40G QSFP+ 10km PSM4 Transceivers

Product Features:

- MPO-12/APC optical interface
- Maximum link length up to 10km
- Up to 10.3125Gb/s data links per lane
- +3.3 V power supply
- QSFP MSA compliant package
- Hot Pluggable
- High performance singal mode DML transmitter
- High sensitivity PIN/TIA optical receiver
- Single Mode operation
- Case Operating temperature : 0 to 70ºC
- Data and Control Interfaces
- Tx Data CML/AC Coupled
- Rx Data CML/AC Coupled
- ModSelL LVTTL
- ResetL LVTTL
- ModPrsL LVTTL
- LPMode LVTTL
- 2-wire I2C communication bus
- RoHS 6 compliance

Applications:

- 40G BASE Ethernet
- Infiniband EDR interconnects
- Enterprise networking

Description:

The QSFP-40G-LR4-PSM QSFP+ PSM4 optical transceiver is intended for up to 10km reach service with four-lane 10.3125G data rate. It is based on 3.3V DC power supply and operates in the Commercial temperature range. It is compliant with QSFP MSA, SFF-8436 and IEEE802.3ba-2018. Digital diagnostic functions are available via I2C interface，and the control functions can be achieved by LVTTL interfaces on the host, mainly including Module Select(ModSelL)、Module Reset(ResetL), Low Power Mode(LPMode). The transceiver incorporates a four-laser array which is usually DFB, four-PIN diode

array, an integrated four drivers and TIAs IC separately. The differential AC coupled Tx and Rx data interfaces are CML compatible.

Absolute maximum parameters

Absolute Maximum Ratings (EXCEEDING THESE RATINGS MAY CAUSE IRREVERSIBLE DAMAGE TO THE DEVICE)					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	T_{stg}	-40	+95	ºC	Exceeding the absolute maximum ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous absolute maximum rat- ings, which may cause irreversible damage to the device.
Case Operating Temperature (Commercial)	T_O	0	70	ºC	
Relative Humidity - Storage	R_{HS}	0	95	%	
Relative Humidity - Operating	R_{HO}	0	85	%	
Supply Voltage	VCC	-0.3	3.6	V	

Operating conditions

Recommended Operating Conditions						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Case Operating Temperature	Tcase	0	-	+70	ºC	
DC Supply Voltage	VCC	3.135	-	3.465	V	
Module Supply Current	Iin	-	-	1060	mA	

Electrical Characteristics

Transmitter Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Differential Data input Swing	Vin	180	-	900	mV	
Tx Differential Input Impendence	Zin	90	100	110	Ω	
Tx Differential Output	Zout	45	50	55	Ω	

Impendence						
ResetL Disable Voltage	Vr	2.0	-	Vcc+0.3	V	
ResetL Enable Voltage	VrEN	0	-	0.8	V	
ModSelL Disable Voltage	Vm	2.0	-	Vcc+0.3	V	
ModSelL Enable Voltage	VmEN	0	-	0.8	V	
Receiver Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Differential Data Output Swing	Vout	180	-	900	mV	
Rx Differential Output Impendence	Zout	90	100	110	Ω	
IntL Assert Voltage	VInt	VCC-0.5	-	VCC+0.3	V	
IntL De-assert Voltage	VDInt	0	-	+0.4	V	

Optical Specification

Transmitter Optical Specification						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Signal Rate|Each Lane			10.3125±100ppm		Gbps	
Lane Wavelength	L0	1295	1310	1325	nm	
	L1	1295	1310	1325	nm	
	L2	1295	1310	1325	nm	
	L3	1295	1310	1325	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power|Each Lane	Pavg	-7		2.5	dBm	
Optical Modulation Amplitude|Each Lane	OMA			2.5	dBm	1
Transmitter and dispersion penalty|Each Lane	TDP			2.6	dB	
Eye Mask coordinates: X1, X2, X3, Y1, Y2, Y3		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Average launch power of OFF transmitter|Each Lane				-30	dBm	

Extinction Ratio	ER	3.5			dB	
Spectral Width|$_{20dB}$				1	nm	
Transmitter Reflectance				-12	dB	
Optical return loss tolerance				20	dB	

Notes:

1. Even if the TDP < 0.8dB, the OMA min must exceed the minimum value specified here.
2. Hit ratio@ 5e-5, per IEEE.

Receiver Optical Specification						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Signal Speed Per Lane			10.3125±100ppm		Gbps	
Lane Wavelength	L0	1295	1310	1325	nm	
	L1	1295	1310	1325	nm	
	L2	1295	1310	1325	nm	
	L3	1295	1310	1325	nm	
Damage threshold|$_{Each\ Lane}$	THd	2.5			dBm	1
Average Receive Power|$_{Each\ Lane}$		-12.6		2	dBm	
Receiver reflectance				-26	dB	
Sensitivity OMA|$_{Each\ Lane}$[1]	Sen1			-12	dBm	2
Stressed Receiver Sensitivity (OMA), each Lane				-8.6	dBm	
LOS Assert	LOSA	-30	-		dBm	
LOS Deassert	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5		5	dB	
Vertical Eye Closure Penalty	VECP	1.9			dB	3
Stressed Eye J2 Jitter	J2	0.3			UI	
Stressed Eye J4 Jitter	J4	0.47			UI	

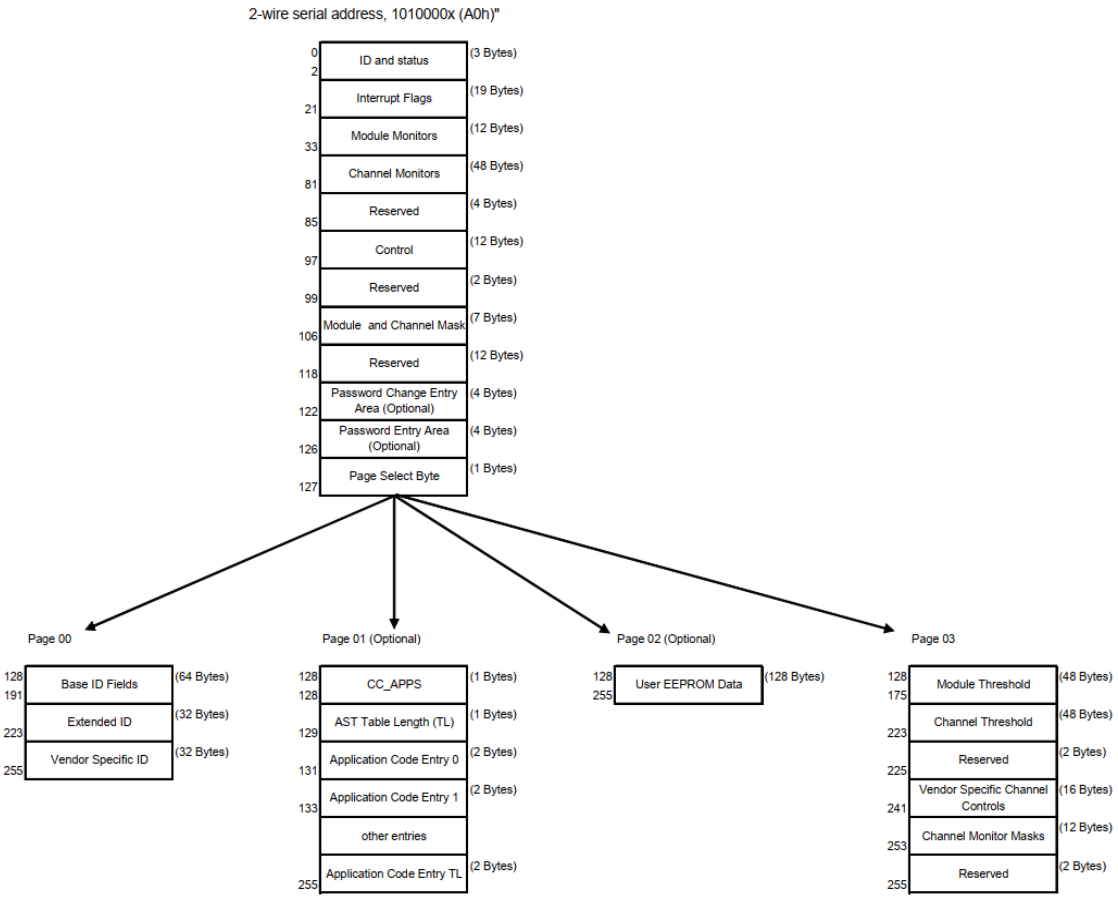
Notes:

1. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
2. Measured with conformance test signal at receiver input for BER = 1e-12 .
3. Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

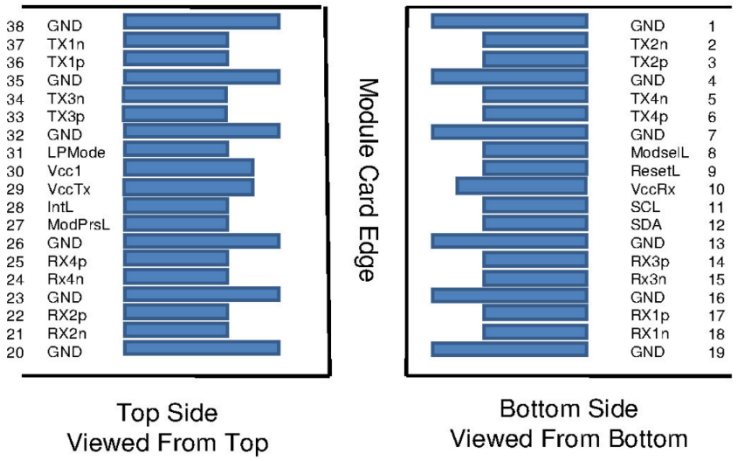
Digital diagnostic

Monitoring Interface				
Parameter	**Symbol**	**Spec**	**Units**	**Condition/Notes**
Temperature	Te	+/-3	°C	
Voltage	VCC	+/-5%	V	
IBias	BIAS	+/-10%	mA	
Rx power	Rx-pwr	+/-2	dBm	
Tx power	Tx-pwr	+/-2	dBm	

Memery Map



PIN Assignment



PIN Description			
PIN	**Symbol**	**Name/Description**	**Note**
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3V Power Supply Receiver	2
11	SCL	2-Wire Serial Interface Clock	
12	SDA	2-Wire Serial Interface Data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1

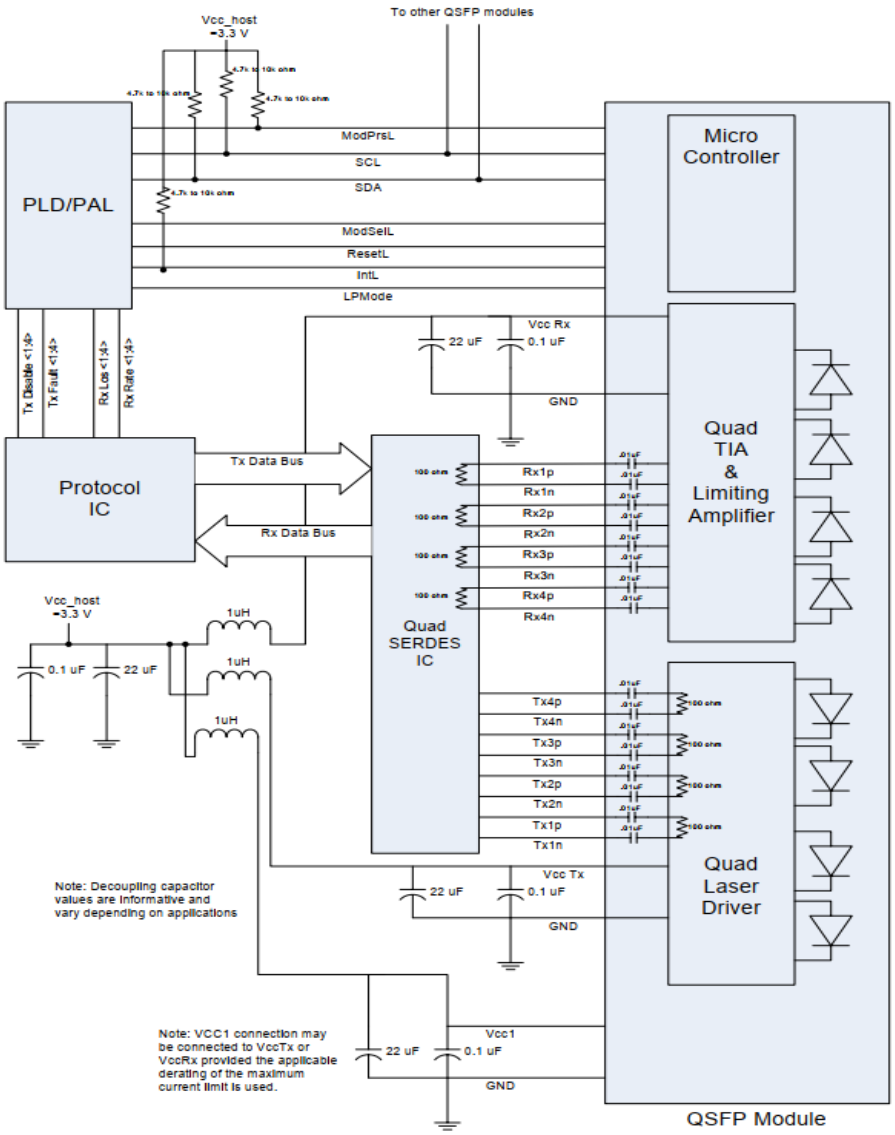
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3 V Power Supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data output	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data output	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:

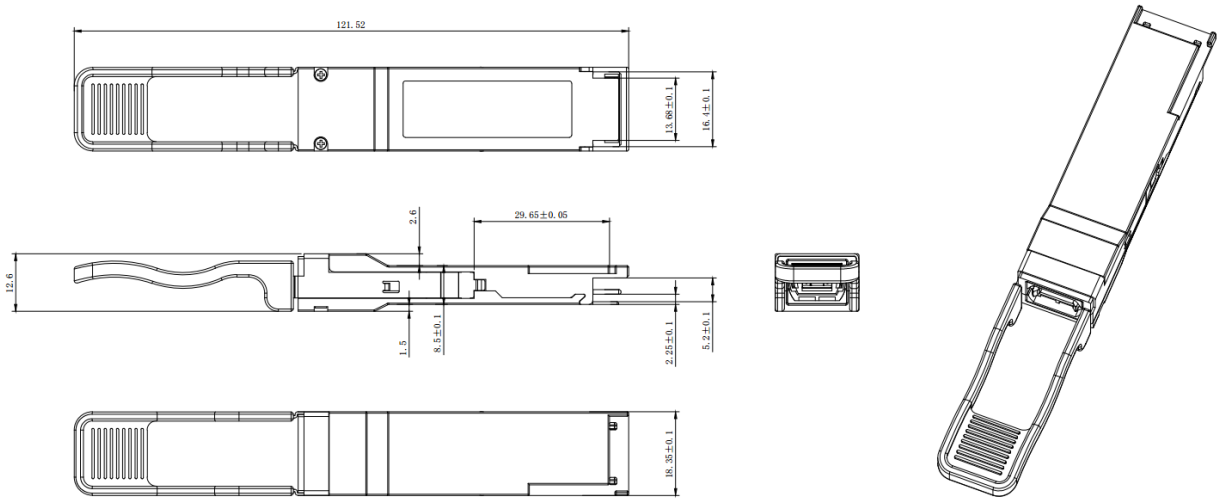
1. GND is the symbol for signal and supply (power) common for the QSFP module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed . Recommended host board power supply filtering is shown in Figures 3 and 4. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP+ Module in any combination. The connector pins are each rated for a maximum current of 500 mA

Electrical Interface



Mechanical Dimensions



Notes:

1. Tolerance: +/-0.1mm.
2. Others according to SFF-8661 or customer spec.
3. Optical port according to fiber connector spec.

Ordering Information

Part No.	Description
QSFP-40G-LR4-PSM	40G QSFP+ PSM4 10km, MPO/APC, 0 to 70 ºC

NOTICE:

Connlight reserves the right to make changes to this product in this specification without notice, in order to improve product performance.