Low Voltage and High Speed SPDT Analog Switch with True Isolation

Descriptions

The RLCS3157 is a single SPDT low on-resistance analog switch. It can operate from a single 1.5V to 5.5V power supply. The device offers low ON-state resistance and excellent ON-state resistance matching with break-before-make feature, to prevent signal distortion during the transferring of a signal from one channel to another. The device is capable of truly isolation. Even when A overrides VCC, very little current will flow back to the supply.

Features

- Very Wide Supply Range (1.5V ~ 5.5V)
- Low Quiescent Current(<2uA)
- Low On-resistance, Ron=1.5Ω when V_A=5V
- High Bandwidth(-3dB@700MHz) Suitable for USB2.0 High-Speed Routing
- VA Overrides VCC to Achieve True Isolation Even When SupplyIs Dead
- High Off-Isolation:-100dB@100KHz
- Low Channel-to-Channel Crosstalk:-97dB@100KHz
- ESD HBM:±5500V
- SC70-6 Package

Applications

- Audio
- Video
- UART,USB2.0 Signal and Supply Routing
- Cell phone sand TWS head set
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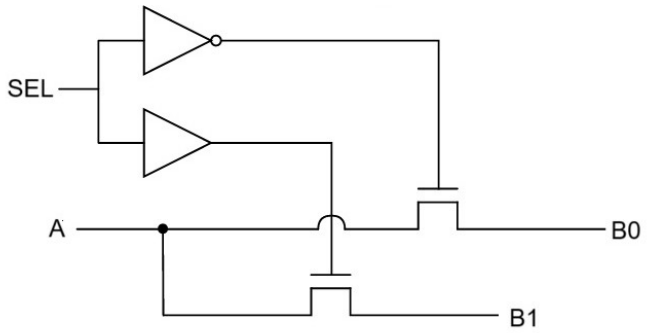
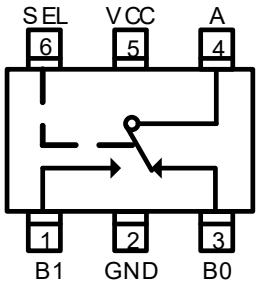
Block Diagram



Functions and Pin Configuration



Pin configuration(Top view)
SC70-6

Pin Number	Symbol	Descriptions
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 Descriptions

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

Order Information

Package		PartNumber	Quantity per Reel
SC70-6	Tape and Reel	RLCS3157SC6/R6	3,000PCS

Absolute Maximum Ratings(1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3~6.5	V
Control Input Voltage	V_S	-0.3~6.5	V
Continuous Current Through A,B0,B1		±100	mA
Peak Current Through A,B0,B1(pulsedat1ms50%dutycycle)		±200	mA
StorageTemperature Range	T_{STG}	-55~150	°C
JunctionTemperature under Bias	T_J	150	°C
Lead Temperature(Soldering,10seconds)	T_L	260	°C
Therma lresistance	$R_{\theta JA}$	350	°C/W

Recommend operating ratings(2)

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V_{CC}	1.5~5.5	V
Control Input Voltage	V_S	-0.3~5.5	V
Input Signal Voltage	V_A	-0.3~5.5	V
OperatingTemperature	T_A	-40~85	°C

Note:

1. “Absolute Maximum Ratings ”may cause permanent damage to the device.This is a stressonly rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of thiss pecification is notimplied.

DC Electronics Characteristics(Ta=25℃,VCC=3.3V,unless other wise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Inputlogichighlevel	V_{IH}	VCC:3.3~5.5V	1.6			V
		VCC: 1.5 ~ 3.3V	1.4			V
Input logic low level	V_{IL}	VCC: 3.3 ~ 5.5V			0.6	V
		VCC: 1.5 ~ 3.3V			0.4	V
Supply quiescent current	I_{CC}	I_A=0, V_S =0 or V_S =VCC			1.0	uA
Increase in I_{CC} per input	I_{CCT}	I_A=0, VCC=4.5V V_S>1.8 or V_S<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			±2.0	uA
On-Resistance	R_{ON1}	V_A=0 ~ 0.5V, I_A=30mA		3.0	3.5	Ω
	R_{ON2}	V_A=0.5 ~ 2.0V, I_A=30mA		3.6	3.9	Ω
	R_{ON3}	V_A=2.0 ~ 4.0V, I_A=30mA		2.5	3.5	Ω
	R_{ON4}	V_A=4.0 ~ 5.5V, I_A=30mA		1.5	1.8	Ω
On-Resistance Flatness	R_{FLAT1}	V_A=0 ~ 0.5V, I_A=30mA		0.7		Ω
	R_{FLAT2}	V_A=0.5 ~ 2.0V, I_A=30mA		0.5		Ω
	R_{FLAT3}	V_A=2.0 ~ 4.0V, I_A=30mA		1.6		Ω
	R_{FLAT4}	V_A=4.0 ~ 5.5V, I_A=30mA		0.3		Ω
On-Resistance Matching Between Channels	Δ R_{ON}	V_A=0~5.5V, I_A=30mA,		0.1	0.2	Ω

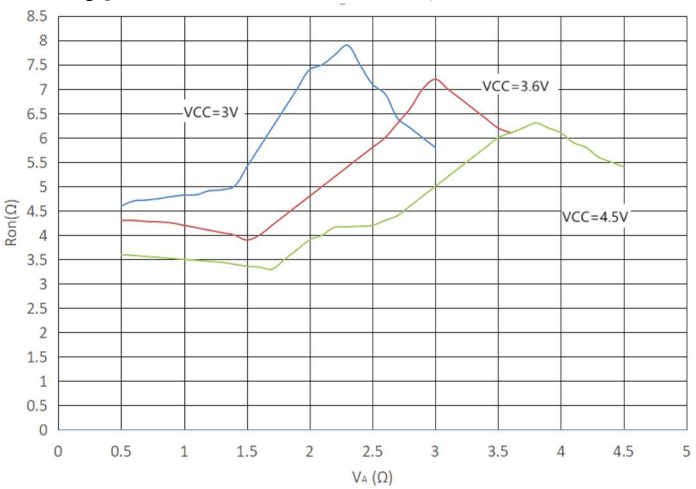
AC Electronics Characteristics (Ta=25℃, VCC=3.3V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
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		700		MHz
Off isolation	OIRR	F=1KHz, R_L=50Ω		-81		dB
		F=10KHz, R_L=50Ω		-80		dB
Crosstalk	Xtalk	F=1KHz, R_L=50Ω		-83		dB
		F=10KHz, R_L=50Ω		-82		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz V_A=600mVp-p @R_L=32Ω,		-80		dB

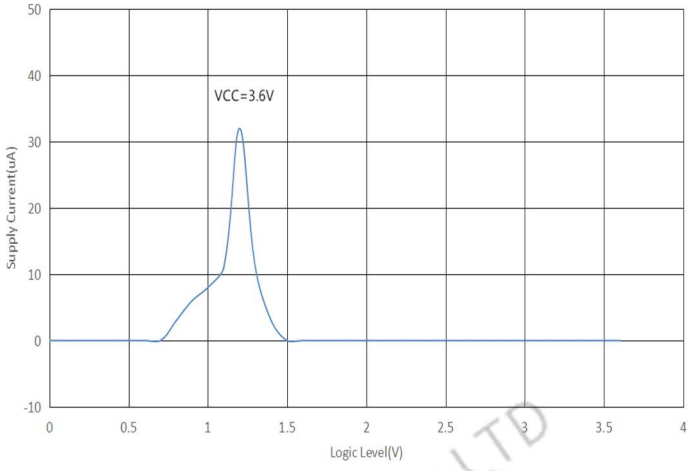
Capacitance (Ta=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C_{OFF}	F=100KHz, VCC=3.3		5		pF
On capacitance	C_{ON}	F=100KHz, VCC=3.3		7		pF

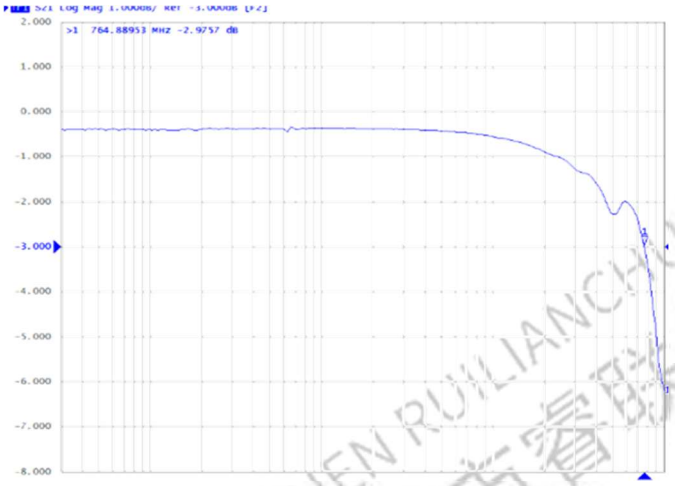
Typical Characteristics (Ta=25℃, VCC=3.3V, unless otherwise noted)



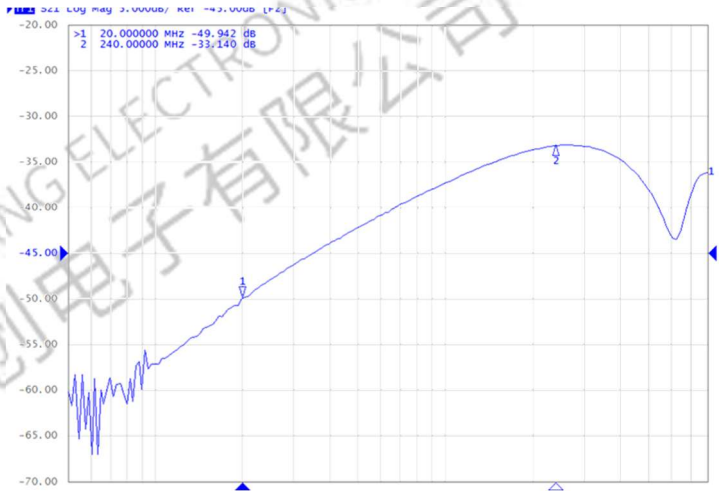
Ron vs. VCC and VA voltage



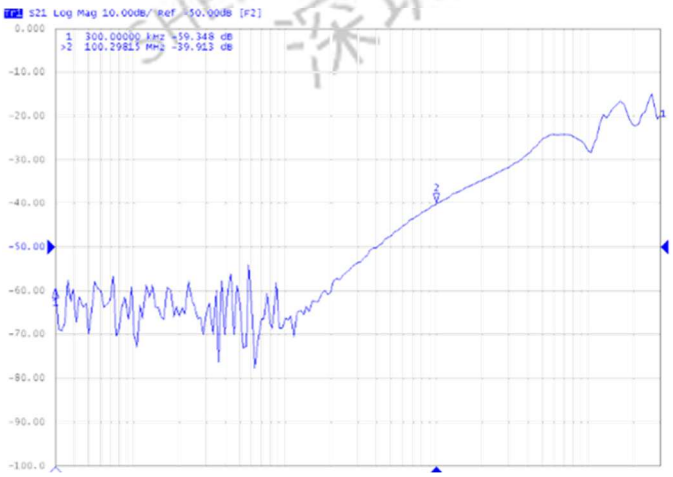
Supply Current vs. Logic Input



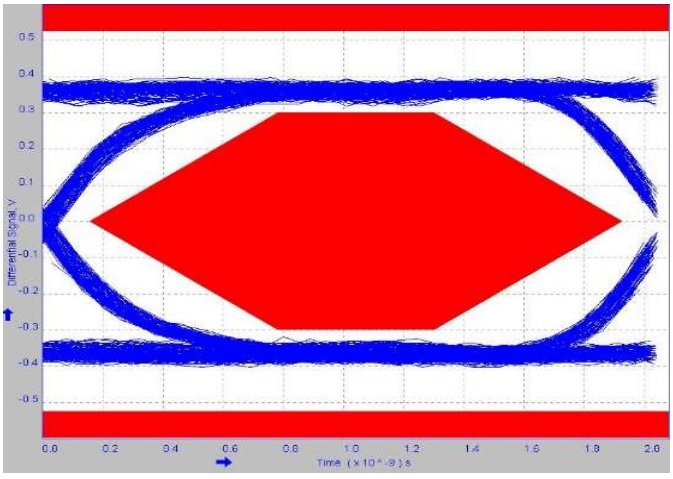
Insertion Loss (-3dB Band width)



Off Isolation



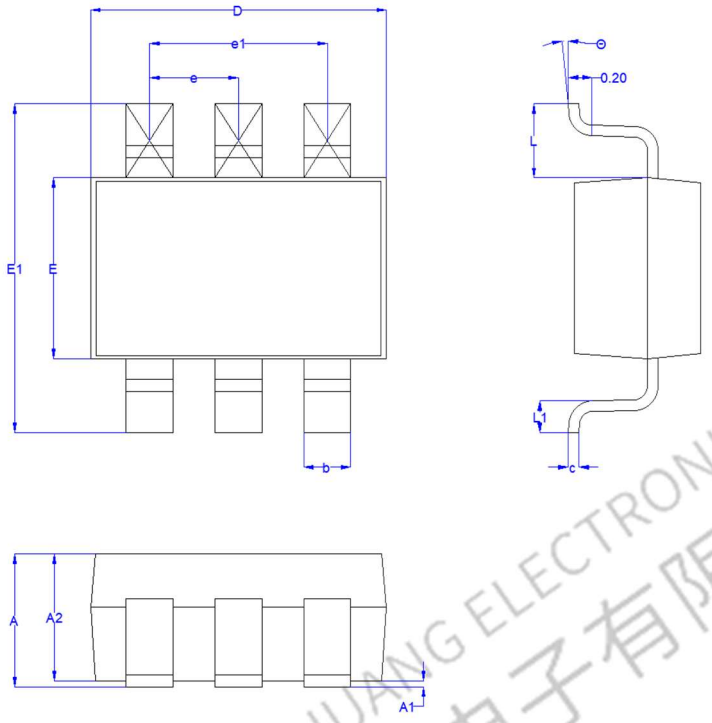
Cross-talk



Eye Diagram (480Mbps)

PACKAGE OUTLINE DIMENSIONS

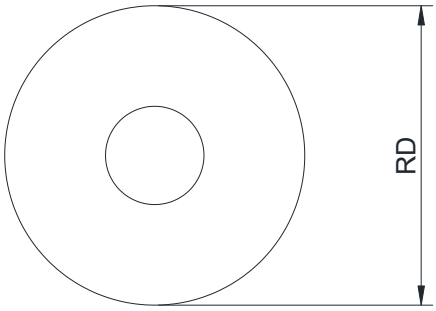
SC70-6



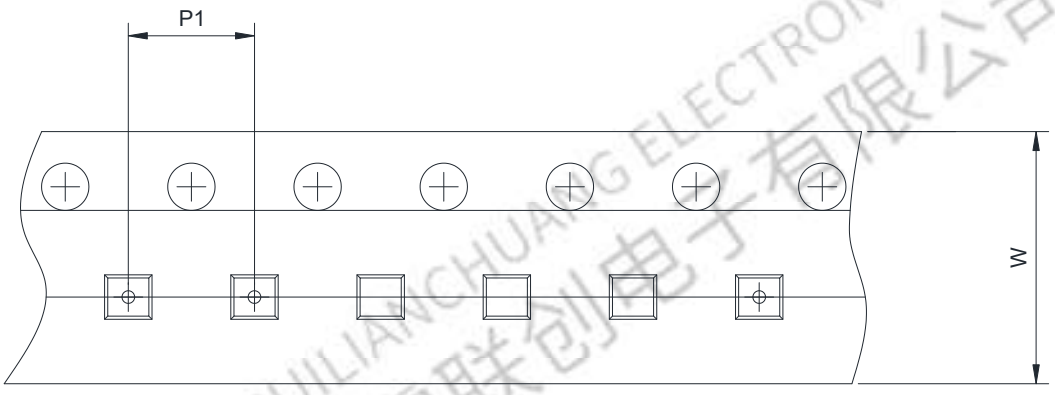
Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.080	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.650Typ	
e1	1.300BSC	
L	0.525REF	
L1	0.260	0.460
Θ	0°	8°

TAPE AND REEL INFORMATION

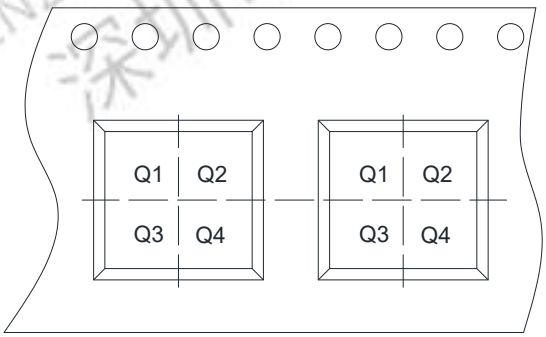
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



User Direction of Feed

R	Reel Dimension	☑ 7inch ☐ 13inch
W	Overall width of the carrier tape	☑ 8mm ☐ 12mm ☐ 16mm
P1	Pitch between successive cavity centers	☐ 2mm ☑ 4mm ☐ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4

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