
100Gb/s QSFP28 CWDM4 2km Optical Transceiver

Features

- QSFP28 MSA compliant
- 4 CWDM lanes MUX/DEMUX design
- Supports 103.1Gb/s aggregate bit rate
- 100G CWDM4 MSA Technical Spec Rev1.1
- Up to 2km transmission on single mode fiber (SMF) with FEC
- Operating case temperature:0 to 70°C
- 4x25G electrical interface (OIF CEI-28GVSR)
- Maximum power consumption 3.5W
- LC duplex connector
- RoHS compliant

Applications

- 100G Ethernet
- Data Center Interconnect
- Enterprise networking

Compliance

- Compliant with IEEE 802.3ae-2002
- Compliant with MSA SFF-8636

Description

This product is a transceiver module designed for 2km optical communication applications. The design is compliant to 100GBASE CWDM4 MSA standard. The module converts 4 inputs channels (ch) of 25Gb/s electrical data to 4 CWDM optical signals, and multiplexes them into a single channel for 100Gb/s optical transmission. Reversely, on the receiver side, the module optically de-multiplexes a 100Gb/s input into 4 CWDM channels signals, and converts them to 4 channel output electrical data.

The central wavelengths of the 4 CWDM channels are 1271, 1291, 1311 and 1331nm as members of the CWDM wavelength grid defined in ITU-T G.694.2. It contains a duplex LC connector for the optical interface and a 38-pin connector for the electrical interface. To minimize the optical dispersion in the long-haul system, single-mode fiber (SMF) has to be applied in this module. Host FEC is required to support up to 2km fiber transmission.

The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP28 Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

Specification

Table1-Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Operating Case Temperature	Tc	0	+70	°C
Supply Voltage	Vcc	-5	3.6	V
Damage Threshold, each Lane	THd	3.5	-	dBm

Table2-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	0	25	+70	°C
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Power Supply Current	Icc	-	-	300	mA
DataRate, each Lane			25.78125		Gb/s

Table3-Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min	Typical	Max	Units	Notes
Bit Rate per Lane		25.78125 ± 100 ppm			Gbps	
Center Wavelength	CH0	λ_{c1}	1264.5	1271	1277.5	nm
	CH1	λ_{c2}	1284.5	1291	1297.5	nm
	CH2	λ_{c3}	1304.5	1311	1317.5	nm
	CH3	λ_{c4}	1324.5	1331	1337.5	nm
Overload Differential Voltage pk-pk	TP1a	900			mV	
Average Launch Power per Lane	Peach	-6.5		2.5	dBm	
Optical modulation amplitude per lane	POMA	-4		2.5	dBm	1
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}			{0.31, 0.4, 0.45, 0.34,			

			0.38, 0.4}			
Total Average Launch Power	PT			8.5	dBm	
Extinction Ratio		3.5			dB	

Table4-Receiver Operating Characteristic-Optical

Parameter	Symbol	Min	Typical	Max	Unit	Note
Damage Threshold, each Lane	THd	3.5			dBm	2
Total Average Receive Power				8.5	dBm	
Average Receive Power each Lane		-11.5	-	2.5	dBm	
Receiver Sensitivity (OMA), each Lane	Rsen	-	-	-10	dBm	for BER = 5×10^{-5}
LOS Hysteresis	LOSH	0.5			dB	
LOS Assert	LOSA	-30			dBm	
LOS Deassert	LOSD			-12	dBm	

Notes:

- [1] Even if the TDP < 1.0 dB, the OMA min must exceed the minimum value specified here.
- [2] 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.

Digital Diagnostic Functions

The transceiver can be used in host systems that require either internally or externally calibrated digital diagnostics.

Table5- Digital diagnostic specification table

Parameter	Symbol	Min.	Max	Unit	Notes
Internally measured transceiver temperature	DMI_Temp	-3	3	°C	Over operating temp
Measured RX received average optical power	DMI_TX	-2	2	dB	
Measured TX output power	DMI_RX	-2	2	dB	-1dBm to -16dBm range
Internally measured transceiver supply voltage	DMI_VCC	-100	100	mV	Full operating range
Measured TX bias	DMI_Ibias	-10	10	%	

Pin Description

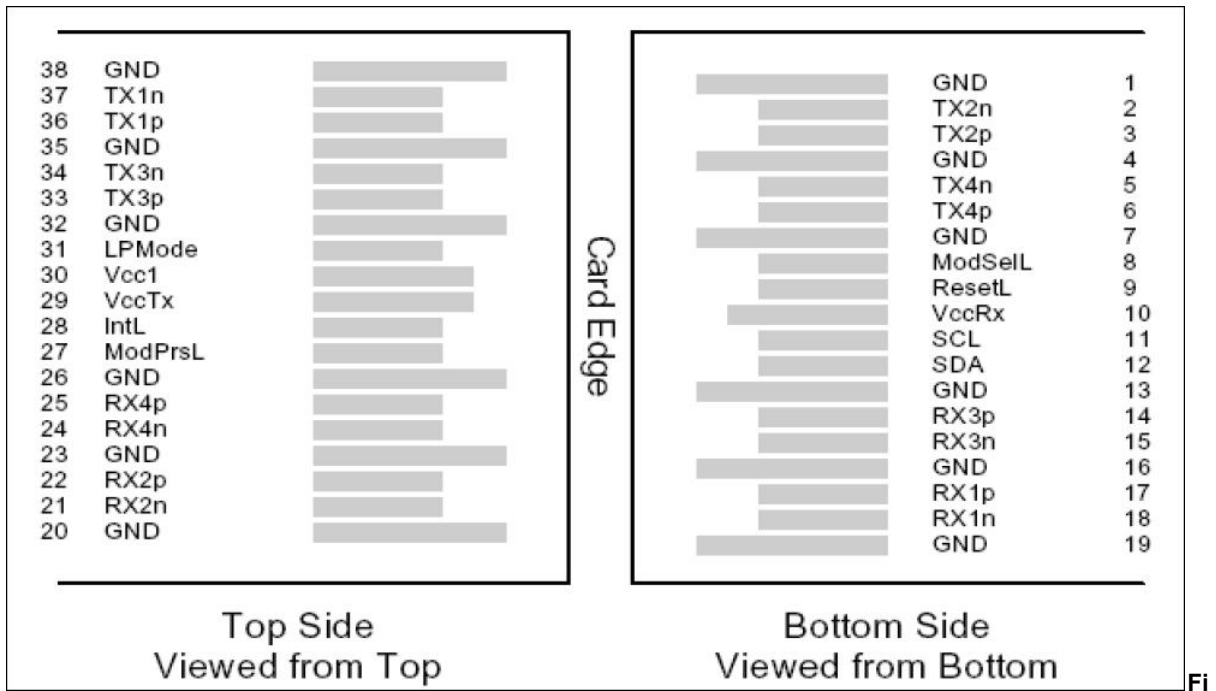


Figure1 Pin View

Table6-Pin Function Definitions

Pin	Name	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	2
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
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	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	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	
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

Notes:

[1] GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 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 in Figure 3 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA

Monitoring Specification

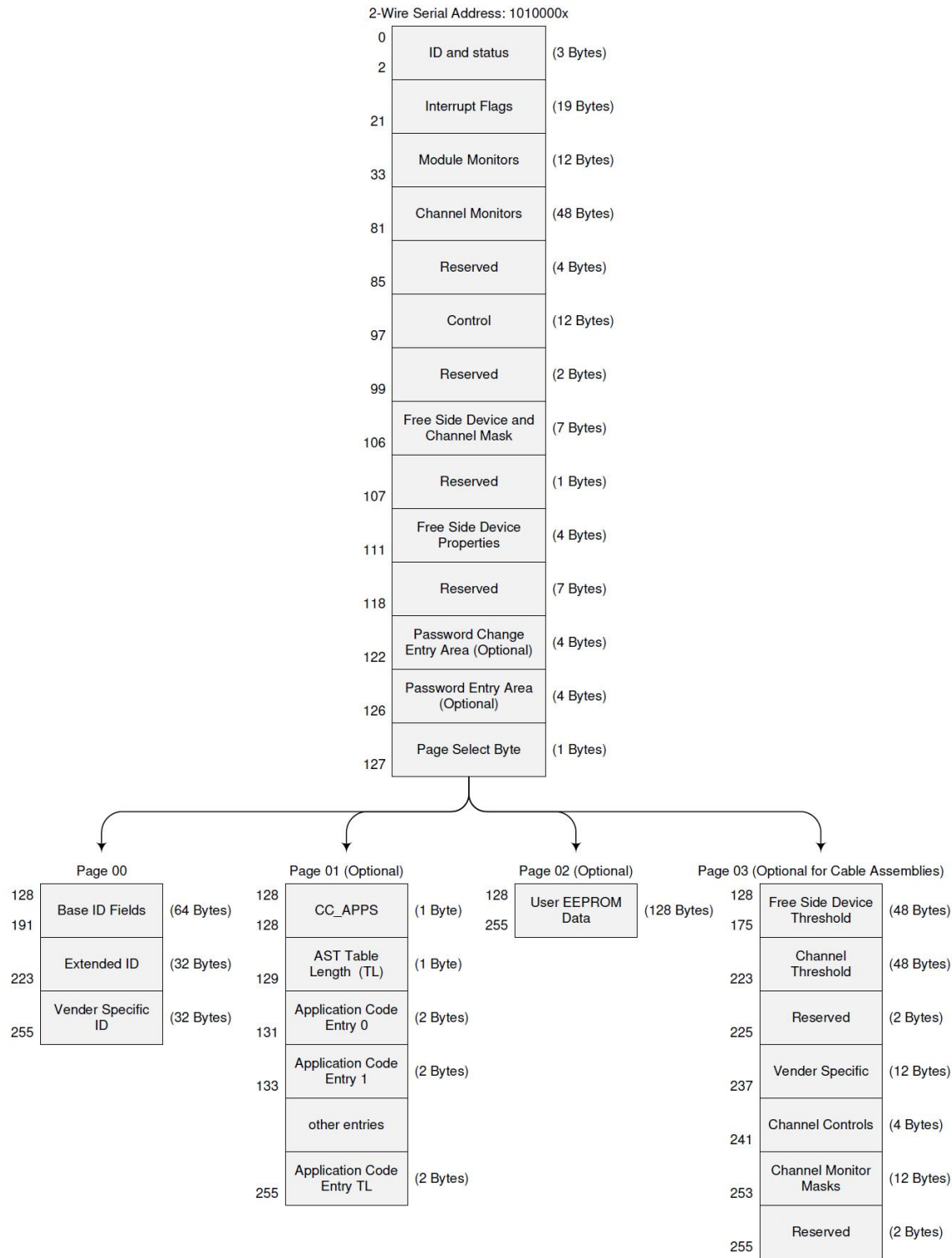


Figure2 Memory Map

Mechanical Dimensions

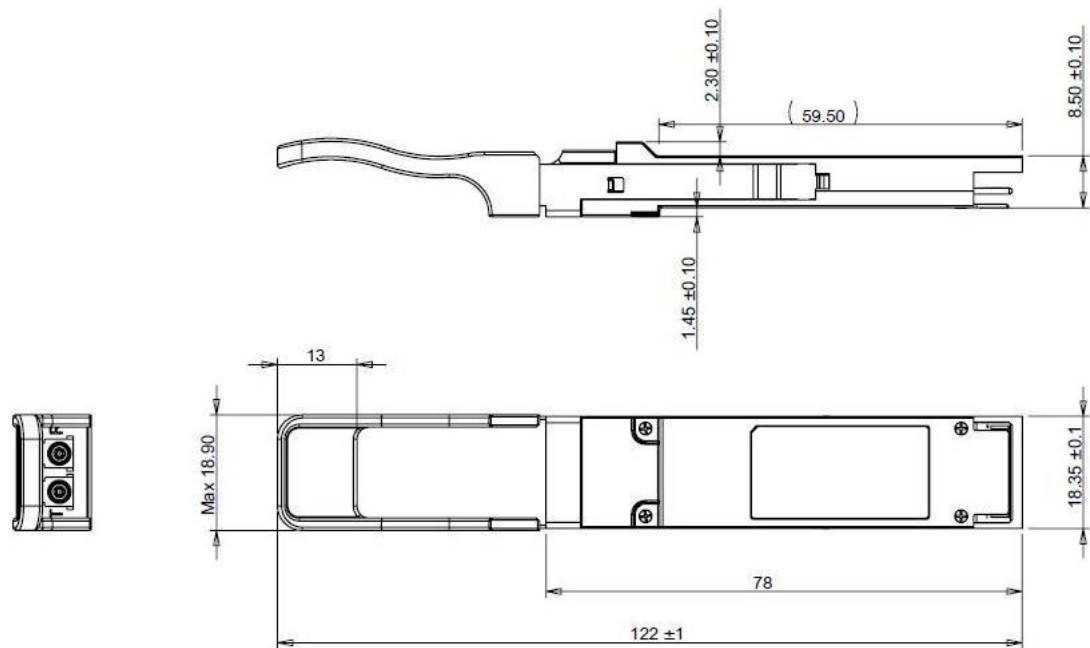


Figure3 Mechanical Outline

ESD

This transceiver is specified as ESD threshold 1kV for high speed data pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

This is a Class 1 Laser Product according to EN 60825-1:2014. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Caution

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

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