

QSP-112M485-1HCM

100G/128G Gb/s QSFP28 SR4 Optical Transceiver

Features

- Compliant with IEEE Std 802.3bm
- Compliant with SFF-8665
- Supports 103.1Gb/s to 112.2Gb/s aggregate bit rates
- High Reliability 850nm VCSEL technology
- Electrically hot-pluggable
- Single +3.3V power supply
- Case temperature range: 0 ~ +70°C
- Maximum power consumption 2.5W
- Single MPO12 connector
- RoHS complaint



Application

- 100GBASE-SR4 Ethernet links
- Data centers
- 128G Fiber Channel

Product Description

Ascent Optics' QSP-112M485-1HCM 100G QSFP28 SR4 is a 4x28G OTN client links over multimode fiber, hot pluggable optical transceiver. The module integrates four parallel lanes with data rate at 28Gbps each lane. It can transmit up to 70 m on fiber OM3 fiber or 100 m on OM4 fiber with FEC.

Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature Range	T _{STG}	-40	+85	°C
Supply Voltage	V _{CC}	0	4	V
Relative Humidity	RH	5% to 85% non-condensing		

Operating Conditions

Table 2- Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Case Temperature- Operating	T _{CASE}	0	70	°C
Supply Voltage	V _{CC}	3.14	3.46	V
Power Consumption	P _{DISS}		2.5	W
Link Distance over OM4 Fiber			100	M
Link Distance over OM3 Fiber			70	M

Transmitter Optical Specifications

Table 3- Transmitter Optical Specifications

Transmitter Parameter	Min	Typical	Max	Units
Signaling Rate, each lane	25.78125±100 ppm			Gbps
Center Wavelength Range	840	850	860	nm
Modulation Format	NRZ			
Average launch Power per lane	-8.4		2.4	dBm
RMS spectral width			0.6	nm
Optical Modulation Amplitude , each lane	-6.4		3.0	dBm
Average Launch Power per Lane @ TX Off State			-30.0	dBm
Launch Power in OMA minus TDEC, each Lane	-7.3			dBm

Transmitter and Dispersion Eye Closure, each Lane			4.3	dB
Extinction Ratio	2.0			dB
Optical Return Loss Tolerance			12	dB
Transmitter Eye mask definition {X1, X2, X3, Y1,Y2,Y3}	{0.3,0.38,0.45,0.35,0.41,0.5}			

Receiver Optical Specifications

Table 4- Receiver Optical Specifications

Receiver Parameter	Min	Typical	Max	Units
Signaling Rate, each lane	25.78125±100 ppm			Gbps
Lane Wavelength Range	840	850	860	nm
Modulation Format	NRZ			
Damage Threshold	3.4			dBm
Average Receive Power, each lane	-10.3		2.4	dBm
Receiver Power, each lane (OMA)			3.0	dBm
Receiver Reflectance			-12.0	dB
Stressed Receiver Sensitivity (OMA), each lane			-5.2	dBm
Stressed Conditions for Stress Receiver Sensitivity				
Stressed Eye Closure		4.3		dB
Stressed Eye J2 Jitter		0.39		UI
Stressed Eye J4 Jitter		0.53		UI
OMA of each aggressor lane		3		dBm
Stressed Receiver Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}	(0.28,0.5,0.5,0.33,0.33,0.4)			
RX_LOS_Assert Min/Max	-30.0			dBm
RX_LOS_De-Assert Min/Max			-12.0	dBm
RX_LOS_Hysteresis	0.5			dB

Ethernet Operation

Table 5- Ethernet Operation

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Signaling Speed per Lane		27.95~28.05			Gb/s	4
Center wavelength		840	-	860	nm	
RMS Spectral Width	SW	-	-	0.6	nm	
Average Launch Power per Lane	TXPx	-9	-	2.4	dBm	
Transmit OMA per Lane	TxOMA	-7.1	-	3	dBm	
Launch Power [OMA] minus TDEC per Lane	P-TDEC	-8.0	-		dBm	
TDEC per Lane	TDEC	-	-	5.0	dBm	
Optical Extinction Ratio	ER	3	-		dB	
Receiver						
Signaling Speed per Lane		27.95~28.05			GBd	5
Center wavelength		840	-	860	nm	
Average Receive Power per Lane	RXPx	-10.9	-	2.4	dBm	6
Receiver Reflectance	Rfl	-	-	-12	dB	
Stressed Receiver Sensitivity (OMA) per Lane	SRS	-	-	-4.7	dBm	7
LOS De-Assert	LOSD	-	-	-13	dBm	
LOS Assert	LOSA	-30	-	-	dBm	
LOS Hysteresis		0.5	2	-	dB	

Notes:

1. Transmitter consists of 4 lasers operating at a maximum speed of 27.95 Gb/s each for OTU4 and 28.05 Gb/s each for Fibre Channel.
2. Hit ratio = 1.5×10^{-3} hits/sample.
3. Receiver consists of 4 photodetectors operating at a maximum speed of 27.95 Gb/s each for OTU4 and 28.05 Gb/s each for Fibre Channel.
4. Minimum value is informative only and not the principal indicator of signal strength.

QSFP28 Connector and Pinout Description

The electrical interface to the transceiver is a 38 pins edge connector. The 38 pins provide high speed data, low speed monitoring and control signals, I2C communication, power and ground connectivity. The top and bottom views of the connector are provided below, as well as a table outlining the contact numbering, symbol and full description.

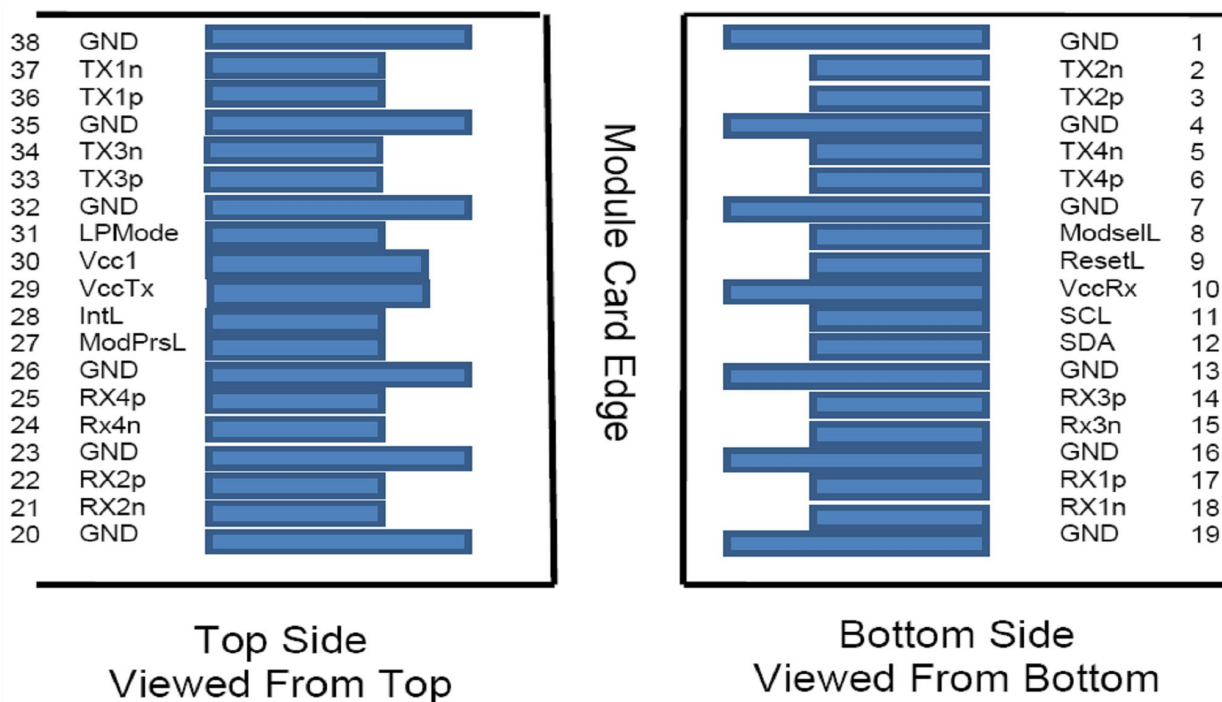


Figure 1. QSFP28-compliant 38-pin connector

QSFP Transceiver Pinout

QSFP Transceiver Pinout

Pin No.	Logic	Symbol	Description	Plug Sequence
1		GND	Ground	1
2	CML-I	TX2n	Transmitted Inverted Data Input	3
3	CML-I	TX2p	Transmitted Non-Inverted Data Input	3
4		GND	Ground	1
5	CML-I	TX4n	Transmitted Inverted Data Input	3
6	CML-I	TX4p	Transmitted Non-Inverted Data Input	3
7		GND	Ground	1
8	LVTTL-I	ModSeil	Module Select	3
9	LVTTL-I	ResetL	Module Reset	3
10		Vcc Rx	+3.3 VDC Receiver Power Supply	2
11	LVC MOS-I/O	SCL	Serial Clock for I2C Interface	3
12	LVC MOS-I/O	SDA	Serial Data for I2C Interface	3
13		GND	Ground	1
14	CML-O	RX3p	Receiver Non-Inverted Data Output	3
15	CML-O	RX3n	Receiver Inverted Data Output	3
16		GND	Ground	1
17	CML-O	RX1p	Receiver Non-Inverted Data Output	3
18	CML-O	RX1n	Receiver Inverted Data Output	3
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	RX2n	Receiver Inverted Data Output	3
22	CML-O	RX2p	Receiver Non-Inverted Data Output	3
23		GND	Ground	1
24	CML-O	RX4n	Receiver Inverted Data Output	3
25	CML-O	RX4p	Receiver Non-Inverted Data Output	3
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	3
28	LVTTL-O	IntL	Interrupt	3
29		Vcc Tx	+3.3 VDC Transmitter Power Supply	2
30		Vcc1	+3.3 VDC Power Supply	2
31	LVTTL-I	LPMODE	Low Power Mode	3
32		GND	Ground	1
33	CML-I	TX3p	Transmitted Non-Inverted Data Input	3
34	CML-I	TX3n	Transmitted Inverted Data Input	3
35		GND	Ground	1
36	CML-I	TX1p	Transmitted Non-Inverted Data Input	3
37	CML-I	TX1n	Transmitted Inverted Data Input	3
38		GND	Ground	1

Electrical Characteristics

Transmitter electrical input signal characteristics(TP1)	Min	Typical	Max	Unit
Signaling rate per lane (range)	25.78125 -112.2			GBd
Differential input return loss	Equation (8 3E-5)			dB
Differential to common mode input return loss	Equation (8 3E-6)			dB
Differential termination mismatch			10	%
Module stressed input test	See 83E3.4. 1			
Differential pk-pk input voltage tolerance	900			mV
DC common mode voltage	-350		2850	mV
Single ended voltage tolerance range	-0.4		3.3	V
Receiver electrical output signal characteristics(TP4)	Min	Typical	Max	Unit
Signaling rate per lane (range)	25.78125 -112.2			GBd
AC common-mode output voltage (RMS)			17.5	mV
Differential output voltage			900	mV
Eye width	0.57			UI
Eye height, differential	228			mV
Vertical eye closure			5.5	dB
Differential output return loss	Equation (8 3E-2)			dB
Common to differential mode conversion return loss	Equation (8 3E-3)			dB
Differential termination mismatch			10	%
Transition time (20% to 80%)	12			ps
DC common mode voltage	-350		2850	mV

Functional Block Diagram

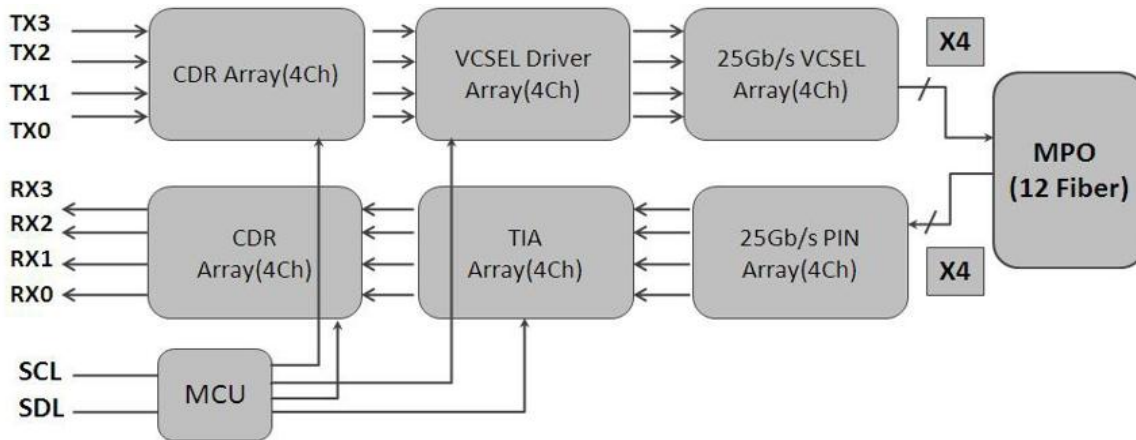


Figure 2. Functional Block Diagram

Mechanical Specifications

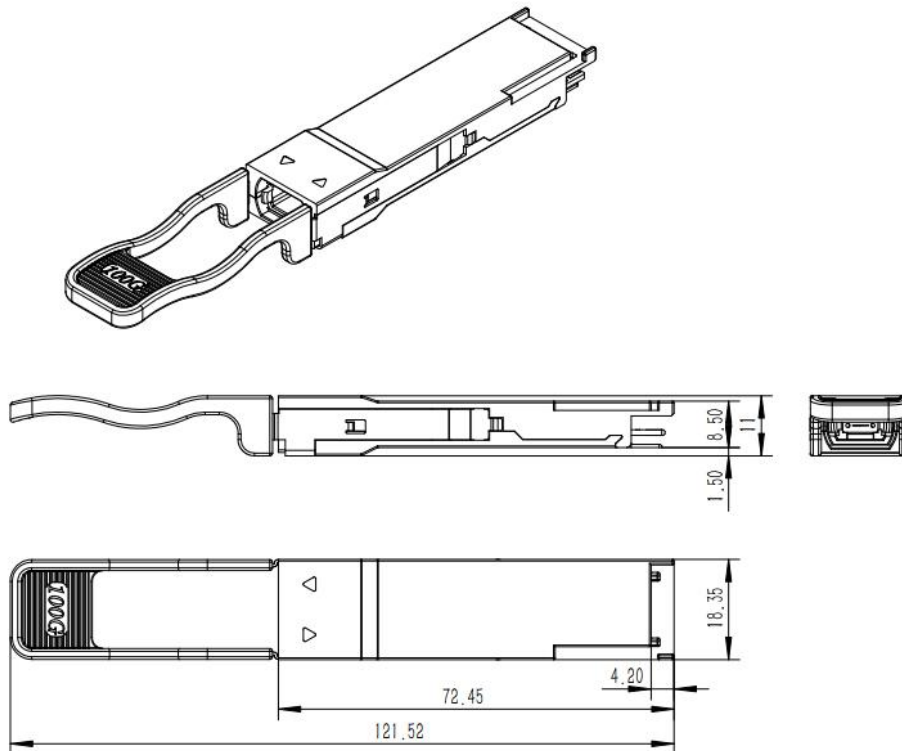


Figure 3. Mechanical Dimensions

Order Information

Table 6- Order Information

Part Number	Product Description
QSP-112M485-1HCM	100/128G QSFP28 103.1Gb/s to 112.2Gb/s 100m on OM4 0°C ~ +70°C

AscentOptics reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information. Edition: Apr. 2019 Published by Ascent Optics Co.,Ltd. Copyright © Ascent Optics All Rights Reserved.

E-mail: sales@ascentoptics.com

Web : <http://www.ascentoptics.com>