钍地半导体
Tudi Semiconductor

Product Specification

TUDI-SN74LVC1G3157

4.5Ω Low Voltage SPDT Analog Switch

网址 www.sztdbdt.com

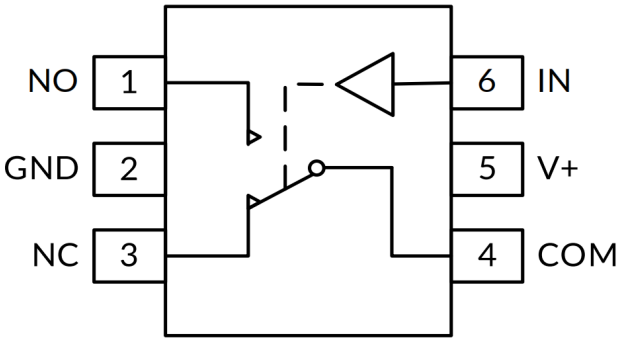
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

FEATURES

- High Bandwidth: 300MHz
- High Speed: Typically 30ns
- Supply Range: +1.8V to +5.5V
- Low ON-State Resistance: 4.5Ω(TYP)
- Break-Before-Make Switching
- Rail-to-Rail Operation
- TTL/CMOS Compatible
- Extended Industrial Temperature Range: -40 ° C to 125 ° C
- ESD Protection Exceeds JESD 22
  - 1000-V Human-Body Model
  - 100-V Machine Model (A115)
  - 1000-V Charged-Device Model (JS-002)
- Micro SIZE PACKAGES: SC70-6, SOT23-6



SOT23/SC70

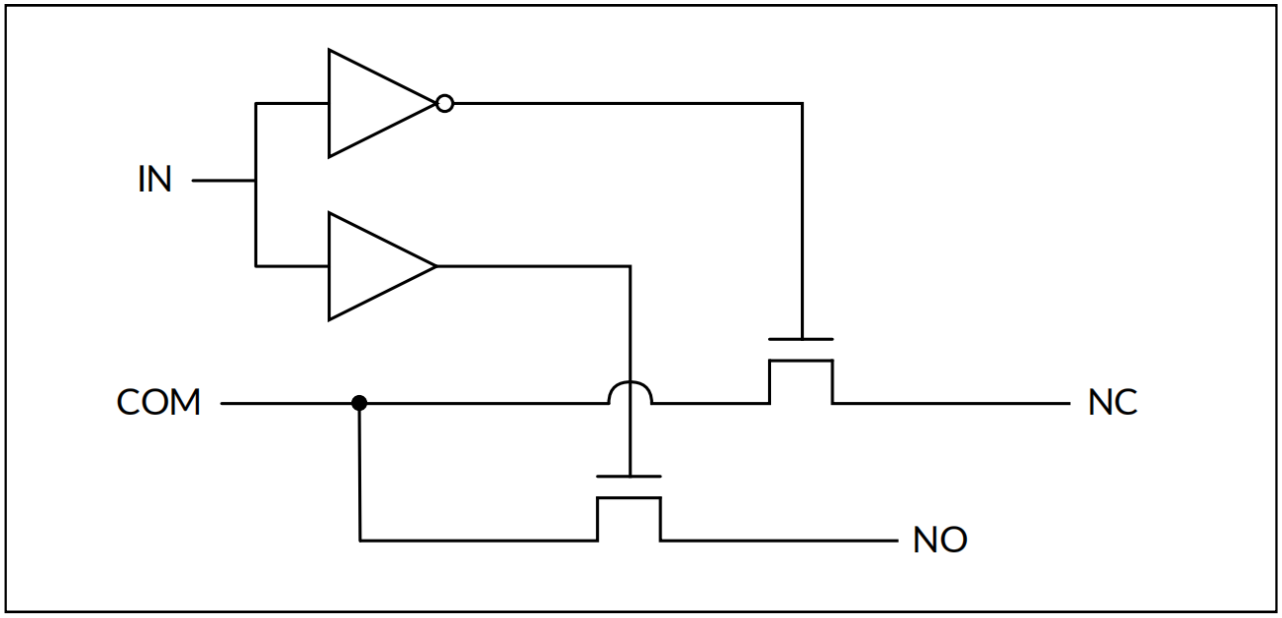
APPLICATIONS

- Wearable Devices
- Battery-Operated Equipment
- Signal Gating, Chopping, Modulation or Demodulation (Modem)
- Portable Computing
- Cell Phones

DESCRIPTIONS

The SN74LVC1G3157 is a single-pole double-throw (SPDT) analog switch that is designed to operate from 1.8 V to 5.5 V.
The SN74LVC1G3157 device can handle both analog and digital signals. It features highbandwidth (300MHz) and low on-resistance (4.5Ω TYP).
Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

BLOCK DIAGRAM



PIN CONFIGURATION AND FUNCTIONS

NAME	PIN	DESCRIPTION
NO	1	Normally-Open Terminal
GND	2	Ground
NC	3	Normally-Closed Terminal
COM	4	Common Terminal
V+	5	Power Supply
IN	6	Digital Control Pin

FUNCTION TABLE

LOGIC	NO	NC
0	OFF	ON
1	ON	OFF

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) (1)

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_+	Supply Voltage	-0.3	6.0	V
V_{In}	Input Voltage	-0.3	6.0	V
	Analog,Digital Voltage Range(2)	-0.3	$(V_+)+0.3$	V
	Continuous Current NO,NC,or COM	-300	+300	mA
I_{PEAK}	Peak Current NO,NC,or COM	-500	+500	mA

Package Thermal Impedance

	PARAMETER		MIN	MAX	UNIT
θ_{JA}	Package thermal impedance(3)	SOT23-6		235	℃/W
		SC70-6		270	

Temperature

	PARAMETER	MIN	MAX	UNIT
Temperature	Junction Temperature,T_J(4)		150	℃
	Storage temperature,T_{stg}	-65	150	

ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

	VALUE	UNIT
Human-Body Model(HBM)	±1000	V
Charged Device Model(CDM)	±1000	
Machine Model(MM)	±100	

ESD SENSITIVITY CAUTION

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.

NOTE:
(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.
(2) Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails should be current-limited to 10mA or less.
(3) The package thermal impedance is calculated in accordance with JESD-51.
(4) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted).

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_{CC}	Supply Voltage	1.8	5.5	V
T_A	Operating temperature	-40	125	℃

Electrical Characteristics

V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V+	T_A	MIN(2)	TYP(3)	MAX(2)	UNIT
ANALOGSWITCH								
Analog Signal Range	V_{no},V_{Nc},V_{COM}			FULL	0		V+	V
On-Resistance	R_{ON}	V_{NO} orV_{Nc}=V+/2, I_{COM}=-10mA,Switch ON,See Figure 1	5V	+25℃ FULL		4.5	 8.5	Ω Ω
			3.3V	+25℃		7		Ω
				FULL			10.5	Ω
On-Resistance Match Between Channels	△R_{ON}	V_{NO} orV_{NC}=V+/2,I_{COM} =-10mA,Switch ON, See Figure 1	5V	+25 ℃		0.15		Ω
				FULL			0.4	Ω
			3.3V	+25 ℃		0.15		Ω
				FULL			0.4	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	0≤(V_{NO} orV_{NC})≤V+/2 ,I_{COM}=-10mA,Switch ON,See Figure 1	5V	+25℃		2		Ω
				FULL			3.3	Ω
			3.3V	+25℃		3		Ω
				FULL			4.3	Ω
NC,NO OFF Leakage Current	$I_{NC(OFF)}$,$I_{NO(OFF)}$	V_{no} or V_{Nc}=0.3V,V+/2V$_{coM}$=V+/2,0.3V See Figure 2	1.8 to 5.5V	FULL			1	μA
NC,NO,COM ON Leakage Current	$I_{NC(ON)}$,$I_{NO(ON)}$, $I_{COM(ON)}$	V_{NO} orV_{NC}=0.3V, OpenV_{COM}=Open,0.3V See Figure 3	1.8 to 5.5V	FULL			1	μA

Electrical Characteristics(continued)

V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS		V+	TA	MIN	TYP	MAX	UNIT
DIGITAL CONTROL INPUTS(1)									
Input High Voltage	V_{INH}			5V	FULL	1.5			V
				3.3V	FULL	1.3			V
Input Low Voltage	V_{INL}			5V	FULL			0.6	V
				3.3V	FULL			0.5	V
Input Leakage Current	I_{IN}	V_{IN}=V_{IO} or 0		1.8 to 5.5V	FULL			1	μA
DYNAMIC CHARACTERISTICS									
Turn-On Time	t_{ON}	V_{COM}=V+,R_L=300Ω,C_L= 35pF,See Figure 5		5V	+25°C		30		ns
				3.3V			40		
Turn-Off Time	t_{OFF}	V_{COM}=V+,R_L=300Ω,C_L= 35pF,See Figure 5		5V	+25°C		25		ns
				3.3V			30		
Break-Before-Make TimeDelay	t_{BBM}	V_{NO1}=V_{NC1}=V_{NO2}=V_{NC2}= 3V,R_L=300Ω,C_L=35pF,See Figure 6		5V3.3V	+25°C		5		ns
				3.3V			8		
Off Isolation	O_{ISO}	R_L=50Ω, Switch OFF, See Figure 11	f=10MHz		+25°C		-52		dB
			f=1MHz		+25°C		-71		dB
-3dBBandwidth	BW	Switch ON,R_L=50Ω,See Figure 7			+25°C		300		MHz
NC,NO OFFCapacitance	$C_{NC(OFF)}$, $C_{NO(OFF)}$	V_{NC} or V_{NO}=V+/2 or GND, Switch OFF,See Figure 4			+25°C		5		pF
NC,NO,COM ONCapacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	V_{NC} or V_{NO}=V+/2 or GND, Switch ON,See Figure 4			+25°C		15		pF

Electrical Characteristics(continued)

V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

POWER REQUIREMENTS							
Power Supply Range	V_+		FULL	1.8		5.5	V
Power Supply Current	I_+ V_{IN}=GND or V_+	5.5V	FULL			1	μA

(1) All unused digital inputs of the device must be held at VIO or GND to ensure proper device operation.
(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.
(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

PARAMETER MEASUREMENT INFORMATION

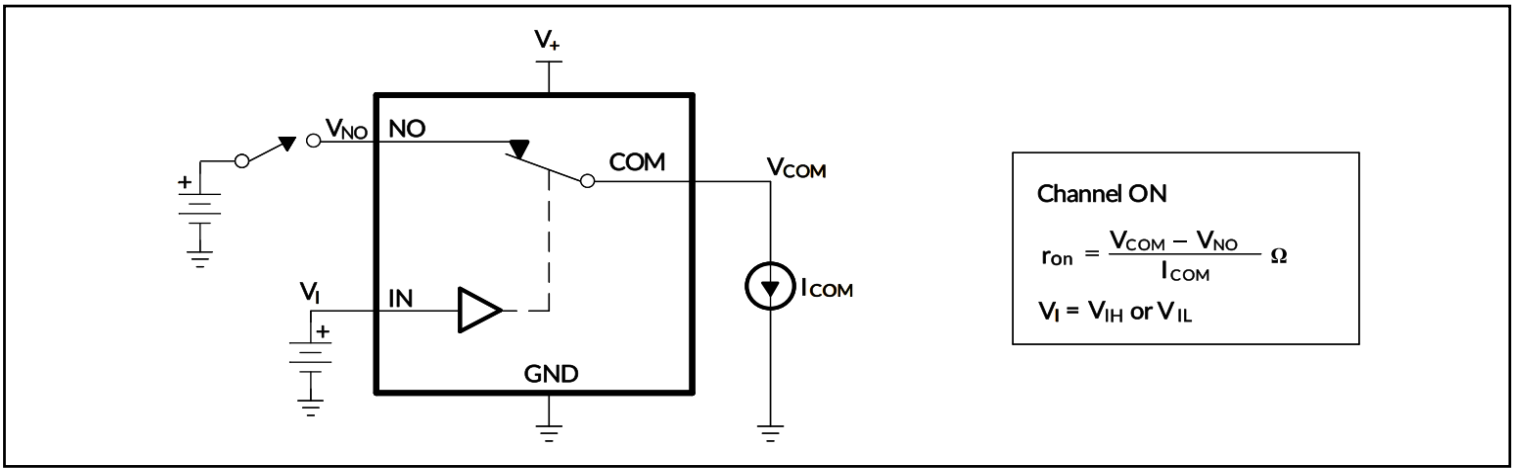


Figure 1. ON-State Resistance (R_{on})

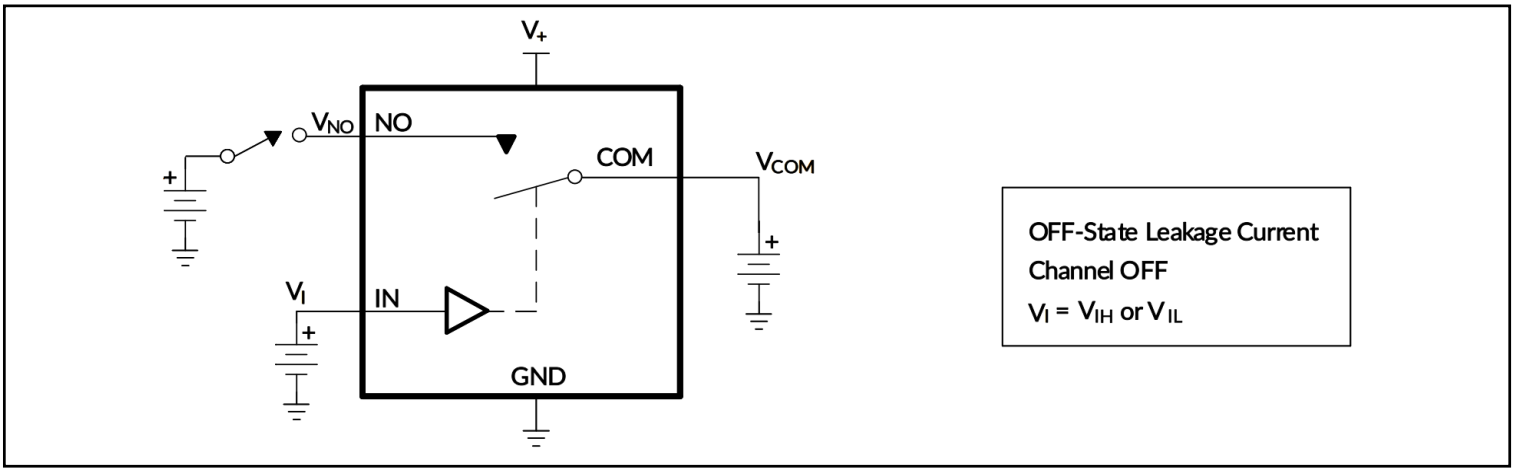


Figure 2. OFF-State Leakage Current ($I_{COM (OFF)}$, $I_{NO (OFF)}$)

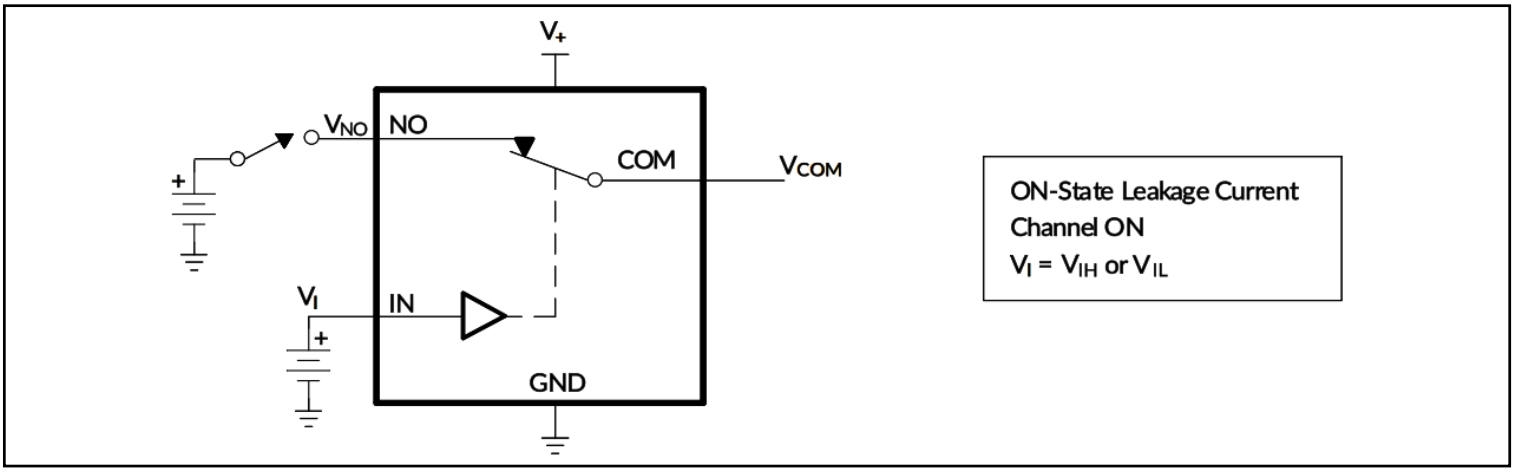


Figure 3. ON-State Leakage Current ($I_{COM (ON)}$, $I_{NO (ON)}$)

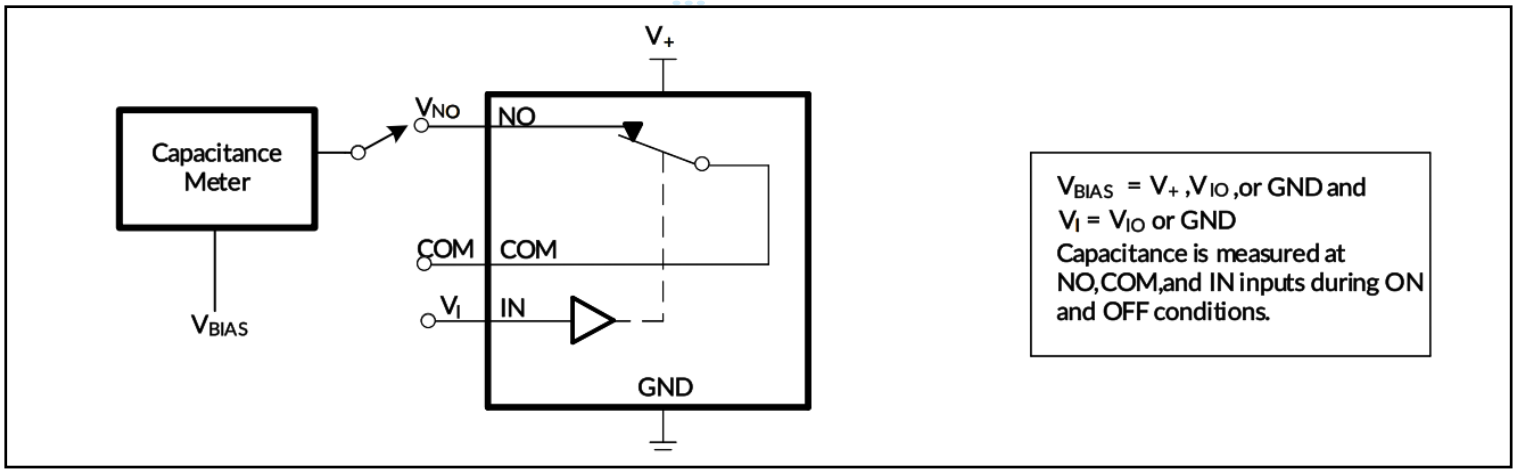
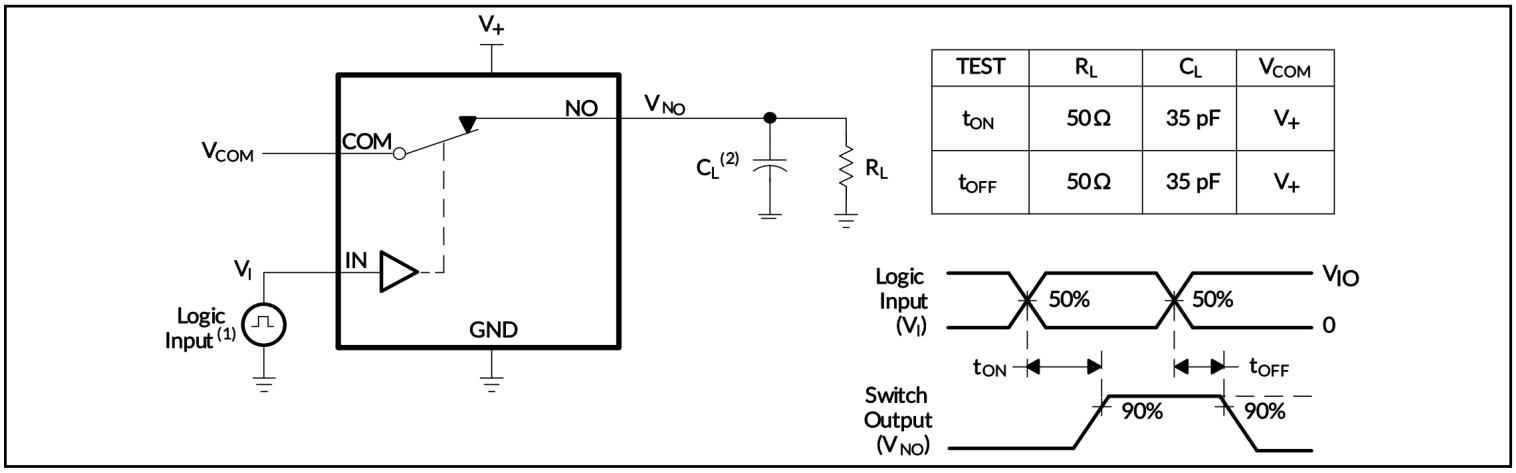


Figure 4. Capacitance (CI, $C_{COM(OFF)}$, $C_{COM(ON)}$, $C_{NO(OFF)}$, $C_{NO(ON)}$)



TEST	R_L	C_L	V_{COM}
t_{ON}	50Ω	35 pF	V+
t_{OFF}	50Ω	35 pF	V+

Figure 5 Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

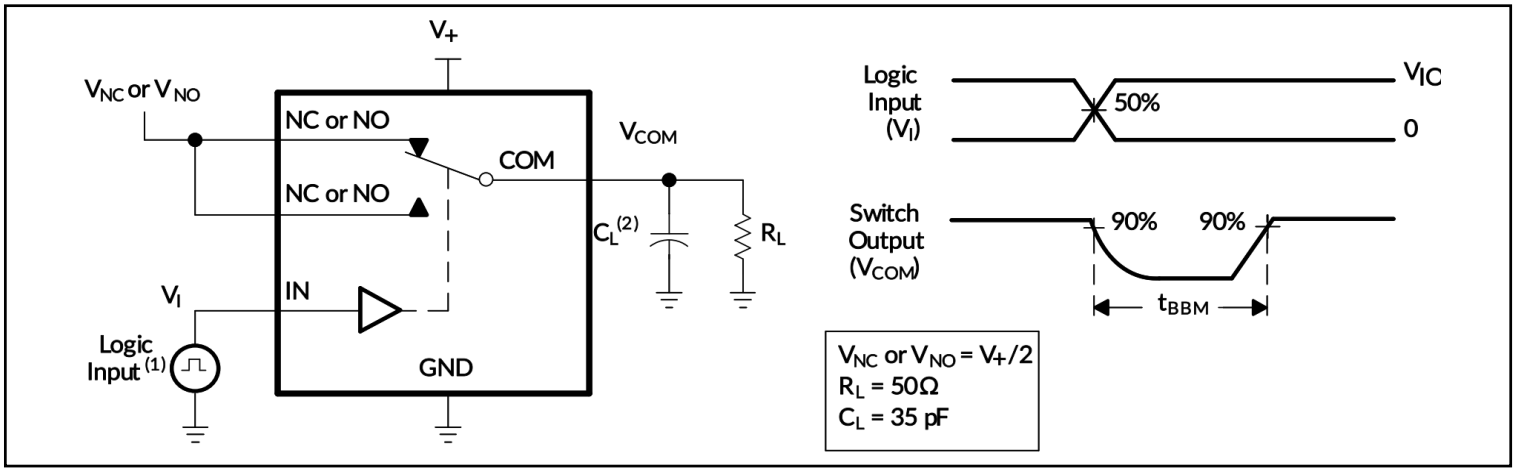


Figure 6. Break-Before-Make Time (t_{BBM})

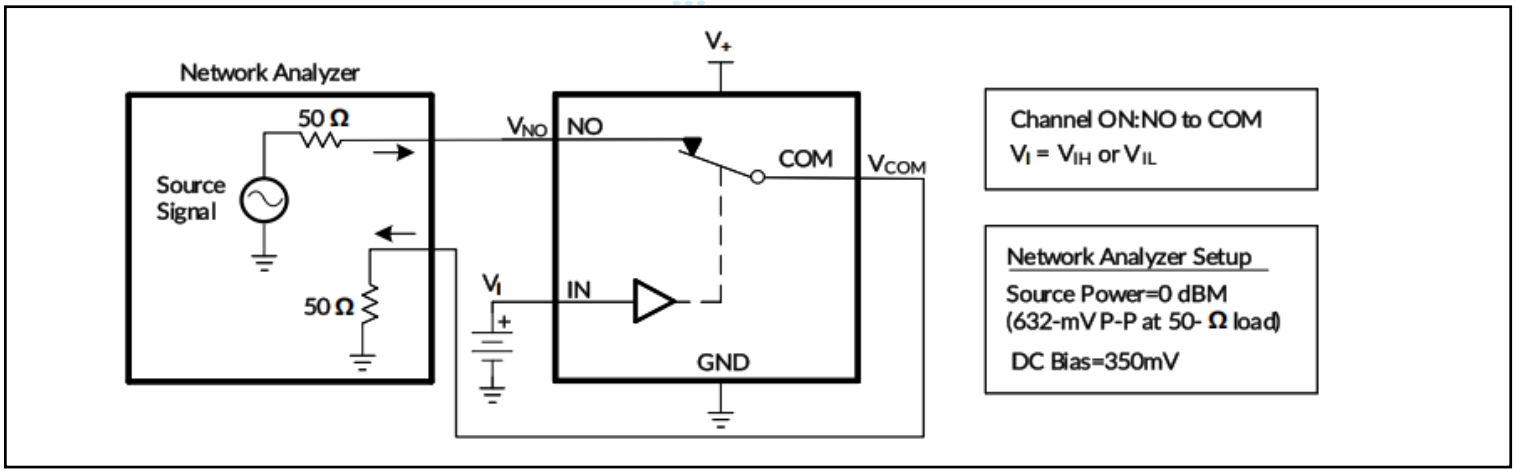


Figure 7. Bandwidth (BW)

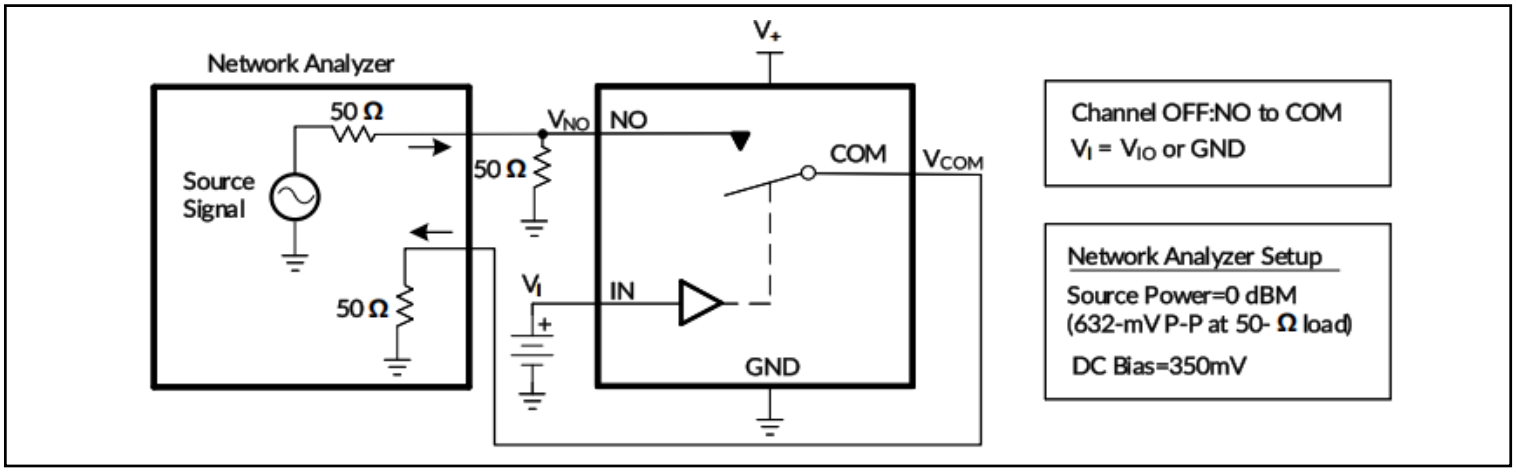


Figure 8. OFF Isolation (O_{ISO})

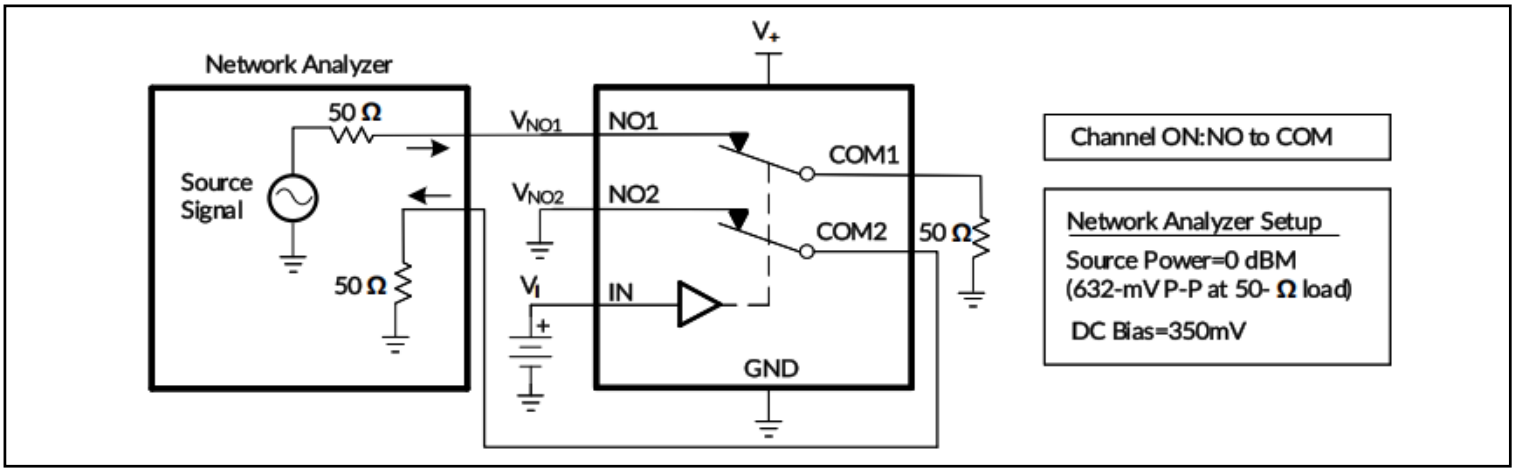


Figure 9. Crosstalk (X_{TALK})

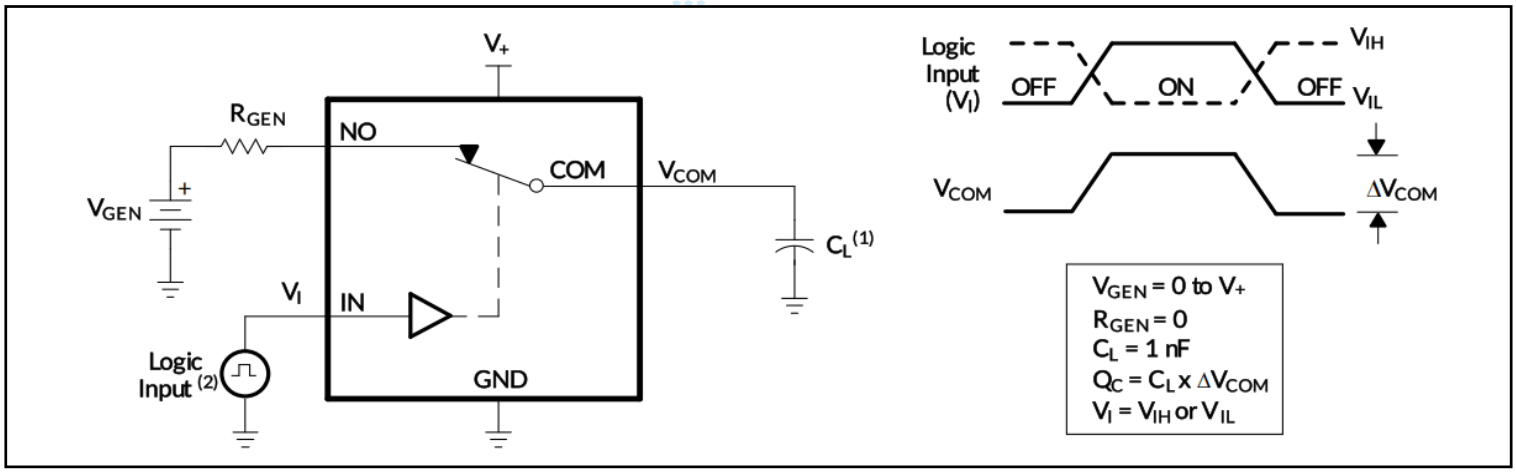


Figure 10. Charge Injection (Q c)

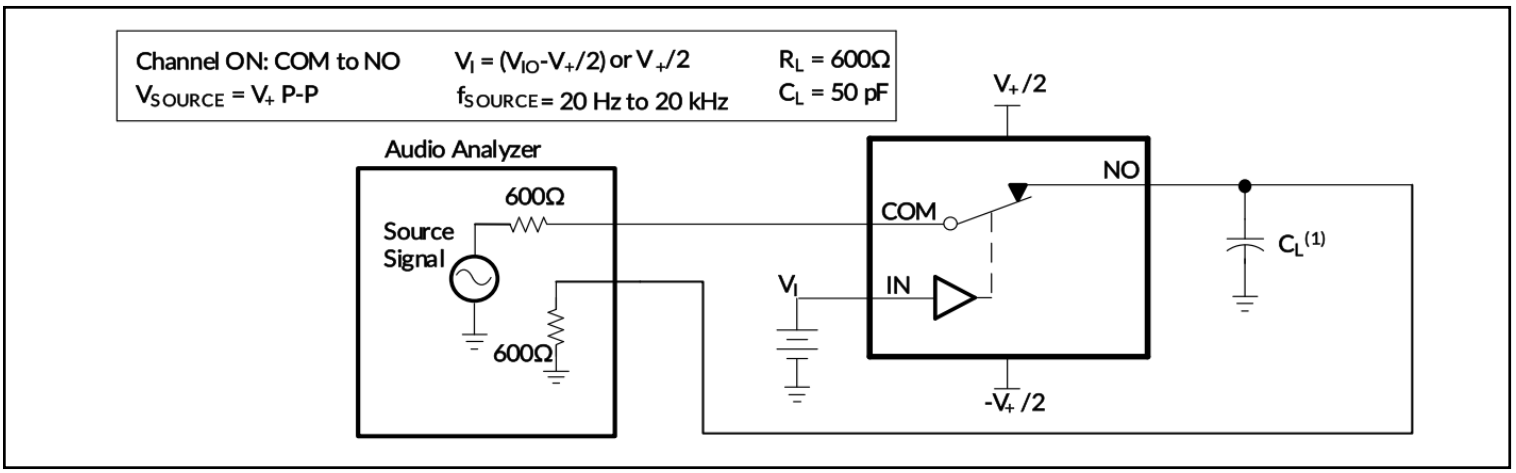


Figure 11. Total Harmonic Distortion (THD)

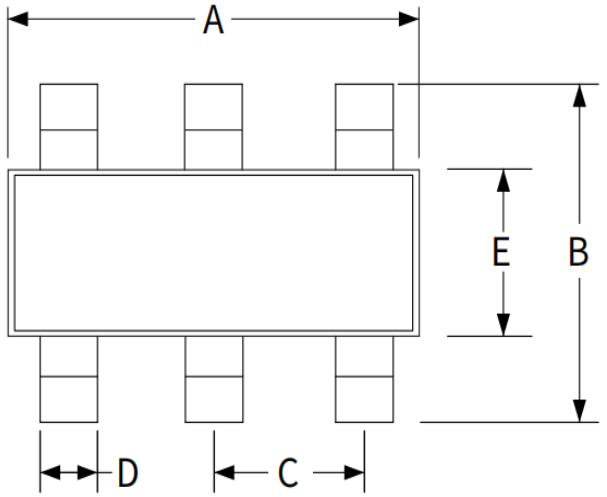
Order information

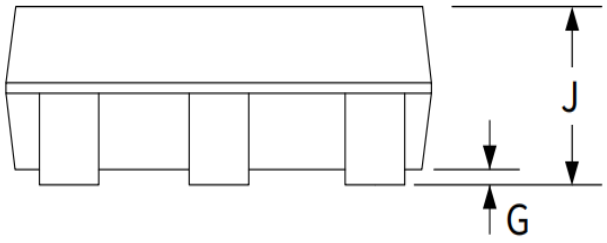
Order Number	Package	Package Quantity	Marking On The park	Temperature
SN74LVC1G3157DBVR-TUDI	SC70-6	Tape,Reel,3000	CC5F	-40°C~125°C
SN74LVC1G3157DCKR-TUDI	SOT23-6	Tape,Reel,3000	3157	

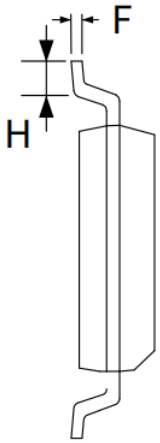
Revision history

	Date	Revision	Page
V1.0	2018/6/10	New	1-16

Package SOT23-6

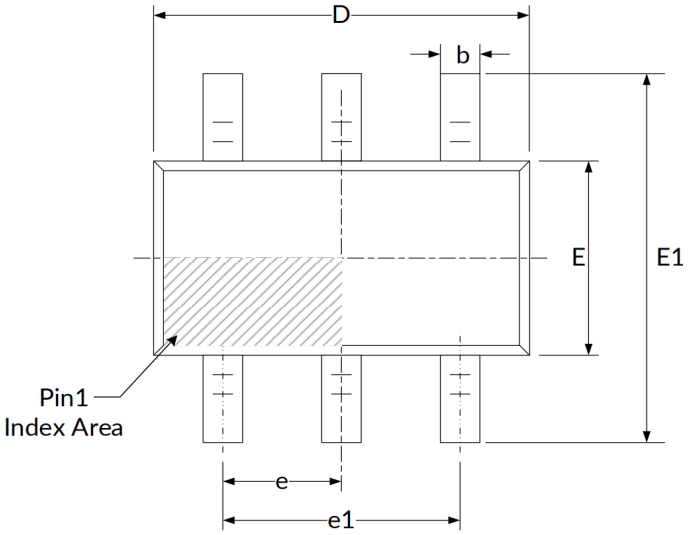


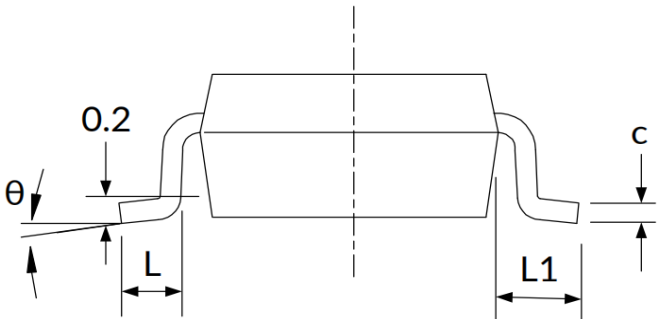


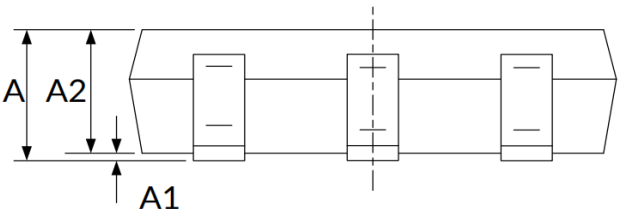


Symbol	Dimen Millimeters		sions Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.00	0.110	0.118
B	2.60	3.00	0.102	0.118
C	0.93	0.97	0.037	0.038
D	0.41		0.016	
E	1.50	1.70	0.059	0.067
F	0.11	0.19	0.004	0.007
G	-	0.10	-	0.004
H	0.40	-	0.016	-
J	1.00	1.20	0.035	0.057

Package SC70-6







Symbol	DimensionsIn Millimeters		DimensionsIn Inches	
	Min	Max	Min	Max
A(1)	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(1)	2.000	2.200	0.079	0.087
E(1)	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC)(2)			
e1	1.300(BSC)(2)		0.051(BSC)(2)	
L	0.260	0.460	0.01	0.018
L1	0.525		0.021	
θ	0°	8°	0°	8°

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