



40G Base-LR4 QSFP+ 20km Optical Transceiver

HC-QP-S31L-20D

Description:

This Transceiver is a high performance, cost effective module for serial optical data communication applications to 41.5Gb/s. The HC-QP-S31L-20D 4 is designed to 40GBASE-LR4 of the IEEE P802.3ba standard for 20km links.

The module converts 4 inputs channels (ch) of 10Gb/s electrical data to 4 CWDM optical signals, and multiplexes them into a single channel for 40Gb/s optical transmission. Conversely, 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.

The central wavelengths of the 4 CWDM channels are 1271, 1291, 1311 and 1331 nm as members of the CWDM wavelength grid defined in ITU-T G.694.2. It contains a duplex LC connector for the optical interface and a 38-pin connector for the electrical interface.

To minimize the optical dispersion in the long-haul system, single-mode fiber (SMF) has to be applied in this module.

Features:

- Compliant to the industry standard SFF-8436 QSFP+ Transceiver Specification
- Up to 11.2Gb/s data rate per wavelength
- 4 CWDM lanes MUX/DEMUX design
- Up to 20km transmission on single mode fiber (SMF)
- Operating case temperature: 0 to 70°C
- Maximum power consumption 3.5W
- LC duplex connector

Compliance

- IEEE802.3ba 40GBASE-LR4
- SFF-8436 QSFP Specification
- InfiniBand Architecture QDR Specifications

Absolute Maximum Ratings

Parameter	Symbols	Min	Typical	Max	Unit	Notes
Storage Temperature	TSTG	-40	-	+85	°C	
Operating Temperature	Top	0		70		
Operating Relative Humidity	RH	0	-	85	%	
3.3V Supply Voltage	VCC	-0.5	-	+3.6	V	

Recommended Operating Conditions

Parameter	Symbols	Min	Typical	Max	Unit	Notes
Case temperature	Tc	0	-	+70	°C	
Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate			41.25		Gbps	
Receiver Differential Data Output Load		90	100	110	Ohms	
Logic Input Voltage High	Vih	2		Vcc+0.3	V	
Logic Input Voltage Low	Vil	-0.3		0.8	V	
Two wire Serial Interface Clock Rate			100	400	KHz	
Power Noise and Ripple				50	mVpp	
Fiber Length				10	km	
Power Dissipation	PD			3.5	W	
Transceiver Power Supply Current				1008	mA	

Optical, Electrical Characteristic

Parameter	Symbles	Min	Type	Max	Unit	Notes
Wavelength λ_0	λ_0	1264.5	1271	1277.5	nm	
Wavelength λ_1	λ_1	1284.5	1291	1297.5	nm	
Wavelength λ_2	λ_2	1304.5	1311	1317.5	nm	
Wavelength λ_3	λ_3	1324.5	1331	1337.5	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Spectral width	SW			1.0	nm	
Average power, each lane(EOL)	TXP	-7		2.3	dBm	
Extinction Ratio	ER	3.5			dB	
Optical Modulation Amplitude	OMA	-4		3.5	dBm	
Launch Power in OMA minus TDP, each lane		-4.8			dBm	
Difference in Power between any two lanes				6.5	dB	

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Wavelength λ_0	λ_0	1264.5	1271	1277.5	nm	
Wavelength λ_1	λ_1	1284.5	1291	1297.5	nm	
Wavelength λ_2	λ_2	1304.5	1311	1317.5	nm	
Wavelength λ_3	λ_3	1324.5	1331	1337.5	nm	
Max Input power		2.3			dBm	
Sensitivity,each lane				-11.5	dBm	
Stressed Receiver Sensitivity(OMA、EOL), each lane				-9.6	dBm	
Receiver Reflectance				-26	dBm	
Rx_Loss assert	LOSA	-30			dBm	

Rx_LossDe_assert	LOSD			-14	dBm	
LOS Hysteresis		0.5			dB	
Rx LOS in signal or RSSI			RSSI		-	

Digital Diagnostic Function

Parameter	Symbles	Min	Type	Max	Unit	Notes
Temperature DDMaccuracy	DMI_Temp	-5		+5	°C	
Supply voltage DDMaccuracy	DMI_VCC	-5%		+5%	V	
Rx power DDMaccuracy	DMI_Rx	-3		+3	dB	
Bias current DDM accuracy	DMI_Ibias	-10%		+10%	mA	
Tx power DDM accuracy	DMI_Tx	-3		+3	dB	

Pin-out Definitions

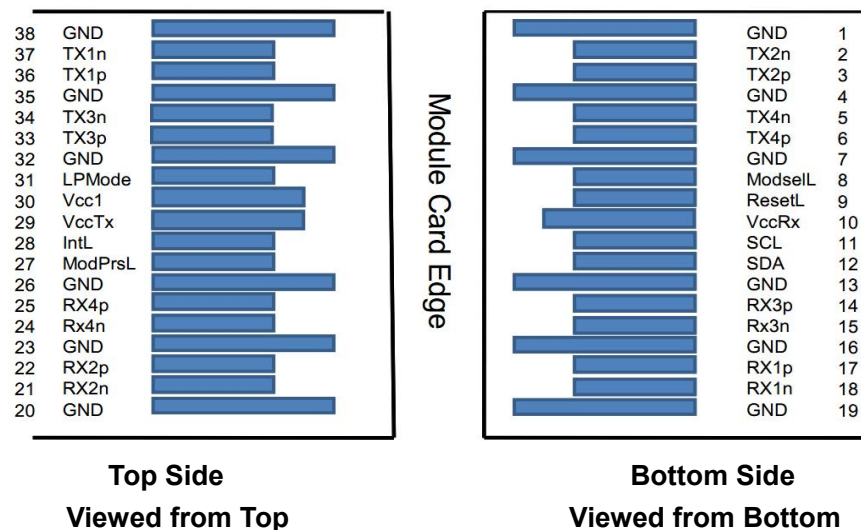


Figure 1 – QSF+ MSA-compliant 38-pin connector

Pin Description

Pin	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	ResetL	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	

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	VccTx	+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

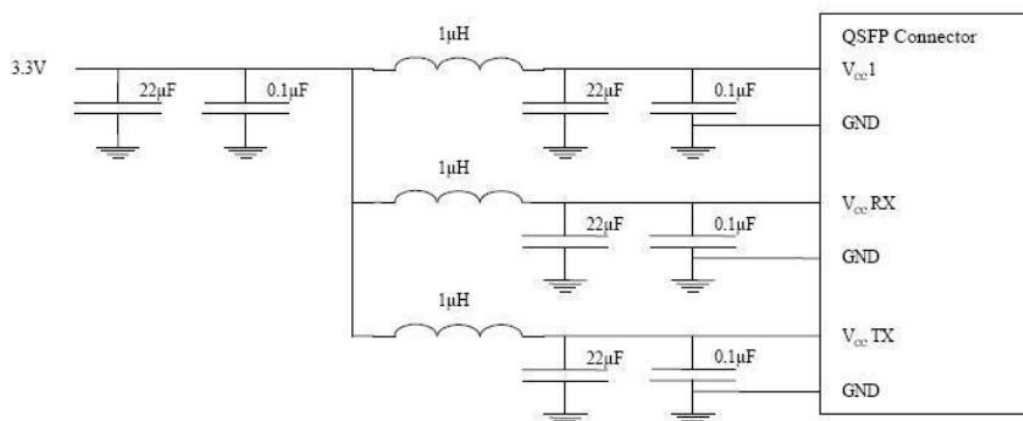
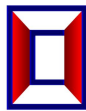


Figure2 - Host Board Power Supply Filtering



EEPROM Serial ID Memory Contents

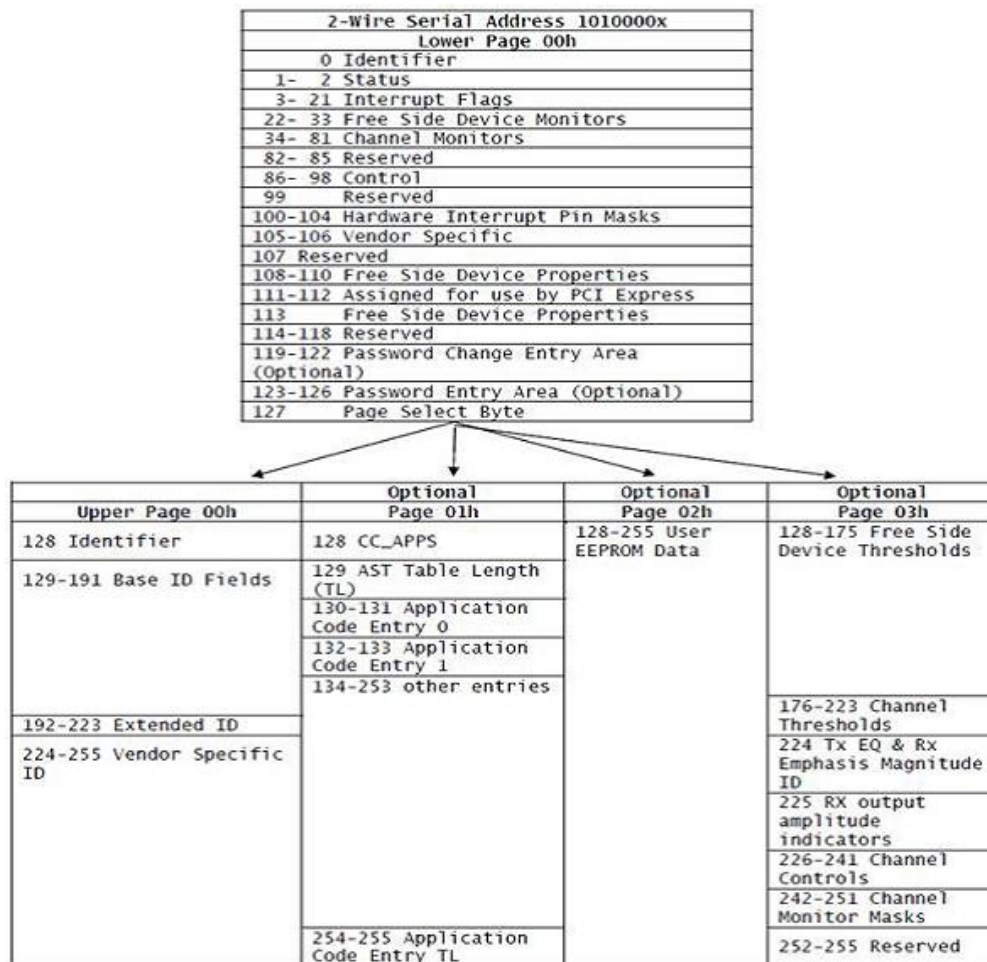


Figure 3– QSFP+ Memory Map