Descriptions

The RLCS1567 is a high performance, quad, Single Pole Double Throw (SPDT) analog switch that features ultra-low Ron of 1.8 Ω (typical) at 3.0V VCC. The RLCS1567 operates over a wide VCC range of 2.3V to 4.5V and is designed for break-before-make operation. The select input is TTL-level compatible. RLCS1567 is also featured with smart circuitry to minimize VCC leakage current even when the control voltage is lower than VCC supply voltage. This feature suits mobile handset applications by allowing direct interface with baseband processor general-purpose IO with minimal battery consumption. In other word, there is no need of additional device to shift control level to be the same as that of VCC in real application.

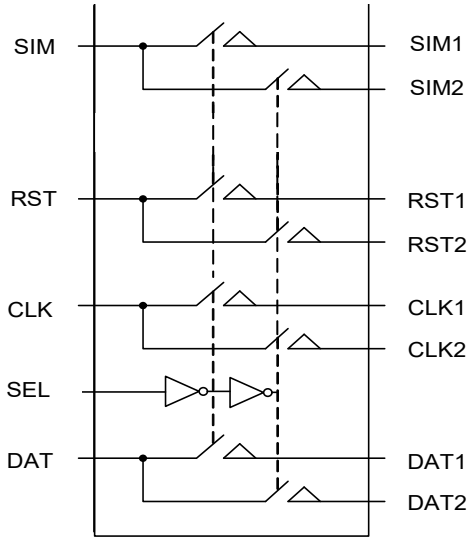
Features

- Supply voltage:1.5 ~ 5.5V
- ultra-low On Resistance:1.8 Ω
- -3dB Bandwidth :700MHz
- Rail-to-Rail Signal Range
- Break-Before-Make Switching
- Low quiescent current over an Expanded Control Input Range
- QFN 1.8x2.6-16L Package

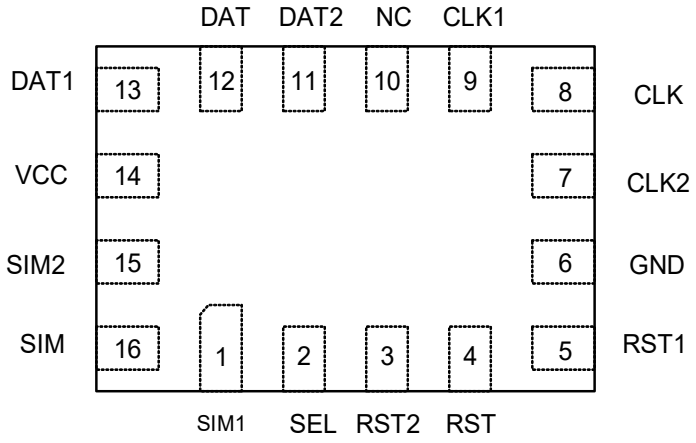
Applications

- Cell phones
- PDA
- Digital Camera
- Notebook
- LCD Monitor, TV and Set-Top Box
- Audio and Video Signal Routing
- Other electronic equipment

Functional Block Diagram



Functions and Pin Configuration



Pin configuration (Top view)

Pin Descriptions

Pin Number	Symbol	Descriptions
4,8,12,16	SIM, DAT, CLK, RST	Common Port
1,5,9,13	SIM1, DAT1, CLK1, RST1	Data Port (Normally closed)
3,7,11,15	SIM2, DAT2, CLK2, RST2	Data Port (Normally open)
2	SEL	Logic Input Control
14	VCC	Positive Power Supply
6	GND	Ground

Note: X=1 or 2,3,4

Function Descriptions

SEL	Function
0	SIM1 Connected to SIM, DAT1 Connected to DAT CLK1 Connected to CLK, RST1 Connected to RST
1	SIM2 Connected to SIM, DAT2 Connected to DAT CLK2 Connected to CLK, RST2 Connected to RST

Order Information

Package		Part Number	Quantity Per Reel
QFN1.8x2.6-16L	Tape and Reel	RLCS1567QN16/R6	3,000PCS

Absolute Maximum Ratings (1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 ~ 6.5	V
Control Input Voltage	V_{IN}	-0.3 ~ 6.5	V
DC Input Voltage (2)	V_{INPUT}	-0.3 ~ 6.5	V
Continuous Current SIM, DAT, CLK, RST		±100	mA
Peak Current SIM, DAT, CLK, RST (pulsed at 1ms 50% duty cycle)		±200	mA
Peak Current SIM, DAT, CLK, RST (pulsed at 1ms 10% duty cycle)		±200	mA
Storage Temperature Range	T_{STG}	-65 ~ 150	°C
Junction Temperature under Bias	T_J	150	°C
Lead Temperature (Soldering, 10 seconds)	T_L	260	°C
Power Dissipation	P_D	250	mW

Recommend operating ratings (3)

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V_{CC}	1.5 ~ 5.5	V
Control Input Voltage	V_{IN}	0.0 ~ V_{CC}	V
Input Signal Voltage	V_{IS}	0.0 ~ V_{CC}	V
Operating Temperature	T_A	-40 ~ 85	°C
Input Raise and Fall Time(Control Input V_{CC}=2.3~3.6V)	t_r,t_f	0 ~ 10	ns/V
Thermal Resistance	$R_{\theta JA}$	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.
2. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.
3. Control input must be held high or Low, it must not float.

DC Electronics Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input logic high level	V_{IH}	VCC: 3.0 ~ 4.5	1.6			V
		VCC: 2.3 ~ 3.0	1.4			V
Input logic low level	V_{IL}	VCC: 3.0 ~ 4.5			0.6	V
		VCC: 2.3 ~ 3.0			0.4	V
Supply quiescent current	I_{CC}	I_{OUT}=0, V_{IN} =0 or V_{IN} =VCC			1.0	uA
Increase in I_{CC} per input	I_{CCT}	I_{OUT}=0, VCC=4.5 V_{IN}>1.8 or V_{IN}<0.5			2.0	uA
Input leakage current	I_{IN}	V_{SEL}=VCC			±1.0	uA
Off state switch leakage current	I_{OFF}				±1.0	uA
On state switch leakage current	I_{ON}				±1.0	uA
On-Resistance	R_{ON}	VCC=4.5V, V_{IS}=0~4.5V, I_{ON}=100mA,		1.5		Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,		1.8		Ω
On-Resistance Matching Between Channels	ΔR_{ON}	VCC=4.5V, V_{IS}=0.8V, I_{OUT}=100mA,		0.1		Ω
		VCC=3.0V, V_{IS}=0.8V, I_{OUT}=100mA,		0.14		Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	VCC=4.5V, V_{IS}=0~4.5V, I_{OUT}=100mA,			0.5	Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,			0.8	Ω

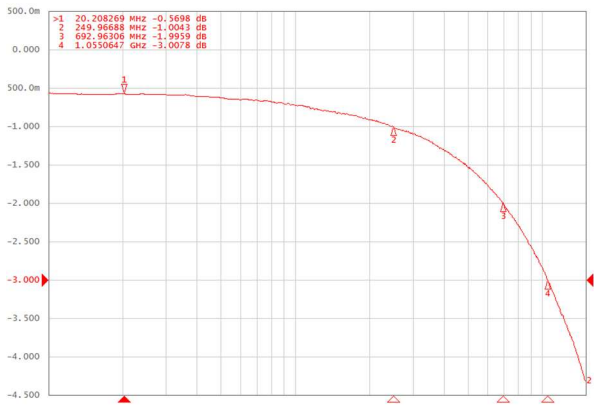
AC Electronics Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Time	T_{ON}	VCC=4.5V, V_{IS}=1.5V, C_L=35pF, R_L=50Ω		200		ns
Turn-Off Time	T_{OFF}	VCC=4.5V, V_{IS}=1.5V, C_L=35pF, R_L=50Ω		200		ns
Break-Before-Make time	T_{BBM}	Generate by design		100		ns
-3dB Bandwidth	BW	R_L=50Ω, C_L=0pF		700		MHz
Off isolation (Per Channel)	OIRR	F=100KHz, R_L=50Ω		-50		dB
Crosstalk (Channel to Channel)	Xtalk	F=100KHz, R_L=50Ω		-50		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz R_L=32Ω, V_{IS}=0.5Vp-p		-80		dB

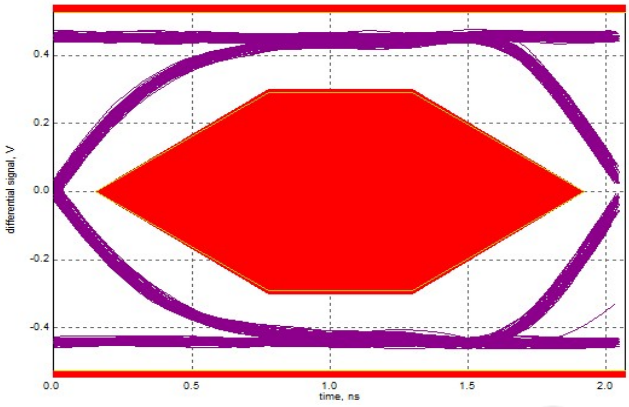
Capacitance (Ta=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C_{OFF}	F=1MHz, VCC=3.3V		5		pF
On capacitance	C_{ON}	F=1MHz, VCC=3.3V		8		pF

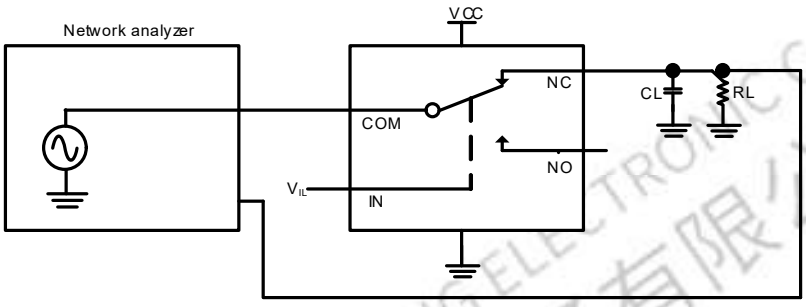
Typical Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)



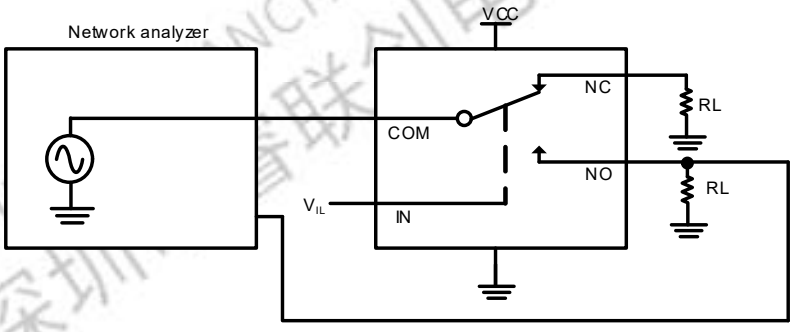
Bandwidth



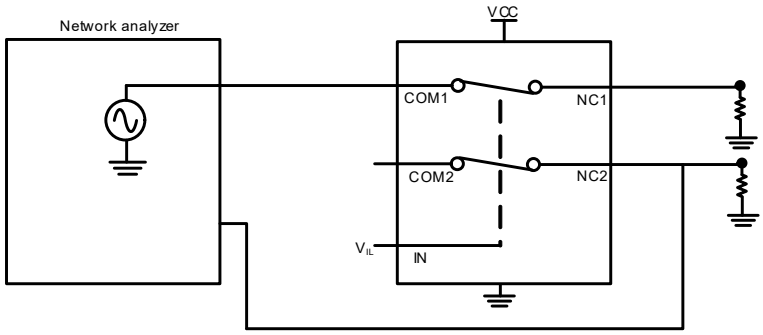
Eye Diagram (480Mbps)



Bandwidth

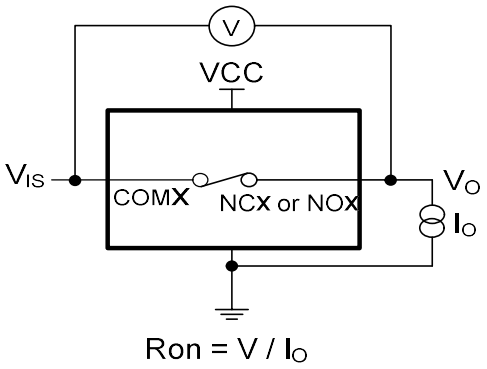


Off isolation

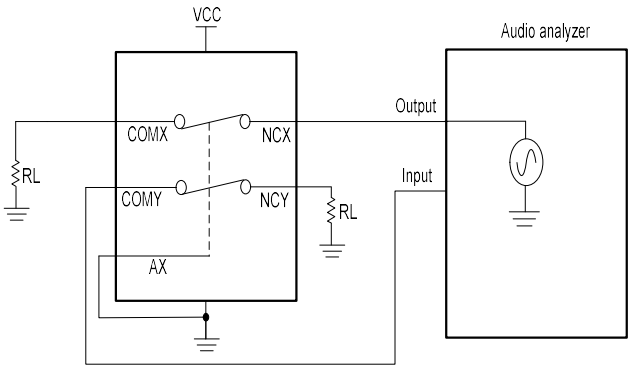


Crosstalk

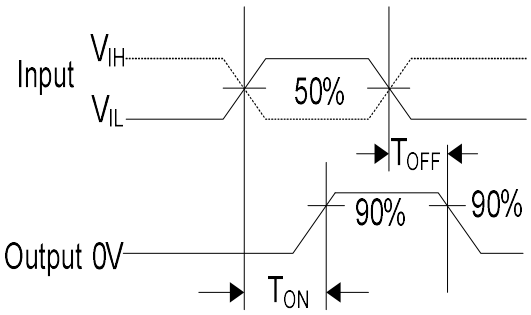
Test Circuits



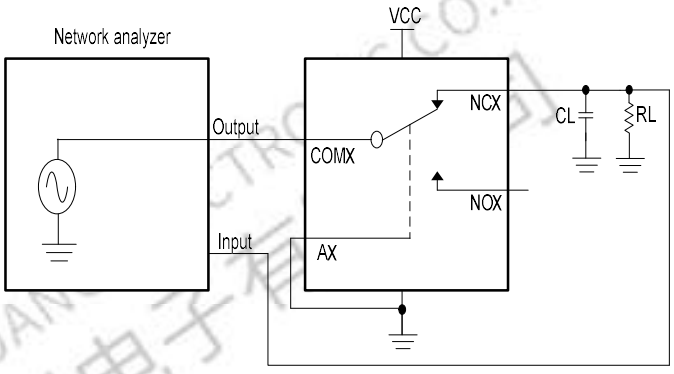
ON-Resistance (R_{ON})



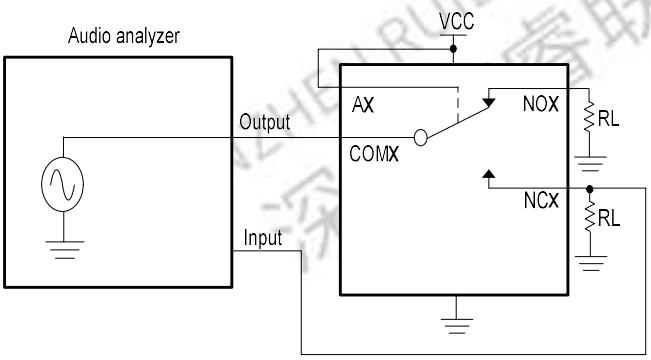
Crosstalk (Xtalk)



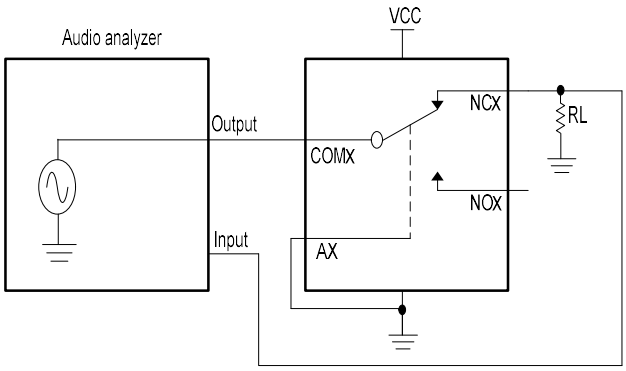
ON/OFF Time Waveforms (T_{ON} / T_{OFF})



Bandwidth (BW)



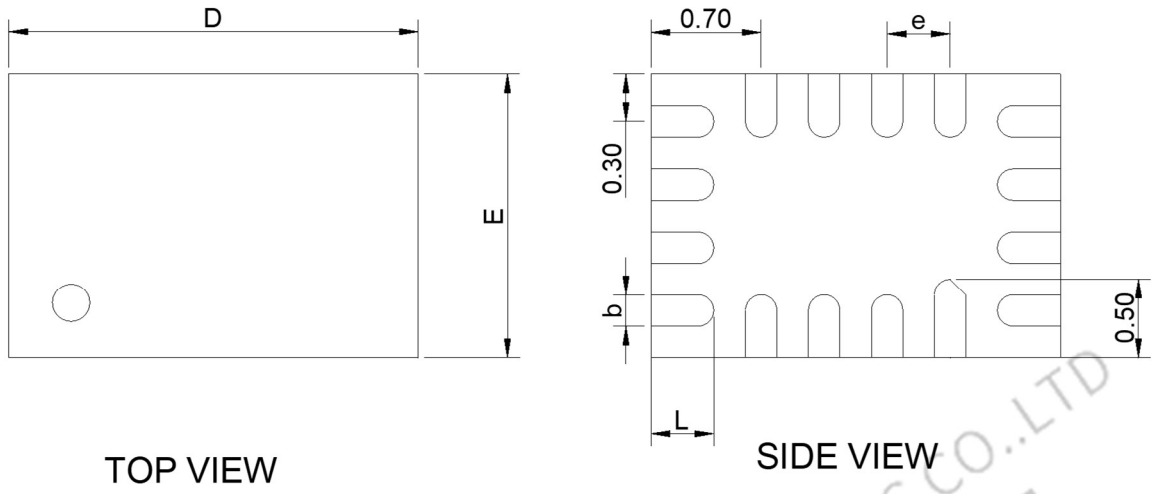
Off isolation (OIRR)

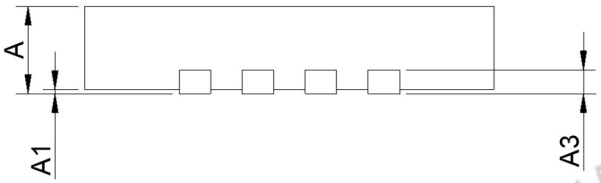


THD+N

Package Outline Dimensions

QFN 1.8 x 2.6-16L

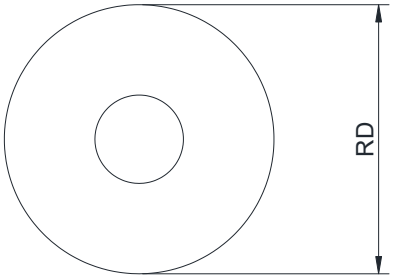




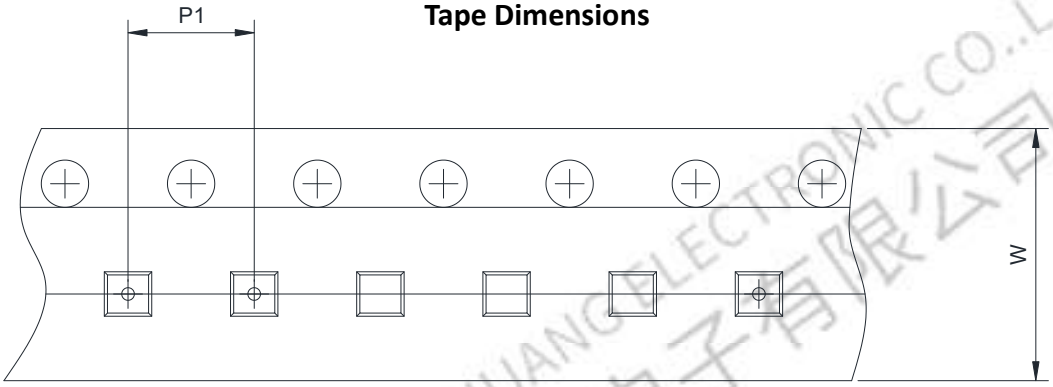
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15 Ref.		
D	2.55	2.60	2.65
E	1.75	1.80	1.85
L	0.30	0.40	0.50
b	0.15	0.20	0.25
e	0.40 BSC		

TAPE AND REEL INFORMATION

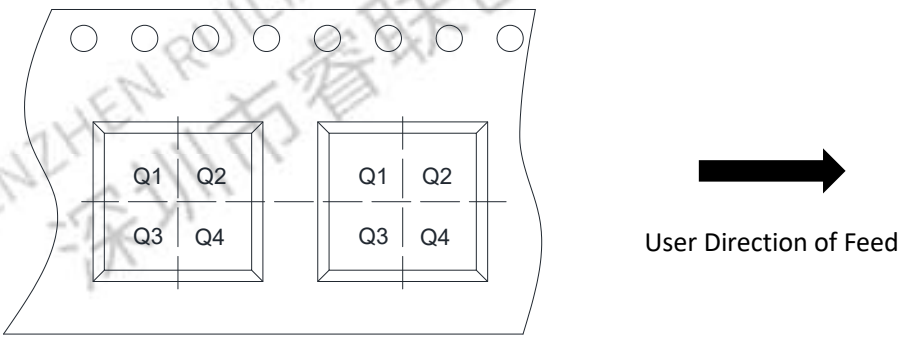
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	**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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