

CQSFP-S-LR-LC-1310-10-DDM

QSFP+ 40G LR4 Transceiver

Features

- Hot Pluggable QSFP+ form factor
- Operating Data Rate up to 41.2Gb/s
- Duplex LC Connector Interface
- Up to 10Km over SMF
- 4x10Gbps DFB-based CWDM transmitter
- PIN and TIA array on the receiver side
- 4x10G electrical interface
- Single 3.3V Power Supply
- Power dissipation <3.5W
- Operating case temperature range: -20°C to 70°C Compliant with SFF-8679
- Compliant with SFF-8636
- Compliant with IEEE802.3ba-2010

Applications

- 40G Ethernet
- Data Center and LAN

General Description

CQSFP-S-LR-LC-1310-10-DDM QSFP+ LR4 is designed to operate over single-mode fiber system using 4X10 CWDM channel in 1310 band and links up to 10km. The module converts 4 inputs channel of 10Gb/s electrical data to 4 CWDM optical signals, and multiplexes them into a single channel for 40Gb/s optical transmission. Reversely, on the receiver side, the module optically de-multiplexes a 40Gb/s input into 4 CWDM channels signals, and converts them to 4 channel output electrical data.

Part Number Ordering Information

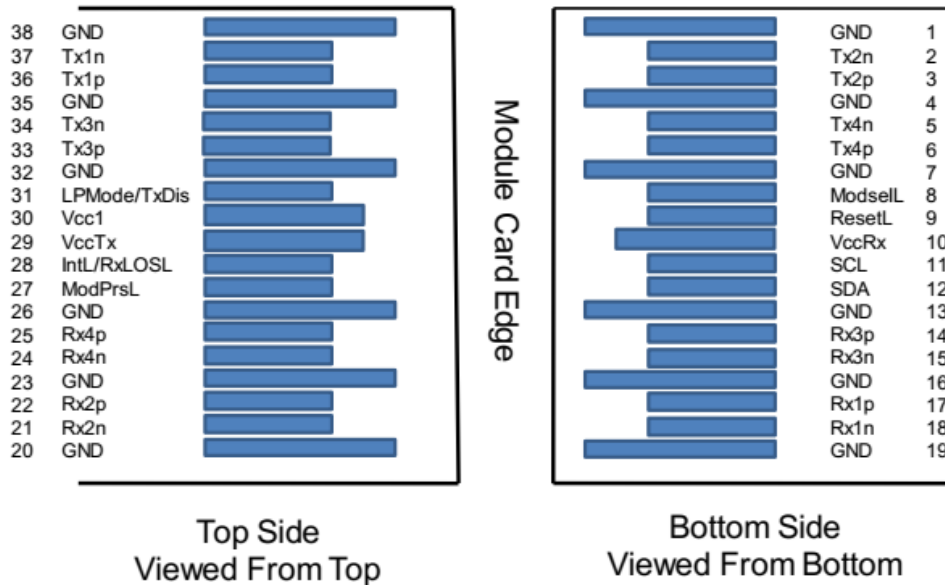
Part NO.	Data Rate	Fiber	Distance	Interface	Temp.
CQSFP-S-LR-LC-1310-10-DDM	41.2Gb/s	SMF	10Km	LC	-20~70°C

Electrical Connector

The following figure shows the signal symbols and pad numbering for the module edge connector. The diagram shows the module PCB edge as a top and bottom view, where bottom is nearer the host PCB. There are 38 pads intended for high speed signals, low speed signals, power and ground connections.

The module contains a printed circuit board that mates with the electrical connector. The pads are designed for a sequenced mating:

- Connected first, disconnected last: - ground contacts
- Connected second, disconnected second: - power contacts
- Connected third, disconnected first: - signal contacts



Pin Description

Pad	Logic	Symbol	Description	Plug Seq.	Note
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVC MOS-I/O	SCL	Two-wire interface clock	3	
12	LVC MOS-I/O	SDA	Two-wire interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	

16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL /RxLOSL	Interrupt. Optionally configurable as RxLOSL via SFF-8636	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-I	LPMode /TxDis	Low Power Mode. Optionally configurable as TxDis via SFF-8636	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Note 1: GND is the symbol for signal and supply (power) common for the module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

Note 2: VccRx, Vcc1 and VccTx are applied concurrently and may be internally connected within the module in any combination.

Absolute Maximum Ratings

Exceeding any one of these values may damage the device permanently.

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V _{CC}	-0.5		3.6	V
Storage Temperature	T _S	-40		+85	°C
Operating Relative Humidity	RH			85	%
Receiver Damage Threshold, per Lane	P _{Rdmg}	5.5			dBm

Recommended Operating Environment

Parameter	Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	T _{op}	-20		70	°C
Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Power Dissipation	P _D			3.5	W

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Data rate		10.31250 ± 100ppm			Gbps	
Transmitter						
Differential data input swing	V _{in}			900	mVpp	
Input Impedance (Differential)	Z _{in}	90	100	100	ohm	
Eye width		0.46			UI	
Eye height		95			mV	
DC common mode voltage		-350		2850	mV	
Receiver						
Differential output amplitude		200		900	mVpp	
Output Impedance (Differential)	Z _{out}	90	100	110	ohm	
Eye width		0.57			UI	
Eye height differential		228			mV	
Vertical eye closure				5.5	dB	

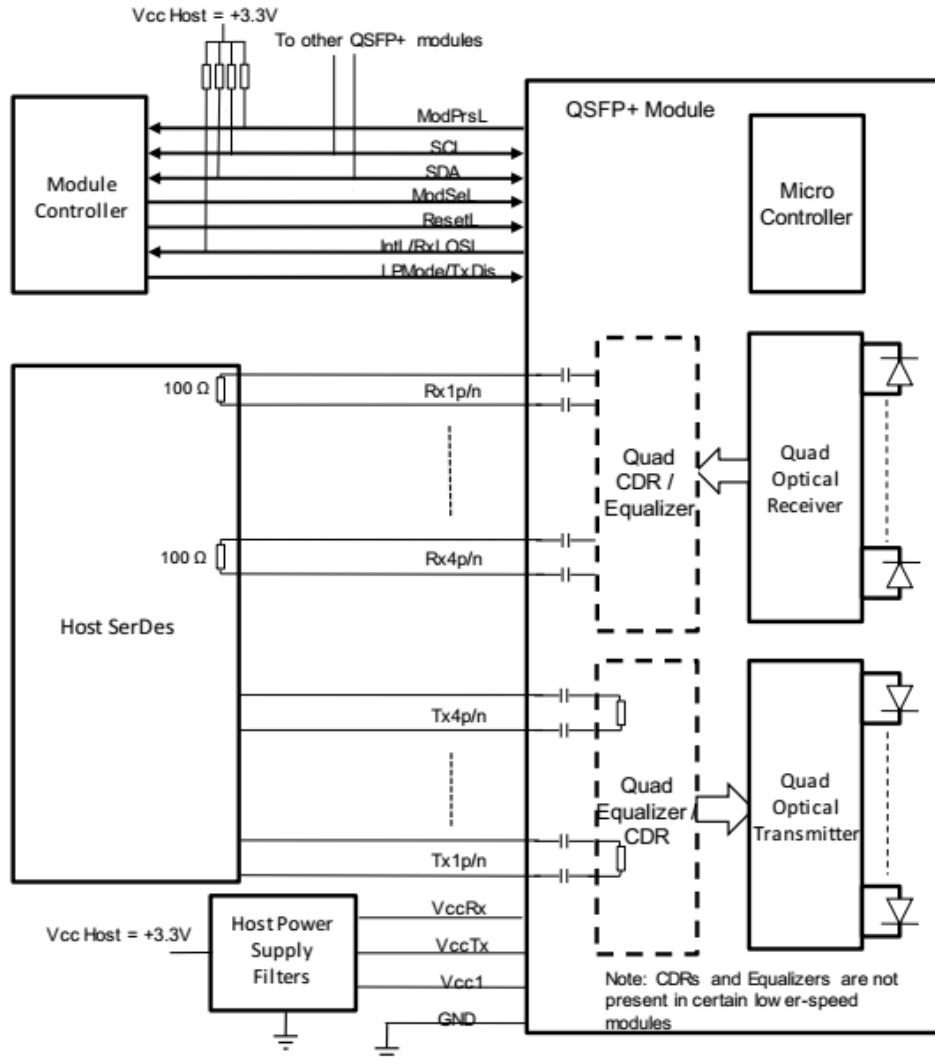
Optical Characteristics

Parameter		Symbol	Min	Typ	Max	Unit	Note
Data rate			10.31250 ± 100ppm			Gbps	
Center Wavelength	Lane1	λ_{c1}	1264.5	1271	1277.5	nm	
	Lane2	λ_{c2}	1284.5	1291	1297.5		
	Lane3	λ_{c3}	1304.5	1311	1317.5		
	Lane4	λ_{c4}	1324.5	1331	1337.5		
Transmitter							
Total Average Output Power		P_T			8.5	dBm	
Average Launch Power each Lane		AOP	-7		2.3	dBm	
Optical Modulation Amplitude each Lane		OMA	-4		3.5	dBm	
Extinction Ratio		ER	3.5			dB	
Transmitter and dispersion penalty, each lane		TDP			2.2	dB	
Launch power in OMA minus TDP, each lane			-2.3			dBm	
Side-mode Suppression ratio		SMSR	30			dB	
Relative Intensity Noise		RIN			-130	dB/Hz	
Transmitter Reflectance		TR			-12	dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3 }			{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				3
Receiver							
Average Receive Power each Lane		RXAOP	-13.7		2.3	dBm	
Receive Power (OMA) each Lane		RXOMA			3.5	dBm	
Receive Sensitivity in OMA each Lane		RXSEN			-11.5	dBm	
Stressed Receiver Sensitivity (OMA) each Lane		RXSRS			-9.6	dBm	4
Optical Return Loss		ORL			-26	dB	
LOS Assert		LOSA	-28			dBm	
LOS De-Assert		LOSD			-15	dBm	
LOS Hysteresis			0.5			dB	
Conditions of stressed receiver sensitivity test							
Vertical eye closure penalty		VECP		1.8		dB	
Stressed eye J2 Jitter		J2		0.3		UI	
Stressed eye J9 Jitter		J9		0.47		UI	

Note 3: Hit ratio 1×10^{-12}

Note 4: Measured with conformance test signal at TP3 for BER = 10^{-12}

Recommend Circuit Schematic



Mechanical Specifications

