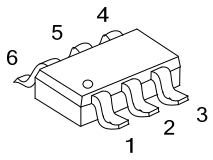
U74LVC1G3157

CMOS IC

SINGLE-POLE,DOUBLE-THROW ANALOG SWITCH



SOT-363

■ DESCRIPTION

The UTC **U74LVC1G3157** 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

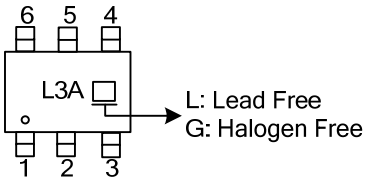
* Useful in Both Analog and Digital Applications
* Rail-to-Rail Signal Handing
* Low ON Resistance: < 10Ω on Typical @ 3.3V V_{CC}
* Broad V_{CC} Operating Range:1.65V to 5.5V
* Over-Voltage Tolerance of Control Input to 7.0V

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G3157L-AL6-R	U74LVC1G3157G-AL6-R	SOT-363	Tape Reel

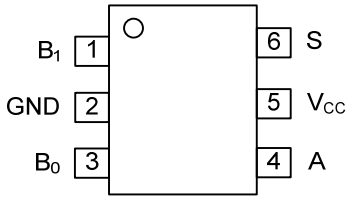
U74LVC1G3157L-AL6-R (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel (2) AL6: SOT-363 (3) G: Halogen Free, L: Lead Free

■ MARKING



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■ PIN CONFIGURATION

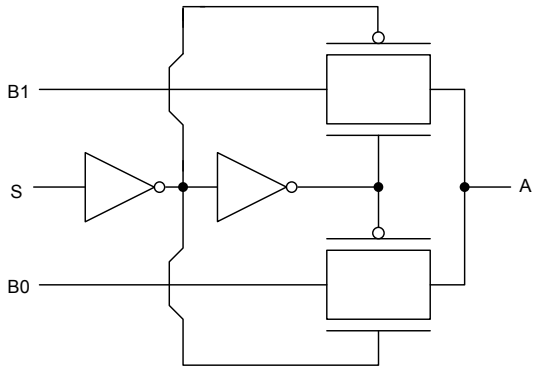


■ FUNCTION TABLE

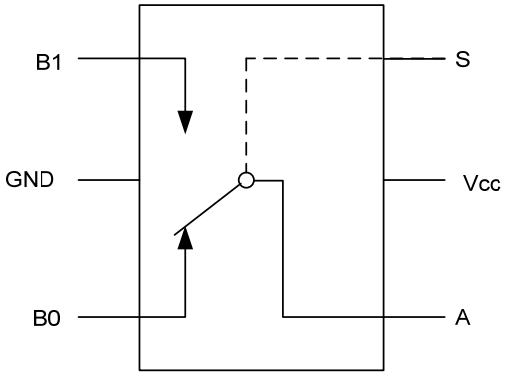
INPUT(S)	OUTPUT(Y)
L	B0 Connected to A
H	B1 Connected to A

H=High Level
L=Low Level

■ LOGIC DIAGRAM



Logic Symbol



Analog Symbol

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7.0	V
Switch Voltage	V_S	-0.5 ~ V_{CC}+0.5	V
Input Voltage	V_{IN}	-0.5 ~ +7.0	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
Operating Temperature	T_{OPR}	-40 ~ + 85	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	270	°C/W

■ RECOMMENDED OPERATING CONDITIONS

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 to 1.95V	0.75×V_{CC}			V
		V_{CC}=2.3V to 5.5V	0.7×V_{CC}			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.65V to 1.95V			0.25×V_{CC}	V
		V_{CC}=2.3V to 5.5V			0.3×V_{CC}	V
Input Rise or Fall Times	$\frac{\Delta t}{\Delta V}$	Control Input V_{CC}=2.3V~3.6V			10	ns/V
		Control Input V_{CC}=4.5V~5.5V			5	ns/V

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

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Switch On Resistance	R_{ON}	V_{CC}=4.5V, V_{IN}=0V ,I_{OUT}=30mA		3.0	7.0	Ω
		V_{CC}=4.5V, V_{IN}=2.4V ,I_{OUT}=-30mA		5.0	12.0	Ω
		V_{CC}=4.5V, V_{IN}=4.5V ,I_{OUT}=-30mA		7.0	15.0	Ω
		V_{CC}=3V, V_{IN}=0V ,I_{OUT}=24mA		4.0	9.0	Ω
		V_{CC}=3V, V_{IN}=3V ,I_{OUT}=-24mA		10.0	20.0	Ω
		V_{CC}=2.3V, V_{IN}=0V ,I_{OUT}=8mA		5.0	12.0	Ω
		V_{CC}=2.3V, V_{IN}=2.3V ,I_{OUT}=-8mA		13.0	30.0	Ω
		V_{CC}=1.65V, V_{IN}=0V ,I_{OUT}=4mA		6.5	20.0	Ω
		V_{CC}=1.65V, V_{IN}=1.65V ,I_{OUT}=-4mA		17.0	50.0	Ω
On Resistance Match Between Channel	ΔR_{ON}	V_{CC}=4.5V, V_{BN}=3.15V, I_A=-30mA		0.15		Ω
		V_{CC}=3V, V_{BN}=2.1V, I_A=-24mA		0.2		Ω
		V_{CC}=2.3V, V_{BN}=1.6V, I_A=-8mA		0.5		Ω
		V_{CC}=1.65V, V_{BN}=1.15V, I_A=-4mA		0.5		Ω
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 to 5.5V, 0≤V_{IN}≤5.5V			±0.1	μA
Off State Leakage Current	I_{OFF}	V_{CC}=1.65 to 5.5V, 0≤A,B≤V_{CC}			±0.1	μA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			1	μA
Analog Signal Range		V_{CC}= V_{CC}, V_{IN}=V_{CC} or GND	0		V_{CC}	V

■ SWITCHING CHARACTERISTICS (see TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
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	ns
			V_{CC}=2.3 ~ 2.7V			1.2	ns
			V_{CC}=3.0 ~ 3.6V			0.8	ns
			V_{CC}=4.5 ~ 5.5V			0.3	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	7.0		23.0	ns
			V_{CC}=2.3 ~ 2.7V	3.5		13.0	ns
			V_{CC}=3.0 ~ 3.6V	2.5		6.9	ns
			V_{CC}=4.5 ~ 5.5V	1.7		5.2	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	3.0		12.5	ns
			V_{CC}=2.3 ~ 2.7V	2.0		7.0	ns
			V_{CC}=3.0 ~ 3.6V	1.2		5.0	ns
			V_{CC}=4.5 ~ 5.5V	0.8		3.5	ns

Note: Guaranteed by design.

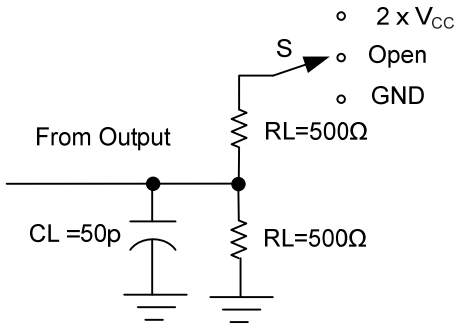
■ DYNAMIC CHARACTERISTICS (T_A=25°C , unless otherwise specified)

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}=3.0V,		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}=3.0V		-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}=3.0V		-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}=3.0V		0.015		%
			V_{CC}=4.5V		0.01		%

■ OPERATING CHARACTERISTICS (T_A=25°C)

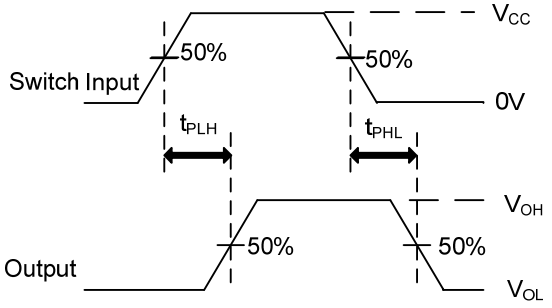
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Control Pin Input Capacitance	C_{IN}	V_{CC}=0V		2.3		pF
B Port Off Capacitance	C_{IO-B}	V_{CC}=5.0V		6.5		pF
A Port Capacitance When Switch Is Enabled	C_{IOA-ON}	V_{CC}=5.0V		18.5		pF

■ TEST CIRCUIT AND WAVEFORMS

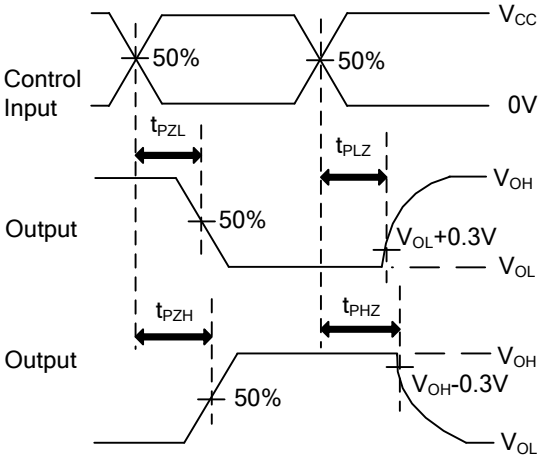


TEST CIRCUIT

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.

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