



U74LVC1G18

Preliminary

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 1Y (output) and 2Y (output) is in the high-impedance state. When the select input S is high data passes from A (input) to 2Y (output) and 1Y (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_{OFF} . The I_{OFF} circuitry disables the outputs and prevents damaging current backflow through the device when it is powered down.

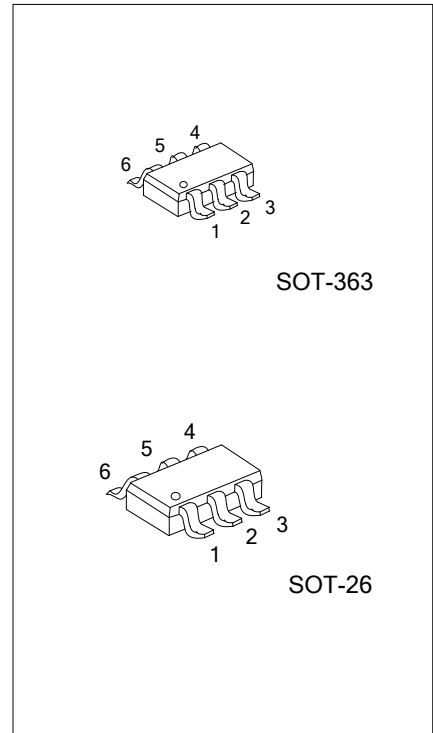
FEATURES

- * Wide supply voltage range from 1.65V to 5.5V
- * Max t_{PD} of 3.4 ns at 3.3V
- * Up to 5.5V inputs accept voltages
- * Low power consumption, $I_{CC} = 10 \mu A$ (Max.)
- * ± 24 mA output driver at 3.3V
- * Typical V_{OLP} (Output Ground Bounce) $< 0.8V$,
 $V_{CC} = 3.3 V$, $T_A = 25^\circ C$
- * Typical V_{OHV} (Output V_{OH} undershoot) $> 2V$,
 $V_{CC} = 3.3 V$, $T_A = 25^\circ C$
- * I_{OFF} supports partial-power-down mode operation

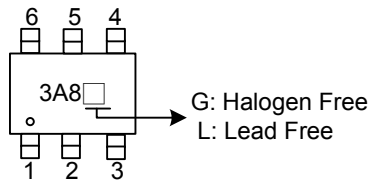
ORDERING INFORMATION

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

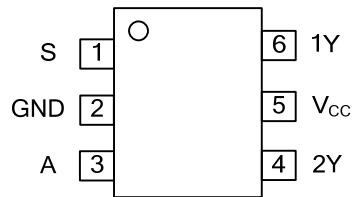
U74LVC1G18L-AL6-R		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) AL6: SOT-363, AG6: SOT-26
		(3) Lead Free	(3) G: Halogen Free, L: Lead Free



MARKING



PIN CONFIGURATION



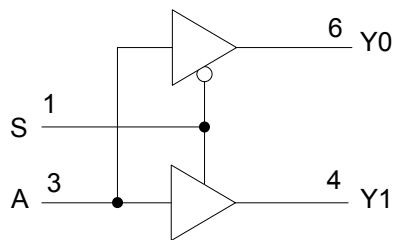
FUNCTION TABLE

INPUTS		OUTPUT	
S	A	Y ₀	Y ₁
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_{tot}	250	mW
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

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.

1. 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	350	$^{\circ}\text{C/W}$
	SOT-26	230	

■ RECOMMENDED OPERATING COMDITIONS

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	$V_{CC} = 1.65\text{V}$ to 1.95V	$0.65^* V_{CC}$		V
		$V_{CC} = 2.3\text{V}$ to 2.7V	1.7		
		$V_{CC} = 3\text{V}$ to 3.6V	2		
		$V_{CC} = 4.5\text{V}$ to 5.5V	$0.7^* V_{CC}$		
	Low	$V_{CC} = 1.65\text{V}$ to 1.95V		$0.35^* V_{CC}$	V
		$V_{CC} = 2.3\text{V}$ to 2.7V		0.7	
		$V_{CC} = 3\text{V}$ to 3.6V		0.8	
		$V_{CC} = 4.5\text{V}$ to 5.5V		$0.3^* V_{CC}$	
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	
				-24	
			$V_{CC}=4.5\text{V}$	-32	
	Low	I_{OL}	$V_{CC}=1.65\text{V}$	4	mA
			$V_{CC}=2.3\text{V}$	8	
			$V_{CC}=3\text{V}$	16	
				24	
			$V_{CC}=4.5\text{V}$	32	
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=1.8\pm0.15\text{V}$, $2.5\pm0.2\text{V}$		20	ns/V
		$V_{CC}=3.3\pm0.3\text{V}$		10	
		$V_{CC}=5.0\pm0.5\text{V}$		5	
Operating Temperature	T_A		-40	85	$^{\circ}\text{C}$

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

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

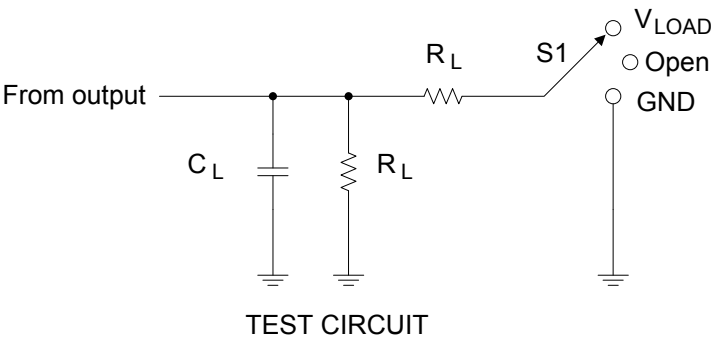
■ SWITCHING CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Propagation delay from input A to output Y	t_{PLH} t_{PHL} (t_{pd})	$V_{CC} = 1.8 \pm 0.15\text{V}$, $C_L = 15\text{pF}$, $R_L = 1\text{M}\Omega$	2.3	8.4	ns
		$V_{CC} = 2.5 \pm 0.20\text{V}$, $C_L = 15\text{pF}$, $R_L = 1\text{M}\Omega$	1.1	4.2	
		$V_{CC} = 3.3 \pm 0.30\text{V}$, $C_L = 15\text{pF}$, $R_L = 1\text{M}\Omega$	1.1	3.4	
		$V_{CC} = 5.0 \pm 0.50\text{V}$, $C_L = 15\text{pF}$, $R_L = 1\text{M}\Omega$	0.8	2.7	
Propagation delay from input A to output Y	t_{PLH} t_{PHL} (t_{pd})	$V_{CC} = 1.8 \pm 0.15\text{V}$, $C_L = 30\text{pF}$, $R_L = 1\text{K}\Omega$	3.5	9.3	ns
		$V_{CC} = 2.5 \pm 0.20\text{V}$, $C_L = 30\text{pF}$, $R_L = 500\Omega$	1.7	5	
		$V_{CC} = 3.3 \pm 0.30\text{V}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$	1.5	4.2	
		$V_{CC} = 5.0 \pm 0.50\text{V}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$	0.7	3.2	
Propagation delay from input S to output Y	t_{PZL} t_{PZH} (t_{en})	$V_{CC} = 1.8 \pm 0.15\text{V}$, $C_L = 30\text{pF}$, $R_L = 1\text{K}\Omega$	3.6	10.2	ns
		$V_{CC} = 2.5 \pm 0.20\text{V}$, $C_L = 30\text{pF}$, $R_L = 500\Omega$	1.7	5.6	
		$V_{CC} = 3.3 \pm 0.30\text{V}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$	1.5	4.6	
		$V_{CC} = 5.0 \pm 0.50\text{V}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$	0.9	3.4	
Propagation delay from input S to output Y	t_{PLZ} t_{PHZ} (t_{dis})	$V_{CC} = 1.8 \pm 0.15\text{V}$, $C_L = 30\text{pF}$, $R_L = 1\text{K}\Omega$	1.9	12.7	ns
		$V_{CC} = 2.5 \pm 0.20\text{V}$, $C_L = 30\text{pF}$, $R_L = 500\Omega$	1	5.3	
		$V_{CC} = 3.3 \pm 0.30\text{V}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$	1.1	4.9	
		$V_{CC} = 5.0 \pm 0.50\text{V}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$	0.5	3.3	

■ OPERATING CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT
Power Dissipation Capacitance	C_{pd}	$V_{CC} = 1.8\text{V}$, $f = 10\text{MHz}$	17	pF
		$V_{CC} = 2.5\text{V}$, $f = 10\text{MHz}$	17	
		$V_{CC} = 3.3\text{V}$, $f = 10\text{MHz}$	18	
		$V_{CC} = 5.0\text{V}$, $f = 10\text{MHz}$	21	

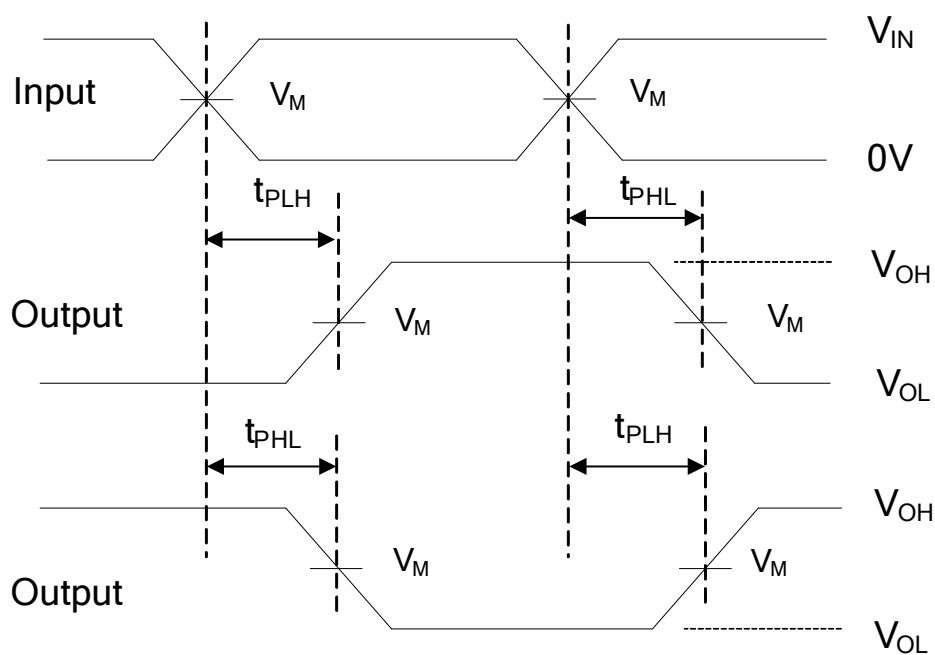
■ TEST CIRCUIT AND WAVEFORMS



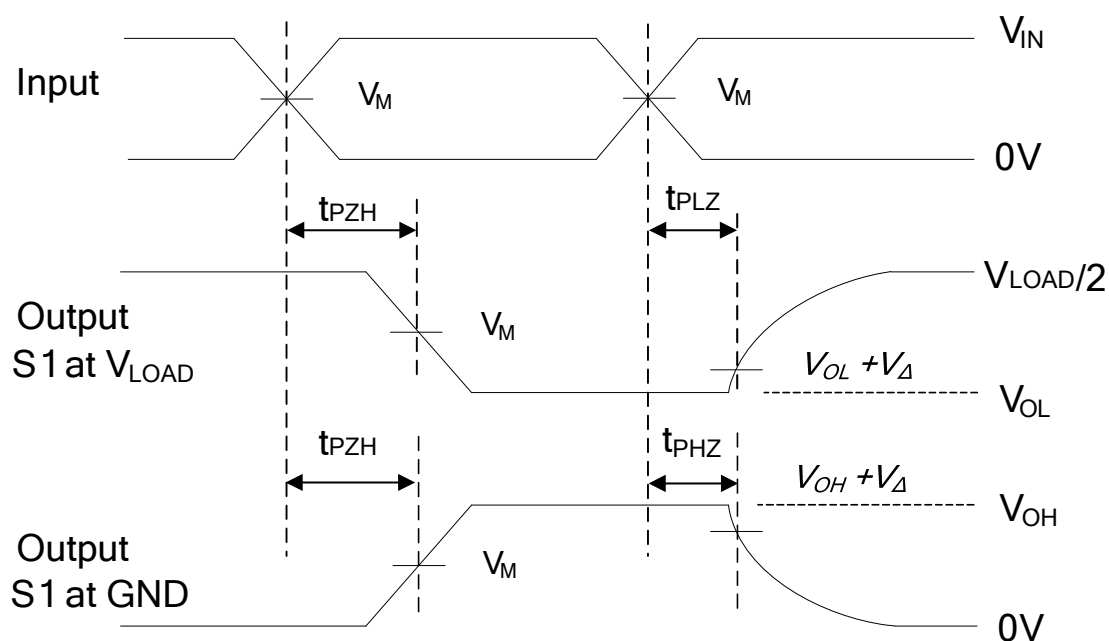
TEST	S1
t _{PLH} /t _{PHL}	Open
t _{PLZ} /t _{PZL}	V _{LOAD}
t _{PHZ} /t _{PZH}	GND

V _{CC}	Inputs		V _M	V _{LOAD}	C _L	R _L	V _Δ
	V _{IN}	t _r , t _f					
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	2*V _{CC}	15pF	1MΩ	0.15V
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	2*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*V _{CC}	15pF	1MΩ	0.3V
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

■ 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: $PRR \leq 10MHz$, $Z_O = 50\Omega$.

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