SFP-M1213L-02

1.25Gbps 1310nm 2km Duplex LC SFP Transceiver

Features

- Up to 1.25Gbps bi-directional data links
- 1310nm FP laser and PIN photo detector for 2km transmission
- Compliant with SFP MSA and SFF-8472 with single LC receptacle
- Digital Diagnostic Monitoring: Internal Calibration or External Calibration
- Metal enclosure, for lower EMI
- Compatible with RoHS
- +3.3V single power supply
- Operating case temperature:

  Standard: 0 to +70ºC

  Industrial: -40 to +85ºC

Applications

- Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

Description

SFP-M1213L-02 Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the FP laser and the PIN photo-detector .The module data link up to 2km in Multi-mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Specification

Absolute Maximum Ratings				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Supply Voltage	Vcc	0	4	V
Damage Threshold	THd		5	dBm
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	95	%

Recommended Operating Conditions						
Parameter		**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Operating Case Temperature	Standard	Tc	-5		+70	°C
	Industrial		-40		+85	°C
Power Supply Voltage		Vcc	3.13	3.3	3.47	V
Power Supply Current		Icc			280	mA
Control Input Voltage High			2		Vcc	V
Control Input Voltage Low			0		0.8	V
Data Rate				1.25		Gbps

Optical and Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Transmitter						
Centre Wavelength	λc	1270	1310	1360	nm	
Spectral Width (RMS)	Δλ			3.5	nm	
Average Output Power	Pout	-11		-3	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time (20%~80%)	tr/tf			100	ps	
Transmit Disable Assert Time			5		us	
Data Input Swing Differential	V_{IN}	200		2400	mV	2
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
TX Disable — Disable	Vdis	Vcc-1.3		Vcc	V	
TX Disable — Enable	Ven	Vee-0.3		0.8	V	

TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λc	1270		1610	nm	
Receiver Sensitivity					-19	dBm	3
Receiver Overload			-3			dBm	3
LOS De-Assert		LOS_D			-20	dBm	
LOS Assert		LOS_A	-35			dBm	
LOS Hysteresis			0		5	dB	
Data Output Swing Differential		Vout	500		900	mV	4
LOS		High	Vcc-1.3		Vcc	V	
		Low	Vee-0.3		0.8	V	

Notes:

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2^7-1 test pattern @1250Mbps, BER ≤1×10^{-12}.
4. Internally AC-coupled.

Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
	-40 to +85			
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-11 to -3	dBm	±3dB	Internal / External
RX Power	-3 to -19	dBm	±3dB	Internal / External

Digital Diagnostic Memory Map

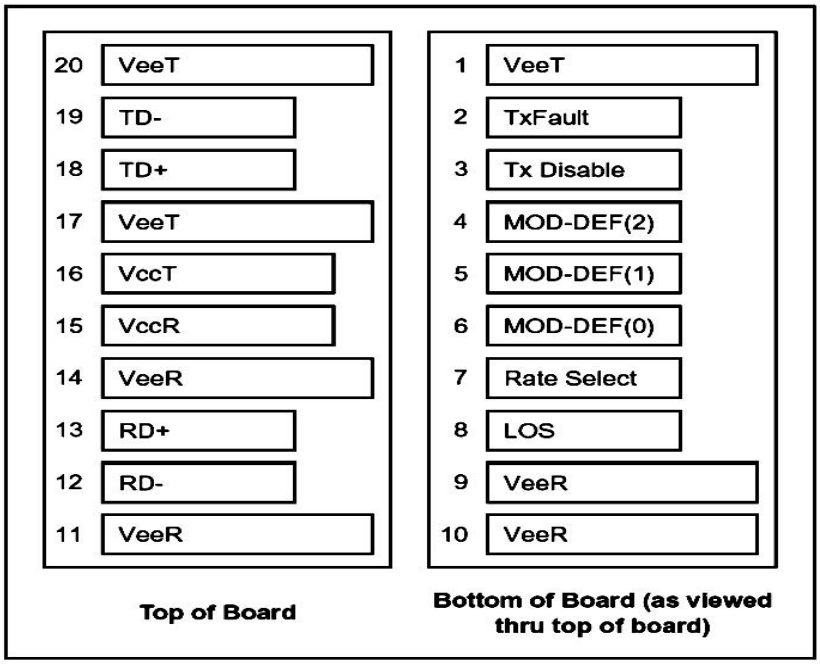
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring,

bias current monitoring, supply voltage monitoring and temperature monitoring.
The digital diagnostic memory map specific data field defines as following.

Pin Definitions

Pin Diagram



Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V_{EER}	Receiver ground	1	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V_{EET}	Transmitter Ground	1	

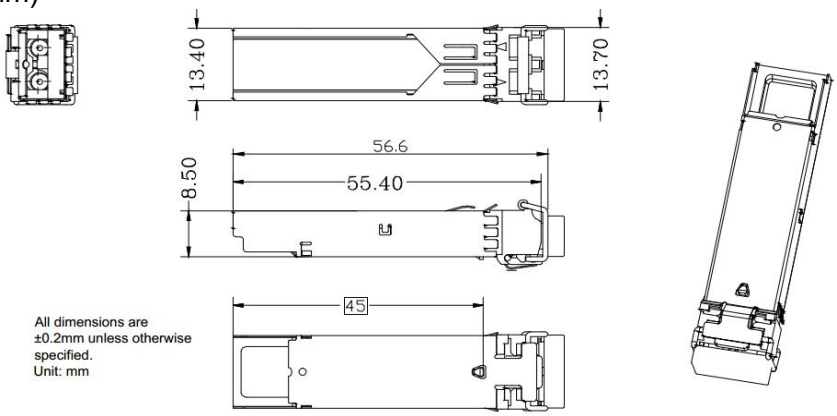
Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 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~10kΩ resistor. Its states are:
   Low (0 to 0.8V): Transmitter on
   (>0.8V, < 2.0V): Undefined
   High (2.0 to 3.465V): Transmitter Disabled
   Open: Transmitter Disabled
3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
   Mod-Def 0 is grounded by the module to indicate that the module is present
   Mod-Def 1 is the clock line of two wire serial interface for serial ID
   Mod-Def 2 is the data line of two wire serial interface for serial ID
4) LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
5) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Package Outline

Dimensions are in millimeters. All dimensions are ±0.2mm unless otherwise specified.(Unit:mm)



Ordering information

Model No.	Product Description
SFP-M1213L-02	1.25Gbps, 1310nm,LC,2km, 0ºC ~ +70ºC
SFP-M1213L-02I	1.25Gbps, 1310nm LC, 2km, -40ºC ~ +85ºC