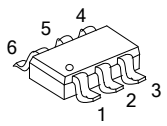
U74LVC1G18

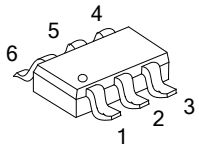
Preliminary

CMOS IC

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



SOT-363



SOT-26

■ 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 μA (Max.)
* ±24 mA output driver at 3.3V
* Typical V_{OLP} (Output Ground Bounce) < 0.8V, V_{CC} = 3.3 V, T_A = 25 ℃
* Typical V_{OHV} (Output V_{OH} undershoot) > 2V, V_{CC} = 3.3 V, T_A = 25 ℃
* I_{OFF} supports partial-power-down mode operation

■ ORDERING INFORMATION

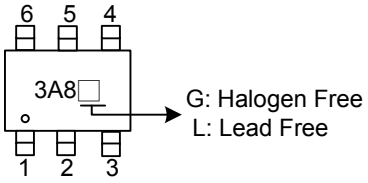
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G18L-AL6-R	U74LVC1G18G-AL6-R	SOT-363	Tape Reel
U74LVC1G18L-AG6-R	U74LVC1G18G-AG6-R	SOT-26	Tape Reel

U74LVC1G18L-AL6-R

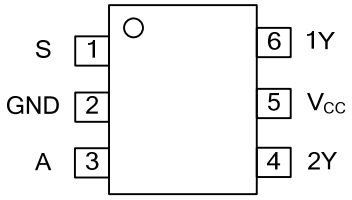
(1)Packing Type
(2)Package Type
(3)Lead Free

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

■ MARKING



■ PIN CONFIGURATION



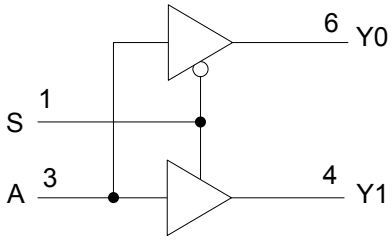
■ FUNCTION TABLE

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°C to +85°C	P_{tot}	250	mW
Storage Temperature		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.

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	θ_{JA}	350	°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_{IH}	V_{CC} = 1.65V to 1.95V	0.65* V_{CC}		V
			V_{CC} = 2.3V to 2.7V	1.7		
			V_{CC} = 3V to 3.6V	2		
			V_{CC} = 4.5V to 5.5V	0.7* V_{CC}		
	Low	V_{IL}	V_{CC} = 1.65V to 1.95V		0.35* V_{CC}	V
			V_{CC} = 2.3V to 2.7V		0.7	
			V_{CC} = 3V to 3.6V		0.8	
			V_{CC} = 4.5V 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}=1.65V		-4	mA
			V_{CC}=2.3V		-8	
			V_{CC}=3V		-16	
					-24	
			V_{CC}=4.5V		-32	
	Low	I_{OL}	V_{CC}=1.65V		4	mA
			V_{CC}=2.3V		8	
			V_{CC}=3V		16	
					24	
			V_{CC}=4.5V		32	
Input Transition Rise or Fall Rate		$\Delta t/\Delta v$	V_{CC}=1.8±0.15V, 2.5±0.2V		20	ns/V
			V_{CC}=3.3±0.3V		10	
			V_{CC}=5.0+0.5V		5	
Operating Temperature		T_A		-40	85	°C

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

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

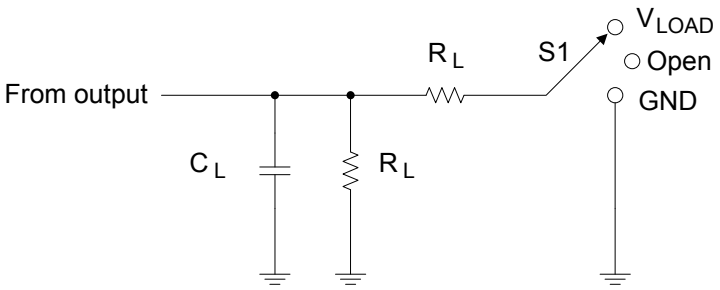
■ SWITCHING CHARACTERISTICS (T_A =25°C)

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±0.15V, C_L=15pF, R_L=1MΩ	2.3	8.4	ns
		V_{CC}=2.5±0.20V, C_L=15pF, R_L=1MΩ	1.1	4.2	
		V_{CC}=3.3±0.30V, C_L=15pF, R_L=1MΩ	1.1	3.4	
		V_{CC}=5.0±0.50V, C_L=15pF, R_L=1MΩ	0.8	2.7	
Propagation delay from input A to output Y	t_{PLH} t_{PHL} (t_{pd})	V_{CC}=1.8±0.15V, C_L=30pF, R_L=1KΩ	3.5	9.3	
		V_{CC}=2.5±0.20V, C_L=30pF, R_L=500Ω	1.7	5	
		V_{CC}=3.3±0.30V, C_L=50pF, R_L=500Ω	1.5	4.2	
		V_{CC}=5.0±0.50V, C_L=50pF, R_L=500Ω	0.7	3.2	
Propagation delay from input S to output Y	t_{PZL} t_{PZH} (t_{en})	V_{CC}=1.8±0.15V, C_L=30pF, R_L=1KΩ	3.6	10.2	ns
		V_{CC}=2.5±0.20V, C_L=30pF, R_L=500Ω	1.7	5.6	
		V_{CC}=3.3±0.30V, C_L=50pF, R_L=500Ω	1.5	4.6	
		V_{CC}=5.0±0.50V, C_L=50pF, R_L=500Ω	0.9	3.4	
Propagation delay from input S to output Y	t_{PLZ} t_{PHZ} (t_{dis})	V_{CC}=1.8±0.15V, C_L=30pF, R_L=1KΩ	1.9	12.7	ns
		V_{CC}=2.5±0.20V, C_L=30pF, R_L=500Ω	1	5.3	
		V_{CC}=3.3±0.30V, C_L=50pF, R_L=500Ω	1.1	4.9	
		V_{CC}=5.0±0.50V, C_L=50pF, R_L=500Ω	0.5	3.3	

■ OPERATING CHARACTERISTICS (T_A =25°C)

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

■ TEST CIRCUIT AND WAVEFORMS

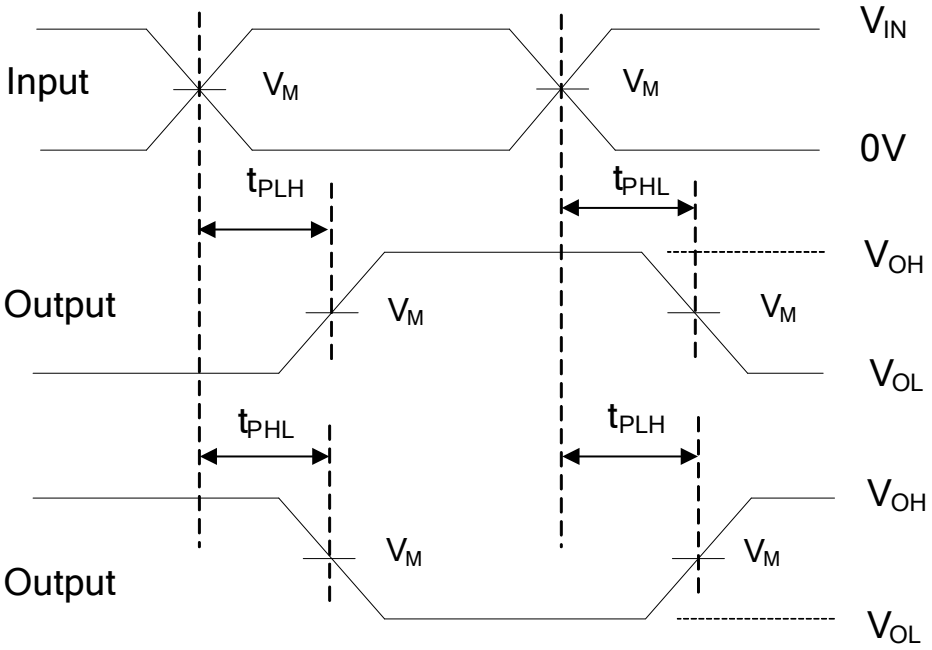


TEST CIRCUIT

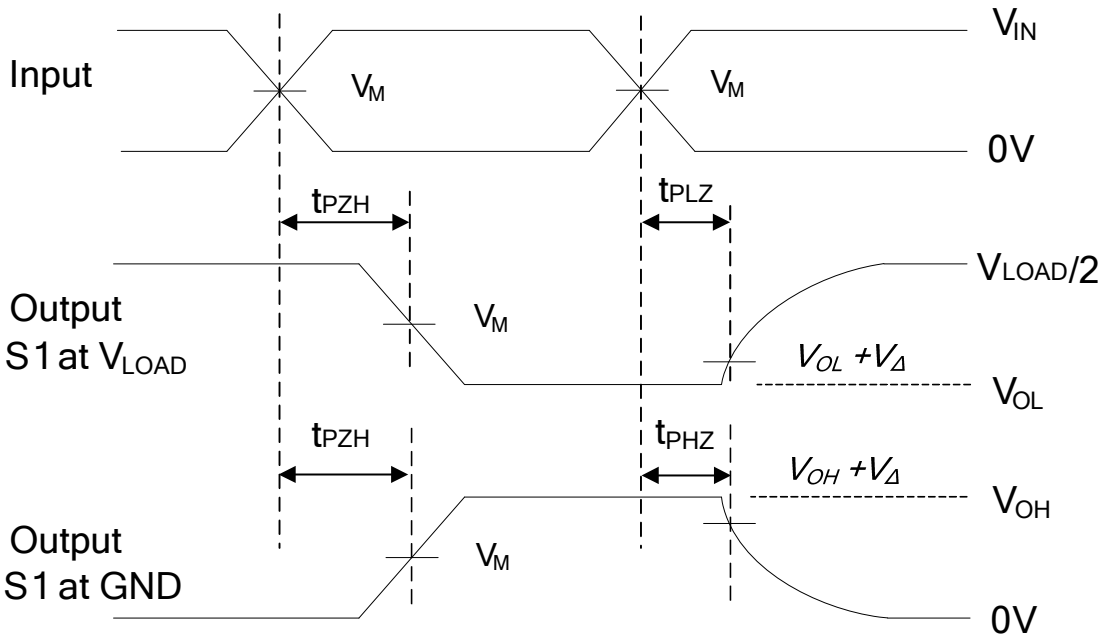
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

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 ≤10MHz, Z_O = 50Ω.