

Lightem 100Gb/s QSFP28 Active Optical Cable

FEATURES

- Full duplex 4 channel 850nm parallel active optical cable
- Up to 28.05Gbps Data rate per channel
- Maximum link length of 150m links on OM3 multimode fiber
- High Reliability 850nm VCSEL technology
- Electrically hot-pluggable
- Case operating temperature range:0°C to 70°C
- Power dissipation < 2.5 W per cable end

APPLICATIONS

- 100G Ethernet
- Infiniband QDR
- Fiber channel
- HPC Interconnections

STANDARD

- Compliant to QSFP28 MSA
- RoHS Compliant.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0		+70	°C	Without air flow
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Power Supply Current	ICC	-		750	mA	Per cable end
Data Rate	BR		25.78125		Gbps	Each Channel

GENERAL PRODUCT CHARACTERISTICS

Parameter	Unit	Value
Module Form Factor		QSFP28
Number of Lanes		4 Tx /Rx
Maximum Aggregate Data Rate	Gb/s	112.2
Maximum Data Rate per Lane	Gb/s	28.05
Standard Cable Lengths		3, 5, 7, 10 (please contact sales for other lengths)
Protocols Supported	meters	Typical applications include Infiniband, FiberChannel, 100G Ethernet
Electrical Interface and Pin-out		38-pin edge connector (Pin-out as defined by the QSFP28 MSA)
Standard Optical Cable Type		Multimode ribbon fiber cable assembly, riser-rated
Maximum Power Consumption per End	W	2.5
Management Interface		Serial, I2C-based, 400 kHz maximum frequency (As defined by the QSFP28 MSA)

Notes:

1.100GBASE-SR4 and ITU-T OTU4 has different register setting , not auto- Negotiatio



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HIGH-SPEED ELECTRICAL CHARACTERISTICS PER LANE

Parameter-Inputs				Symbol	Min	Max	Unit	Parameter-Inputs				Symbol	Min	Max	Unit
<i>Input electrical specifications (per Lane)</i>								<i>Output electrical specifications (per Lane)</i>							
Differential Voltage pk-pk						900	mV	Differential Voltage pk-pk						900	mV
Common Mode Noise RMS						17.5	mV	Common Mode Voltage				Vcm	-350	2850	mV
Differential Termination Resistance Mismatch						10	%	Differential Termination Resistance Mismatch						10	%
Differential Return Loss				SDD22	Per OIF CEI-28G-VSR and CAUI-4 requirements			Common Mode Noise RMS						17.5	mV
Common Mode to Differential conversion and Differential to Common Mode Conversion				SDC22, SCD22				Common Mode to Differential conversion and Differential to Common Mode Conversion				SDC22, SCD22			
Common Mode Return Loss				SCC22	10		dB	Differential Return Loss				SDD22			dB
Transition Time, 20 to 80%				Tr,Tf	-0.3		ps	Common Mode Return Loss				SCC22			dB
Common Mode Voltage				Vcm	0.46	2.8	V	Output Rise and Fall time (20% to 80%)				tRH, tFH	9.5		ps
Eye Width at 1E-15 probability				Em15	94		UI	Vertical Eye Closure				VEC		5.5	dB
Eye Height at 1E-15 probability				EH15			mV	Eye Width at 1E-15 probability				EW15	0.57		UI

PIN ASSIGNMENT

Pin	Symbol			Symbol	NOTE
38	GND			GND	1
37	TX1n			TX2n	2
36	TX1p			TX2p	3
35	GND			GND	4
34	TX3n			TX4n	5
33	TX3p			TX4p	6
32	GND			GND	7
31	LPMODE			ModSelL	8
30	Vcc1			ResetL	9
29	VccTx			VccRx	10
28	IntL			SCL	11
27	ModPrsl			SDA	12
26	GND			GND	13
25	RX4p			RX3p	14
24	RX4n			RX3n	15
23	GND			GND	16
22	RX2p			RX1p	17
21	RX2n			RX1n	18
20	GND			GND	19

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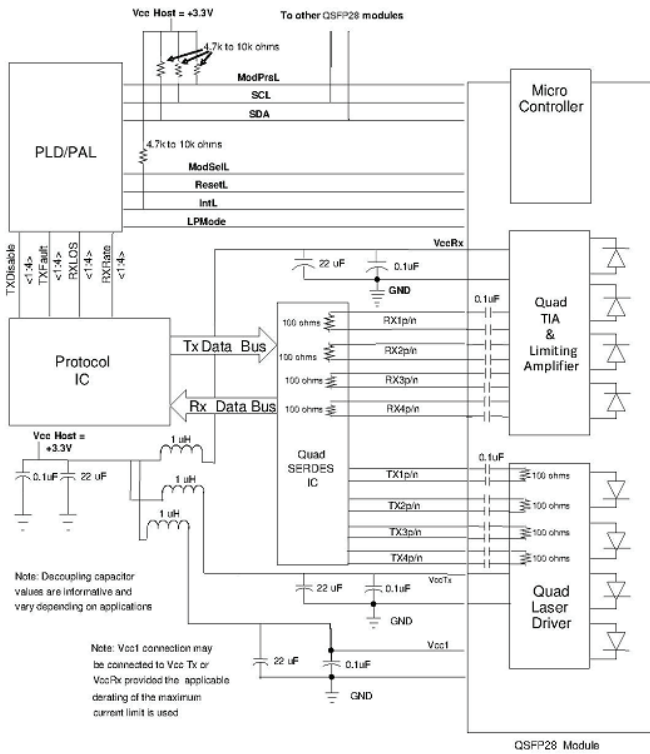
Pin	Symbol	Name/Description	NOTE
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver 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	Transmitter Ground (Common with Receiver Ground)	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4n	Receiver Inverted Data Output	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	LPMODE	Low Power Mode , not connect	
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:

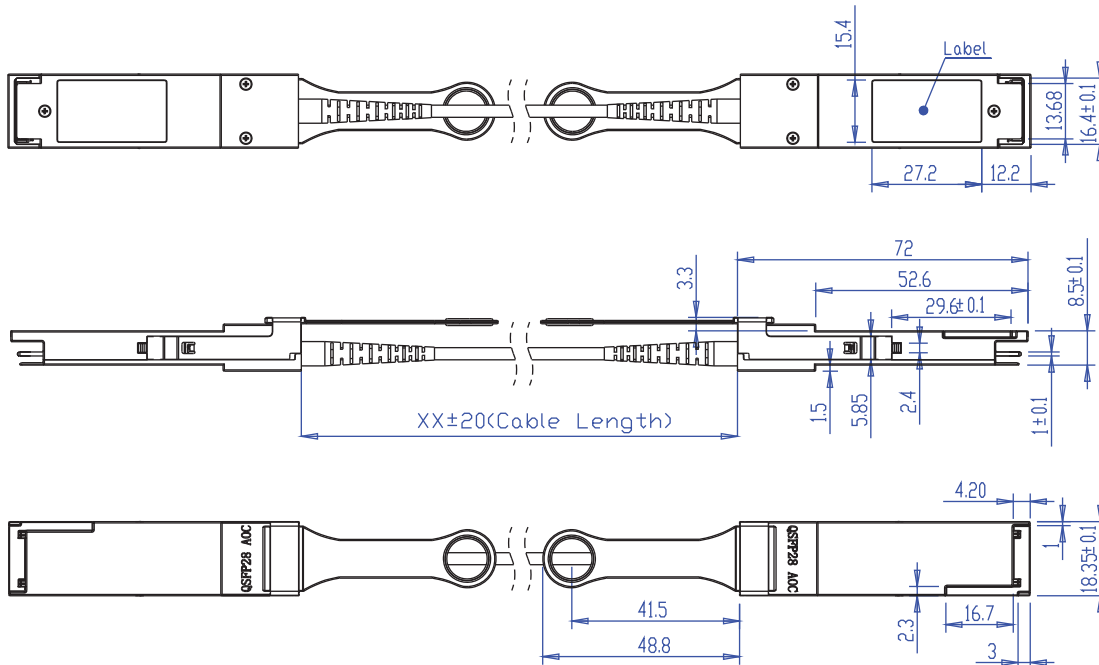
1. GND is the symbol for signal and supply(power) common for QSFP+ modules. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP+ transceiver module in any combination. The connector pins are each rated for a maximum current of 500mA.

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HOST - TRANSCEIVER INTERFACE BLOCK DIAGRAM



MECHANICAL DIMENSIONS



ORDERING INFORMATION

PN	Description
LQSFP28AOCxxx	Lightem 100Gb/s QSFP28 Active Optical Cable
xxx	xxx = different cable length on OM3 Multimode Fiber (MMF) , max 150m
eg.	
LQSFP28AOC050	050 - 5m Active Optic Cable
LQSFP28AOC150	150- 15m Active Optic Cable