Features

- Data-Rate of 1.25Gbps operation
- 1310nm FP LD laser and PIN photodetector
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Digital Diagnostic Monitoring:
- Internal Calibration or External Calibration
- 2km transmission with 50/125μm MMF
- 1km transmission with 62.5/125μm MMF
- Compatible with RoHS
- +3.3V single power supply
- Operating case temperature:

  Standard : 0 to +70°C

  Industrial : -40 to +85°C

Applications

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

Description

The SFP transceivers are high performance, cost effective modules supporting data-rate of 1.25Gbps and 2KM transmission distance with MMF.

The transceiver consists of three sections: a 1310nm FP LD laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Supply Voltage	Vcc	-0.5		4.5	V	
Storage Temperature	Ts	-40		+85	°C	
Operating Humidity	-	5		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Case Operating Temperature	*Top*	0		70	°C	CO
		-40		85	°C	IO
Power Supply Current	*Icc*			300	mA	
Data Rate			1.25		Gbps	

Digital Diagnostic Functions

Parameter	Symbol	Accuracy	Unit	Notes
Temperature Monitor Absolute Error	*DMI_Temp*	± 3	°C	Over operating Temp
Supply Voltage Monitor Absolute Error	*DMI_VCC*	±0.1	V	Full operating range
RX Power Monitor Absolute Error	*DMI_RX*	± 3 dB	dB	1
Bias Current Monitor	*DMI_Ibias*	± 10%	mA	
Laser Power Monitor Absolute Error	*DMI_TX*	± 3 dB	dB	1

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
			Transmitter			
Centre Wavelength	λc		1310		nm	
Spectral Width (RMS)	Δλ			0.85	nm	
Average Output Power	Pout	-5		0	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time (20%~80%)	tr/tf			0.26	ns	
			Receiver			
Centre Wavelength	λc		1310		nm	
Receiver Sensitivity				-20	dBm	2
Receiver Overload		0			dBm	2
LOS De-Assert	LOS_D			-21	dBm	
LOS Assert	LOS_A	-35			dBm	
LOS Hysteresis		1		4	dB	

Note:

1. The optical power is launched into MMF
2. Measured with a PRBS 27-1 test pattern @1250Mbps, BER ≤1×10-12

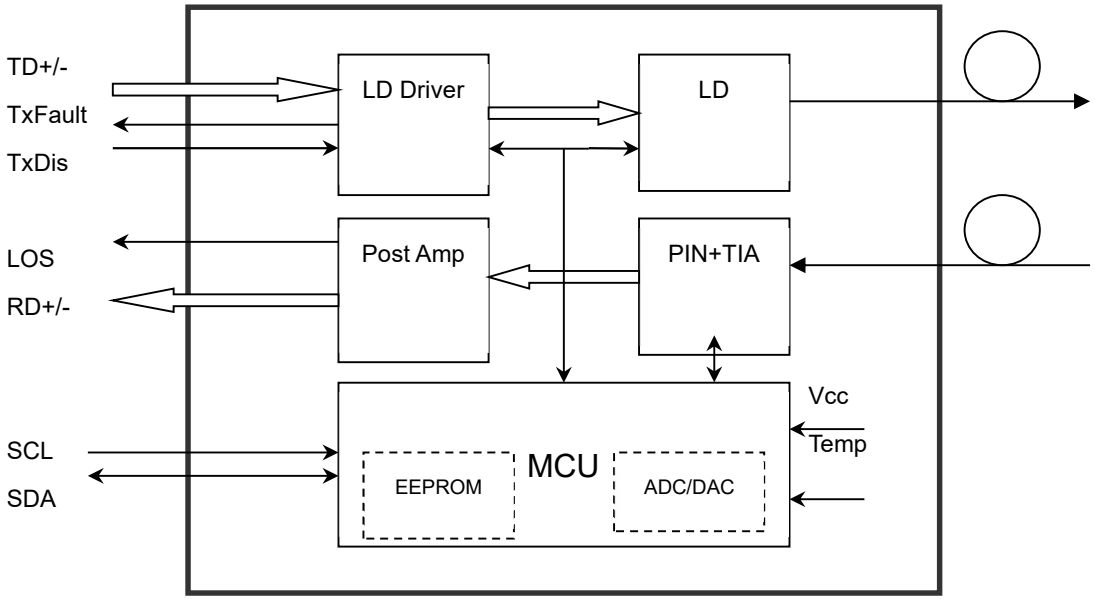
Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
		Transmitter				
Data Input Swing Differential	V_{IN}	400		1800	mV	1
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
TX Disable		2.0		Vcc	V	
TX Enable		0		0.8	V	
TX Fault		2.0		Vcc	V	
TX Normal		0		0.8	V	
		Receiver				
Data Output Swing Differential	V_{OUT}	400		1800	mV	2
LOS	*High*	2	-	Vcc	V	
	Low			0.8	V	

Note:

1. PECL input, internally AC-coupled and terminated.
2. Internally AC-coupled.

Block Diagram of Transceiver



Pin Assignment

Pin	Symbol	Function/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

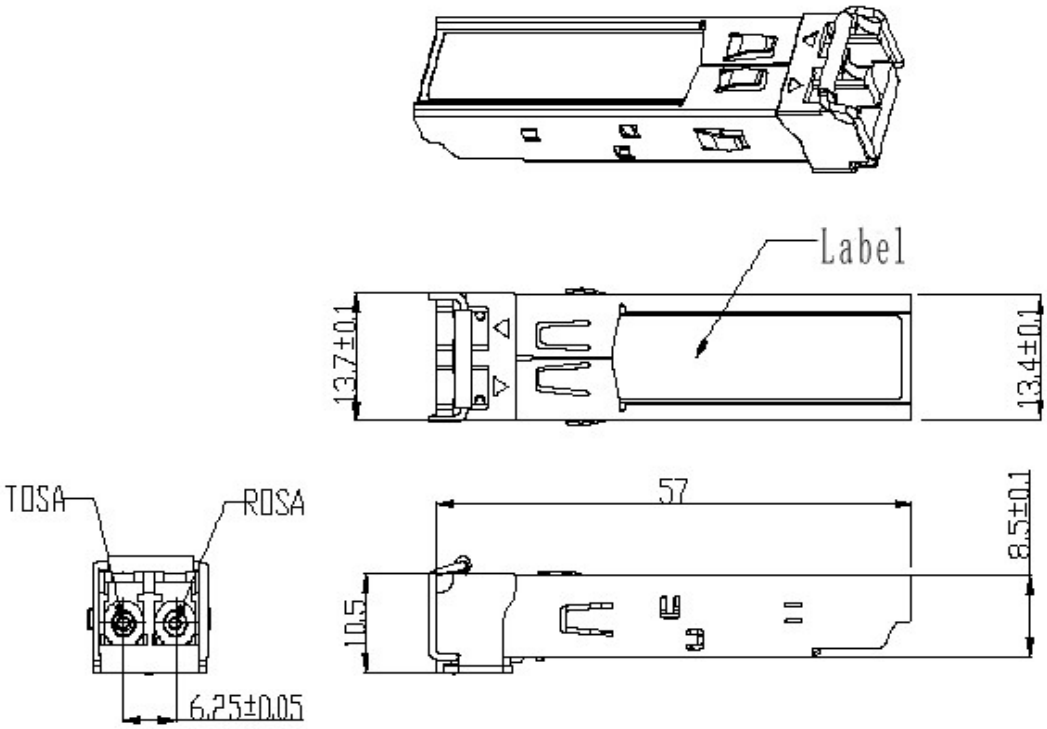
Mod-Def 2 is the data line of two wire serial interface for serial ID

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.

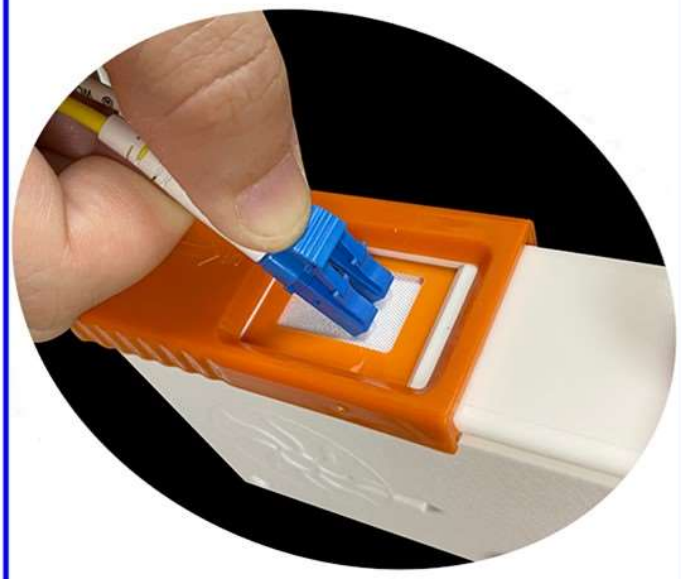
Dimensions



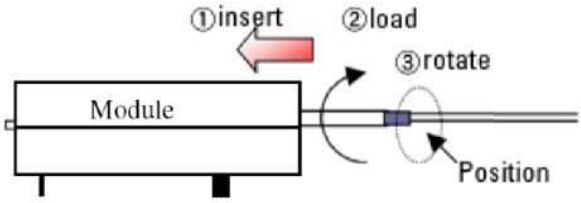
Optical Receptacle Cleaning Recommendations :

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette.

Cleaning of patch-cord



Cleaning of fiber stub



1. Insert
   Ensure that stick is held straight when inserting into sleeve.
2. Load
   Apply sufficient pressure (approx 600-700g) to ensure ferrule a little depressed in sleeve.
3. Rotate
   Rotate stick clockwise 4-5 times, while ensuring direct contact with ferrule end-face is maintained.

Notice: Number of possible wipes:
Maintenance (repair) ~1 use / piece
Equipment construction: 4 uses / piece (max.)

Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

Ordering Information

Model Number	Part Number	Wavelength	Temperature
SFP-1.25G-MLX-DM	OP6C-M02-13-CMF	1310nm	0°C ~70 °C
SFP-1.25G-MLX-DM-I	OP6C-M02-13-IMF	1310nm	-40 °C ~85 °C

Modification History

Revision	Date	Description
A1	Aug. 2024	Initial Release

Note: All information contained in this document is subject to change without notice.