

PRODUCT SPECIFICATION

C u s t o m e r : _____

Product Name : Analog Switch

Part Number : SN74LVC1G3157

I s s u e D a t e : _____

Prepared	Checked	Customer Check
ChenTT	Zelig	

SN74LVC1G3157: 4.5Ω Low Voltage SPDT Analog Switch

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 high-bandwidth (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.

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**

APPLICATIONS

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

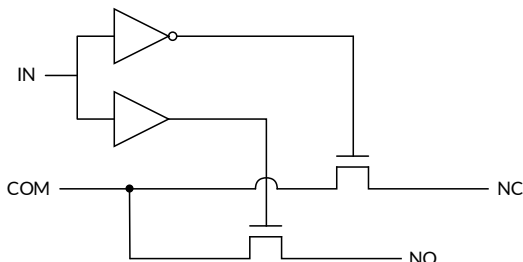
PACKAGE/ORDERING INFORMATION ⁽¹⁾

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING ⁽²⁾	MSL ⁽³⁾	PACKAGE OPTION
SN74LVC1G3157	SN74LVC1G3157DBVR	-40°C~125°C	SC70-6 ⁽⁴⁾	CC5F	MSL3	Tape and Reel,3000
SN74LVC1G3157	SN74LVC1G3157DCKR	-40°C~125°C	SOT23-6	3157	MSL3	Tape and Reel,3000

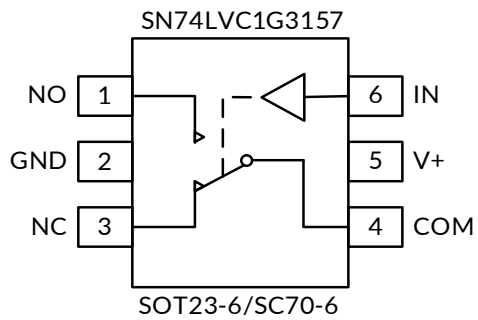
NOTE:

- (1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document.
- (2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.
- (3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.
- (4) Equivalent to SOT363.

BLOCK DIAGRAM



PIN CONFIGURATION AND FUNCTIONS (TOP VIEW)



NOTE: NO, NC and COM terminals may be an input or output

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

REVISION HISTORY

Note: Page numbers for previous revisions may different from page numbers in the current version.

VERSION	Change Date	Change Item
Rev A.1	2026/01/09	Initial version completed

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 SC70-6	235 270	°C/W

Temperature

	PARAMETER	MIN	MAX	UNIT
Temperature	Junction Temperature, T _J ⁽⁴⁾		150	°C
	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	 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.
Human-Body Model (HBM)	±1000		
Charged Device Model (CDM)	±1000	V	
Machine Model (MM)	±100		

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_{θJA}, and T_A. The maximum allowable power dissipation at any ambient temperature is P_D = (T_{J(MAX)} - T_A) / R_{θJA}. 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	°C

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
ANALOG SWITCH								
Analog Signal Range	V _{NO} , V _{NC} , V _{COM}			FULL	0		V+	V
On-Resistance	R _{ON}	V _{NO} or V _{NC} = V+/2, I _{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		4.5		Ω
				FULL			8.5	Ω
			3.3V	+25°C		7		Ω
				FULL			10.5	Ω
On-Resistance Match Between Channels	ΔR _{ON}	V _{NO} or V _{NC} = V+/2, I _{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		0.15		Ω
				FULL			0.4	Ω
			3.3V	+25°C		0.15		Ω
				FULL			0.4	Ω
On-Resistance Flatness	R _{FLAT(ON)}	0 ≤ (V _{NO} or V _{NC}) ≤ V+/2, I _{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		2		Ω
				FULL			3.3	Ω
			3.3V	+25°C		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+/2 V _{COM} = V+/2, 0.3V See Figure 5	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} or V _{NC} = 0.3V, Open V _{COM} = Open, 0.3V See Figure 6	1.8 to 5.5V	FULL			1	μA
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

(1) All unused digital inputs of the device must be held at V_{IO} 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.

Electrical Characteristics(continued)

$V_+ = 5.0\text{ V}$, $T_A = -40^\circ\text{C}$ to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V_+	T_A	MIN	TYP	MAX	UNIT
DYNAMIC CHARACTERISTICS								
Turn-On Time	t_{ON}	$V_{COM} = V_+$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 8	5V 3.3V	+25°C		30 40		ns
Turn-Off Time	t_{OFF}	$V_{COM} = V_+$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 8	5V 3.3V	+25°C		25 30		ns
Break-Before-Make Time Delay	t_{BBM}	$V_{NO1} = V_{NC1} = V_{NO2} = V_{NC2} = 3\text{V}$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 9	5V 3.3V	+25°C		5 8		ns
Off Isolation	O_{ISO}	$R_L = 50\Omega$, Switch OFF, See Figure 11		$f = 10\text{MHz}$	+25°C	-52		dB
				$f = 1\text{MHz}$	+25°C	-71		dB
-3dB Bandwidth	BW	Switch ON, $R_L = 50\Omega$, See Figure 10		+25°C		300		MHz
NC, NO OFF Capacitance	$C_{NC(OFF)}$, $C_{NO(OFF)}$	V_{NC} or $V_{NO} = V_+/2$ or GND, Switch OFF, See Figure 7		+25°C		5		pF
NC, NO, COM ON Capacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	V_{NC} or $V_{NO} = V_+/2$ or GND, Switch ON, See Figure 7		+25°C		15		pF
POWER REQUIREMENTS								
Power Supply Range	V_+			FULL	1.8		5.5	V
Power Supply Current	I_+	$V_{IN} = \text{GND or } V_+$	5.5V	FULL			1	μA

Typical Characteristics

NOTE: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only.

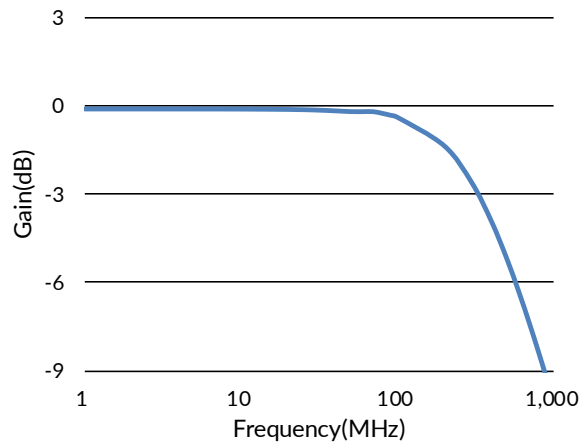


Figure 1. Bandwidth vs Frequency, $V+=3V$

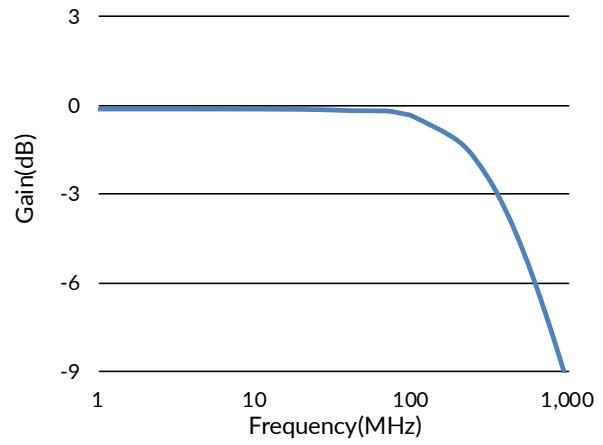


Figure 2. Bandwidth vs Frequency, $V+=5V$

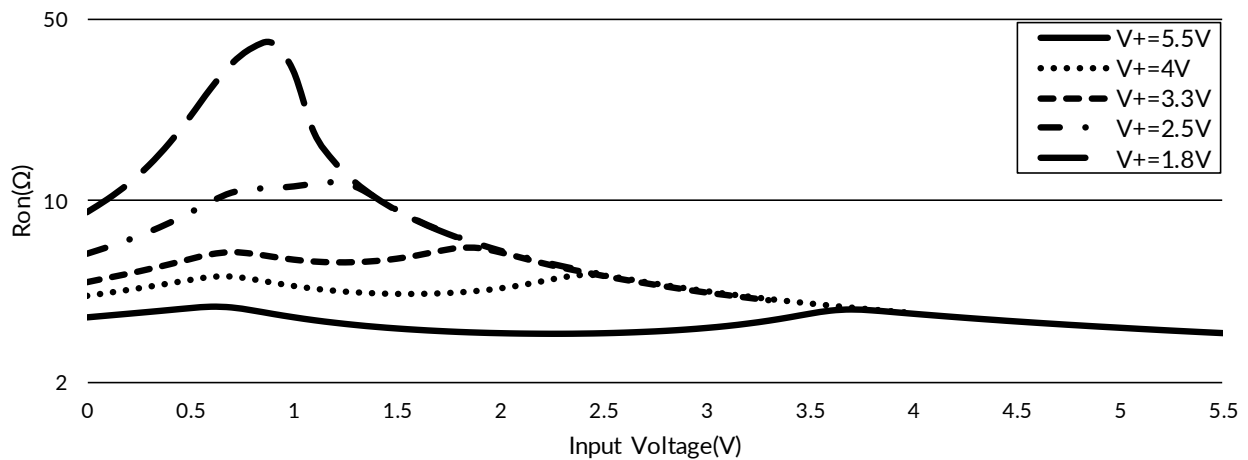


Figure 3. Typical R_{on} as a Function of Input Voltage, $V_{IN}= 0V$ to $V+$

PARAMETER MEASUREMENT INFORMATION

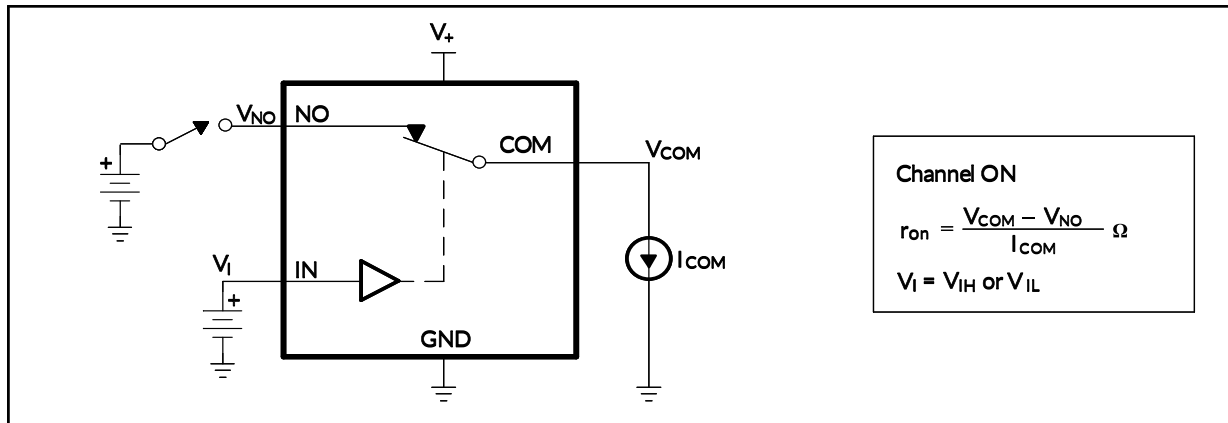


Figure 4. ON-State Resistance (R_{on})

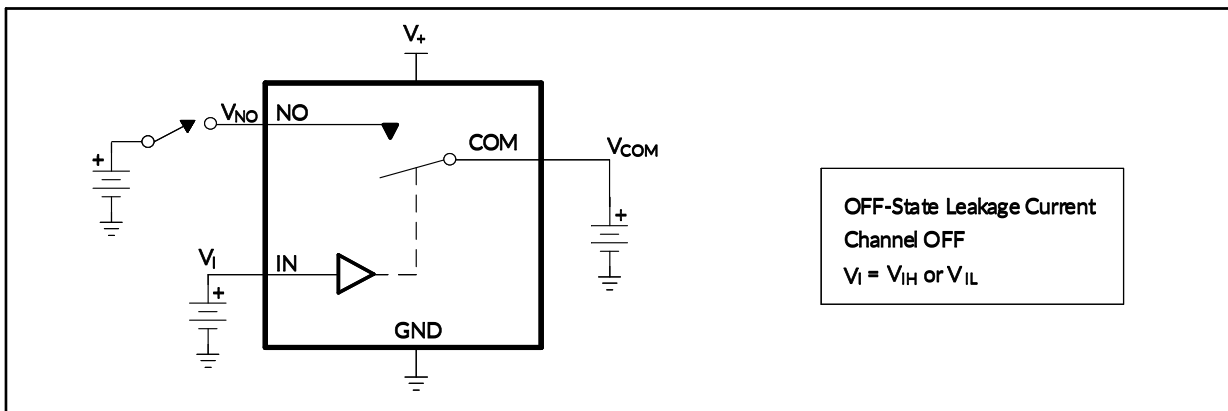


Figure 5. OFF-State Leakage Current ($I_{COM(OFF)}$, $I_{NO(OFF)}$)

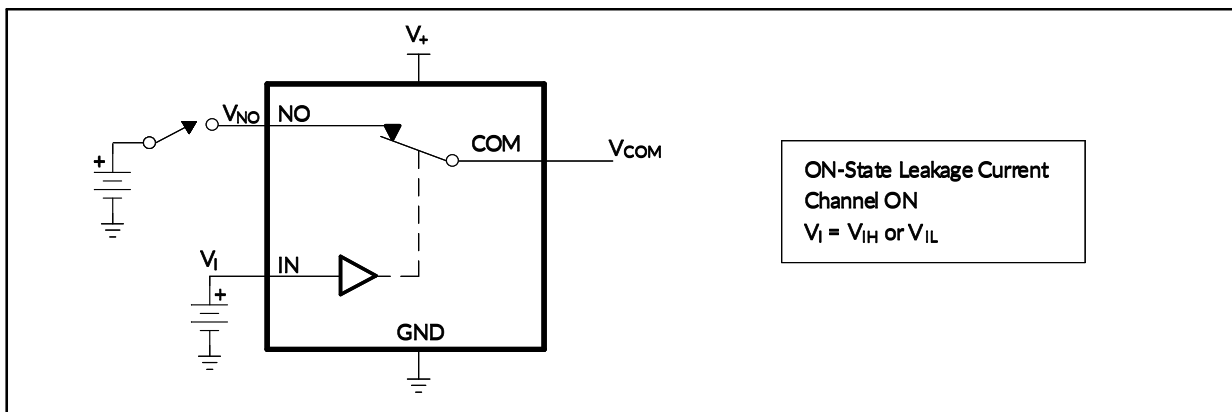


Figure 6. ON-State Leakage Current ($I_{COM(ON)}$, $I_{NO(ON)}$)

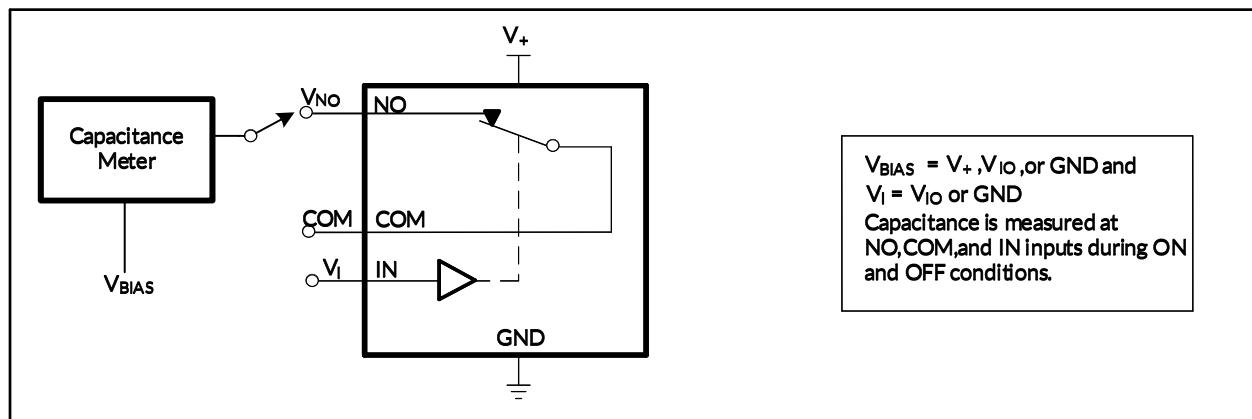


Figure 7. Capacitance (C_I , $C_{COM(OFF)}$, $C_{COM(ON)}$, $C_{NO(OFF)}$, $C_{NO(ON)}$)

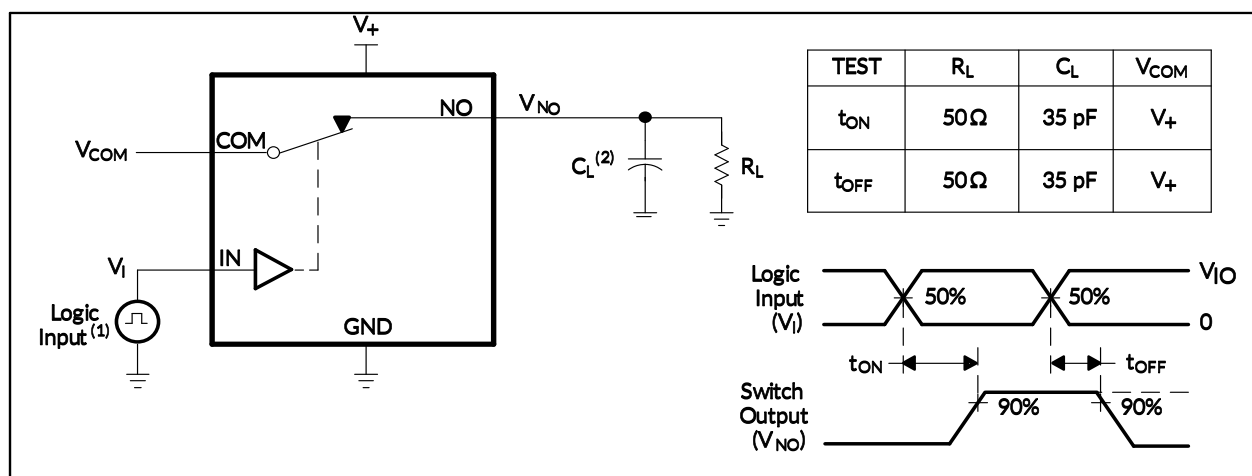


Figure 8. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

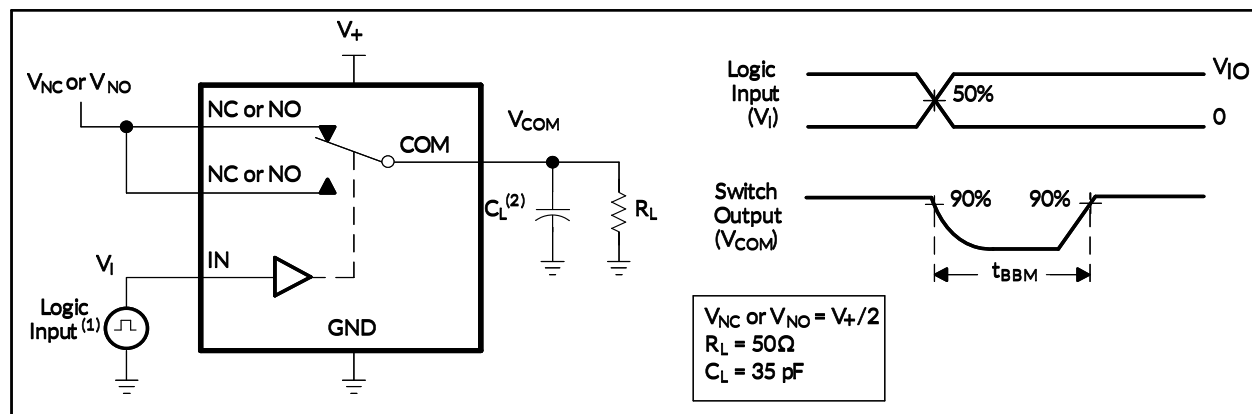


Figure 9. Break-Before-Make Time (t_{BBM})

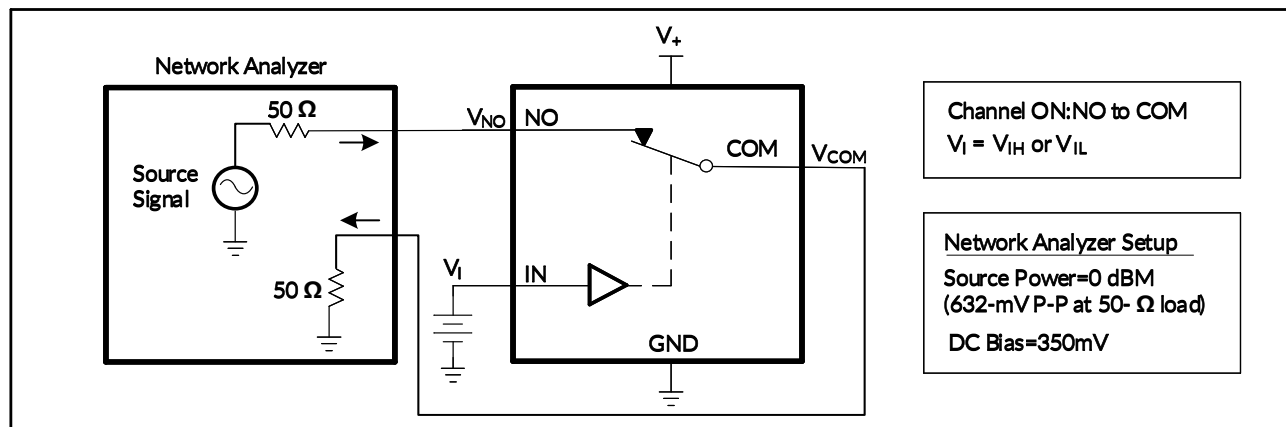


Figure 10. Bandwidth (BW)

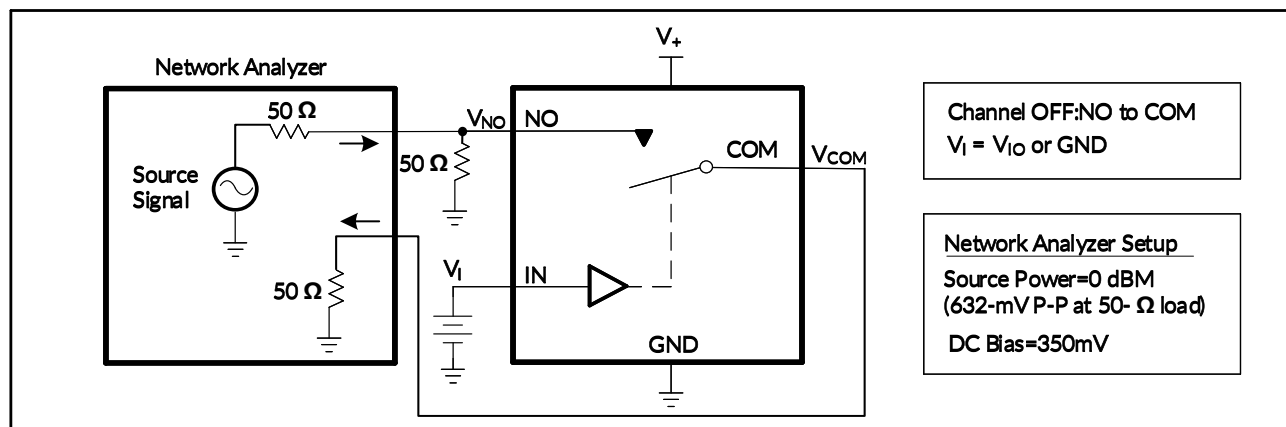


Figure 11. OFF Isolation (O_{ISO})

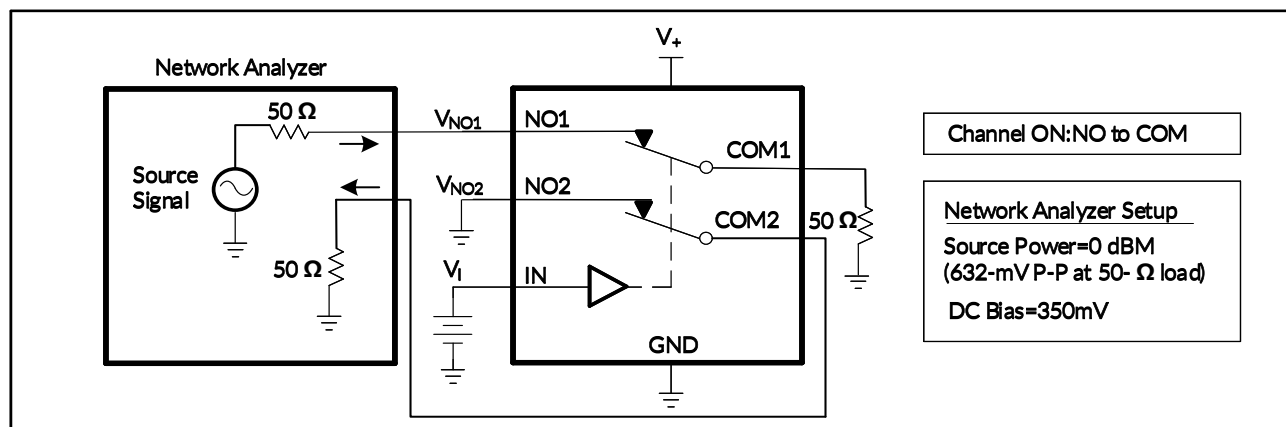


Figure 12. Crosstalk (X_{TALK})

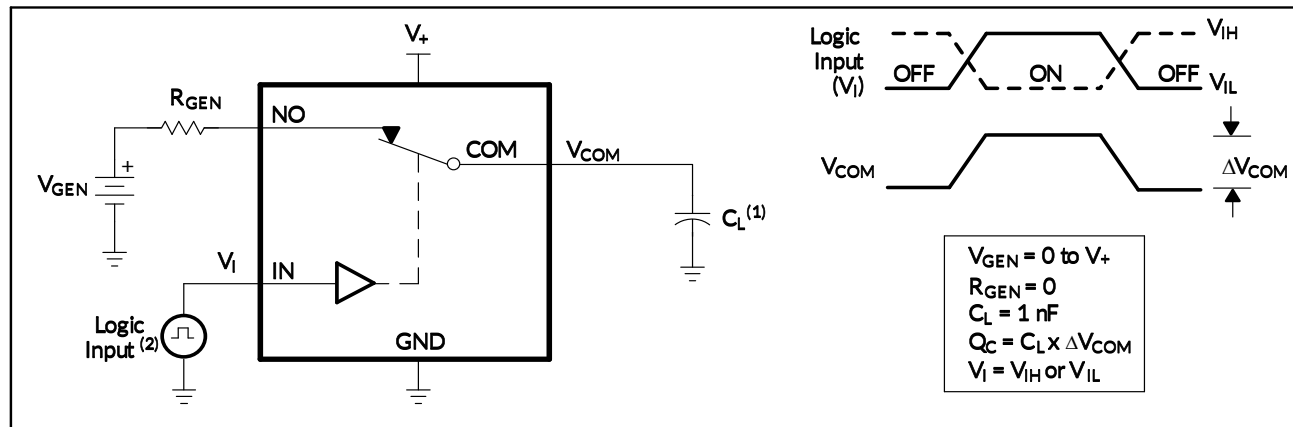


Figure 13. Charge Injection (Q_c)

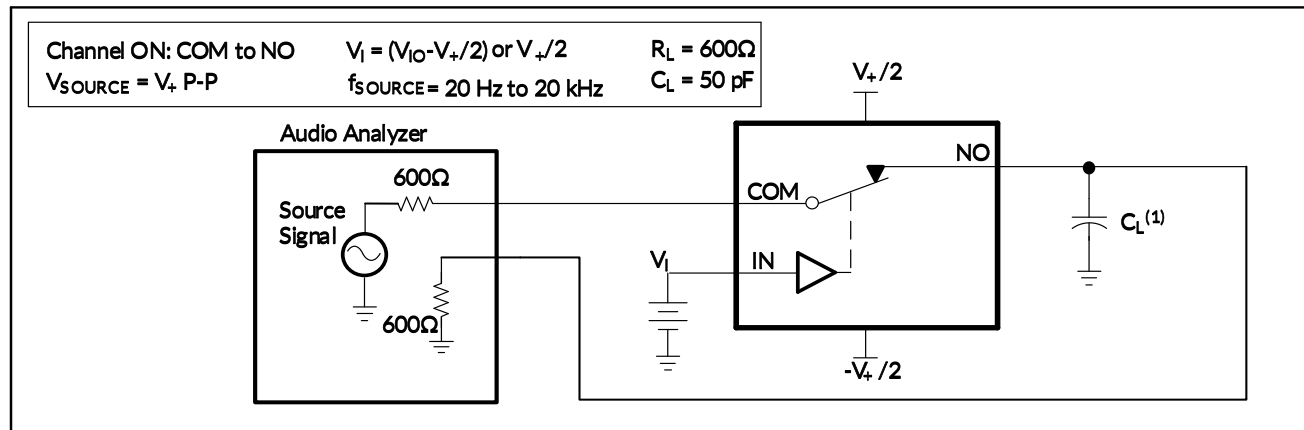
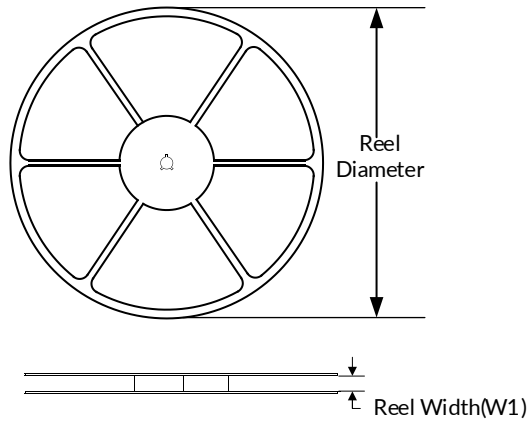


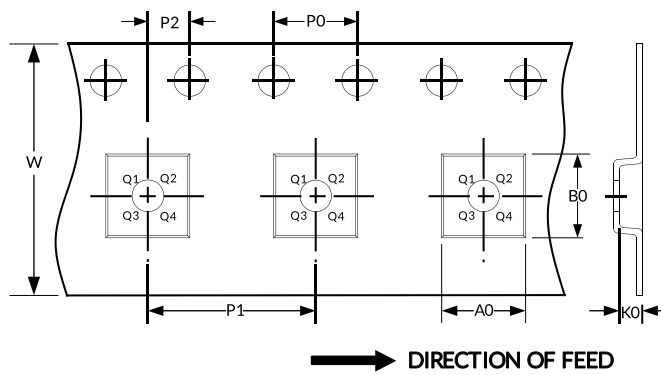
Figure 14. Total Harmonic Distortion (THD)

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SC70-6	7"	9.5	2.40	2.50	1.20	4.0	4.0	2.0	8.0	Q3
SOT23-6	7"	9.5	3.17	3.23	1.37	4.0	4.0	2.0	8.0	Q3

NOTE:

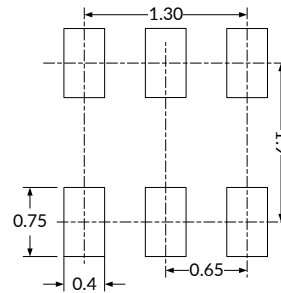
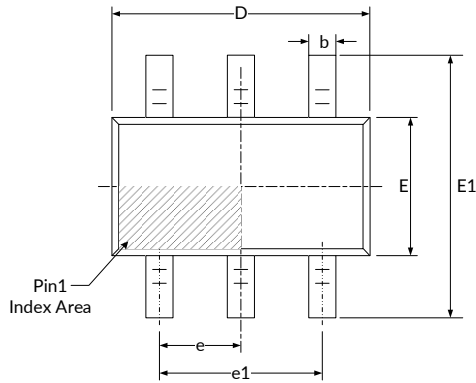
1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.

PACKAGE OUTLINE DIMENSIONS

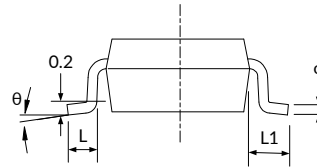
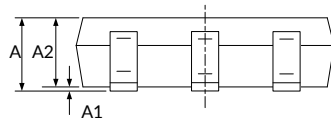
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers),"Basic" spacing is nominal.
3. This drawing is subject to change without notice.

SC70-6⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)

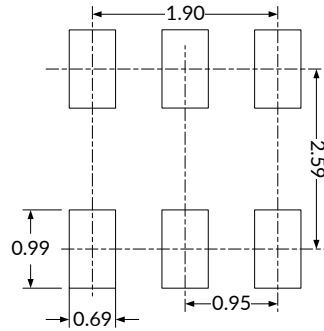
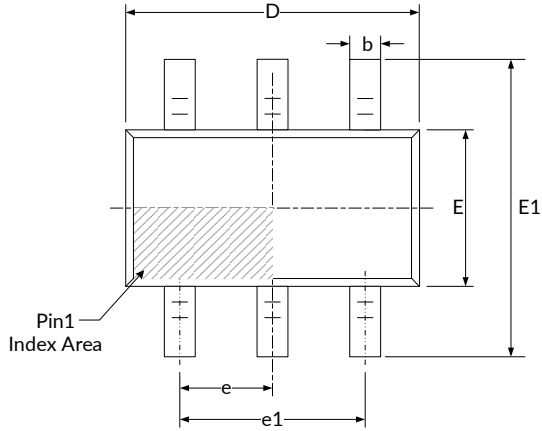


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D ⁽¹⁾	2.000	2.200	0.079	0.087
E ⁽¹⁾	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC) ⁽²⁾		0.026(BSC) ⁽²⁾	
e1	1.300(BSC) ⁽²⁾		0.051(BSC) ⁽²⁾	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
θ	0°	8°	0°	8°

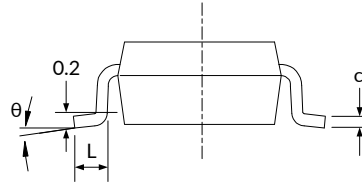
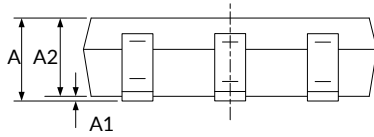
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers),"Basic" spacing is nominal.
3. This drawing is subject to change without notice.

SOT23-6⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D ⁽¹⁾	2.820	3.020	0.111	0.119
E ⁽¹⁾	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC) ⁽²⁾		0.037(BSC) ⁽²⁾	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°