E-CW-SFP+-LR-XX

CWDM SFP+ 1270~1610nm 10km DDM LC SMF Transceiver

Features

- Up to 11.3Gb/s Bit Rate
- Hot-Pluggable SFP+ Footprint
- 18-Wavelength CWDM DFB Transmitter from 1270nm to 1610nm, with Step 20nm
- 10dB Power Budget at Least
- Duplex LC Connector
- Power Dissipation < 1.2W
- Case Operation Temperature Range: Standard: -5°C to 70°C
- Extended: -20°C to 75°C
- Compliant with SFP+ MSA Specification SFF-8431
- Build-in Digital Diagnostic Functions
- Compliant with SFF-8472 MSA

Applications

- 10GBASE-LR/LW 10G Ethernet
- 10GBASE-LR at 10.31Gbps
- 10GBASE-LW at 9.95Gbps
- Other Optical Links

1. Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Maximum Supply Voltage	Vcc	-0.5		4.0	V
Storage Temperature	TS	-40		85	°C

2. Recommend Operating Condition

Parameter	Symbol		Min	Typical	Max	Units
Case Operating Temperature	Tc	Standard	-5		+70	°C
		Extended	-20		+75	°C
Supply Voltage	Vcc		3.13	3.3	3.45	V
Supply Current	Icc				350	mA
Data Rate			0.614		11.3	Gbps

3. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	Vin	150		1200	mVpp	1
Input Impedance (Differential)	Zin	85	100	115	ohm	
Tx_DISABLE Input Voltage - High		2		Vcc+0.3	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		2		Vcc+0.3	V	
Tx_FAULT Output Voltage -- Low		0		0.8	V	
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	1
Output Impedance (Differential)	Zout	85	100	115	ohms	
Rx_LOS Output Voltage - High		2		Vcc+0.3	V	
Rx_LOS Output Voltage - Low		0		0.8	V	
MOD_DEF (0:2)	VoH	2.5			V	2
	VoL	0		0.5	V	

Notes:

After internal AC coupling.

Reference the SFF-8472 MSA.

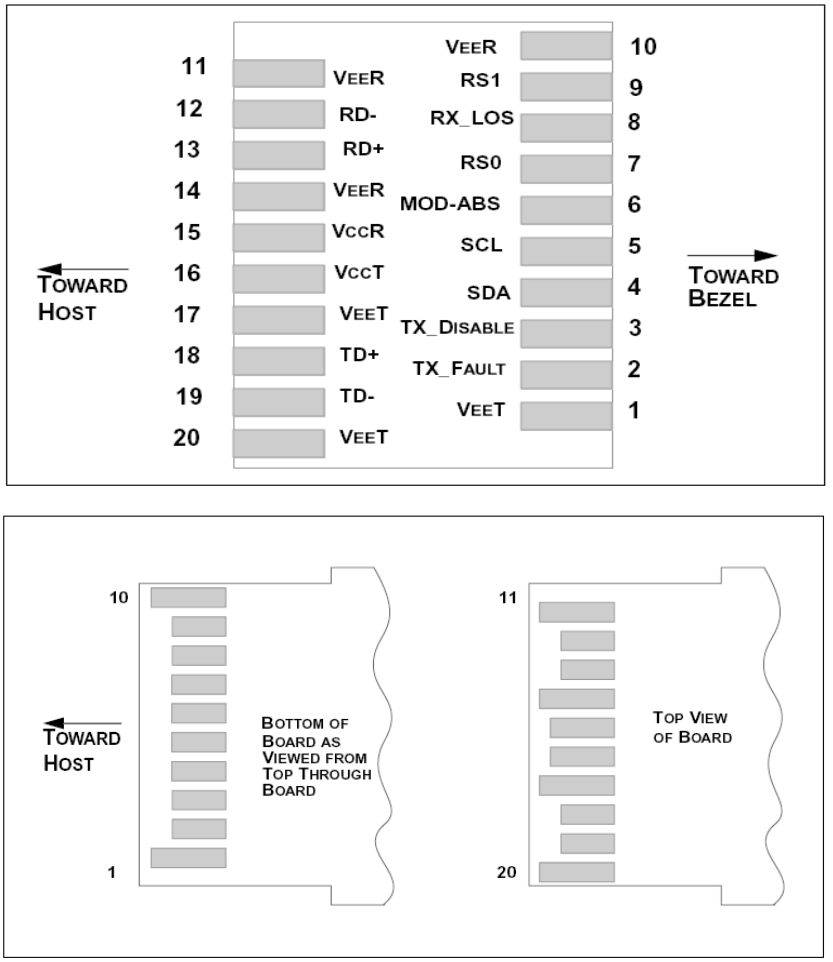
4. Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Output Opt. Pwr: 9/125 SMF	Pout	-8.2		+0.5	dBm	1
Optical Extinction Ratio	ER	3.5			dB	
Optical Wavelength	λ	λc–6.5	λc	λc+6.5	nm	2
-20dB Spectrum Width	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			2	dB	
Average Launch Power of OFF Transmitter				-30	dBm	
	POFF					
TX Jitter Generation (Peak-to-Peak)	TXj			0.1	UI	
TX Jitter Generation (RMS)	TXj RMS			0.01	UI	
Receiver						
Receiver Sensitivity @ 10.7Gb/s	Pmin			-14.4	dBm	3
Maximum Input Power	Pmax	+0.5			dBm	
Optical Center Wavelength	λ	1260		1620	nm	
Receiver Reflectance	Rrf			-27	dB	
LOS De-Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-28			dBm	
LOS Hysteresis		1			dB	

Notes:

Output power is coupled into a 9/125μm SMF.
ITU-T G.694.2 CWDM wavelength from 1270nm to 1610nm, each step 20nm.
Average received power; BER less than 1E-12 and PRBS 231-1 test pattern.

5. SFP+ Transceiver Electrical Pad Layout



6. Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	Data line for Serial ID.
5	SCL	Module Definition 1	3	Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	No Function Implement..

8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	No Function Implement..
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K~10 K Ω resistor. Its states are:

Low (0 – 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3) Module Absent, connected to VeeT or VeeR in the module.

4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT/R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5) VeeR and VeeT may be internally connected within the SFP+ module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 350 and 700mV differential (175 –350mV single ended) when properly terminated.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 350mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP+ transceiver module will result in an inrush current of no more than 30mA greater than the steady state value.