

## 40Gb/s QSFP+LR4 Transceiver

The 40Gb/s QSFP+LR4 is a single mode module with four coarse wavelength division multiplexed (CWDM) channels, pluggable, QSFP+ optical transceiver, designed for use in 40Gb/s applications. This module incorporates CWDM DFB lasers and high sensitivity PIN receivers providing superior performance for 40GbE Ethernet applications up to 10km links and is compliant to optical interface with IEEE 802.3ba 40GBASE-LR4 and to SFF-8436. The transceiver operates over single mode fibre, using a nominal wavelength of 1310nm. Rigorous production testing ensures the best out-of-the-box installation experience, performance, and durability.

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## Features

- 4 CWDM lanes MUX/DEMUX design
- 4 independent full-duplex channels up to 11.3Gbps data rate per wavelength
- Hot-pluggable QSFP +footprint
- RoHS compliant and Lead Free
- Up to 10km link length
- Power dissipation <3.5W (0~70°C)
- Commercial operating temperature optional
- Compliant with IEEE802.3ba, SFF-8436

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## Applications

- 40G Ethernet
- Infiniband 4X SDR DDR QDR
- 40G Telecom connections

## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with RoHS 2 (2011/65/EU)

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Maximum Supply Voltage	Vcc	-0.5		+4.0	V
Storage Temperature	TS	-40		+85	°C
Operating Humidity	RH	0		85	%

## Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	3.13	3.30	3.47	V
Power Supply Current	Icc	-	-	1	A
Case Operating Temperature	Tc	0	-	+70	°C
Bit Rate Each Lane	BR	1	-	11.3	Gbps
9/125um G.652 SMF	Lmax	-	-	10	Km

## Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter	Symbol	Min	Typ	Max	Unit
<b>Transmitter</b>					
Input differential impedance	Rin	80	100	120	Ω
Differential data input swing	Vin, pp	120		850	mV
TX Disable-High		Vcc - 0.8		Vcc	V
TX Disable-Low		Vee		Vee+ 0.8	V
TX Fault-High		Vcc-0.8		Vcc	V
TX Fault-Low		Vee		Vee+0.8	V

<b>Receiver</b>					
Single ended data output swing	Vout, pp	300		850	mV
Data output rise time	Tr	30			ps
Data output fall time	Tf	30			ps
LOS-High		Vcc - 0.8		Vcc	V
LOS-Low		Vee		Vee+0.8	V

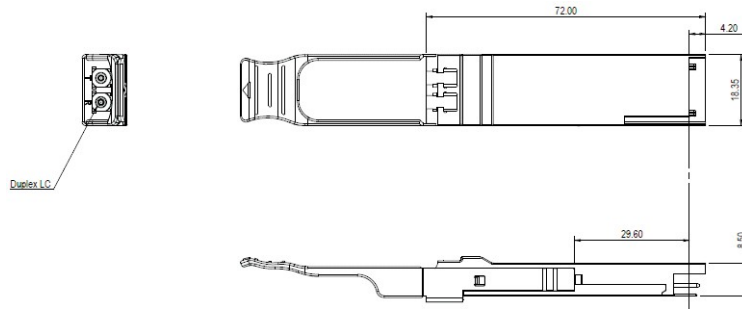
## Notes:

1. AC coupled
2. Into 100ohm differential termination
3. 20 – 80%

### Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)

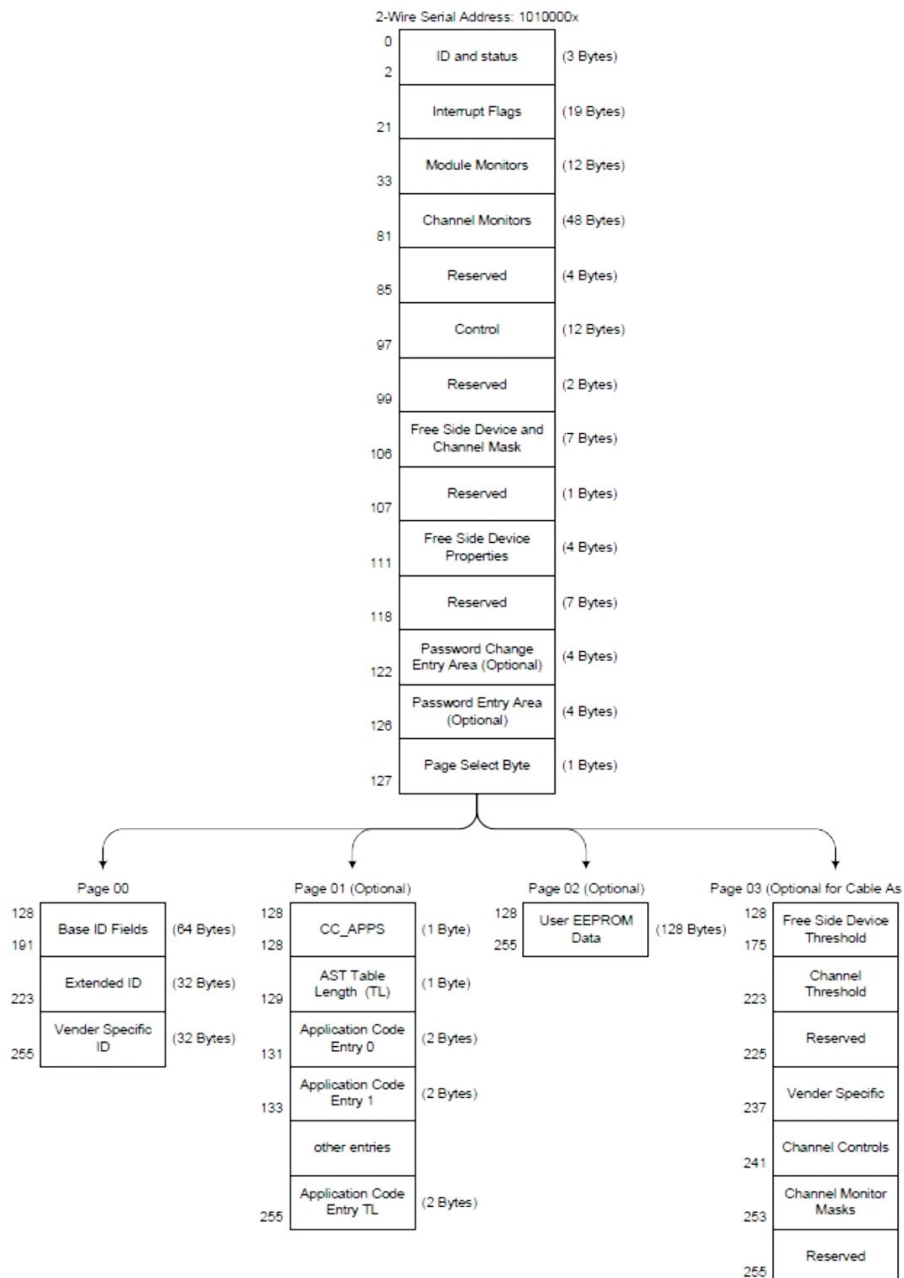
Parameter	Symbol	Min	Typ	Max	Unit
<b>Transmitter</b>					
Optical Wavelength	L0	1264.5	1271	1277.5	nm
	L1	1284.5	1291	1297.5	nm
	L2	1304.5	1311	1317.5	nm
	L3	1324.5	1331	1337.5	nm
Side-mode Suppression Ratio	SMSR	30			dB
Total Average Launch Power	PT			8.3	dBm
Average Launch Power, each Lane		-7		2.3	dBm
Optical Modulation Amplitude, each Lane	OMA	-4		+3.5	dBm
Extinction Ratio	ER	3.5			dB
TDP, each Lane	TDP	Vee		2.3	dB
Relative Intensity Noise	RIN			-128	dB/Hz
Transmitter Reflectance	RT	300		-12	dB
<b>Receiver</b>					
RX Sensitivity @10.3 Gb/s, each lane	SENS			-11.5	dBm
Receiver Overload		2.3		7.5	dBm
Difference in Receive Power between any two Lanes (OMA)				-12	dB
LOS De-Assert	LOSD				dBm
LOS Assert	LOSA	-25			dBm
LOS Hysteresis	-	0.5			dB

## Mechanical Specifications



## EEPROM Information

EEPROM memory map specific data field description is as below:



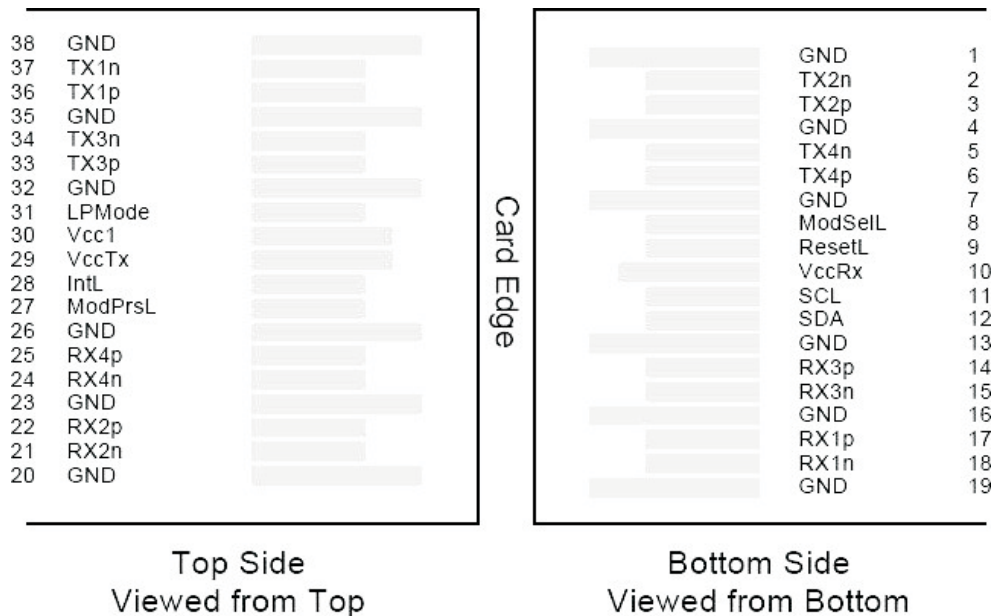
## Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C	±3°C	Internal
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
RX Power	-12 to 2.5dBm	±3dB	Internal

Four transceiver parameter values are monitored. The following table defines the Monitor parameter's accuracy.

## Pin Diagram

### Pin-out of Connector Block on Host Board



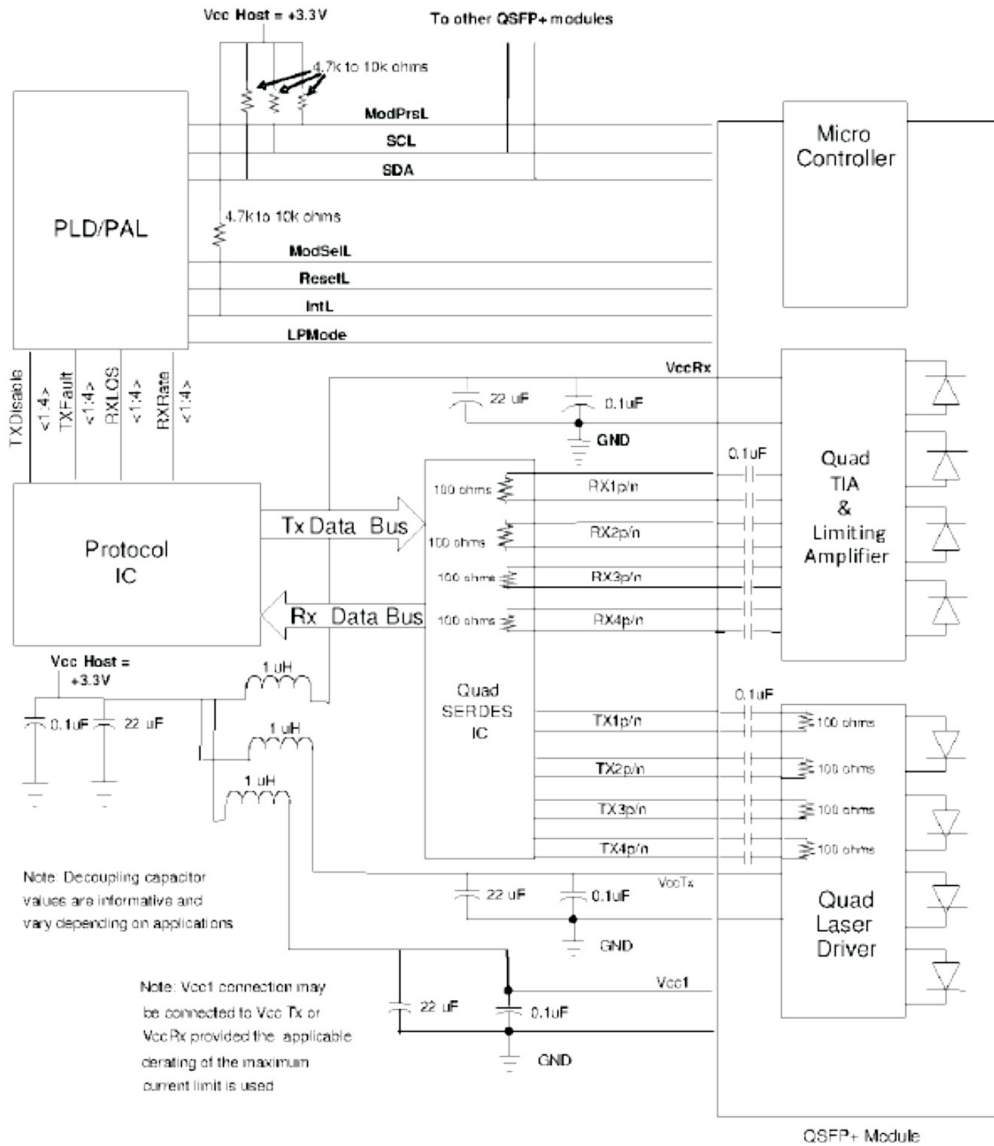
## Pin Definitions

Pin	Symbol	Name/Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input, CML-I
3	Tx2p	Transmitter Non-Inverted Data output, CML-I
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input, CML-I
6	Tx4p	Transmitter Non-Inverted Data output, CML-I
7	GND	Ground

8	ModSelL	The ModSelL is an input pin. When held low by the host, the module responds to 2-wire serial communication commands. The ModSelL allows the use of multiple QSFP+ modules on a single 2-wire interface bus. When the ModSelL is "High", the module shall not respond to or acknowledge any 2-wire interface communication from the host. ModSelL signal input node must be biased to the "High" state in the module
9	ResetL	The ResetL pin must be pulled to Vcc in the QSFP+ module. A low level on the ResetL pin for longer than the minimum pulse length ( $t_{Reset\_init}$ ) initiates a complete module reset, returning all user module settings to their default state. Module Reset Assert Time ( $t_{init}$ ) starts on the rising edge after the low level
10	VccRx	+ 3.3V Power Supply Receiver
11	SCL	2-Wire Serial Interface Clock
12	SDA	2-Wire Serial Interface Clock
13	GND	GND
14	Rx3p	Receiver Non-Inverted Data Output, CML-O
15	Rx3n	Receiver Inverted Data Output, CML-O
16	GND	GND
17	Rx1p	Receiver Non-Inverted Data Output, CML-O
18	Rx1n	Receiver Inverted Data Output, CML-O
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output, CML-O
22	Rx2p	Receiver Non-Inverted Data Output, CML-O
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output, CML-O
25	Rx4p	Receiver Non-Inverted Data Output, CML-O
26	GND	Ground
27	ModPrsL	Module Present, connect to GND
28	IntL	The IntL pin is an open collector output and must be pulled to host supply voltage on the host board. The IntL pin is de-asserted "High" after completion of reset, when byte 2 bit 0 (Data Not Ready) is read with a value of '0' and the flag field is read
29	VccTx	+3.3 V Power Supply transmitter
30	Vcc1	+3.3 V Power Supply
31	LPMODE	The LPMODE pin shall be pulled up to Vcc in the QSFP+ module. This function is affected by the LPMODE pin and the combination of the Power_override and Power_set software control bits (Address A0h, byte 93 bits 0,1)
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input, CML-I
34	Tx3n	Transmitter Inverted Data Output, CML-I

35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input, CML-I
37	Tx1n	Transmitter Inverted Data Output, CML-I
38	GND	Ground

### Recommend Circuit Schematic



### Ordering Information

DESCRIPTION	PART NUMBER	OPERATING CASE TEMPERATURE	DMMI
Optronics 40Gb/s QSF+LR4 Transceiver Singlemode 10km	OQSFP-LR4C-40-10	Commercial (0~70°C)	Yes