

40Gbps 1310nm 2Km QSFP+ Optical Transceiver Module

S-QS4031L2K-CD

Features

- Hot Pluggable QSFP+ form factor
- Supports bit rate up to 10.3125Gb/s per lane
- Duplex LC interface
- Uncooled 4x10Gbps 1310nm transmitter, PIN array detector
- Low power consumption <3.5W
- Maximum link length of 2km on Single Mode Fiber (SMF)
- All-metal housing for superior EMI performance
- IIC management interface
- Single +3.3V power supply
- Operating case temperature:0 to 70 °C
- RoHS compliant (lead free)

Applications

- 40G Ethernet
- High speed access

Standards

- Compliant to IEEE 802.3bm
- Compliant to SFF-8436

Description

Springtek 40G-IR4 QSFP+ transceiver is designed to meet the requirements of 40G ethernet links over SMF up to 2km. It is compliant with QSFP+ MSA, IEEE 802.3ba 40GBase-IR4. It is cost-effective, low power consumption with a single 3.3V power supply. It is fabricated with all-metal and compact size housing for superior EMI performance.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	-0.5		4	V
Storage Temperature Range	Ts	-40		85	°C
Relative Humidity - Storage	RHs	0		95	%
Relative Humidity - Operating	RHo	0		85	%

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Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	T _c	0	-	70	°C
Power Supply Voltage	V _{cc}	3.14	3.3	3.47	V
Total Power Consumption	P	-	-	3.5	W
Data Rate per Lane	BR	-	10.3125	-	Gbps

Electrical Characteristics

Transmitter Electrical Characteristics						
Parameter	Symbol	Min	Typ	Max	Unit	Note
Differential Input Voltage Swing	V _{IN}	180	-	1200	mV	
Tx Differential Input Impedence	Z _{IN}	-	100	-	Ω	
Differential input return loss		Per IEEE P802.3ba 86A.4.1.1			dB	10MHz to 11.1GHz
Differential to common-mode input return loss		10	-	-	dB	10MHz to 11.1GHz
J2 Jitter Tolerance	J2T	0.17	-	-	UI	Per IEEE P802.3ba 86A.4.1
J9 Jitter Tolerance	J9T	0.29	-	-	UI	
Receiver Electrical Characteristics						
Parameter	Symbol	Min	Typ	Max	Unit	
Differential output Voltage Swing	V _{OUT}	300	-	1200	mV	
Rx Differential Output Impedence	Z _{OUT}	-	100	-	Ω	
Differential output return loss		Per IEEE P802.3ba 86A.4.2.1			dB	10MHz to 11.1GHz
Common mode output return loss		Per IEEE P802.3ba 86A.4.2.2			dB	10MHz to 11.1GHz
Output transition time,20% to 80%		28	-	-	ps	Per IEEE P802.3ba 86A.4.2
J2 Jitter output	J2O	-	-	0.42	UI	
J9 Jitter output	J9O	-	-	0.65	UI	

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Characteristics						
Laser Type		CWDM DFB				
Data Rate per lane	-	-	10.3125	-	Gb/s	
Lane Center Wavelengths	λ ₀	1264.5		1277.5	nm	
	λ ₁	1284.5		1297.5		
	λ ₂	1304.5		1317.5		
	λ ₃	1324.5		1337.5		
Side-mode suppression ratio	SMSR	30	-	-	dB	
Total average Launch Power	P _T	-	-	8.3	dBm	
Average Launch Power, each lane	P _{OUT}	-7.0	-	2.3	dBm	

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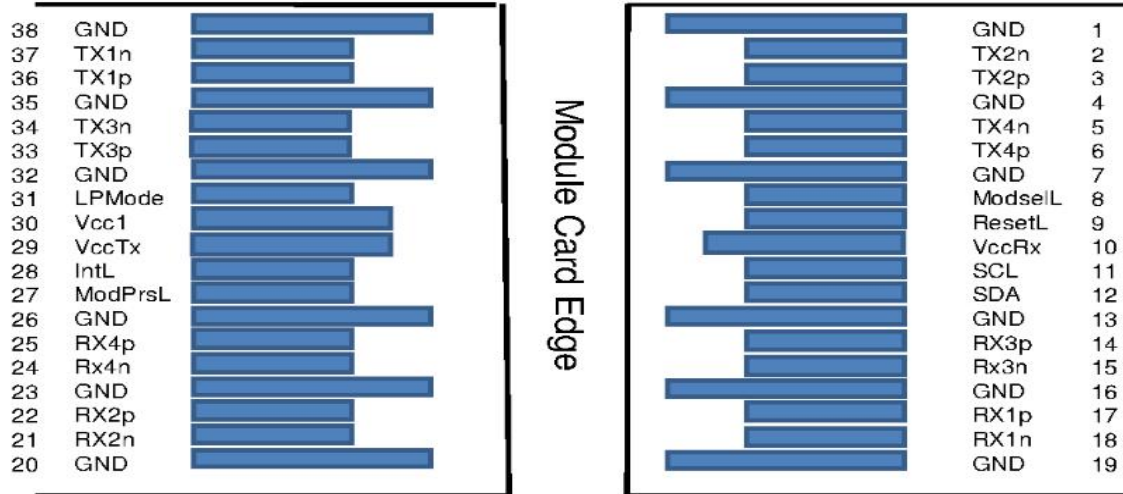
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Optical Modulation Amplitude, each lane	OMA	-4	-	3.5	dBm	
Difference in launch power between any two lanes (OMA)		-	-	6.5	dB	
Launch Power in OMA minus TDP, each lane		-4.8	-	-	dBm	
Extinction Ratio	ER	3.5	-	-	dB	
Transmitter dispersion penalty	TDP	-	-	2.6	dB	
Average Launch Power of OFF transmitter, each lane	POFF	-	-	-30	dBm	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Optical return loss tolerance		-	-	20	dB	
Transmitter Reflectance		-	-	-12	dB	
Transmitter eye mask definition		Compliant to IEEE802.3ba				
Receiver Characteristics						
Receiver Type		PIN				
Data Rate per lane		-	10.3125	-	Gb/s	
Lane Center Wavelengths	λ_0	1264.5		1277.5	nm	
	λ_1	1284.5		1297.5		
	λ_2	1304.5		1317.5		
	λ_3	1324.5		1337.5		
Average receive power, each lane	PIN1	-13.7	-	2.3	dBm	
Damage Threshold	DT	3.3	-	-	dBm	
Receiver Power (OMA), each lane (max)		-	-	3.5	dBm	
Difference in receive power between any two lanes(OMA)(max)		-	-	7.5	dB	
Receiver Sensitivity (OMA), each lane (max)	Sen1	-	-	-11.5	dBm	1
Stressed Receiver Sensitivity (OMA), each lane (max)	Sen1	-	-	-9.6	dBm	
Receiver 3dB electrical upper cutoff frequency, each lane		-	-	12.3	GHz	
Receiver Reflectance	RFL	-	-	-26	dB	
LOS Assert	LOSA	-30	-	-	dBm	
LOS De-Assert	LOSD	-	-	-15	dBm	
LOS Hysteresis	LOSH	0.5	3	5	dB	
Notes						
1. BER=1E-12, measured with PRBS31@10.3125Gbps						

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Pin Definitions



Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

Pin	Symbol	Name/Description	Notes
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non -Inverted Data Input	
7	GND	Ground	
8	ModselL	Module Select	
9	RetsetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	

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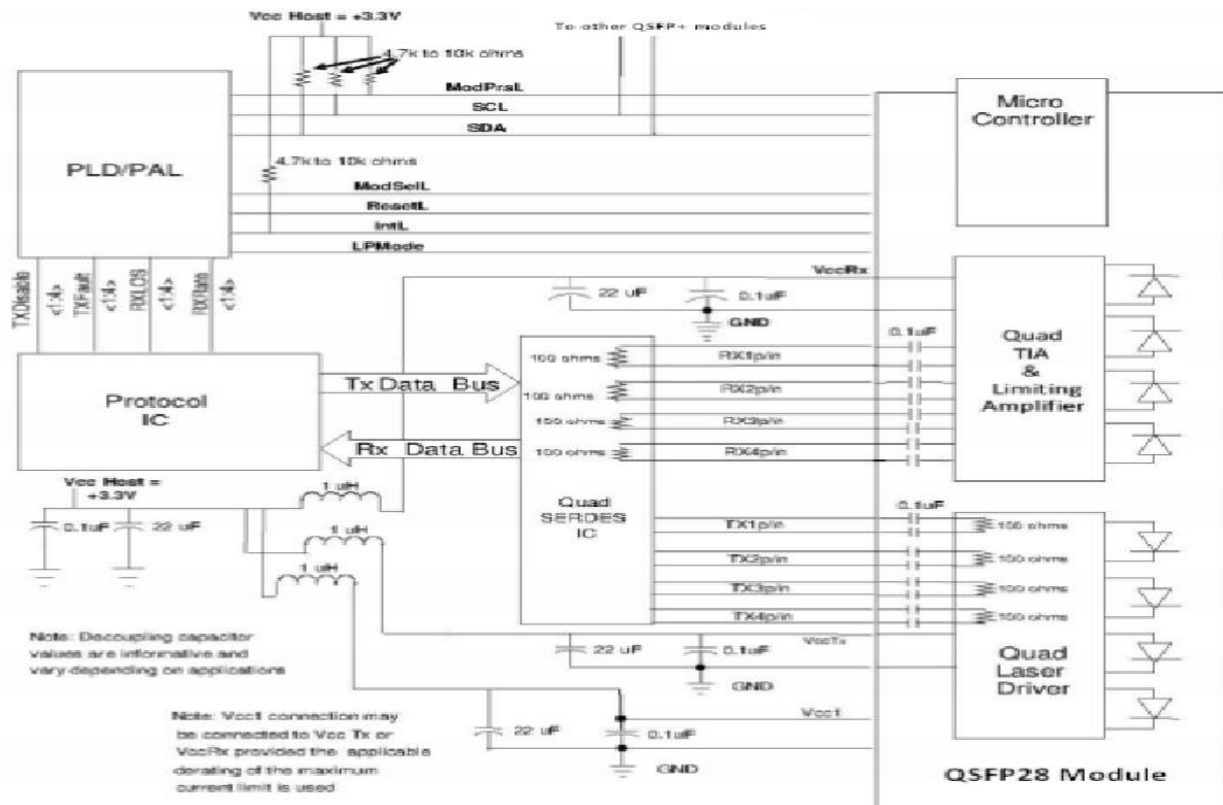
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23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power Supply transmitter	
30	Vcc1	+3.3V Power Supply	
31	LPMODE	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

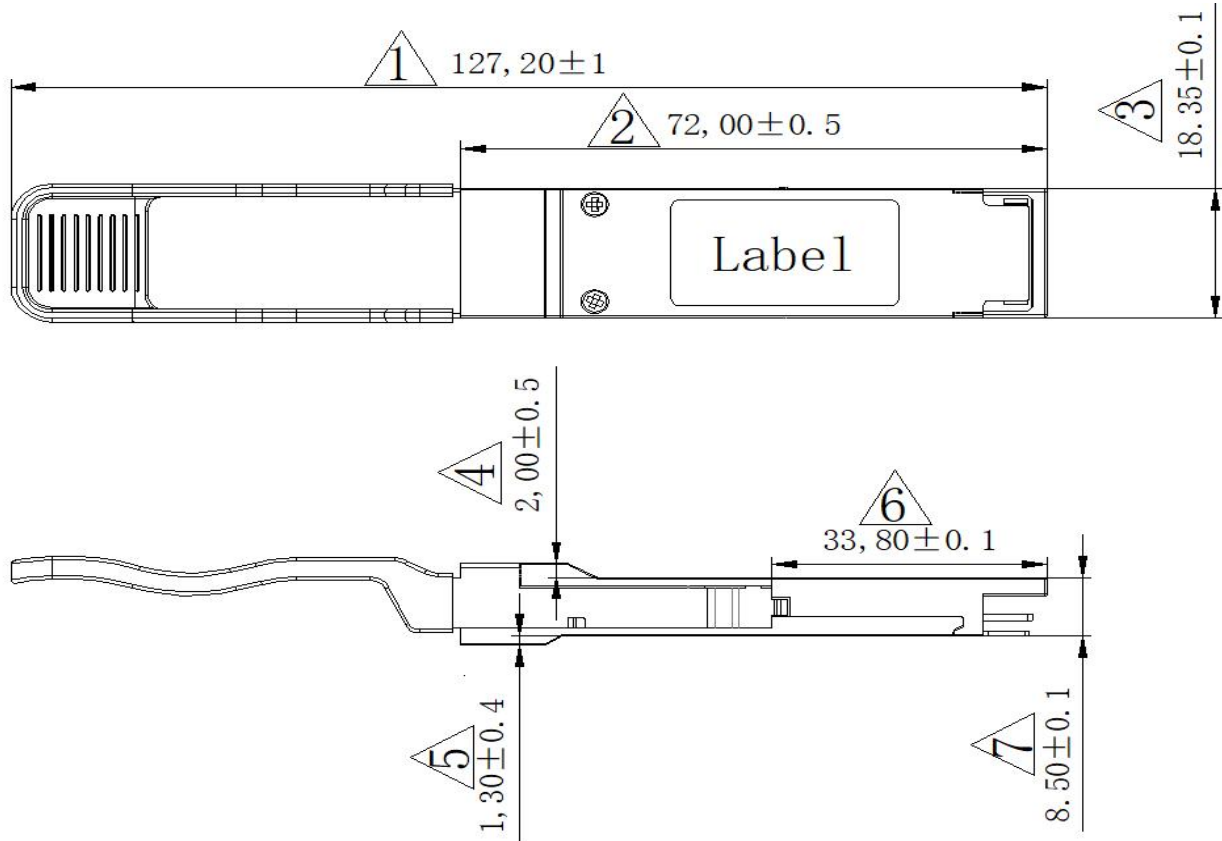
Recommended Interface Circuit



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Mechanical Dimensions



Ordering information

Part Number	Product Description
S-QS4031L2K-CD	QSFP+, 40Gbps,1310nm, SM,LC,2km, 0°C ~ +70°C, With DDM