钍地半导体
Tudi Semiconductor

NC7SB3157, FSA3157
Low Voltage, SPDT 4.0Ω Analog Switch
TTL/CMOS Compatible

Features

- Useful in Both Analog and Digital Applications
- Space-Saving, SC70 6-Lead Surface Mount Package
- Ultra-Small, MicroPak™ Leadless Package
- Broad V_{CC} Operating Range: 1.7V to 5.5V
- Rail-to-Rail Signal Handling
- Power-Down, High-Impedance Control Input
- Break-Before-Make Enable Circuitry
- NC7SB3157P6 250MHz, 3dB Bandwidth
  FSA3157P6 300MHZ, 3dB Bandwidth

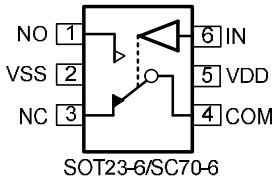
Description

The NC7SB3157 / FSA3157 is a high-performance, single-pole / double-throw (SPDT) analog switch 4.0**Ω**

The device is fabricated with advanced sub-micron CMOS technology to achieve high-speed enable and disable times and low on resistance. The break-before-make select circuitry prevents disruption of signals on the B Port due to both switches temporarily being enabled during select pin switching. The device is specified to operate over the 1.7 to 5.5V V_{CC} operating range. The control input tolerates voltages up to 5.5V, independent of the V_{CC} operating range.

Ordering Information

Part Number	Top Mark	Package Description	Packing Method
NC7SB3157P6X-TUD	BB5X	6-Lead, SC70,	3000 Units on Tape and Reel
FSA3157P6X-TUDI	BB5R	6-Lead, SC70,	3000 Units on Tape and Reel



SOT23-6/SC70-6

Absolute Maximum Ratings

Condition	Min	Max
Power Supply Voltage (V_{DD} to Vss)	-0.5V	+7.5V
Analog Input Voltage (NC NO or COM)	Vss-0.5V	V_{DD}+0.5V
PDB Input Voltage	Vss-0.5V	+7V
Operating Temperature Range	-40°C	+125°C
Junction Temperature	+160°C	
Storage Temperature Range	-55°C	+150°C
Lead Temperature (soldering, 10sec)	+260°C	
Package Thermal Resistance (T_A=+25℃)		
SOT23-6, θ_{JA}	190°C/W	
SC70-6, θ_{JA}	333°C/W	
ESD Susceptibility		
HBM	3500V	
MM	300V	

Note: Stress greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions outside those indicated in the operational sections of this specification are not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Electrical Characteristics

(At V_S = +5V, and T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	25℃	-40℃ ~85℃	-40℃ ~125℃	LIMIT	UNITS
ANALOG SWITCH							
Analog Signal Range	V_{NO} ,V_{NC} ,V_{COM}		V_S	V_S	V_S	MAX	V
On-Resistance	R_{ON}	V_S = 4.5V, V_{NO} or V_{NC} = 4V, I_{COM} = -10mA, Test Circuit 1	4.0			TYP	Ω
On-Resistance Match Between Channels	ΔR_{ON}	V_S = 4.5V, V_{NO} or V_{NC} = 4V, I_{COM} = -10mA, Test Circuit 1	0.3			TYP	Ω
		V_S = 4.5V, V_{NO} or V_{NC} = 4V, I_{COM} = -10mA, Test Circuit 1	0.8			MAX	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	V_S = 4.5V, V_{NO} or V_{NC} = 1.0V, 2.0V, 3.5V, I_{COM} = -10mA, Test Circuit 1	1.7			TYP	Ω
		V_S = 4.5V, V_{NO} or V_{NC} = 1.0V, 2.0V, 3.5V, I_{COM} = -10mA, Test Circuit 1	3.7			MAX	Ω
Source OFF Leakage Current	$I_{NC(OFF)}$,$I_{NO(OFF)}$	V_S = 5.5V, V_{NO} or V_{NC} = 1.0V, 4.5V, V_{COM} = 4.5V, 1.0V	±1			MAX	μA
Channel ON Leakage Current	$I_{NC(ON)}$,$I_{NO(ON)}$,$I_{COM(ON)}$	V_S = 5.5V, V_{COM} = 1.0V, 4.5V V_{NO} or V_{NC} = 1.0V, 4.5V, or floating	±1			MAX	μA
DIGITAL INPUTS							
Input High Voltage	V_{INH}	V_S = 5V	1.5			MIN	V
		V_S = 3V	0.9			MIN	V
Input Low Voltage	V_{INL}	V_S = 5V	0.55			MAX	V
		V_S = 3V	0.45			MAX	V
Input Leakage Current	I_{IN}	V_S = 5.5V, V_{IN} = 0V or 5.5V	±1			MAX	μA

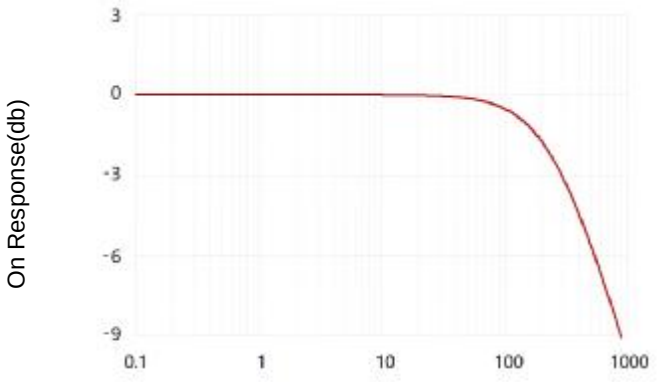
(At V_S = +5V, and T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		25℃	-40℃ ~85℃	-40℃ ~125℃	LIMIT	UNITS
DYNAMIC CHARACTERISTICS								
Turn-On Time	T_{ON}	V_S = 5V, V_{NO} or V_{NC} = 3V, V_{IN_H} = 1.5V, V_{IN_L} = 0V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		20			TYP	ns
		V_S = 3V, V_{NO} or V_{NC} = 1.5V, V_{IN_H} = 1.5V, V_{IN_L} = 0V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		30			TYP	ns
Turn-Off Time	T_{OFF}	V_S = 5V, V_{NO} or V_{NC} = 3V, V_{IN_H} = 1.5V, V_{IN_L} = 0V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		15			TYP	ns
		V_S = 3V, V_{NO} or V_{NC} = 1.5V, V_{IN_H} = 1.5V, V_{IN_L} = 0V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		25			TYP	ns
Break-Before-Make Time Delay	T_{BBM}	V_S = 5V, V_{NO1} or V_{NC1} = V_{NO2} or V_{NC2} = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 3		5.0			TYP	ns
		V_S = 3V, V_{NO1} or V_{NC1} = V_{NO2} or V_{NC2} = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 3		8			TYP	ns
Skew	T_{SKEW}	V_S = 5V, R_S = 39Ω, C_L = 50pF, Test Circuit 4		5			TYP	ns
		V_S = 3V, R_S = 39Ω, C_L = 50pF, Test Circuit 4		2			TYP	ns
Off Isolation	O_{ISO}	R_L = 50Ω, Signal = 0dBm, C_L = 5pF, Test Circuit 5	f=10MHz	-51			TYP	db
			f=1MHz	-72			TYP	db
-3dB Bandwidth	BW	R_L = 50Ω, Signal = 0dBm, C_L = 5pF, Test Circuit 6		120			TYP	MHz
Source OFF Capacitance	$C_{NC(OFF)}$,$C_{NO(OFF)}$	f=1MHz		5.5			TYP	pF
Channel ON Capacitance	$C_{NC(ON)}$,$C_{NO(ON)}$,$C_{COM(ON)}$	f=1MHz		15.5			TYP	pF
POWER REQUIREMENTS								
Power Supply Range	V_S			1.8			MIN	V
Power Supply Range	V_S			5.5			MAX	V
Power Supply Current	I_S	V_{IN} = 0V or V_S		1			MAX	μA

Typical Performance characteristics

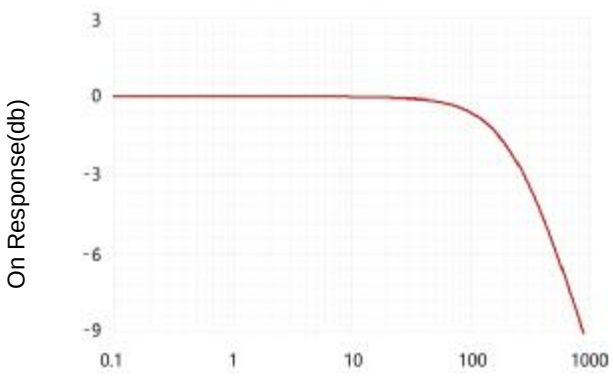
At T_A=+25°C, and V_S=+5V, unless otherwise noted.

BANDWIDTH



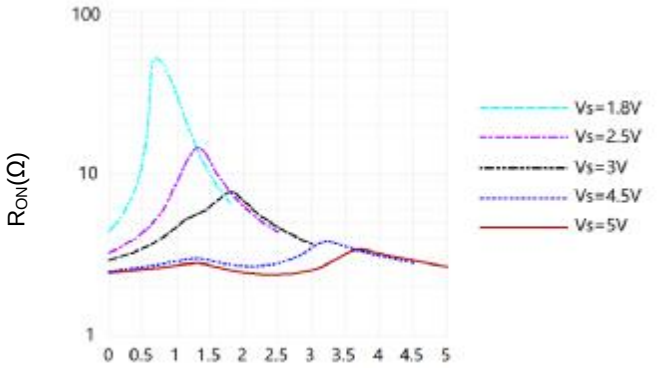
Frequency(MHz) V_S=+5V

BANDWIDTH



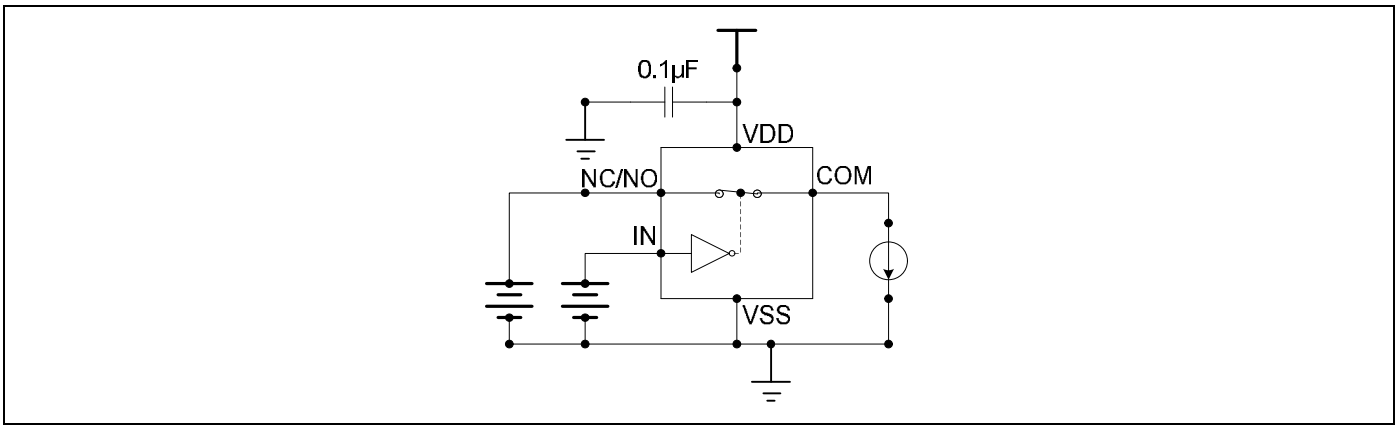
Frequency(MHz) V_S=+3V

Typical R_{ON} vs Input Voltage (VI)

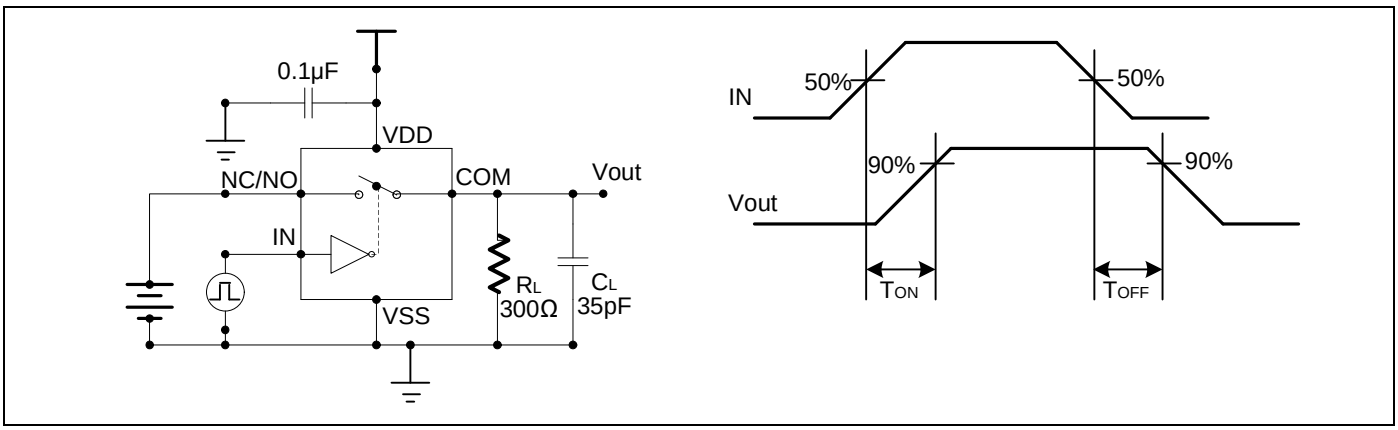


VI(V)

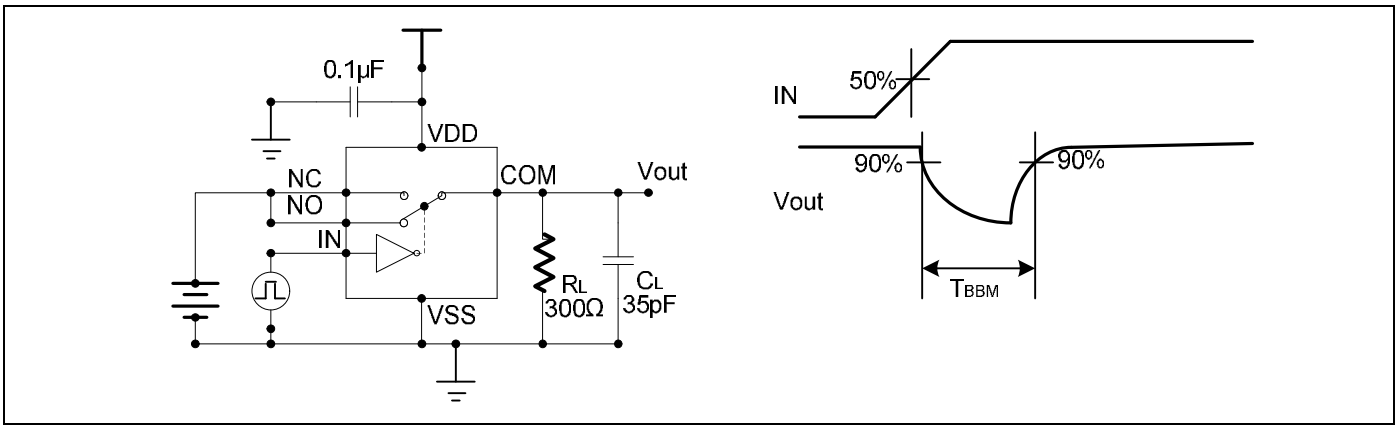
Parameter Measurement Information



Test Circuit 1. On-Resistance

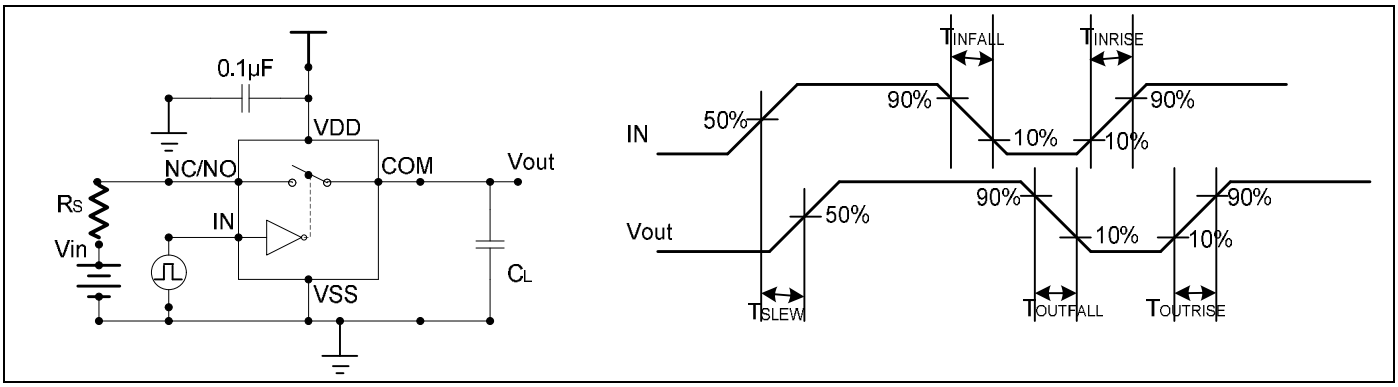


Test Circuit 2. Switching Times

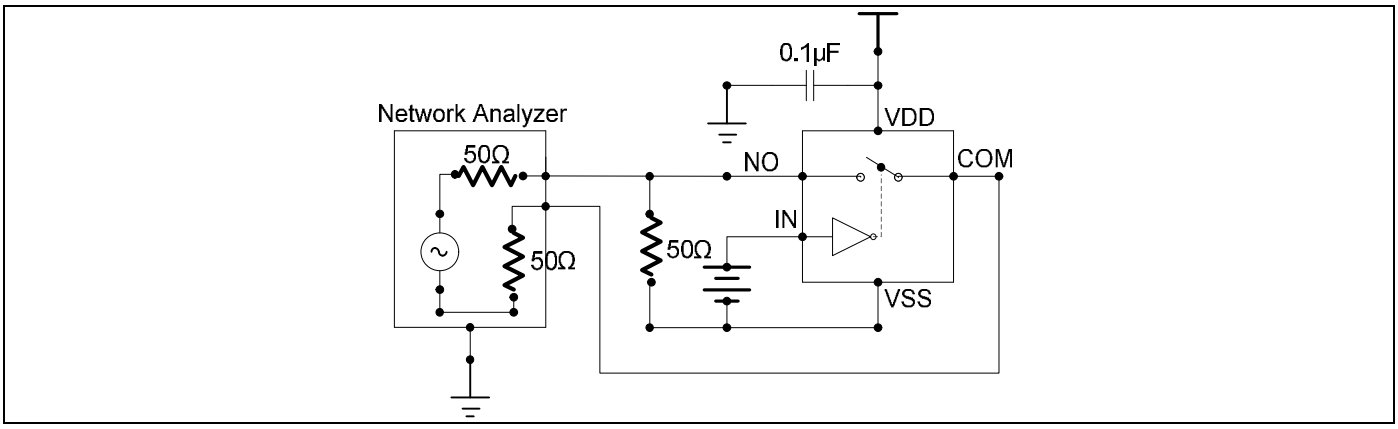


Test Circuit 3. Break-Before-Make Time Delay

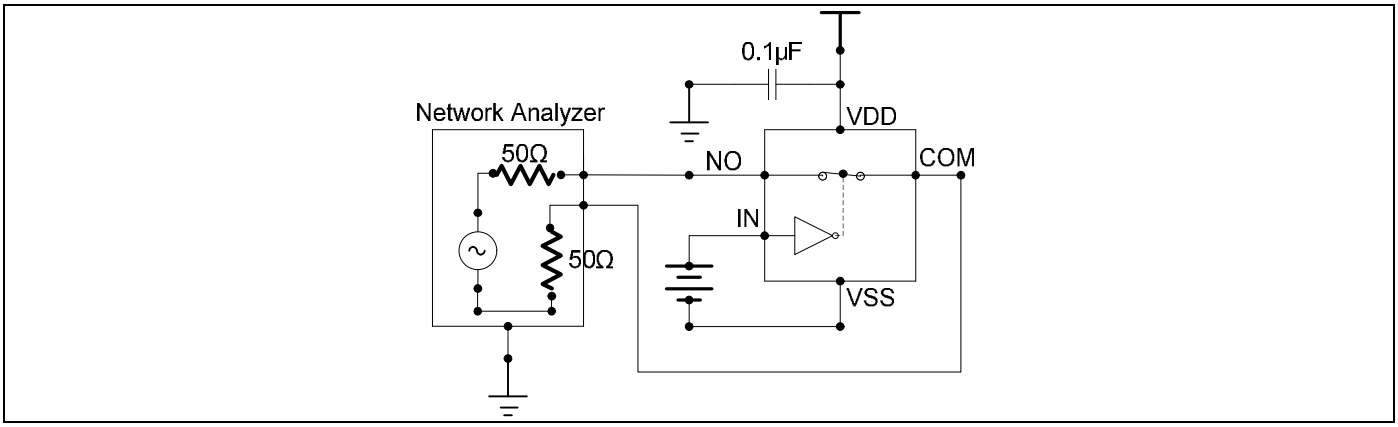
Parameter Measurement Information



Test Circuit 4. Output Signal Skew



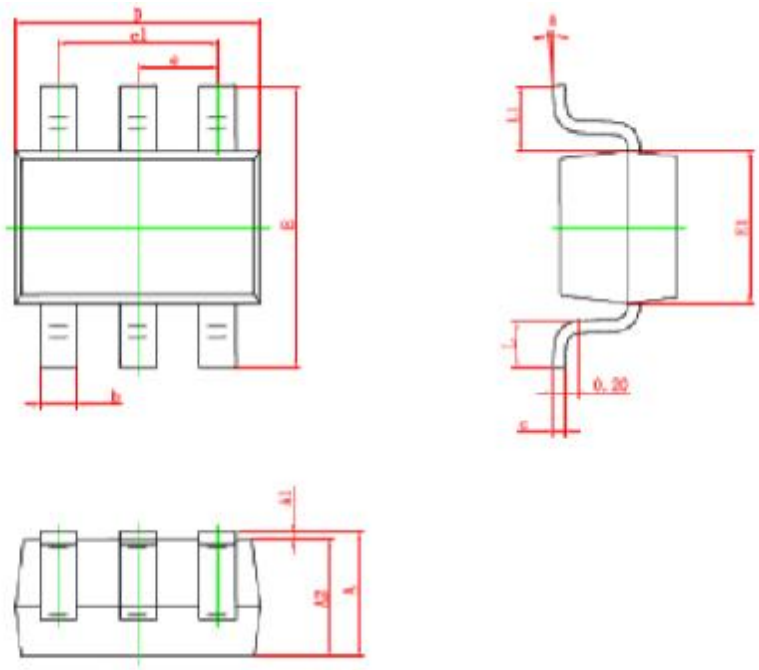
Test Circuit 5. Off Isolation



Test Circuit 6. -3dB Bandwidth

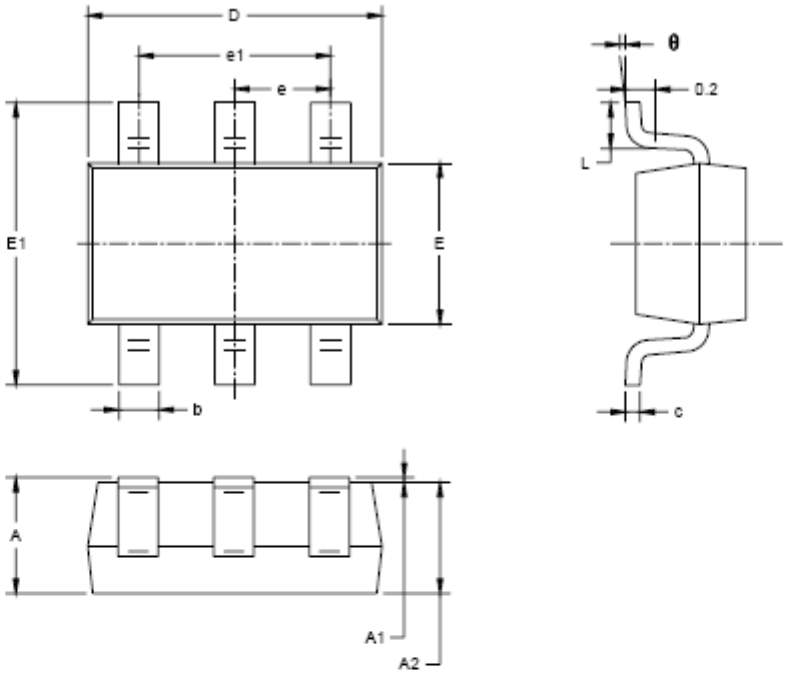
Package Information

SC70-6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	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	2.150	2.450	0.085	0.096
E1	1.150	1.350	0.045	0.053
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.260	0.460	0.010	0.018
L1	0.525 REF.		0.021 REF.	
θ	0°	8°	0°	8°

SOT23-6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	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	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°