



U74LVC1G66

CMOS IC

SINGLE BILATRAL ANALOG SWITCH

DESCRIPTION

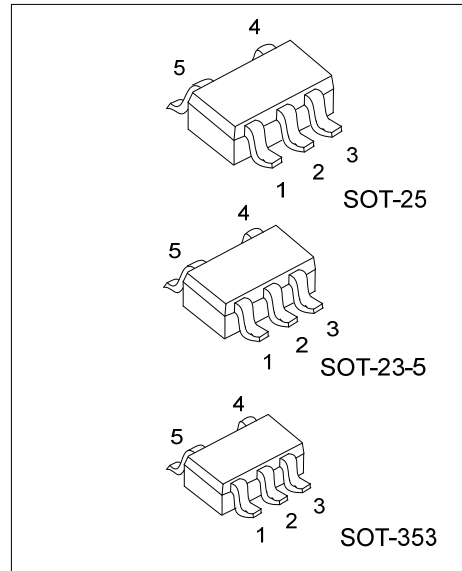
The **U74LVC1G66** is a high-speed CMOS device.

The **U74LVC1G66** has two data input/output pins(A and B) and an active HIGH enable input pin(C) .

The **U74LVC1G66** can handle both analog and digital signals. The signals can be transmitted in either direction when enable pin is high . The analog switch is off when enable pin is low.

FEATURES

- * Operation Voltage Range: 1.65~5.5V
- * Inputs Accept Voltages to 5.5V
- * Max t_{PD} of 0.8 ns at 3.3V
- * High Degree of Linearity

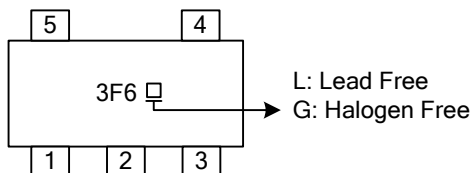


ORDERING INFORMATION

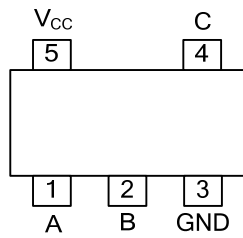
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G66L-AE5-R	U74LVC1G66G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G66L-AF5-R	U74LVC1G66G-AF5-R	SOT-25	Tape Reel
U74LVC1G66L-AL5-R	U74LVC1G66G-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G66G-AE5-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



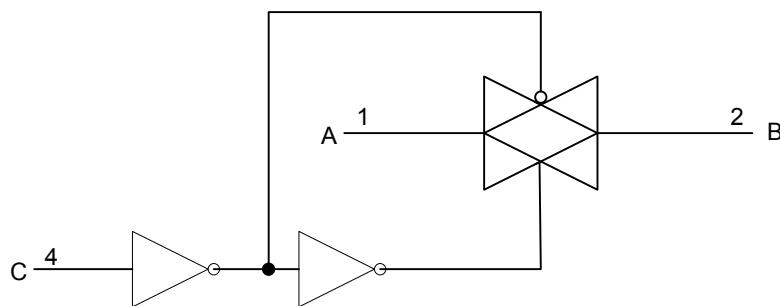
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

CONTROL INPUT(C)	SWITCH
L	OFF
H	ON

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage(Note2)	V_{CC}	-0.5 ~ 6.5	V
Input Voltage	V_{IN}	-0.5 ~ 6.5	V
Switch I/O voltage range	$V_{I/O}$	-0.5 ~ $V_{CC}+0.5$	V
Control Input Clamp Current($V_{IN}<0$)	I_{IK}	-50	mA
I/O Port Diode Current($V_{I/O}<0$ or $V_{I/O}>V_{CC}$)	I_{IOK}	± 50	mA
On-state Switch Current($V_{I/O} : 0$ to V_{CC})	I_T	± 50	mA
V_{CC} or GND Current	I_{CC}	± 100	mA
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

Notes: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 2. 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 COMDITIONS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		1.65		5.5	V
Input Voltage	V_{IN}		0		5.5	V
I/O Port Voltage	$V_{I/O}$		0		V_{CC}	V
Input transition rise/fall time	t_R / t_F	$V_{CC}=1.65\text{V}\sim 1.95\text{V}$			20	ns
		$V_{CC}=2.3\text{V}\sim 2.7\text{V}$			20	ns
		$V_{CC}=3\text{V}\sim 3.6\text{V}$			10	ns
		$V_{CC}=4.5\text{V}\sim 5.5\text{V}$			10	ns
Operating Temperature	T_A		-40		+125	$^{\circ}\text{C}$

■ STATIC CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
High-level Input Voltage	V _{IH}	V _{CC} =1.65V~1.95V	0.65× V _{CC}			0.65× V _{CC}			V	
		V _{CC} =2.3V~2.7V	1.7			1.7			V	
		V _{CC} =3V~3.6V	2			2			V	
		V _{CC} =4.5V~5.5V	0.7× V _{CC}			0.7× V _{CC}			V	
Low-level Input Voltage	V _{IL}	V _{CC} =1.65V~1.95V			0.35× V _{CC}			0.35× V _{CC}	V	
		V _{CC} =2.3V~2.7V			0.7			0.7	V	
		V _{CC} =3V~3.6V			0.8			0.8	V	
		V _{CC} =4.5V~5.5V			0.3× V _{CC}			0.3× V _{CC}	V	
ON-resistance(rail)	R _{ON(rail)}	V _I =GND or V _{CC}	V _{CC} =1.65V, I _S =4mA		12	30			45	Ω
			V _{CC} =2.3V, I _S =8mA		9	20			30	Ω
			V _{CC} =3V, I _S =24mA		7.5	15			23	Ω
			V _{CC} =4.5V, I _S =32mA		5.5	10			15	Ω
ON-resistance(peak)	R _{ON(peak)}	V _I =GND or V _{CC}	V _{CC} =1.65V, I _S =4mA		74.5	120			185	Ω
			V _{CC} =2.3V, I _S =8mA		20	30			45	Ω
			V _{CC} =3V, I _S =24mA		11.5	20			30	Ω
			V _{CC} =4.5V, I _S =32mA		7.5	15			23	Ω
On-state Switch Leakage Current	I _{S(ON)}	V _I = V _{CC} or GND, V _C =V _{IH} , V _O = Open, V _{CC} =5.5V			±0.1			2	μA	
Off-state Switch Leakage Current	I _{S(off)}	V _I = V _{CC} and V _O = GND or V _I = GND and V _O = V _{CC} , V _C =V _{IL} , V _{CC} =5.5V			±0.1			1	μA	
Control input current	I _{I(CTL)}	V _C = V _{CC} or GND, V _{CC} =5.5V			±0.1			1	μA	
Quiescent Supply Current	I _{CC}	V _C = V _{CC} or GND, V _{CC} =5.5V			1			10	μA	
Additional Quiescent Supply Current	ΔI _{CC}	V _C = V _{CC} -0.6V, V _{CC} =5.5V			500			500	μA	

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Frequency response(1) (switch ON)	A or B	B or A	C _L =50pF, R _L =600Ω, F _{IN} =sine wave	V _{CC} =1.65V		35	MHz
				V _{CC} =2.3		120	MHz
				V _{CC} =3V		175	MHz
				V _{CC} =4.5V		195	MHz
			C _L =5pF, R _L =50Ω, F _{IN} =sine wave	V _{CC} =1.65V		>300	MHz
				V _{CC} =2.3V		>300	MHz
				V _{CC} =3V		>300	MHz
				V _{CC} =4.5V		>300	MHz
Crosstalk (control input to signal output)	C	A or B	C _L =50pF, R _L =600Ω, F _{IN} =1MHz(square wave)	V _{CC} =1.65V		35	mV
				V _{CC} =2.3V		50	mV
				V _{CC} =3V		70	mV
				V _{CC} =4.5V		100	mV
Feedthrough attenuation(2) (switch OFF)	A or B	B or A	C _L =50pF, R _L =600Ω, F _{IN} =1MHz(sine wave)	V _{CC} =1.65V		-58	dB
				V _{CC} =2.3V		-58	dB
				V _{CC} =3V		-58	dB
				V _{CC} =4.5V		-58	dB
			C _L =5pF, R _L =50Ω, F _{IN} =1MHz(sine wave)	V _{CC} =1.65V		-42	dB
				V _{CC} =2.3V		-42	dB
				V _{CC} =3V		-42	dB
				V _{CC} =4.5V		-42	dB
Sine-wave distortion	A or B	B or A	C _L =50pF, R _L =10KΩ, F _{IN} =1KHZ(sine wave)	V _{CC} =1.65V		0.1	%
				V _{CC} =2.3V		0.025	%
				V _{CC} =3V		0.015	%
				V _{CC} =4.5V		0.01	%
			C _L =50pF, R _L =10kΩ, F _{IN} =10KHz(sine wave)	V _{CC} =1.65V		0.15	%
				V _{CC} =2.3V		0.025	%
				V _{CC} =3V		0.015	%
				V _{CC} =4.5V		0.01	%

Notes: 1. Adjust f_{IN} voltage to obtain 0 dBm at output. Increase f_{IN} frequency until dB meter reads -3dB.

2. Adjust f_{IN} voltage to obtain 0 dBm at input.

■ DYNAMIC CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay time	t _{PD} (1)	A or B	B or A	V _{CC} =1.8V±0.15V			3			4	ns
				V _{CC} =2.5V±0.2V			2.4			3.4	ns
				V _{CC} =3.3V±0.3V			2.2			3.2	ns
				V _{CC} =5V±0.5V			2			3	ns
Tun-ON time	t _{EN} (2)	C	A or B	V _{CC} =1.8V±0.15V	2.5		12			15.5	ns
				V _{CC} =2.5V±0.2V	1.9		7.5			9.5	ns
				V _{CC} =3.3V±0.3V	1.8		6.5			8	ns
				V _{CC} =5V±0.5V	1.5		5.5			6.5	ns
Tun-OFF time	t _{DIS} (3)	C	A or B	V _{CC} =1.8V±0.15V	2.2		10			13	ns
				V _{CC} =2.5V±0.2V	1.4		6.9			9	ns
				V _{CC} =3.3V±0.3V	2		6.5			8.5	ns
				V _{CC} =5V±0.5V	1.4		5			6.5	ns

Notes: 1. t_{PLH} and t_{PHL} are the same as t_{PD}.

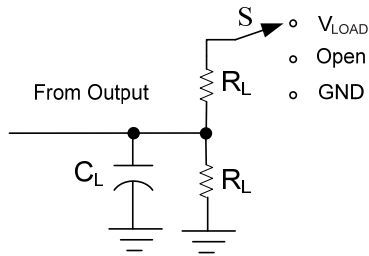
2. t_{PZL} and t_{PZH} are the same as t_{EN}.

3. t_{PLZ} and t_{PHZ} are the same as t_{DIS}.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
C _{ic} Control input capacitance	C _{IC}	V _{CC} =5V		2		pF
C _{io(off)} Switch input/output capacitance	C _{OFF}	V _{CC} =5V		6		pF
C _{io(on)} Switch input/output capacitance	C _{ON}	V _{CC} =5V		13		pF
Power Dissipation Capacitance	C _{PD}	V _{CC} =3.3V, f=10MHz		9		pF

TEST CIRCUIT AND WAVEFORMS



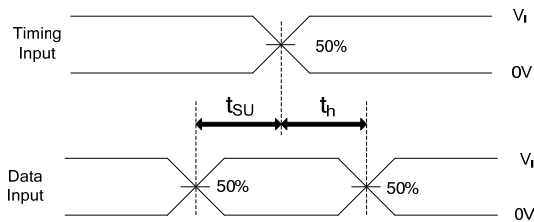
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{LOAD}

t_{PD} is the same as t_{PHL} and t_{PLH} .
 t_{en} is the same as t_{PZL} and t_{PZH} .
 t_{dis} is the same as t_{PLZ} and t_{PHZ} .

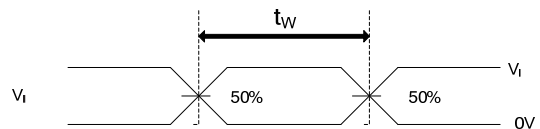
TEST CIRCUIT

Note: C_L includes probe and jig capacitance.

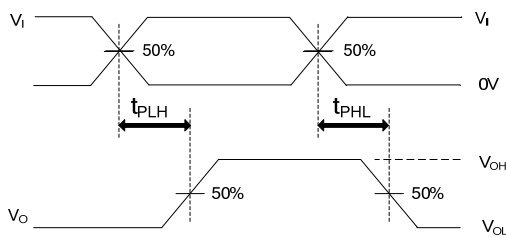
V_{CC}	V_I	t_R, t_F	V_M	V_{LOAD}	C_L	R_L	V_{Δ}
1.65V~1.95V	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
2.3V~2.7V	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
3.0V~3.6V	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V
4.5V~5.5V	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V



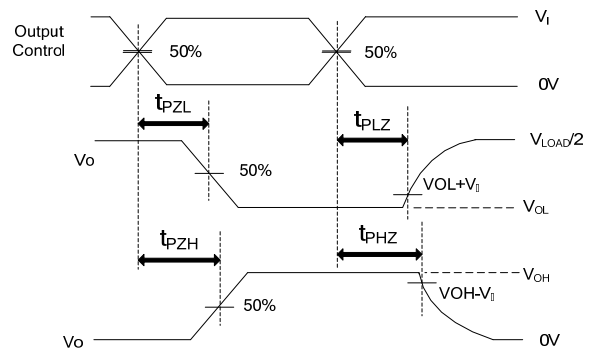
SETUP TIME AND HOLD TIME



PULSE WIDTH



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

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