

## 40Gbps QSFP+ Bi-Di SR4 MMF 100M

SLQS-40G-SR4-BD



### Overview

The SLQS-40G-SR4-BD is a Four-Channel, Pluggable, LC Duplex, Fiber-Optic QSFP+ Transceiver for 40 Gigabit Ethernet Applications. This transceiver is a high performance module for short-range duplex data communication and interconnect applications. It integrates four electrical data lanes in each direction into transmission over a single LC duplex fiber optic cable. Each electrical lane operates at 10.3125Gbps and conforms to the 40GE XLPI interface.

The transceiver internally multiplexes an XLPI 4x10G interface into two 20Gb/s electrical channels, transmitting and receiving each optically over one simplex LC fiber using bi-directional optics. This results in an aggregate bandwidth of 40Gbps into a duplex LC cable. This allows reuse of the installed LC duplex cabling infrastructure for 40GbE application. Link distances up to 100 m using OM3 and 150m using OM4 optical fiber are supported. These

modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm on one end and 900nm on the other end. The electrical interface uses a 38 contact QSFP+ type edge connector. The optical interface uses a conventional LC duplex connector.

### Features

- ◆ Compliant to the 40GbE XLPI electrical specification per IEEE 802.3ba-2010
- ◆ Compliant to QSFP+ SFF-8436 Specification
- ◆ Aggregate bandwidth of > 40Gbps
- ◆ Operates at 10.3125 Gbps per electrical channel with 64b/66b encoded data
- ◆ QSFP MSA compliant
- ◆ Capable of over 100m transmission on OM3 MMF and 150m on OM4 MMF
- ◆ Single +3.3V power supply operating
- ◆ Temperature range 0°C to 70°C
- ◆ RoHS Compliant
- ◆ Utilizes a standard LC duplex fiber cable allowing reuse of existing cable infrastructure

### Applications

- ◆ 40 Gigabit Ethernet interconnects
- ◆ Datacom/Telecom switch & router connections
- ◆ Data aggregation and backplane applications
- ◆ Proprietary protocol and density applications

### Ordering Information

Part Number	Product Description
SLQS-40G-SR4-BD	QSFP+ Bi-Di SR4 850nm 100m on OM3 MMF and 150m on OM4 MMF 0°C to 70°C

**Datasheet**
**Absolute Maximum Ratings**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>CC-Tx/V<sub>CC-Rx/V<sub>CC1</sub></sub></sub>	-0.5	4	V
Storage Temperature Range	T <sub>STG</sub>	-40	+85	°C
Relative Humidity	RH	0to 85% (non-condensing)		

**Operating Conditions**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>CC-Tx/V<sub>CC-Rx/V<sub>CC1</sub></sub></sub>	3.1	3.5	V
Operating Case temperature	T <sub>CASE</sub>	0	70	°C
Power Consumption	P <sub>DISS</sub>		3.5	W
Supply Current	ICC		1000	mA

**High Speed Electrical Specifications**

Parameter	Min	Typical	Max	Units
<b>General</b>				
Data Rate per Channel	-	10.3125	11.2	Gbps
Power Consumption	-	2.5	3.5	W
Supply Current		0.75	1.0	A
Control I/O Voltage-High	2.0		V <sub>CC</sub>	V
Control I/O Voltage-Low	0		0.7	V
Inter-Channel Skew			150	Ps
RESETL Duration		10		Us
RESETL De-assert time			100	ms
Power On Time			100	ms
<b>Transmitter</b>				
Single Ended Output Voltage Tolerance	0.3		4	V
Common mode Voltage Tolerance	15			mV
Transmit Input Diff Voltage	120		1200	mV
Transmit Input Diff Impedance	80	100	120	
Data Dependent Input Jitter			0.1	UI
Data Input Total Jitter			0.28	UI
<b>Receiver</b>				

## Datasheet

Single Ended Output Voltage Tolerance	0.3		4	V
Rx Output Diff Voltage		600	800	mV
Rx Output Rise and Fall Voltage			35	ps
Total Jitter			0.7	UI
Deterministic Jitter			0.42	UI

## Optical Characteristics

### Transmitter Specifications

Parameter	Min	Typical	Max	Unit
Optical Wavelength CH1	832	850	868	nm
Optical Wavelength CH2	882	900	918	nm
RMS Spectral Width		0.5	0.65	nm
Average Optical Power per Channel	-4	-2.5	+5.0	dBm
Laser Off Power Per Channel			-30	dBm
Optical Extinction Ratio	3.5			dB
Relative Intensity Noise			-128	dB/HZ
Optical Return Loss Tolerance			12	dB

### Receiver Specifications

Parameter	Min	Typical	Max	Unit
Optical Center Wavelength CH1	882	900	918	nm
Optical Center Wavelength CH2	832	850	868	nm
Receiver Sensitivity per Channel		-11		dBm
Maximum Input Power	+0.5			dBm
Receiver Reflectance			-12	dB
LOS De-Assert			-14	dBm
LOS Assert	-30			dBm
LOS Hysteresis	0.5			dB

### Functional Block Diagram

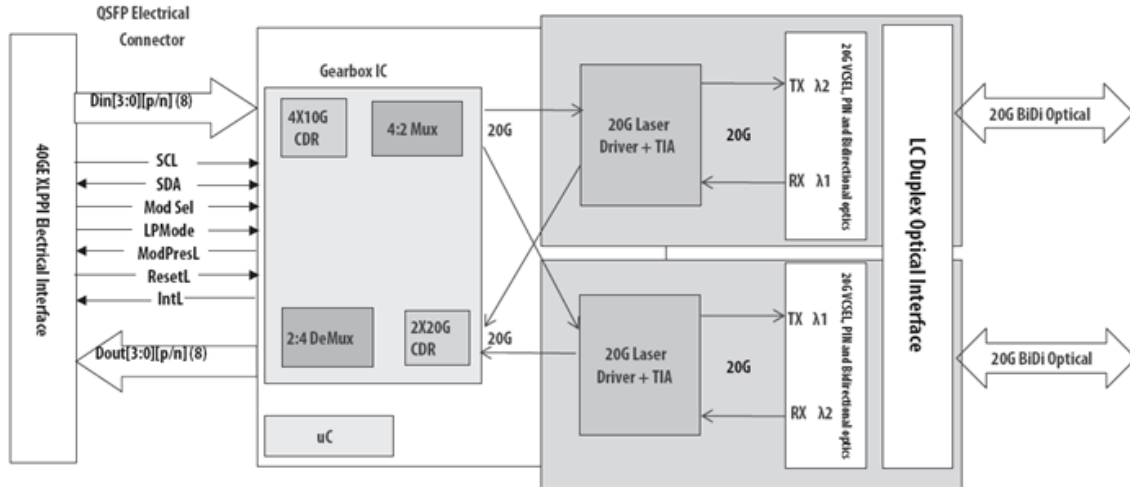


Figure1. Functional Block Diagram

### QSFP Edge Connector and Pinout Description

The electrical interface to the transceiver is a 38-pin edge connector. The 38-pins provide high speed data, low speed monitoring and control signals, I<sup>2</sup>C communication, power and ground connectivity. The top and bottom views of the connector are provided below, as well as a table outlining the contact numbering, symbol and full description.

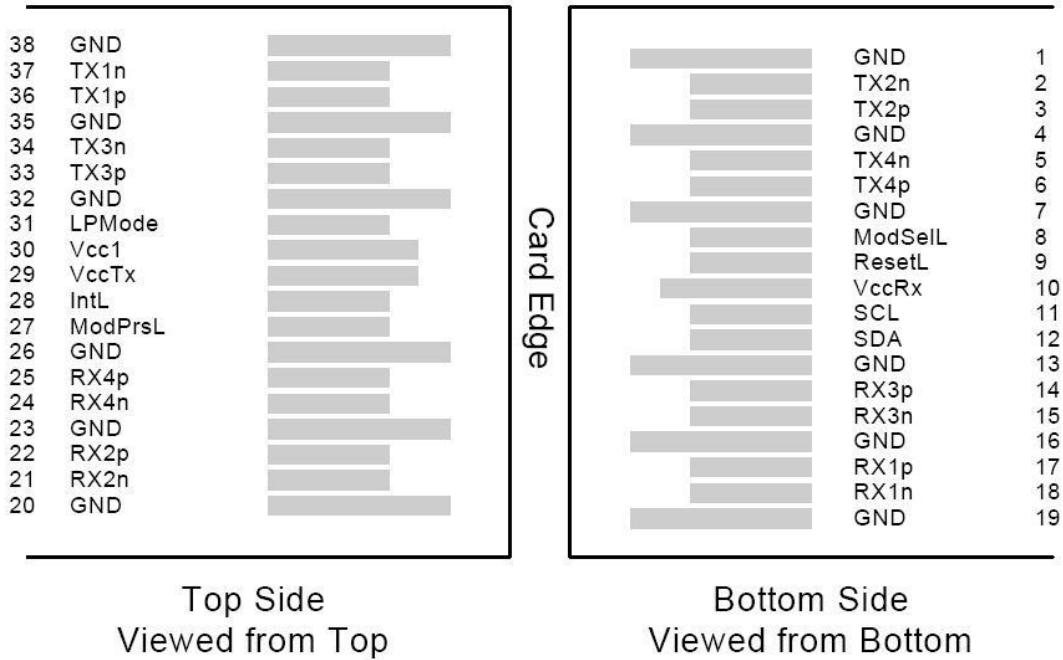


Figure2. QSFP Edge Connector and Pinout Description

## QSFP Transceiver Pinout

Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Ground	1
2	CML-I	Tx2n	Transmitted Inverted Data Input	3
3	CML-I	Tx2p	Transmitted Non-inverted Data Input	3
4		GND	Ground	1
5	CML-I	Tx4n	Transmitted Inverted Data Input	3
6	CML-I	Tx4p	Transmitted Non-inverted Data Input	3
7		GND	Ground	1
8	LVTTL-I	ModSeiL	Module Select	3
9	LVTTL-I	ResetL	Module Reset	3
10		Vcc Rx	+3.3 VDC Receiver Power Supply	2
11	LVC MOS-I/O	SCL	Serial Clock for I <sup>2</sup> C Interface	3
12	LVC MOS-I/O	SDA	Serial Data for I <sup>2</sup> C Interface	3
13		GND	Ground	1
14	CML-O	RX3p	Receiver Non-inverted Data Output	3
15	CML-O	RX3n	Receiver Inverted Data Output	3
16		GND	Ground	1
17	CML-O	RX1p	Receiver Non-inverted Data Output	3
18	CML-O	RX1n	Receiver Inverted Data Output	3
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	RX2n	Receiver Inverted Data Output	3
22	CML-O	RX2p	Receiver Non-inverted Data Output	3
23		GND	Ground	1
24	CML-O	RX4n	Receiver Inverted Data Output	3
25	CML-O	RX4p	Receiver Non-inverted Data Output	3
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	3
28	LVTTL-O	IntL	Interrupt	3
29		Vcc Tx	+3.3 VDC Transmitter Power Supply	2
30		Vcc1	+3.3 VDC Power Supply	2
31	LVTTL-I	LPMODE	Low Power Mode	3
32		GND	Ground	1
33	CML-I	TX3p	Transmitted Non-inverted Data Input	3
34	CML-I	TX3n	Transmitted Inverted Data Input	3
35		GND	Ground	1
36	CML-I	TX1p	Transmitted Non-inverted Data Input	3
37	CML-I	TX1n	Transmitted Inverted Data Input	3
38		GND	Ground	1

## Mechanical Dimensions

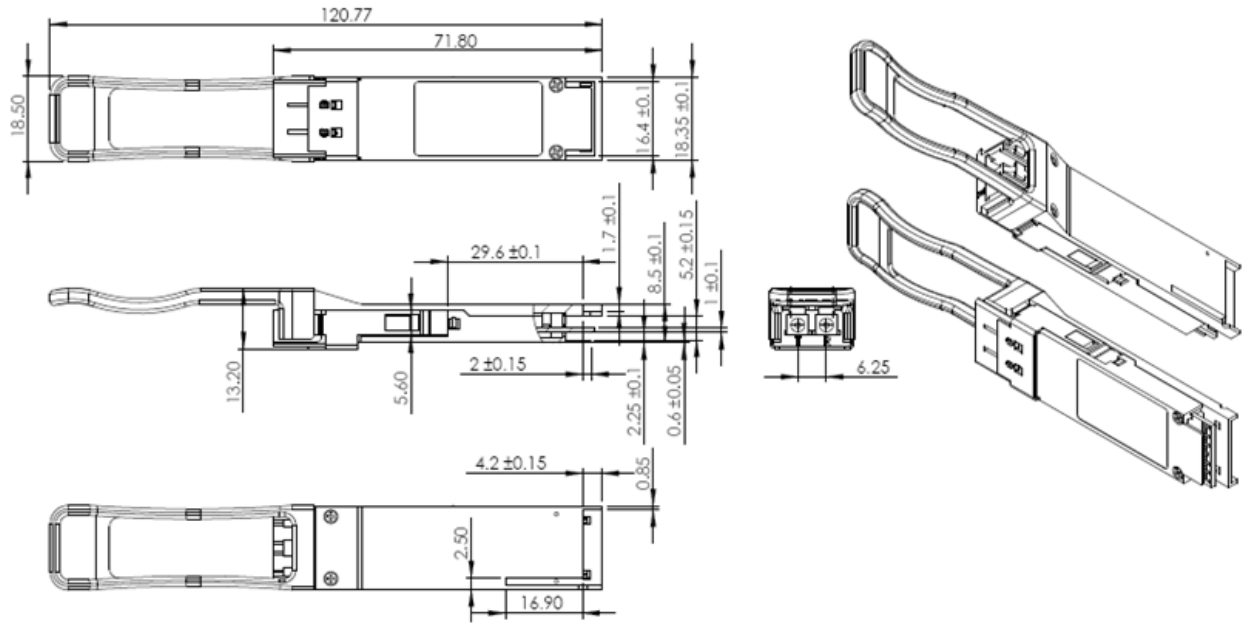


Figure4. Mechanical Specifications

## Regulatory Compliance

Requirement	Standard
Electromagnetic Interference (EM)	Compliant to Class B requirements for FCC Part15 and CISPR 22
RF Immunity (RFI)	Compliant to EN/IEC 61000-4-3 and GR-1089-CORE Issue 4
Electrostatic Discharge (ESD)	Compliant to EN/IEC 61000-4-2 and GR-1089-CORE Issue 4 JEDEC JESD22-A114-B (2Kv limit)
Eye Safety	Compliant to Class 1M Laser Device per IEC60825-1
Lead Free Requirement (RoHS)	Compliant to 2002/95/EC RoHS 6/6 Directive

### Shenzhen Sourcelight Technology Co., Ltd

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