



SV73157A

Low Voltage, Low Quiescent Current,
4.5 Dual SPDT Analog Switch

v0.95
SAVITECH Corporation

SV73157A

Low Voltage, Low Quiescent Current, 4.5 Dual SPDT Analog Switch

Features

- Wide VCC operating range: 1.8V to 5.5V
- Benchmark ESD protection: 6KV at HBM
- Handle both digital and analog signals
- Reliable Break-before-Make switching
- Low switch-on resistance: 4.5Ω (typ.)
- Excellent on-resistance matching: 0.14Ω (typ.)
- Low charge injection
- Low total harmonic distortion
- Wide -3dB bandwidth: 300MHz
- Low quiescent current: 1.6uA (typ.)
- High impedance, power down control input
- Rail-to-Rail signal handling
- Over-voltage tolerance at control input: 6V
- Available in SC70-6, Lead (Pb) free package

Description

The SV73157A is a bidirectional, single-pole/double-throw (SPDT) CMOS analog switch that is designed to operate from a single +1.8V to +5.5V supply. It features high-bandwidth (300MHz) and low on-resistance (4.5Ω TYP), targeted on high-speed switching applications.

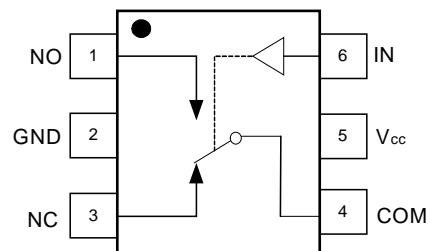
SV73157A offers guaranteed on-resistance matching (0.14Ω TYP) between channels and on-resistance flatness over the signal range (2.3Ω TYP).

This ensures excellent linearity and low distortion when switching high-speed signals. The SV73157A is available in a SC70-6 package.

Function Table

LOGIC	NO	NC
0	OFF	ON
1	ON	OFF

Pin Connection



SV73157A

Ordering Information

Ordering Code	Operation range	Package	Packing
SV73157A-06SC-TR3	-40°C ~ +85°C	SC70-6L	Tape & Reel, 3000 pcs

Absolute Maximum Ratings

Parameter	Value	Unit
V _{cc} to GND, Supply Voltage,	+6.5	V
Input Voltage	GND - 0.3 to (V _{cc}) +0.3	V
Storage Temperature Range	-65 to +150	°C
Continuous current through V _{DD} or GND	100	mA
ESD Susceptibility: HBM	6000	V
ESD Susceptibility: MM	400	V

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Caution

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SAVITECH recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications

Electrical Characteristics

($V_{cc} = +4.5V$ to $+5.5V$, $GND = 0V$, $T_A = -40^\circ C$ to $+85^\circ C$. Typical values are tested at $V_{cc} = +5.0V$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
DC CHARACTERISTICS							
Analog Signal Range	D,IN,S		$-40^\circ C \sim +85^\circ C$	0		V_{cc}	V
On-Resistance	R_{ON}	$V_{cc} = 4.5V$, V_{NO} or $V_{NC} = 3.5V$, $I_{COM} = -10mA$	$+25^\circ C$		4.5		
On-Resistance Match Between Channels	R_{ON}	$V_{cc} = 4.5V$, V_{NO} or $V_{NC} = 3.5V$, $I_{COM} = -10mA$	$+25^\circ C$		0.14		
On-Resistance Flatness	$R_{FLAT(ON)}$	$V_{cc} = 4.5V$, V_{NO} or $V_{NC} = 1.0V, 2.0V, 3.5V$, $I_{COM} = -10mA$	$+25^\circ C$		2.3		
Source OFF Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	$V_{cc} = 5.5V$, V_{NO} or $V_{NC} = 1.0V, 4.5V$, $V_{COM} = 4.5V, 1.0V$	$-40^\circ C \sim +85^\circ C$		0.1		μA
Channel ON Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	$V_{cc} = 5.5V$, $V_{COM} = 1.0V, 4.5V$, V_{NO} or $V_{NC} = 1.0V, 4.5V$, or floating	$-40^\circ C \sim +85^\circ C$		0.1		μA
Input High Voltage	V_{INH}		$-40^\circ C \sim +85^\circ C$	$V_{cc} * 0.6$			V
Input Low Voltage	V_{INL}		$-40^\circ C \sim +85^\circ C$			$V_{cc} * 0.4$	V
Input Leakage Current	I_{IN}	$V_{cc} = 5.5V$, $V_{IN} = 0V$ or $5.5V$	$-40^\circ C \sim +85^\circ C$		0.1		μA
Total Harmonic Distortion	THD+N	$R_L = 600 \Omega$, $C_L = 200pF$, $f = 20Hz$ to $20kHz$	$-40^\circ C \sim +85^\circ C$		0.0007		%
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}	V_{NO} or $V_{NC} = 5.0V$, $V_{IH} = 1.5V$, $V_{IL} = 0V$, $R_L = 300 \Omega$, $C_L = 35pF$	$+25^\circ C$		5.5		ns
Turn-Off Time	t_{OFF}				10		ns
Break-Before-Make Time Delay	t_D	V_{NO1} or $V_{NC1} = V_{NO2}$ or $V_{NC2} = 3.0V$, $R_L = 300 \Omega$, $C_L = 35pF$	$+25^\circ C$		4.5		ns
Off Isolation	O_{ISO}	$R_L = 50 \Omega$, $C_L = 5pF$, Signal = 0dBm	$f = 10MHz$	$+25^\circ C$		-52	dB
			$f = 1MHz$	$+25^\circ C$		-73	
-3dB Bandwidth	BW	Signal = 0dBm	$+25^\circ C$		300		MHz
Channel ON Capacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	$f = 1MHz$	$+25^\circ C$		14		pF
POWER REQUIREMENTS							
Power Supply Range	V_{cc}		$-40^\circ C \sim +85^\circ C$	1.8		5.5	V
Power Supply Current	I_{cc}	$V_{cc} = +5.5V$, $V_{IN} = 0V$ or V_{cc}	$-40^\circ C \sim +85^\circ C$		1.6		μA

Specifications are subject to change without notice.

Electrical Characteristics

($V_{CC} = +2.7V$ to $+3.6V$, $GND = 0V$, $T_A = -40^\circ C$ to $+85^\circ C$. Typical values are tested at $V_{CC} = +3.0V$, $T_A = +25^\circ C$, unless otherwise noted.)

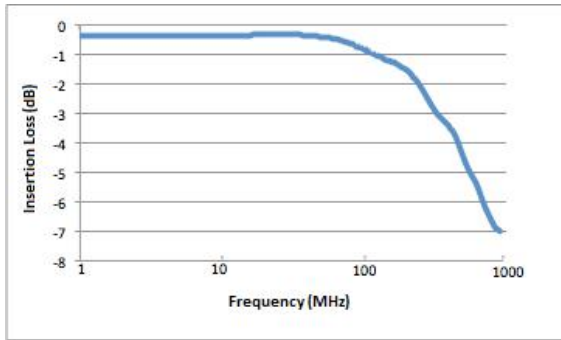
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}		$-40^\circ C \sim +85^\circ C$	0		V_{CC}	V
On-Resistance	R_{ON}	$V_{CC} = 2.7V, V_{NO}$ or $V_{NC} = 1.5V, I_{COM} = -10mA$	$+25^\circ C$		6.5		
On-Resistance Match Between Channels	R_{ON}	$V_{CC} = 2.7V, V_{NO}$ or $V_{NC} = 1.5V, I_{COM} = -10mA$	$+25^\circ C$		0.14		
On-Resistance Flatness	$R_{FLAT(ON)}$	$V_{CC} = 2.7V, V_{NO}$ or $V_{NC} = 1.0V, 1.5V, 2.0V, I_{COM} = -10mA$	$+25^\circ C$		3		
Source OFF Leakage Current	$I_{NC(OFF)}, I_{NO(OFF)}$	$V_{CC} = 3.6V, V_{NO}$ or $V_{NC} = 0.3V, 3.3V, V_{COM} = 3.3V, 0.3V$	$-40^\circ C \sim +85^\circ C$		0.1		μA
Channel ON Leakage Current	$I_{NC(ON)}, I_{NO(ON)}, I_{COM(ON)}$	$V_{CC} = 3.6V, V_{COM} = 0.3V, 3.3V, V_{NO}$ or $V_{NC} = 0.3V, 3.3V, \text{ or floating}$	$-40^\circ C \sim +85^\circ C$		0.1		μA
DIGITAL INPUTS							
Input High Voltage	V_{INH}		$-40^\circ C \sim +85^\circ C$	$V_{CC} * 0.6$			V
Input Low Voltage	V_{INL}		$-40^\circ C \sim +85^\circ C$			$V_{CC} * 0.4$	V
Input Leakage Current	I_{IN}	$V_{CC} = 3.6V, V_{IN} = 0V$ or $3.6V$	$-40^\circ C \sim +85^\circ C$		0.1		μA
DYNAMIC CHARACTERISTICS							
Off Isolation	O_{ISO}	$R_L = 50 \Omega, C_L = 5pF, \text{ Signal} = 0dBm$	$f = 10MHz$	$+25^\circ C$		-52	dB
			$f = 1MHz$	$+25^\circ C$		-73	
-3dB Bandwidth	BW	Signal = 0dBm	$+25^\circ C$		300		MHz
Channel ON Capacitance	$C_{NC(ON)}, C_{NO(ON)}, C_{COM(ON)}$	$f = 1MHz$	$+25^\circ C$		5		pF
Total Harmonic Distortion	THD+N	$R_L = 600 \Omega, C_L = 200pF, f = 20Hz$ to $20kHz$	$+25^\circ C$		0.001		%
POWER REQUIREMENTS							
Power Supply Range	V_{CC}		$-40^\circ C \sim +85^\circ C$	1.8		5.5	V
Power Supply Current	I_{CC}	$V_{CC} = 5.5V, V_{IN} = 0V$ or V_{CC}	$-40^\circ C \sim +85^\circ C$		1.6		μA

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Typical Performance Characteristics

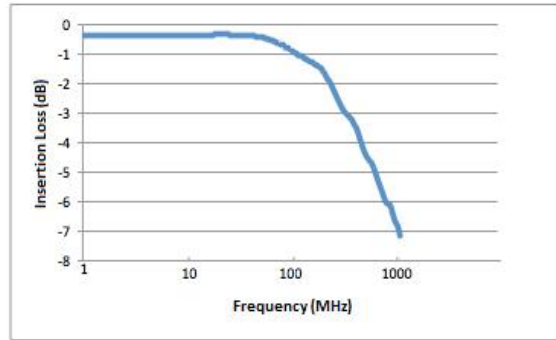
On-Frequency Response

$V_{CC} = +3V$



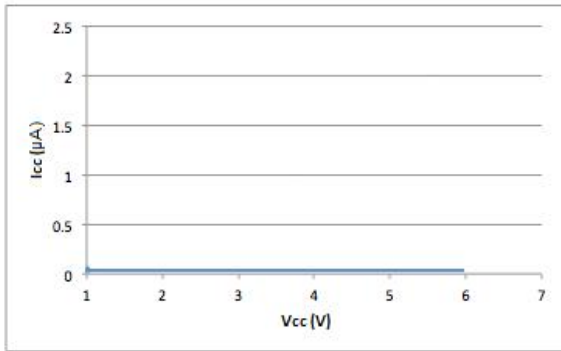
On-Frequency Response

$V_{CC} = +5V$



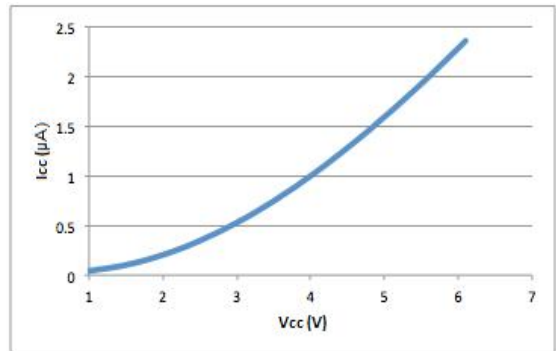
Supply Current vs. V_{CC}

$V_{in} = GND$

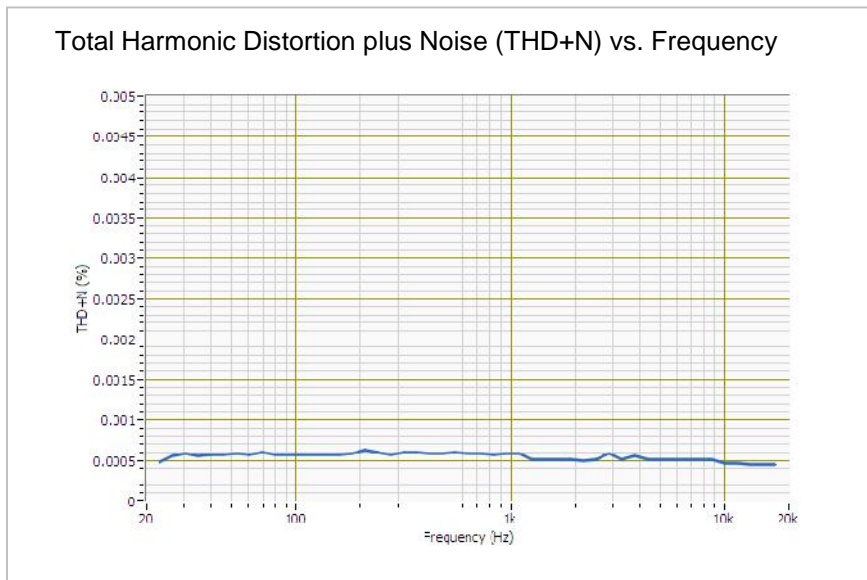


Supply Current vs. V_{CC}

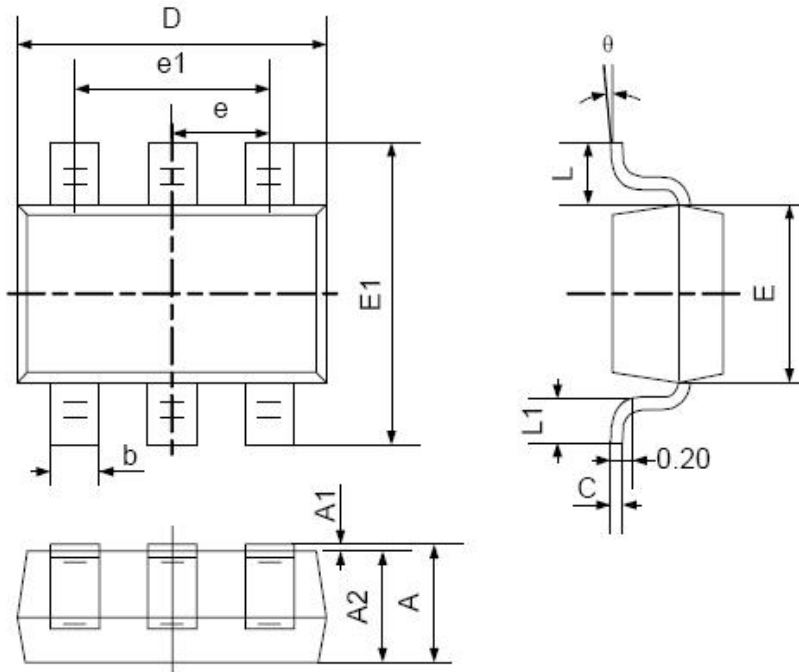
$V_{in} = V_{CC}$



Total Harmonic Distortion plus Noise (THD+N) vs. Frequency



SC70-6 MECHANICAL DATA



Symbol	Dimension in MM		Dimension in Inch	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.085	0.096
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
Θ	0*	8*	0*	8*

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