Dual 2:1 High-Speed USB2.0 (480Mbps) DPDT Analog Switch

Descriptions

The RLCS7227 is a bidirectional, low-power, dual-port USB 2.0 analog switch for USB Type-C™ systems, configured as a dual 2:1 or 1:2 switch. Optimized for USB 2.0 DP/DM lines, it provides true isolation, preventing current backflow even when COM+/- overrides VCC.The device features low skew, high noise isolation, and supports high-speed USB 2.0 (480Mbps) with minimal signal attenuation. Its wide bandwidth ensures strong signal integrity. SEL control is 1.8V logic-compatible.Available in QFN 1.4x1.8-10L and MSOP-10L packages, it is Pb-free and halogen-free, ideal for mobile and space-constrained applications.

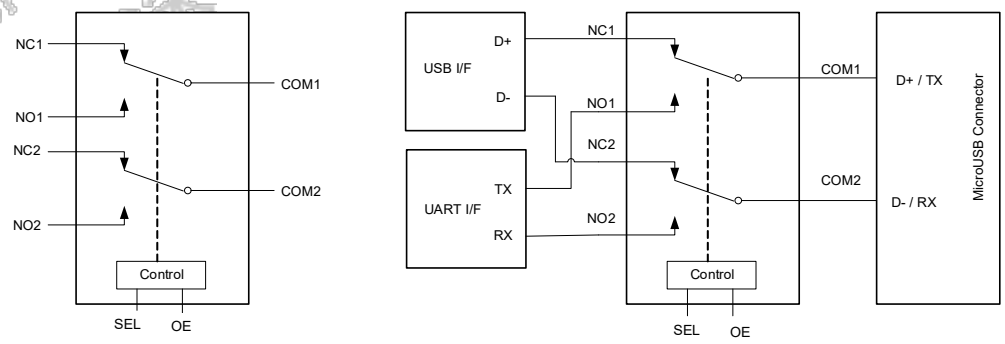
Features

- Low On-resistance, Ron=1.5Ω when VCC =5V
- 1.8V Logic Compatible Control Pin
- COM+/- Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- High Off-Isolation: -100dB @ 100KHz
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth (-3dB @800MHz) Suitable for USB2.0 High-Speed Routing
- Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)

Applications

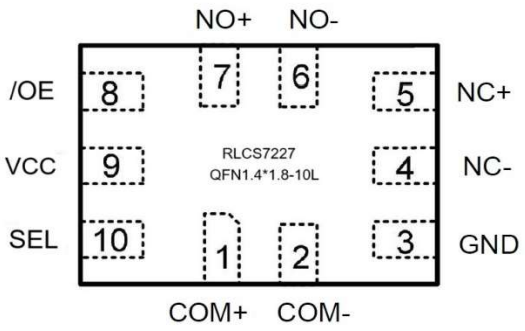
- Anywhere a USB Type-C™ or Micro-B Connector is Used
- Mobile Phones
- Tablets and Notebooks

Functional Block Diagram

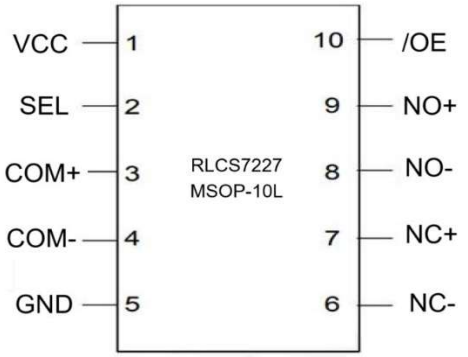


Functional Block Diagram

Pin Configuration



QFN1.4*1.8-10L



MSOP-10L

Functions and Pin Configuration

Pin Number		Symbol	Descriptions
QFN1.4x1.8-10L	MSOP-10L		
1,2	3,4	COM_X	Common Signal Ports
3	5	GND	Ground
4,5	6,7	NC_X	Analog/Digital Signal Ports (Normally closed)
6,7	8,9	NO_X	Analog/Digital Signal Ports (Normally open)
8	10	/OE	Active Low
9	1	VCC	Single Power Supply
10	2	SEL	Logic Input Selection

Pin Descriptions

Truth Table

/OE	SEL	Function
L	L	NC1=COM1 and NC2=COM2
L	H	NO1=COM1 and NO2=COM2

Truth Table

Order Information

Package		Part Number	Quantity Per Reel
QFN 1.4x1.8 -10L	Tape and Reel	RLCS7227QN10/R6	3000PCS
MSOP -10L	Tape and Reel	RLCS7227MS10/R6	3000PCS

Order Information

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
Continuous Current Through NO, NC, COM		±100	mA
Peak Current Through NO, NC, COM (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
Power Dissipation	P_D	250	mW

Recommend operating ratings (2)

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V_{CC}	1.5 ~ 5.5	V
Control Input Voltage	V_{IN}	-0.3 ~ 5.5	V
Input Signal Voltage	V_{COM}	-0.3 ~ 5.5	V
Operating Temperature	T_A	-40 ~ 85	°C
Thermal Resistance	$R_{\theta JA}$	360	°C/W

Note:
"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.

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input logic high level	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_{COM}=0, V_{IN} =0 or V_{IN} =VCC			1.0	uA
Increase in I_{CC} per input	I_{CCT}	I_{COM}=0, VCC=4.5V V_{IN}>1.8 or V_{IN}<0.5			1.0	uA
Off state leakage from COM_X to NC_X (or NO_X)	I_{COMx}	V_{COM} = 5.5V , $V_{NC(or\ NO)}$ = 0V			±2.0	uA
On-Resistance	R_{ON1}	V_{COM}=0 ~ 0.5V, I_{COM}=30mA		3.0	3.5	Ω
	R_{ON2}	V_{COM}=0.5 ~ 2.0V, I_{COM}=30mA		3.6	3.9	Ω
	R_{ON3}	V_{COM}=2.0 ~ 4.0V, I_{COM}=30mA		2.5	3.5	Ω
	R_{ON4}	V_{COM}=4.0 ~ 5.5V, I_{COM}=30mA		1.5	1.8	Ω
On-Resistance Flatness	R_{FLAT1}	V_{COM}=0 ~ 0.5V, I_{COM}=30mA		0.7		Ω
	R_{FLAT2}	V_{COM}=0.5 ~ 2.0V, I_{COM}=30mA		0.5		Ω
	R_{FLAT3}	V_{COM}=2.0 ~ 4.0V, I_{COM}=30mA		1.6		Ω
	R_{FLAT4}	V_{COM}=4.0 ~ 5.5V, I_{COM}=30mA		0.3		Ω
On-Resistance Matching Between Channels	ΔR_{ON}	V_{COM}=0~5.5V, I_{COM}=30mA,		0.1	0.2	Ω

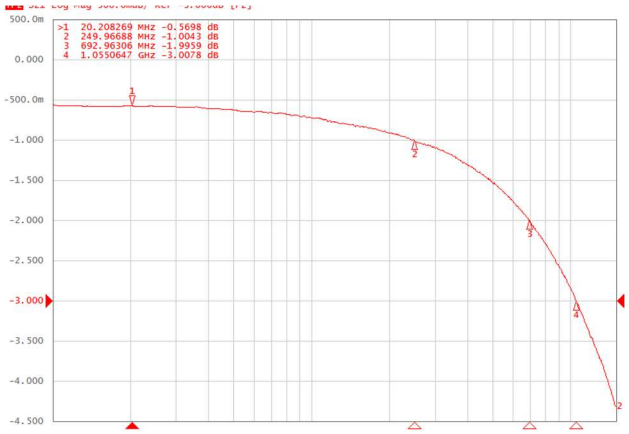
AC Electronics Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Time	T_{ON}	V_{COM}=1.5V, C_L=35pF, R_L=50Ω		200		ns
Turn-Off Time	T_{OFF}	V_{COM}=1.5V, C_L=35pF, R_L=50Ω		200		ns
Break-Before-Make time	T_{BBM}	V_{COM}=1.5V, C_L=35pF, R_L=50Ω		500		ns
-3dB Bandwidth	BW	R_L=50Ω, C_L=0pF		800		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_{COM}=600mVp-p @R_L=32Ω,		-80		dB

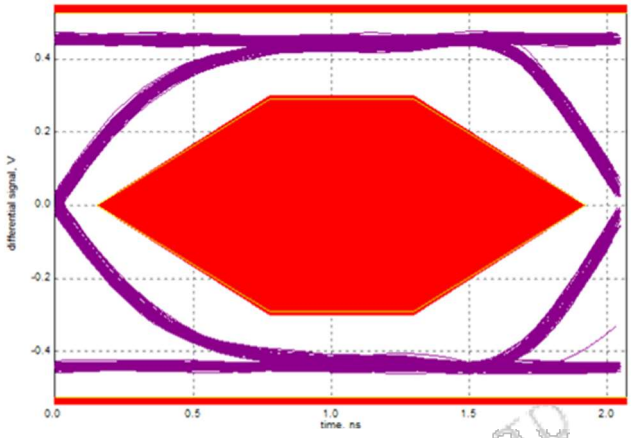
Capacitance (Ta=25°C, VCC=3.3V, unless otherwise noted)

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

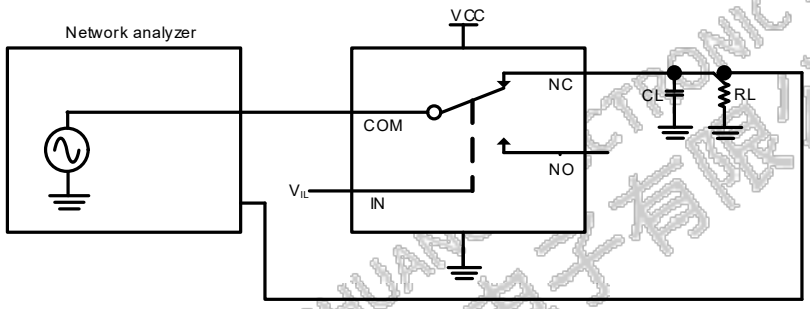
Typical Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)



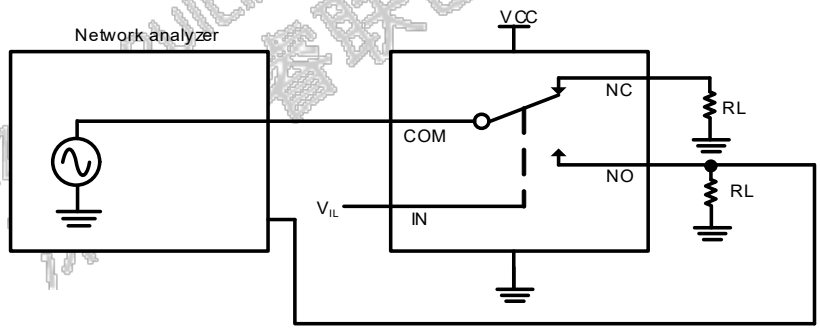
Bandwidth



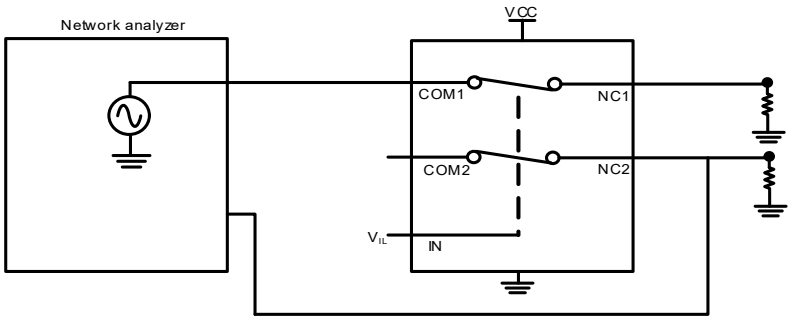
Eye Diagram (480Mbps)



Bandwidth



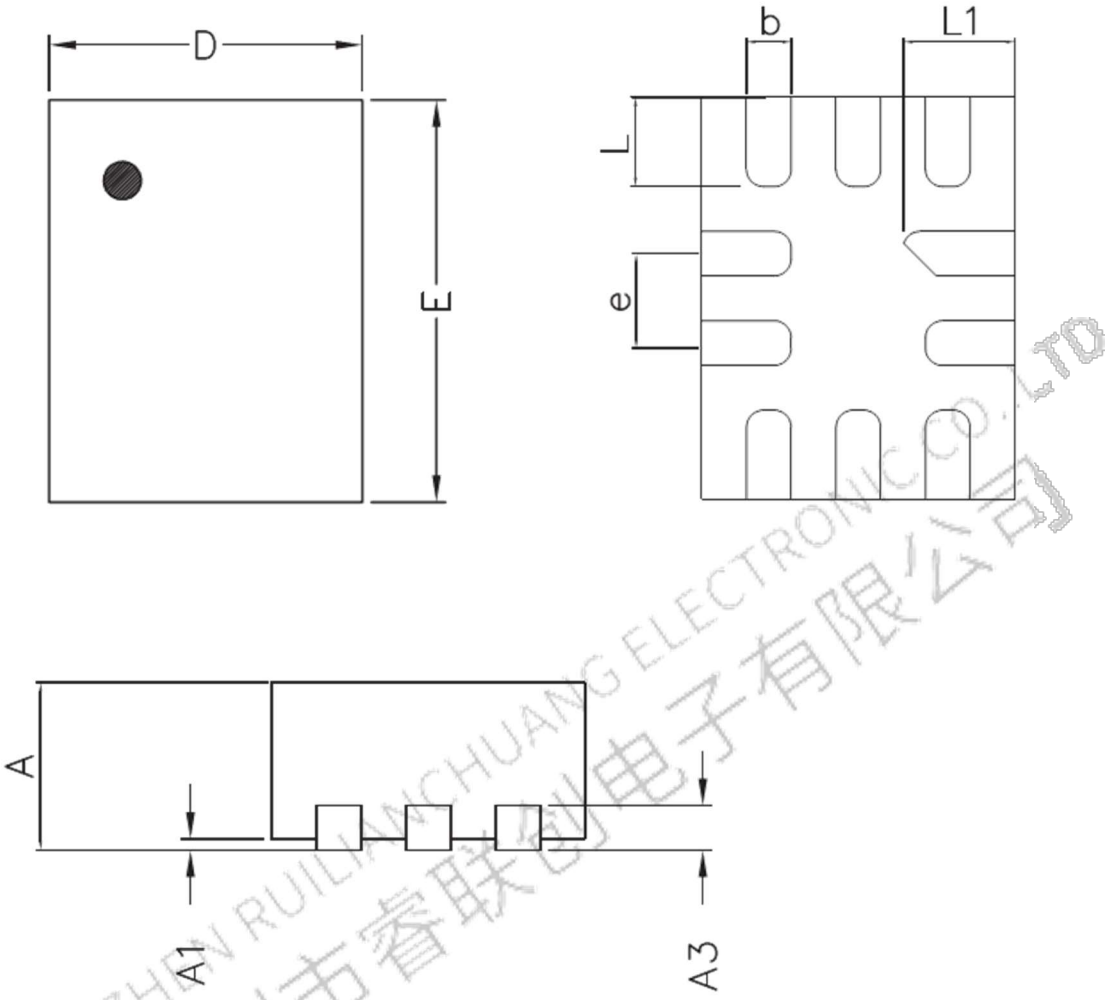
Off isolation



Crosstalk

Package Outline Dimensions

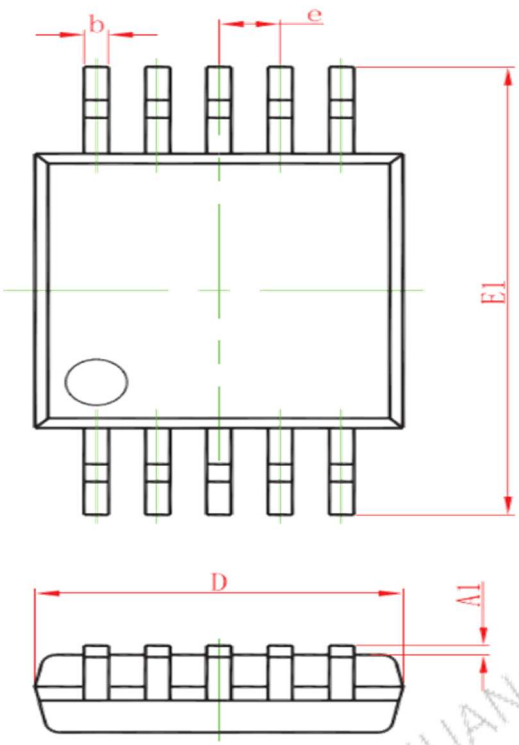
UQFN 1.4x1.8 -10L

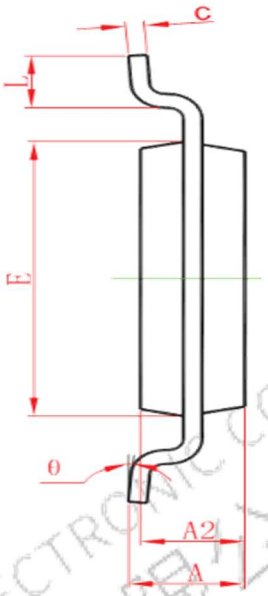


Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.450	0.550
A1	0.000	0.050
A3	0.152 Ref.	
D	1.350	1.450
E	1.750	1.850
b	0.150	0.250
e	0.400 Typ.	
L	0.350	0.450
L1	0.450	0.550

Package Outline Dimensions

MSOP-10L





Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.820	1.100
A1	0.020	0.150
A2	0.750	0.950
b	0.180	0.280
c	0.090	0.230
D	2.900	3.100
e	0.50(BSC)	
E	2.900	3.100
E1	4.750	5.050
L	0.400	0.800
θ	0°	6°

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