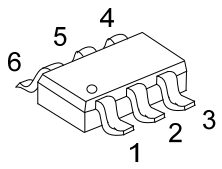
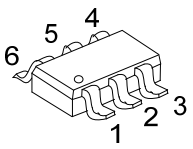
U74LVC1G3157A

CMOS IC

SINGLE-POLE,DOUBLE-THROW ANALOG SWITCH



SOT-26



SOT-363

X1DFN14510-6

■ DESCRIPTION

The UTC **U74LVC1G3157A** is a low voltage single-pole, double-throw (SPDT) analog switch intending for use in chopping, modem, signal gating, and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

■ FEATURES

* Useful in Both Analog and Digital Applications
* Rail-to-Rail Signal Handing
* Broad V_{CC} Operating Range:1.65V to 5.5V
* Over-Voltage Tolerance of Control Input to 6.5V

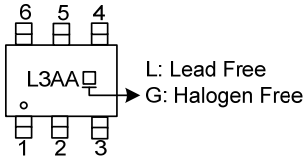
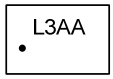
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G3157AL-AG6-R	U74LVC1G3157AG-AG6-R	SOT-26	Tape Reel
U74LVC1G3157AL-AL6-R	U74LVC1G3157AG-AL6-R	SOT-363	Tape Reel
U74LVC1G3157AL-KAP-R	U74LVC1G3157AG-KAP-R	X1DFN14510-6	Tape Reel

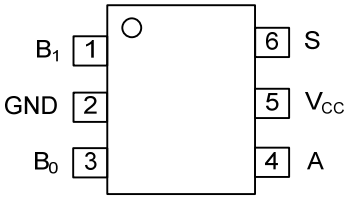
U74LVC1G3157AG-AG6-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AG6: SOT-26, AL6: SOT-363, KAP: X1DFN14510-6
(3) G: Halogen Free and Lead Free, L: Lead Free

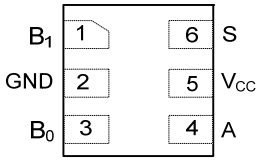
■ MARKING

SOT-26 / SOT-363	X1DFN14510-6
	

■ PIN CONFIGURATION



SOT-26 / SOT-363



X1DFN14510-6
(TOP VIEW)

■ PIN DESCRIPTION

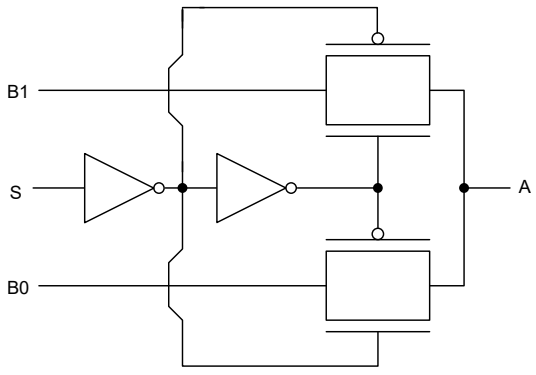
PIN NO.	PIN NAME	DESCRIPTION
1	B1	Independent input or output
2	GND	Ground (0 V)
3	B0	Independent input or output
4	A	Common output or input
5	V_{CC}	Supply voltage
6	S	Select input

■ FUNCTION TABLE

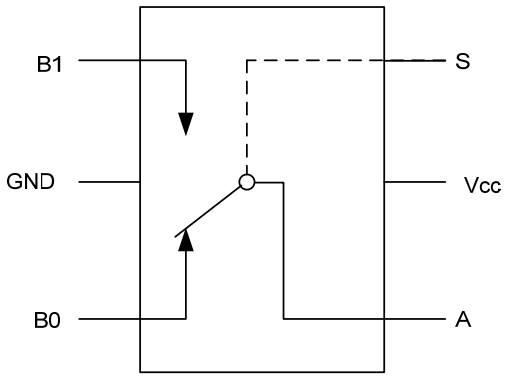
INPUT(S)	OUTPUT(Y)
L	B0 Connected to A
H	B1 Connected to A

H=High Level
L=Low Level

■ LOGIC DIAGRAM



Logic Symbol



Analog Symbol

■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +6.5	V
Switch Voltage	V_S	-0.5 ~ V_{CC}+0.5	V
Input Voltage	V_{IN}	-0.5 ~ +6.5	V
V_{CC} or GND Current	I_{CC}	±100	mA
Continuous Output Current	I_{OUT}	±128	mA
Input Clamp Current (V_{IN}<0V)	I_{IK}	-50	mA
Junction Temperature	T_J	+150	°C
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.

■ RECOMMENDED OPERATING CONDITIONS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		1.65		5.5	V
Control Input Voltage	V_{IN}	(Note)	0		V_{CC}	V
Switch Input Voltage	V_{IN}	(Note)	0		V_{CC}	V
Output Voltage	V_{OUT}	(Note)	0		V_{CC}	V
High-level Input Voltage	V_{IH}	V_{CC}=1.65V ~ 1.95V	0.75×V_{CC}			V
		V_{CC}=2.3V ~ 5.5V	0.7×V_{CC}			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.65V ~ 1.95V			0.25×V_{CC}	V
		V_{CC}=2.3V ~ 5.5V			0.3×V_{CC}	V
Input Rise or Fall Times	$\frac{\Delta t}{\Delta V}$	V_{CC}=1.65V ~ 1.95V			20	ns/V
		V_{CC}=2.3V ~ 2.7V			20	ns/V
		V_{CC}=3V ~ 3.6V			10	ns/V
		V_{CC}=4.5V ~ 5.5V			10	ns/V
Operating Temperature	T_A		-40		+125	°C

Note: Control input must be held HIGH or LOW; it must not float.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-26	θ_{JA}	230	°C/W
	SOT-363		330	°C/W
	X1DFN14510-6		400	°C/W
Junction to Case	SOT-26	θ_{JC}	90	°C/W
	SOT-363		110	°C/W
	X1DFN14510-6		260	°C/W

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Switch On Resistance	R_{ON}	V_{CC}=4.5V, V_{IN}=0V, I_{OUT}=30mA		3	7		6	8	Ω
		V_{CC}=4.5V, V_{IN}=2.4V, I_{OUT}=-30mA		5	12		7	13	Ω
		V_{CC}=4.5V, V_{IN}=4.5V, I_{OUT}=-30mA		7	15		7	16	Ω
		V_{CC}=3V, V_{IN}=0V, I_{OUT}=24mA		4	9		7	10	Ω
		V_{CC}=3V, V_{IN}=3V, I_{OUT}=-24mA		10	20		10	20	Ω
		V_{CC}=2.3V, V_{IN}=0V, I_{OUT}=8mA		5	12		8	13	Ω
		V_{CC}=2.3V, V_{IN}=2.3V, I_{OUT}=-8mA		13	30		13	30	Ω
		V_{CC}=1.65V, V_{IN}=0V, I_{OUT}=4mA		6.5	20		11	20	Ω
		V_{CC}=1.65V, V_{IN}=1.65V, I_{OUT}=-4mA		17	50		17	50	Ω
On Resistance Match Between Channel	ΔR_{ON}	V_{CC}=4.5V, V_{BN}=3.15V, I_A=-30mA		0.15			0.2		Ω
		V_{CC}=3V, V_{BN}=2.1V, I_A=-24mA		0.2			0.3		Ω
		V_{CC}=2.3V, V_{BN}=1.6V, I_A=-8mA		0.5			0.5		Ω
		V_{CC}=1.65V, V_{BN}=1.15V, I_A=-4mA		0.5			0.5		Ω
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 5.5V, 0≤V_{IN}≤5.5V			±0.1			±0.1	μA
Off State Leakage Current	I_{OFF}	V_{CC}=1.65 ~ 5.5V, 0≤A,B≤V_{CC}			±0.1			±0.1	μA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			±1			±1	μA
Analog Signal Range		V_{CC}= V_{CC}, V_{IN}=V_{CC} or GND	0		V_{CC}	0		V_{CC}	V

■ SWITCHING CHARACTERISTICS (see TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay Bus to Bus(Note)	t_{PLH} t_{PHL}	C_L=50 pF, R_L=500Ω	V_{CC}=1.65 ~ 1.95V			3.5			4	ns
			V_{CC}=2.3 ~ 2.7V			1.2			2	ns
			V_{CC}=3 ~ 3.6V			0.8			1	ns
			V_{CC}=4.5 ~ 5.5V			0.3			0.7	ns
Output Enable Time Turn-On Time (A to B_N)	t_{PZL} t_{PZH}	C_L=50 pF, R_L=500Ω	V_{CC}=1.65 ~ 1.95V	7		23	1		24.5	ns
			V_{CC}=2.3 ~ 2.7V	3.5		13	1		14.5	ns
			V_{CC}=3 ~ 3.6V	2.5		6.9	1		8	ns
			V_{CC}=4.5 ~ 5.5V	1.7		5.2	0.5		6	ns
Output Enable Time Turn-Off Time (A to B_N)	t_{PHZ} t_{PLZ}	C_L=50 pF, R_L=500Ω	V_{CC}=1.65 ~ 1.95V	3		12.5	1		13.5	ns
			V_{CC}=2.3 ~ 2.7V	2		7	1		8	ns
			V_{CC}=3 ~ 3.6V	1.2		5	1		5.5	ns
			V_{CC}=4.5 ~ 5.5V	0.8		3.5	0.5		4.5	ns

Note: Guaranteed by design.

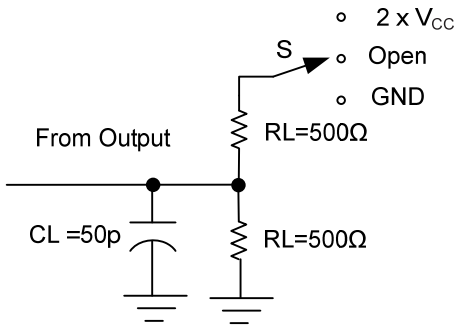
■ DYNAMIC CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Bandwidth	BW	R_L=50Ω, Switch ON	V_{CC}=1.8V		220		MHz
			V_{CC}=2.3V		220		MHz
			V_{CC}=3V		220		MHz
			V_{CC}=4.5V		220		MHz
OFF Isolation	O_{ISO}	R_L=50Ω,f=10MHz, Switch OFF	V_{CC}=1.8V		-60		dB
			V_{CC}=2.3V		-65		dB
			V_{CC}=3V		-65		dB
			V_{CC}=4.5V		-65		dB
Crosstalk	X_{TALK}	R_L=50Ω,f=10MHz, Switch ON	V_{CC}=1.8V		-66		dB
			V_{CC}=2.3V		-66		dB
			V_{CC}=3V		-66		dB
			V_{CC}=4.5V		-66		dB
Total Harmonic Distortion	THD	R_L=600Ω,C_L=50pF, f=600Hz~20KHz	V_{CC}=1.8V		0.015		%
			V_{CC}=2.3V		0.025		%
			V_{CC}=3V		0.015		%
			V_{CC}=4.5V		0.01		%

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

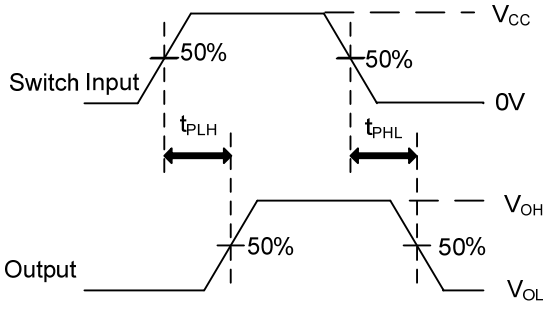
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Control Pin Input Capacitance	C_{IN}	V_{CC}=0V		2.3		pF
B Port Off Capacitance	C_{IO-B}	V_{CC}=5V		6.5		pF
A Port Capacitance When Switch Is Enabled	C_{IOA-ON}	V_{CC}=5V		18.5		pF

■ TEST CIRCUIT AND WAVEFORMS

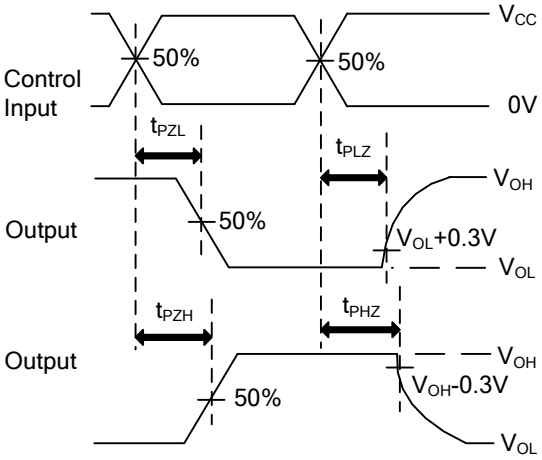


TEST CIRCUIT

TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	2 x V_{CC}



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

Note: C_L includes probe and jig capacitance.
PRR ≤1MHz, Z_O = 50Ω, t_R ≤2.5ns, t_F ≤2.5ns.