamp Current		$I_{IK}$	-50	mA
Output Clamp Current		$I_{OK}$	-50	mA
Output Current		$I_{OUT}$	±50	mA
$V_{CC}$ or GND Current		$I_{CC}$	±100	mA
Power Dissipation	$T_A=-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$P_D$	250	mW
Storage Temperature		$T_{STG}$	-65 ~ +150	$^{\circ}\text{C}$

Notes: 1. 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.

2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

### ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-363	$\theta_{JA}$	350	$^{\circ}\text{C/W}$
	SOT-26		230	

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply Voltage		$V_{CC}$	Operating	1.65	5.5	V
			Data retention only	1.5		
Input Voltage	High	$V_{IH}$	$V_{CC}=1.65\text{V}\sim 1.95\text{V}$	$0.65\times V_{CC}$		V
			$V_{CC}=2.3\text{V}\sim 2.7\text{V}$	1.7		
			$V_{CC}=3\text{V}\sim 3.6\text{V}$	2		
			$V_{CC}=4.5\text{V}\sim 5.5\text{V}$	$0.7\times V_{CC}$		
Input Voltage	Low	$V_{IL}$	$V_{CC}=1.65\text{V}\sim 1.95\text{V}$		$0.35\times V_{CC}$	V
			$V_{CC}=2.3\text{V}\sim 2.7\text{V}$		0.7	
			$V_{CC}=3\text{V}\sim 3.6\text{V}$		0.8	
			$V_{CC}=4.5\text{V}\sim 5.5\text{V}$		$0.3\times V_{CC}$	
Input Voltage		$V_{IN}$		0	5.5	V
Output Voltage		$V_{OUT}$	High or low state	0	$V_{CC}$	V
Output Current	High	$I_{OH}$	$V_{CC}=1.65\text{V}$		-4	mA
			$V_{CC}=2.3\text{V}$		-8	
			$V_{CC}=3\text{V}$		-16	
			$V_{CC}=4.5\text{V}$		-24	
	Low	$I_{OL}$	$V_{CC}=1.65\text{V}$		4	mA
			$V_{CC}=2.3\text{V}$		8	
			$V_{CC}=3\text{V}$		16	
			$V_{CC}=4.5\text{V}$		24	
Input Transition Rise or Fall Rate	$\Delta t/\Delta V$	$V_{CC}=1.8\pm 0.15\text{V}, 2.5\pm 0.2\text{V}$		20	ns/V	
		$V_{CC}=3.3\pm 0.3\text{V}$		10		
		$V_{CC}=5.0\pm 0.5\text{V}$		5		
Operating Temperature		$T_A$		-40	85	$^{\circ}\text{C}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Output Voltage	High	V <sub>OH</sub>	I <sub>OH</sub> =-100μA, V <sub>CC</sub> =1.65V ~ 5.5V	V <sub>CC</sub> -0.1		V	
			I <sub>OH</sub> =-4mA, V <sub>CC</sub> =1.65V	1.2			
			I <sub>OH</sub> =-8mA, V <sub>CC</sub> =2.3V	1.9			
			I <sub>OH</sub> =-16mA, V <sub>CC</sub> =3V	2.4			
			I <sub>OH</sub> =-24mA, V <sub>CC</sub> =3V	2.3			
	I <sub>OH</sub> =-32mA, V <sub>CC</sub> =4.5V	3.8					
	Low	V <sub>OL</sub>	I <sub>OL</sub> =100μA, V <sub>CC</sub> =1.65V ~ 5.5V			0.1	V
			I <sub>OL</sub> =4mA, V <sub>CC</sub> =1.65V			0.45	
			I <sub>OL</sub> =8mA, V <sub>CC</sub> =2.3V			0.3	
			I <sub>OL</sub> =16mA, V <sub>CC</sub> =3V			0.4	
I <sub>OL</sub> =24mA, V <sub>CC</sub> =3V					0.55		
I <sub>OL</sub> =32mA, V <sub>CC</sub> =4.5V			0.55				
Input Leakage Current (A or S inputs)	I <sub>I(LEAK)</sub>	V <sub>IN</sub> = 5.5V or GND, V <sub>CC</sub> = 0 ~ 5.5V			±5	μA	
OFF-state Current	I <sub>OFF</sub>	V <sub>IN</sub> or V <sub>O</sub> = 5.5V, V <sub>CC</sub> = 0V			±10	μA	
High-impedance state Current	I <sub>OZ</sub>	V <sub>O</sub> = 0 to 5.5V, V <sub>CC</sub> = 3.6V			10	μA	
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = 5.5V or GND, I <sub>OUT</sub> = 0, V <sub>CC</sub> = 1.65V to 5.5V			10	μA	
Additional quiescent Supply Current	Δ I <sub>CC</sub>	One input at V <sub>CC</sub> - 0.6V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> =3V ~ 5.5V			500	μA	
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> =3.3V		4		pF	
Output Capacitance	C <sub>OUT</sub>	V <sub>OUT</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> =3.3V		6		pF	

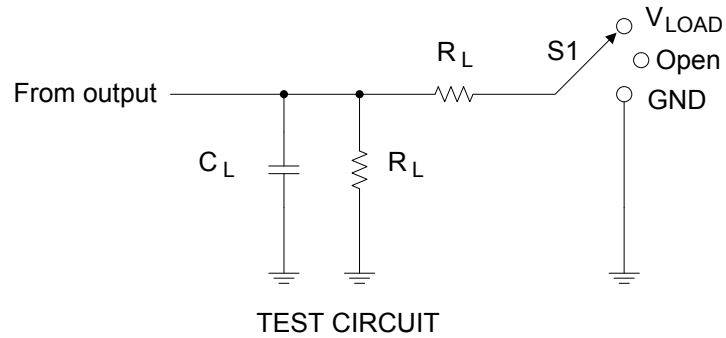
■ SWITCHING CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A to output Y	t <sub>PLH</sub> t <sub>PHL</sub> (t <sub>pd</sub> )	V <sub>CC</sub> =1.8±0.15V, C <sub>L</sub> =15pF, R <sub>L</sub> =1MΩ	2.3		8.4	ns
		V <sub>CC</sub> =2.5±0.20V, C <sub>L</sub> =15pF, R <sub>L</sub> =1MΩ	1.1		4.2	
		V <sub>CC</sub> =3.3±0.30V, C <sub>L</sub> =15pF, R <sub>L</sub> =1MΩ	1.1		3.4	
		V <sub>CC</sub> =5.0±0.50V, C <sub>L</sub> =15pF, R <sub>L</sub> =1MΩ	0.8		2.7	
Propagation delay from input A to output Y	t <sub>PLH</sub> t <sub>PHL</sub> (t <sub>pd</sub> )	V <sub>CC</sub> =1.8±0.15V, C <sub>L</sub> =30pF, R <sub>L</sub> =1KΩ	3.5		9.3	ns
		V <sub>CC</sub> =2.5±0.20V, C <sub>L</sub> =30pF, R <sub>L</sub> =500Ω	1.7		5	
		V <sub>CC</sub> =3.3±0.30V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	1.5		4.2	
		V <sub>CC</sub> =5.0±0.50V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	0.7		3.2	
Propagation delay from input S to output Y	t <sub>PZL</sub> t <sub>PZH</sub> (t <sub>en</sub> )	V <sub>CC</sub> =1.8±0.15V, C <sub>L</sub> =30pF, R <sub>L</sub> =1KΩ	3.6		10.2	ns
		V <sub>CC</sub> =2.5±0.20V, C <sub>L</sub> =30pF, R <sub>L</sub> =500Ω	1.7		5.6	
		V <sub>CC</sub> =3.3±0.30V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	1.5		4.6	
		V <sub>CC</sub> =5.0±0.50V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	0.9		3.4	
Propagation delay from input S to output Y	t <sub>PLZ</sub> t <sub>PHZ</sub> (t <sub>dis</sub> )	V <sub>CC</sub> =1.8±0.15V, C <sub>L</sub> =30pF, R <sub>L</sub> =1KΩ	1.9		12.7	ns
		V <sub>CC</sub> =2.5±0.20V, C <sub>L</sub> =30pF, R <sub>L</sub> =500Ω		1	5.3	
		V <sub>CC</sub> =3.3±0.30V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	1.1		4.9	
		V <sub>CC</sub> =5.0±0.50V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	0.5		3.3	

■ 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>	V <sub>CC</sub> = 1.8V, f=10MHz		17		pF
		V <sub>CC</sub> = 2.5V, f=10MHz		17		
		V <sub>CC</sub> = 3.3V, f=10MHz		18		
		V <sub>CC</sub> = 5.0V, f=10MHz		21		

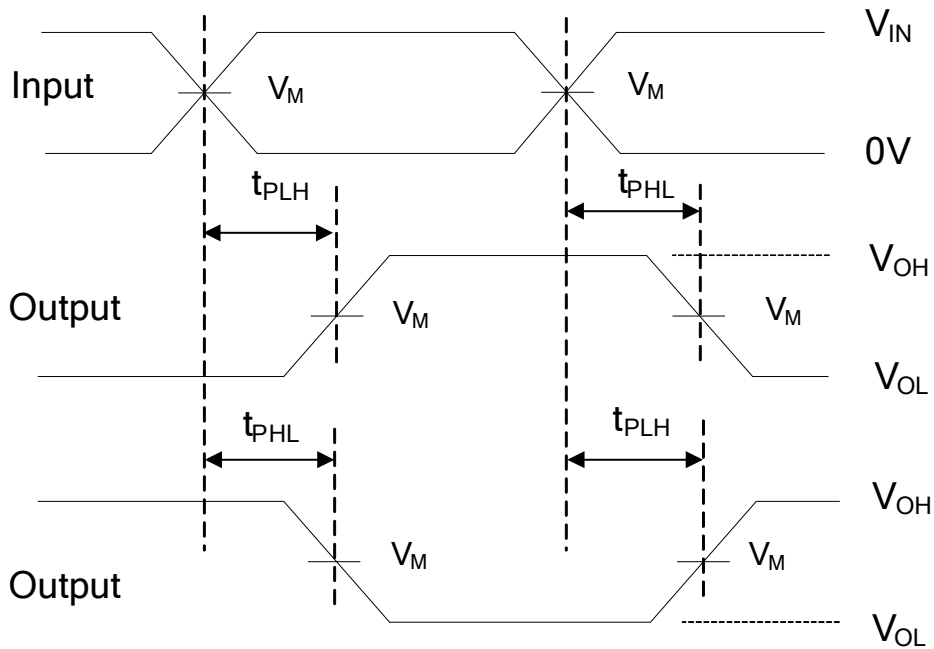
■ TEST CIRCUIT AND WAVEFORMS



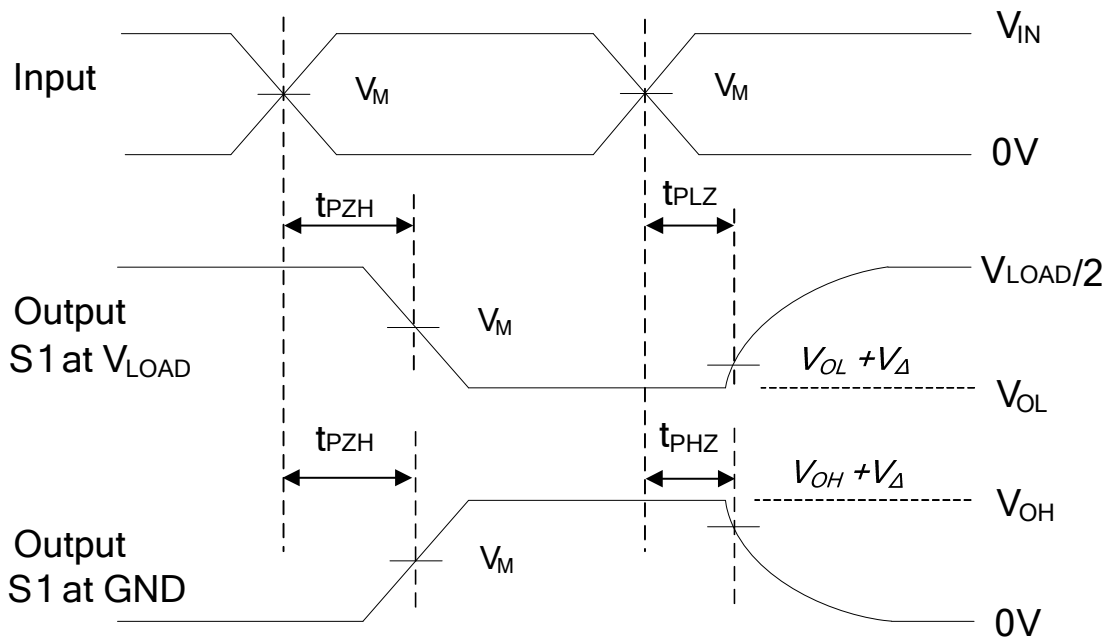
TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_{IN}$	$t_r, t_f$					
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
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

■ TEST CIRCUIT AND WAVEFORMS (Cont.)



PROPAGATION DELAY TIMES  
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS 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  $\leq 10$ MHz,  $Z_O = 50\Omega$ .

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