

## 56Gb/s QSFP+ Active Optical Cable

### Features

- Support Ethernet and Fibre Channel application
- Compliant to QSFP+ Electrical MSA SFF-8436
- Multi rate of up to 14.025Gbps
- +3.3V single power supply
- Low power consumption
- 0 to 70°C case temperature operating range
- RoHS-6 compliant (lead-free)
- Metal enclosure for low EMI
- Distance 1m/2m/3m/5m/7m/10m/15m/20m/30m/50m/100m/150m

### Applications

- 16G Fibre Channel at 14Gb per lane
- Super Computer
- Other optical links

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	Vcc <sub>3</sub>	-0.5	-	+3.6	V	
Storage Temperature	T <sub>s</sub>	- 5	-	+75	°C	
Operating Humidity	RH	+5	-	+85	%	1

Note:

[1] No condensation

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Case Temperature	T <sub>c</sub>	0	-	+70	°C	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	Pd	-	-	1.5	W	1
Bit Rate	BR	1.25	14.025	-	Gbps	

Note:

[1] Per terminal

## Characteristics

Parameter	Symbol	Unit	Min.	Typical	Max.	Note
<b>Transmitter</b>						
Differential Data Input Swing	Vout	mV	200		1000	
Input Differential Impedance	ZD	Ω	90	100	110	
Module Select	VOL	V	VEE-0.3		0.4	
Module Unselect	VIL	V	2.0		VCC+0.3	3
Low Power Mode	VIH	V	VEE-0.3		0.8	
Normal Operation	VIL	V	2.0	-	VCC+0.3	
Reset	VIL		VEE-0.3		0.8	
Normal Operation	VIH		2.0		VCC+0.3	3
<b>Receiver</b>						
Differential Data Output Swing	Vin,P-P	mVPP	200		1000	
Output Differential Impedance	ZD	Ω	90	100	110	
ModPrsL	VOL	V	VEE-0.3	-	0.4	
Interrupt	VOL	V	VEE-0.3	-	0.4	

Normal Operation	VoH	V	2.0	-	VCC+0.3	
Bit Error Rate	BER				E-12	1

Note: PRBS2<sup>31</sup>-1@14.025Gbps

## Recommended Interface

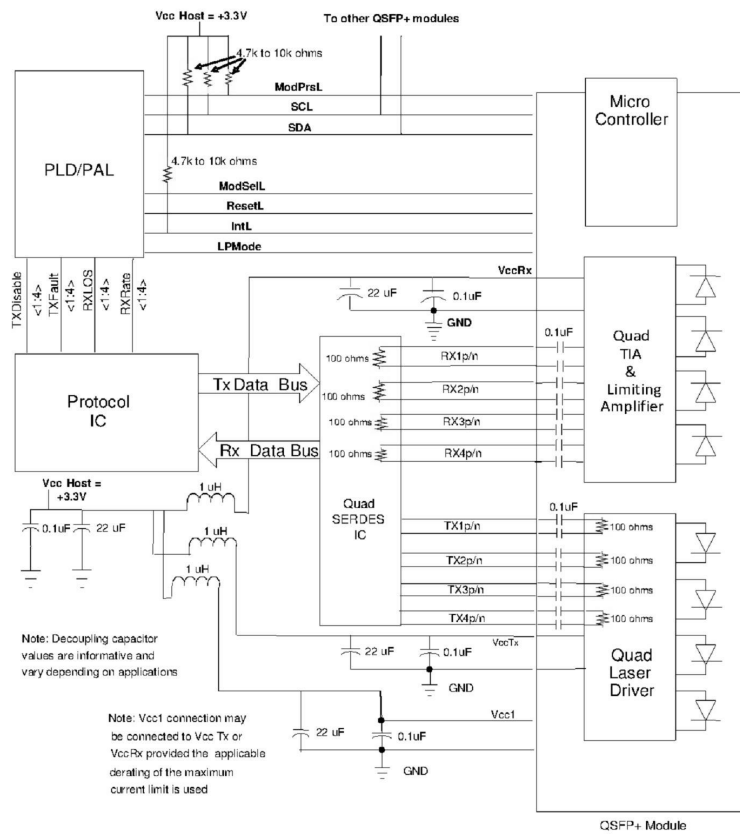


Figure 1 Recommended Interface Circuit

## Pin arrangement

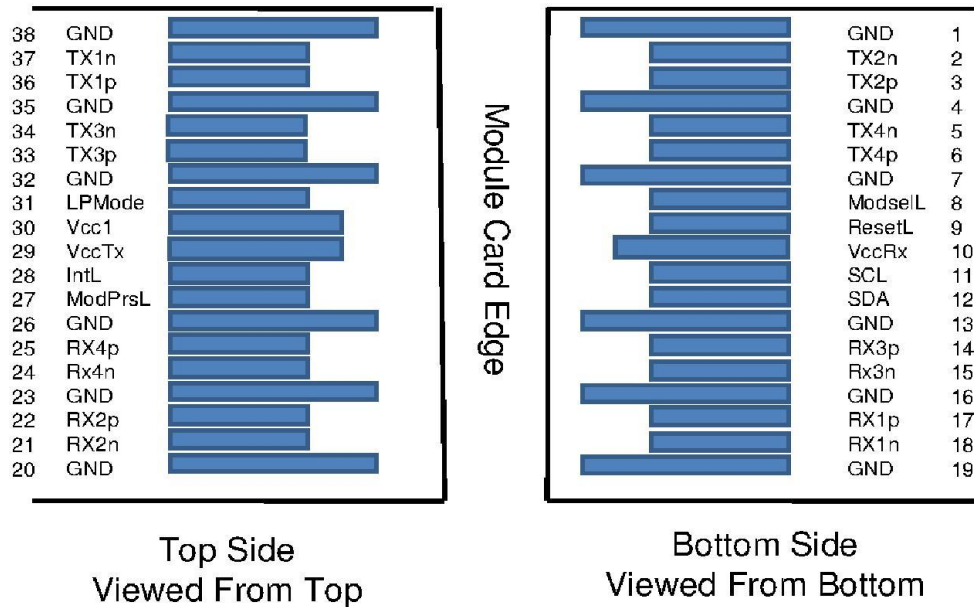


Figure 2 Pin View

## Pin Descriptions

Pin	Symbol	Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
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	1
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	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	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

## Monitoring Specification

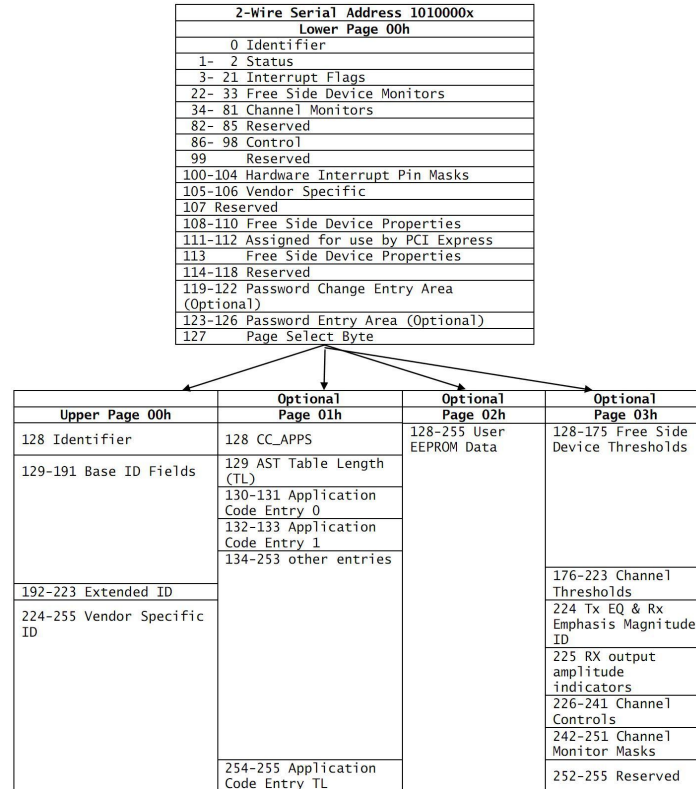


Figure 3 Monitoring Specification

## Mechanical

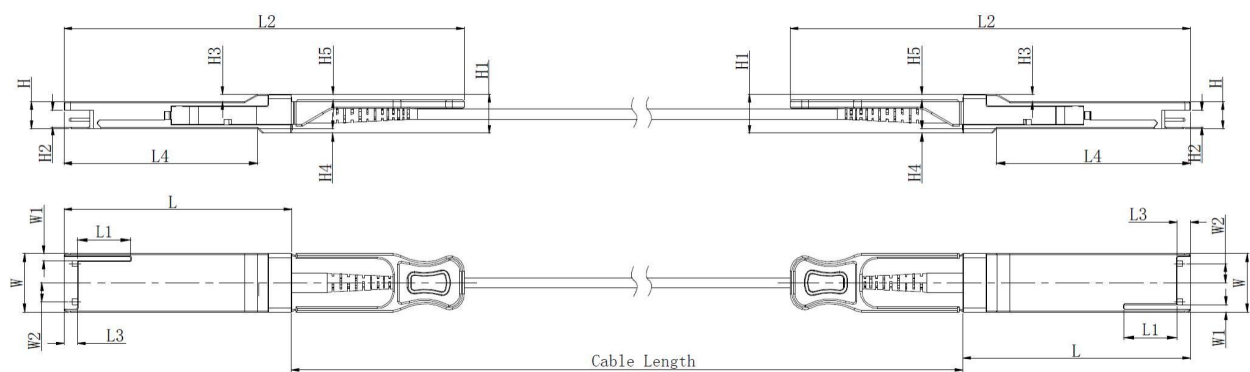


Figure 4 Mechanical Diagram

Unit mm

	L	L1	L2	L3	L4	W	W1	W2	H	H1	H2	H3	H4	H5
Max	72.2	-	128	4.35	61.4	18.45	-	6.2	8.6	12.4	5.35	2.5	1.6	2.0

Type	72.0	-	-	4.2	61.2	18.35	-	-	8.5	12.2	5.2	2.3	1.5	1.8
Min	68.8	16.5	124	4.05	61.0	18.25	2.2	5.8	8.4	12.0	5.05	2.1	1.3	1.6

## Cable Length

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length < 1 m:	+5 / -0
	1 m ≤ length ≤ 4.5 m:	+15 / -0
	5 m ≤ length ≤ 14.5 m:	+30 / -0
	Length ≥ 15.0 m	+2% / -0
Cable color	Orange(OM2),Aqua(OM3),Magenta(OM4)	

## Warnings

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

## Further Information:

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2. Nothing herein should be construed as constituting an additional warranty.

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