

2-Channel Analog Multiplexer/Demultiplexer

1. Description

The FLH 74LVC1G3157 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.

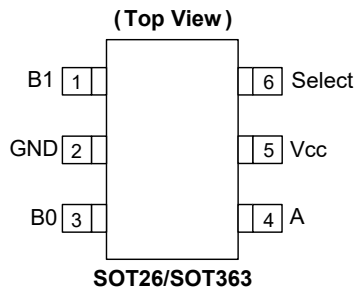
2. Features

- Useful in Both Analog and Digital Applications
- Rail-to-Rail Signal Handling
- Low ON Resistance: <math><10\Omega</math> on Typical at 3.3V V_{CC}
- Broad V_{CC} Operating Range: 1.65V to 5.5V
- Over-Voltage Tolerance of Control Input to 6.5V

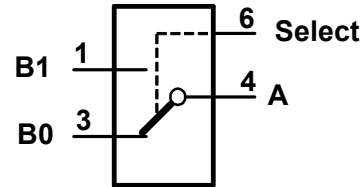
3. Applications

- Multiplexing of Analog Signals
- Multiplexing of Digital Signals
- Wide array of products such as:
 - Tablets, E-readers, Wearables
 - Cell Phones, Personal Navigation / GPS
 - MP3 Players, Cameras, Video Recorders
 - Computer Peripherals, Hard Drives, CD/DVD ROMs
 - TV, DVD, DVR, Set Top Boxes
 - PCs, Networking, Notebooks, Netbooks, PDAs

4. Block Diagram



5. Logic Diagram



6. Simplified Schematic

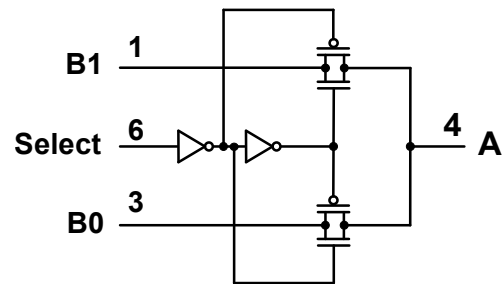


Table 1. Pin Description

Pin Name	Description
B1	Selectable Data I/O
GND	Ground
B0	Selectable Data I/O
A	Common Data I/O
V_{CC}	Supply Voltage
Select	Selection Pin

Table 2. Function Table

Select	Status
H	B1 connected to A B0 high impedance
L	B0 connected to A B1 high impedance

7. Ordering Information

Type Number	Package Type	Packing
74LVC1G3157DBV	SOT-26/SOT-23-6L	Tape & Reel
74LVC1G3157GW	SOT-363	Tape & Reel

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

8. ABSOLUTE MAXIMUM RATING

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
VCC 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.

9. THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT	
Junction to Ambient	SOT-26	θ_{JA}	230	°C/W
	SOT-363		350	°C/W

10. 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 $1.95V$	$0.75 \times V_{CC}$			V
		$V_{CC}=2.3V$ to $5.5V$	$0.7 \times V_{CC}$			V
Low-level Input Voltage	V_{IL}	$V_{CC}=1.65V$ to $1.95V$			$0.25 \times V_{CC}$	V
		$V_{CC}=2.3V$ to $5.5V$			$0.3 \times V_{CC}$	V
Input Rise or Fall Times	Δt	Control Input $V_{CC}=2.3V \sim 3.6V$			10	ns/V
	ΔV	Control Input $V_{CC}=4.5V \sim 5.5V$			5	ns/V

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

11. ELECTRICAL CHARACTERISTICS

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

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

12. 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}	$C_L=50\text{ pF}$, $R_L=500\Omega$	$V_{CC}=1.65 \sim 1.95\text{V}$			3.5	ns
			$V_{CC}=2.3 \sim 2.7\text{V}$			1.2	ns
			$V_{CC}=3.0 \sim 3.6\text{V}$			0.8	ns
			$V_{CC}=4.5 \sim 5.5\text{V}$			0.3	ns
Output Enable Time Turn-On Time (A to B_N)	t_{PZL} t_{PZH}	$C_L=50\text{ pF}$, $R_L=500\Omega$	$V_{CC}=1.65 \sim 1.95\text{V}$	7.0		23.0	ns
			$V_{CC}=2.3 \sim 2.7\text{V}$	3.5		13.0	ns
			$V_{CC}=3.0 \sim 3.6\text{V}$	2.5		6.9	ns
			$V_{CC}=4.5 \sim 5.5\text{V}$	1.7		5.2	ns
Output Enable Time Turn-Off Time (A to B_N)	t_{PHZ} t_{PLZ}	$C_L=50\text{ pF}$, $R_L=500\Omega$	$V_{CC}=1.65 \sim 1.95\text{V}$	3.0		12.5	ns
			$V_{CC}=2.3 \sim 2.7\text{V}$	2.0		7.0	ns
			$V_{CC}=3.0 \sim 3.6\text{V}$	1.2		5.0	ns
			$V_{CC}=4.5 \sim 5.5\text{V}$	0.8		3.5	ns

Note: Guaranteed by design.

13. DYNAMIC CHARACTERISTICS

 (T_A=25°C, unless otherwise specified)

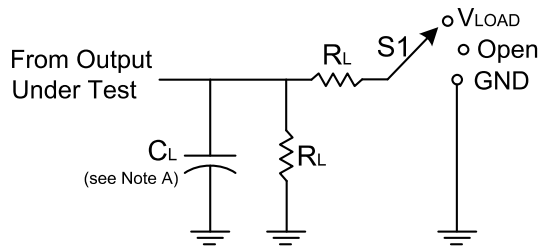
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Bandwidth	BW	R _L =50Ω, Switch ON	V _{CC} =1.8V	220		MHz
			V _{CC} =2.3V	220		MHz
			V _{CC} =3.0V,	220		MHz
			V _{CC} =4.5V	220		MHz
OFF Isolation	O _{ISO}	R _L =50Ω, f=10MHz, Switch OFF	V _{CC} =1.8V,	-60		dB
			V _{CC} =2.3V	-65		dB
			V _{CC} =3.0V	-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		%

14. 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

15. Test Circuit And Waveforms



TEST	S1	R_L
t_{PLH}/t_{PHL}	Open	500 Ω
t_{PLZ}/t_{PZL}	V_{load}	500 Ω
t_{PHZ}/t_{PZH}	GND	500 Ω

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	V_{Δ}
	V_I	t_r/t_f				
1.8V \pm 0.15V	V_{CC}	≤ 2 ns	$V_{CC}/2$	2 x V_{CC}	50pF	0.1V
2.5V \pm 0.2V	V_{CC}	≤ 2 ns	$V_{CC}/2$	2 x V_{CC}	50pF	0.1V
3.3V \pm 0.3V	V_{CC}	≤ 2.5 ns	$V_{CC}/2$	2 x V_{CC}	50pF	0.1V
5V \pm 0.5V	V_{CC}	≤ 2.5 ns	$V_{CC}/2$	2 x V_{CC}	50pF	0.1V

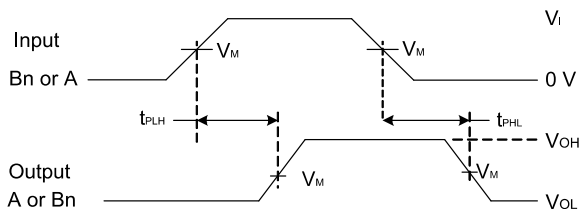


Fig. 1. Voltage Waveform Propagation Delay Times

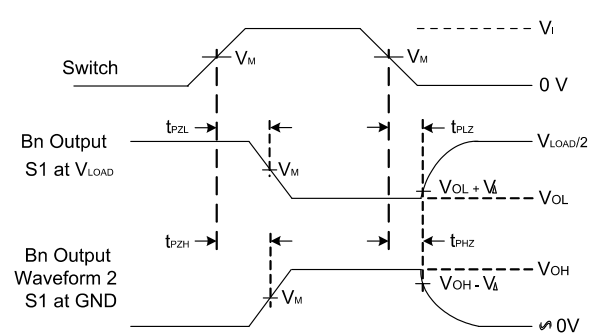
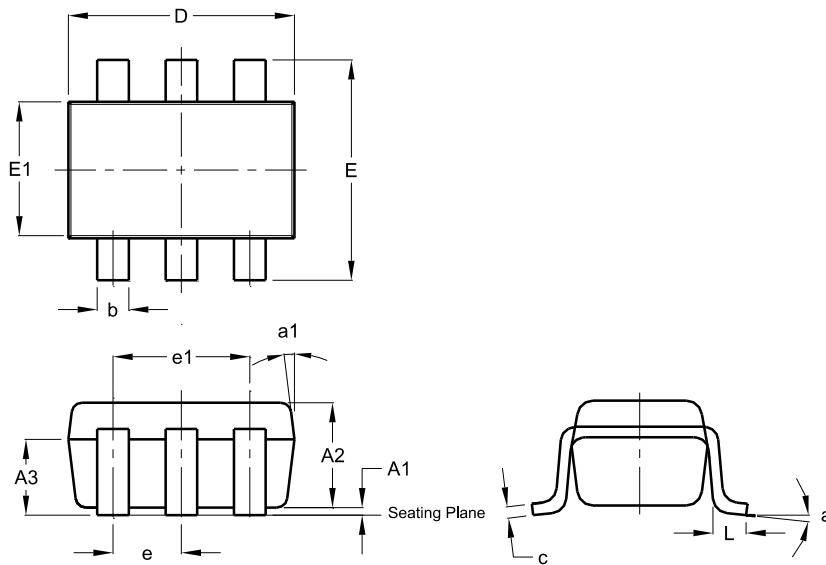


Fig. 2. Voltage Waveform Enable and Disable Times

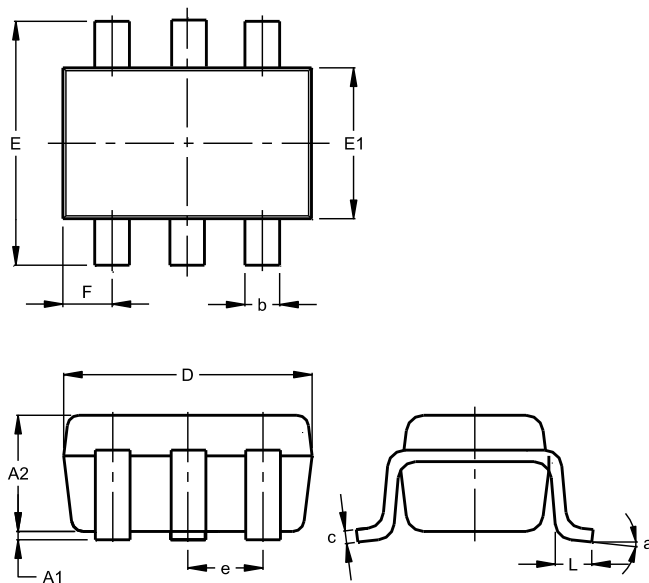
Note:

- Includes test lead and test apparatus capacitance.
- All pulses are supplied at pulse repetition rate ≤ 10 MHz.
- Inputs are measured separately one transition per measurement.
- t_{PLZ} and t_{PHZ} are the same as t_{dis} .
- t_{PZL} and t_{PZH} are the same as t_{EN} .
- t_{PLH} and t_{PHL} are the same as t_{PD} .

16. Package Outlines

SOT-26


SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

SOT-363


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

17. Disclaimers

Limited warranty and liability

Information in this document is believed to be accurate and reliable. However, Fuli hao does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

Suitability for use

Fuli hao products are designed for specific applications and should not be used for any purpose (including, without limitation, automotive, aerospace, medical, life-saving applications, or any other application which requires especially high reliability for the prevention of such defect as may directly cause damage to the third party's life, body or property) not expressly set forth in applicable Fuli hao product documentation.

Right to make changes

Fuli hao reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. Fuli hao takes no responsibility for the content in this document if provided by an information source outside of Fuli hao. This document supersedes and replaces all information supplied prior to the publication hereof.