

HX3157-ST/HX3157-ST3 1.5Ω, Low Voltage SPDT Analog Switch

Descriptions

The HX3157-ST/HX3157-ST3 is a single, bidirectional, single-pole/double-throw (SPDT) CMOS analog switch designed to operate from a single supply voltage ranging from 1.5V to 5.5V. It boasts high bandwidth (-3dB @ 600MHz) and low on-resistance (1.5Ω TYP), making it ideal for audio switching applications.

The HX3157-ST/HX3157-ST3 ensures guaranteed on-resistance matching between switches and maintains consistent on-resistance flatness across the signal range. This design feature guarantees excellent linearity and minimal distortion when handling audio signals.

The HX3157-ST/HX3157-ST3 is available in environmentally friendly Green SOT23-6 and SOT363 packages.

Features

- ★ Supply Voltage Range: 1.5V to 5.5V
- ★ On-Resistance: 1.5Ω (TYP) When A= 5V
- ★ 1.8V Logic Compatible Control Pin
- ★ A Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- ★ Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)
- ★ High Bandwidth: -3dB @600MHz
- ★ ESD Tolerance: 2kV HBM
- ★ Available in Green SOT23-6 and SOT363 Pack- age

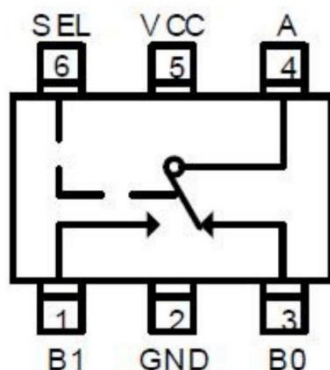
Applications

- ★ Audio, Video, UART, USB2.0 Signal and Supply Routing
- ★ Computer Peripherals
- ★ MP3s
- ★ Portable Instrumentation
- ★ Battery-Operated Equipment
- ★ Cell Phones
- ★ PDAs

Order information

Mode	Package	Specified Temperature range	Packing Option
HX3157-ST	SOT23-6	-40°C to +85°C	Tape and Reel,3000
HX3157-ST3	SOT363	-40°C to +85°C	Tape and Reel,3000

Pin Configuration



Pin#	Pin Name	Description
1	B1	Analog/Digital Signal Port (Normally open)
2	GND	Ground
3	B0	Analog/Digital Signal Port (Normally closed)
4	A	Common Signal Port
5	VCC	Single Power Supply
6	SEL	Logic Input Control

Function Table

Logic Input	Function
SEL=0	B0=A
SEL=1	B1=A

Absolute Maximum Ratings(1)

Parameter	Symbol	Value	Unit
Supply Voltage	V _{CC}	-0.3 ~ 6.5	V
Control Input Voltage	V _{SEL}	-0.3 ~ 6.5	V
Continuous Current Through A, B0, B1		± 100	mA
Peak Current Through A, B0, B1 (pulsed at 1ms 50% duty cycle)		± 200	mA
Storage Temperature Range	T _{STG}	-55 ~ 150	°C
Junction Temperature under Bias	T _J	150	°C
Lead Temperature (Soldering, 10 seconds)	T _L	260	°C
Thermal resistance	R _{θJA}	350	°C/W

Note:

1. “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.

Recommend operating ratings

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V _{CC}	1.5 ~ 5.5	V
Control Input Voltage	V _{SEL}	-0.3 ~ 5.5 V	V
Input Signal Voltage	V _A	-0.3 ~ 5.5	V
Operating Temperature	T _A	-40 ~ 85	°C

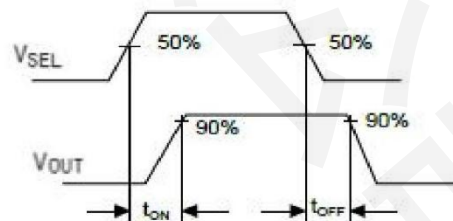
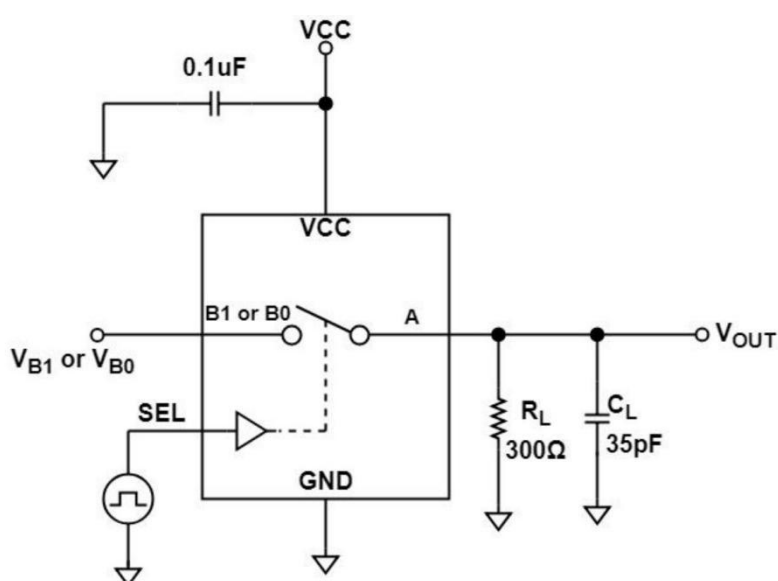
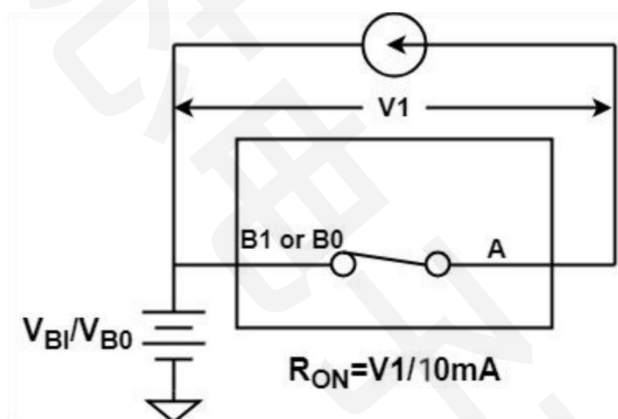
Electrical Characteristics

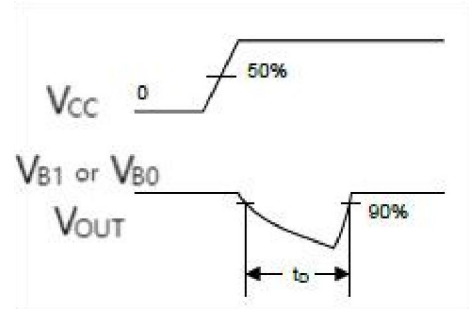
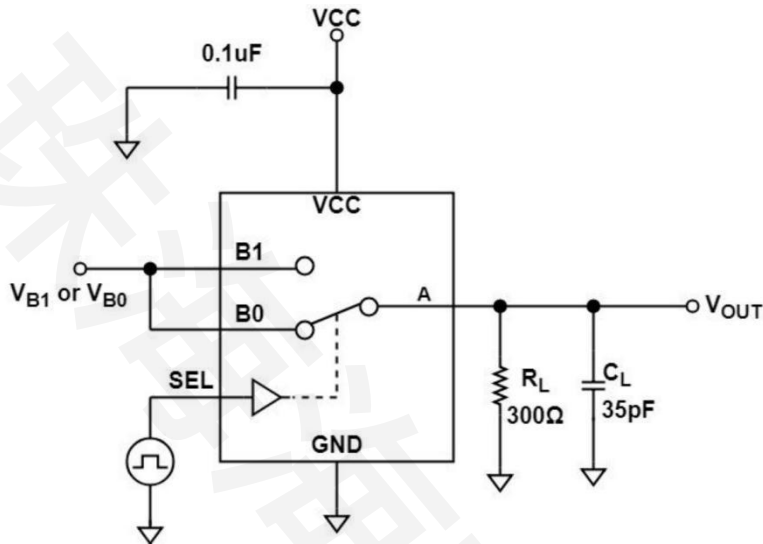
(T_A=25°C, V_{CC}=3.3V, unless otherwise specified)

Parameter	Symbol	conditions	Min.	Typ.	Max	Unit
DC CHARACTERISTICS						
Input logic high level	V _{IH}	V _{CC} =3.3~5.5V	1.6			V
		V _{CC} =1.5~3.3V	1.4			V
Input logic low level	V _{IL}	V _{CC} =3.3~5.5V			0.6	V
		V _{CC} =1.5~3.3V			0.4	V
Supply quiescent current	I _{CC}	I _A =0, V _{SEL} =0 or V _{SEL} =V _{CC}			1.0	uA
Increase in I _{CC} per input	I _{CC} T	I _A =0, V _{CC} =4.5V V _{SEL} >1.8 or V _{SEL} <0.5			1.0	uA
Off state leakage from A to B0 (or B1)	I _A	V _A = 5.5V , V _{B0(or B1)} = 0V			±3.5	uA
On-Resistance	R _{ON1}	V _A =0 ~ 1.5V,			7.5	Ω
	R _{ON2}	V _A =1.5 ~ 2.0V			3.5	Ω
	R _{ON3}	V _A =2.0 ~ 2.5V			3	Ω
	R _{ON4}	V _A =2.5 ~ 4.0V			2.5	Ω
On-Resistance Flatness	R _{FLAT1}	V _A =0 ~ 0.5V		0.7		Ω
	R _{FLAT2}	V _A =0.5 ~ 2.0V		0.5		Ω
	R _{FLAT3}	V _A =2.0 ~ 4.0V		1.6		Ω
	R _{FLAT4}	V _A =4.0 ~ 5.5V		0.3		Ω
On-Resistance Matching Between Channels	Δ R _{ON}	V _A =0~5.5V		0.1	0.2	Ω
AC CHARACTERISTICS						
Turn-On Time	T _{ON}	V _A =1.5V, C _L =35pF, R _L =50Ω		200		nS
Turn-Off Time	T _{OFF}	V _A =1.5V, C _L =35pF, R _L =50Ω		200		nS
Break-Before-Make time	T _{BBM}	V _A =1.5V, C _L =35pF, R _L =50Ω		500		nS
-3dB Bandwidth	BW	R _L =50Ω, C _L =0pF		600		MHZ
Off isolation	OIRR	F=1KHz, R _L =50Ω		-81		dB
		F=10KHz, R _L =50Ω		-80		dB

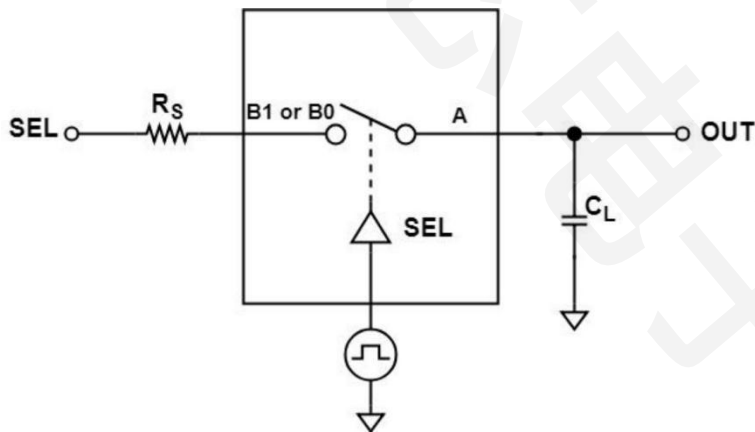
Crosstalk	Xtalk	F= 1KHz, $R_L=50\Omega$		-83		dB
		F= 10KHz, $R_L=50\Omega$		-82		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz $V_A=600mV_{p-p}$ @ $R_L=32\Omega$,		-80		dB
CAPACITANCE						
Off capacitance	C_{OFF}	F= 100KHz, VCC=3.3		5		pF
On capacitance	C_{ON}	F= 100KHz, VCC=3.3		7		pF

Test Circuits





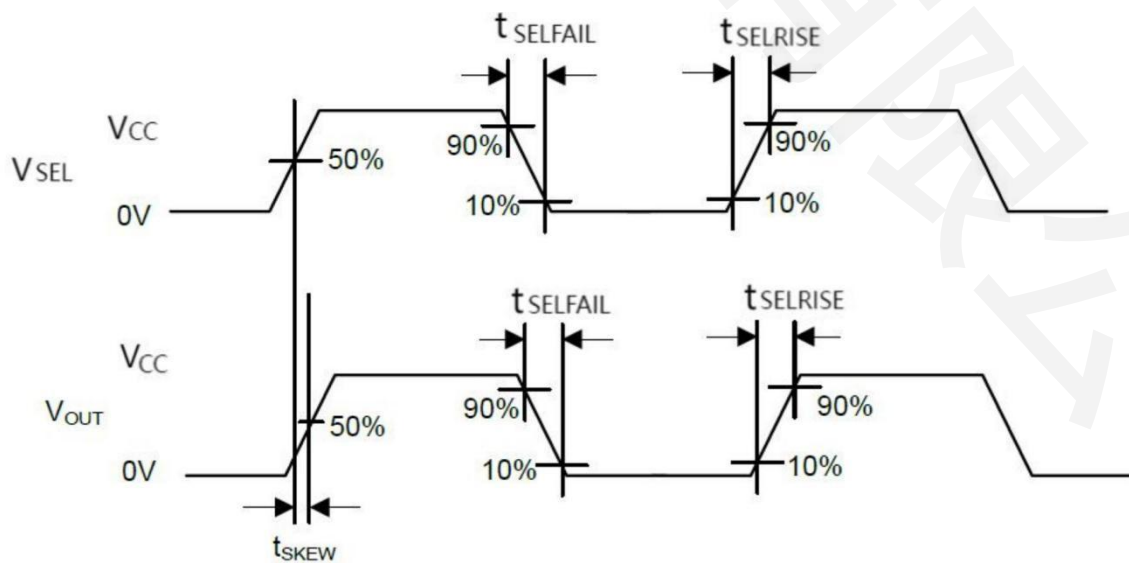
Test Circuit 3. Break-Before-Make Time Delay, t_b



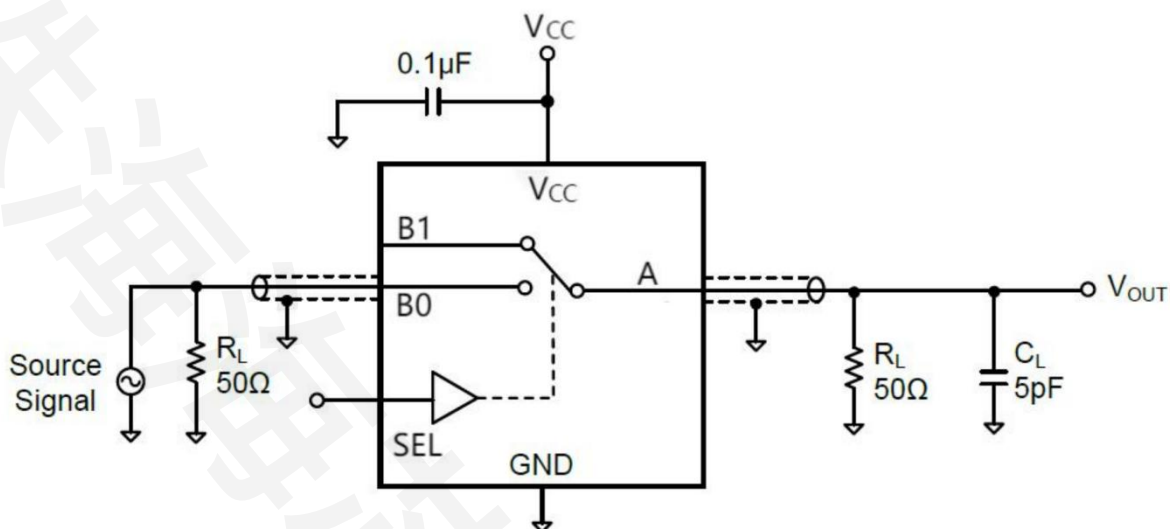
$$\text{Rise Time Delay} = |t_{\text{SELRISE}} - t_{\text{OUTRISE}}|$$

$$\text{Fall Time Delay} = |t_{\text{SELFALL}} - t_{\text{OUTFALL}}|$$

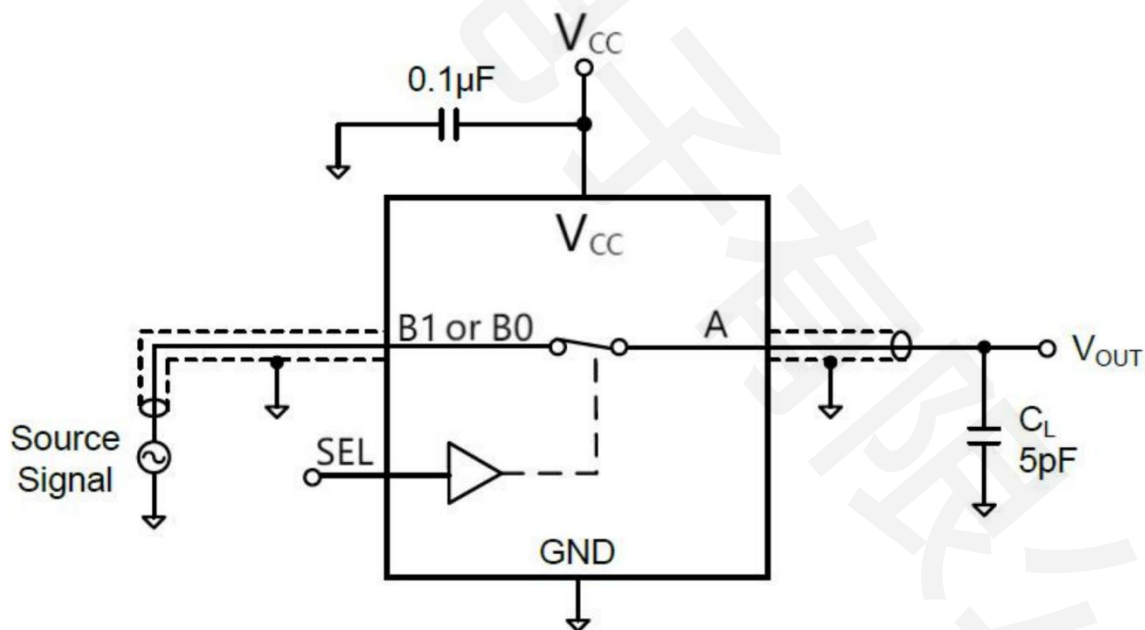
$$\text{Rise Time to Fall Time Mismatch} = |t_{\text{OUTFALL}} - t_{\text{OUTRISE}}|$$



Test Circuit 4. Output Signal Skew



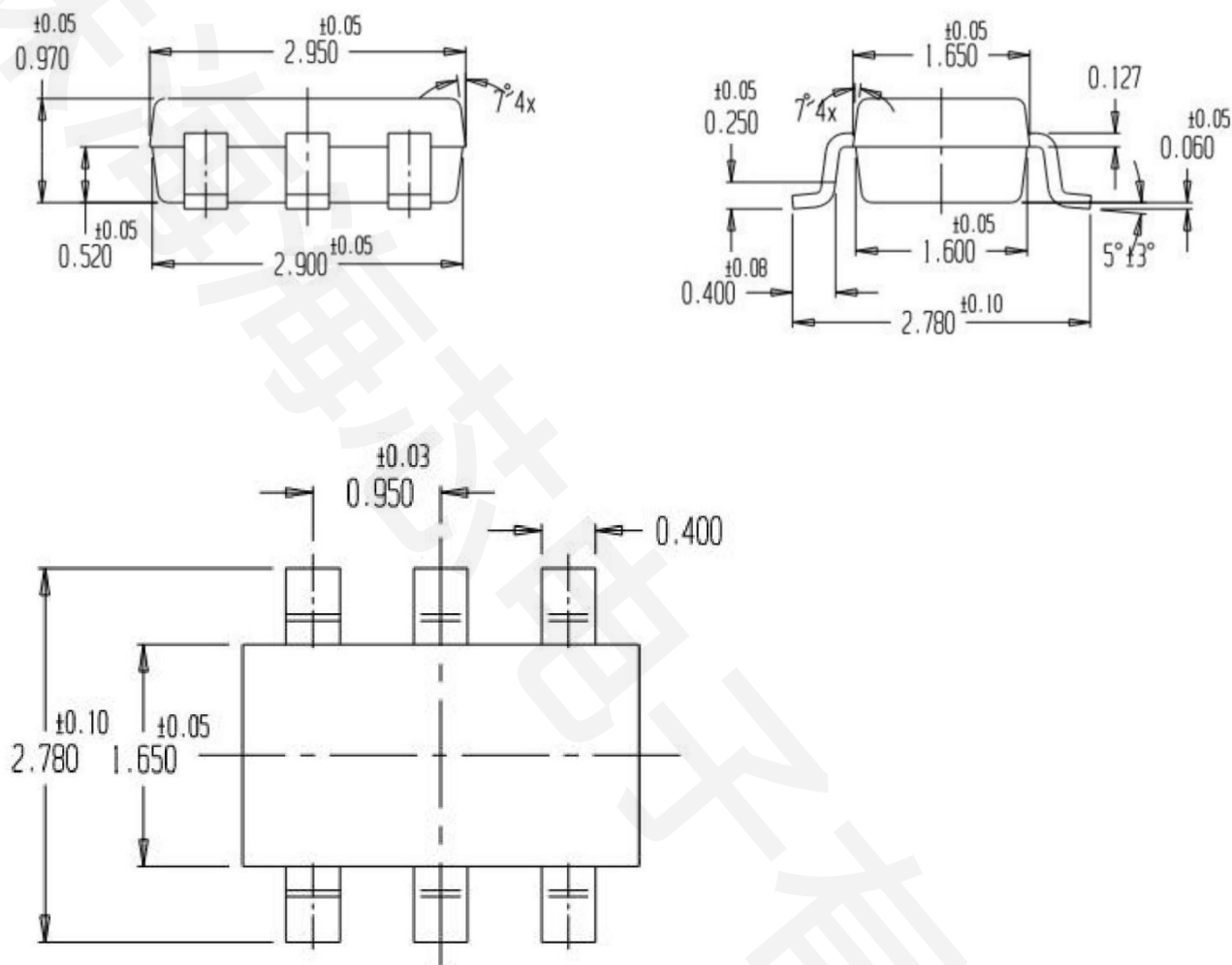
Test Circuit 5. Off Isolation

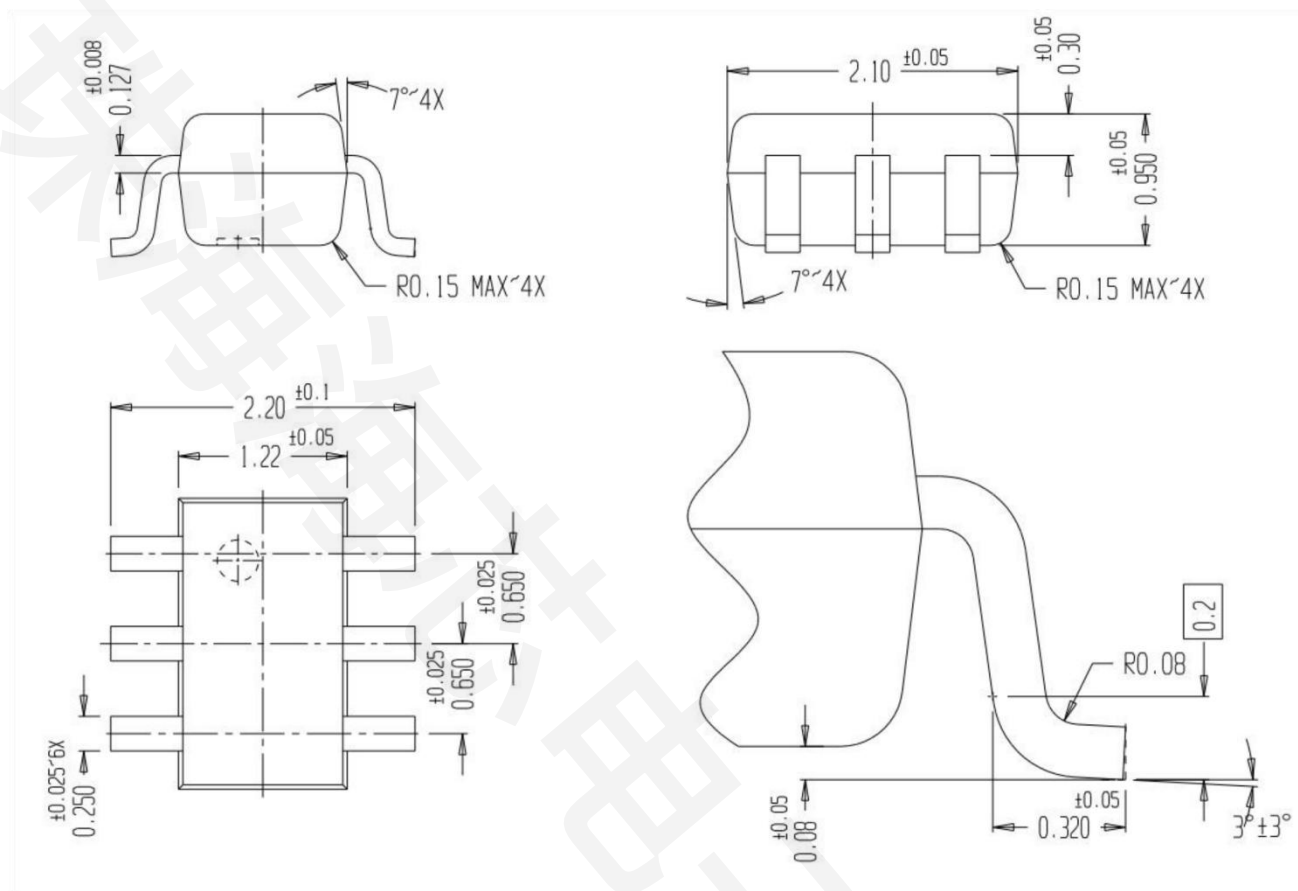


Test Circuit 6. -3dB Bandwidth

Package Outline Dimensions(All dimensions in mm.)

(1) Package Type: SOT23-6





Important Notice And Disclaimer

- We reserves the right to change the instruction manual without prior notice.
- Any semiconductor product has a certain possibility of failure or malfunction under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design and overall manufacturing to avoid potential failure risks that may cause personal injury or property damage.
- The improvement of product quality is endless, our company will be dedicated to provide customers with better products.