

SFP-1G-LXD

TransOpto

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1.25Gbps SFP Optical Transceiver, 10km Reach

DESCRIPTIONS

The SFP transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 10km transmission distance with SMF.



FEATURES

- Dual data-rate of 1.25Gbps/1.063Gbps operation
- 1310nm FP laser and PIN photodetector for 10km transmission
- Interface type: 1000 Base-LX
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle. Cable support SM.
- Internal Calibration or External Calibration
- Compatible with SONET OC-24-LR-1
- Compatible with RoHS
- +3.3V single power supply

- Operating case temperature:
Standard : 0 to +70°C
Industrial : -40 to +85°C

APPLICATIONS

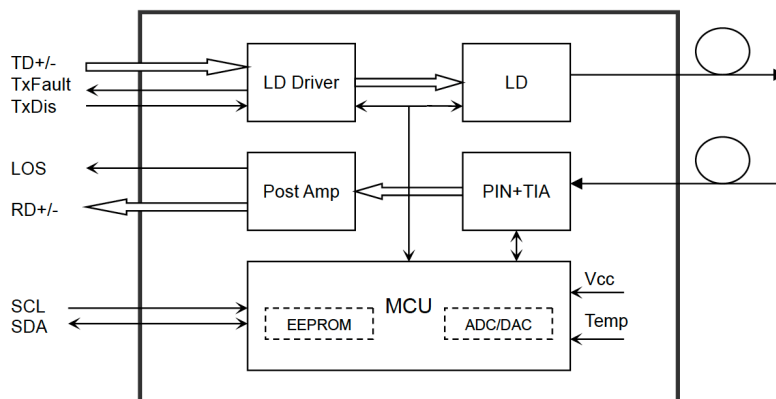
- Gigabit Ethernet
- Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

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The transceiver consists of three sections: a FP laser transmitter, a PIN photodiode integrated with a transimpedance 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.	Max.	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

RECOMMENDED OPERATING ENVIRONMENT

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature - Standard	TC	0		+70	°C
Operating Case Temperature - Industrial	TC	-40		+85	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc			300	mA
Date rate			1.25		Gbps

OPTICAL AND ELECTRICAL CHARACTERISTICS

SFP-24SM31-10C: (FP and PIN, 1310nm, 10km Reach)

Parameter Transmitter	Symbol	Min.	Typical	Max.	Unit	Note
Centre Wavelength	λ_c	1260	1310	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$			4	nm	
Average Output Power	P _{out}	-9		0	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time (20%~80%)	tr/tf			0.26	ns	
Data Input Swing Differential	V _{IN}	400		1800	mV	2
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
TX Disable - Disable		2.0		V _{cc}	V	
TX Disable - Enably		0		0.8	V	
TX Fault - Fault		2.0		V _{cc}	V	
TX Fault - Normal		0		0.8	V	

Parameter Receiver						
Centre Wavelength	λ_c	1260		1360	nm	
Receiver Sensitivity				-23	dBm	3
Receiver Overload		-3			dBm	3
LOS De-Assert	LOS _D			-24	dBm	
LOS Assert	LOS _A	-36			dBm	
LOS Hysteresis		1		4	dB	
Data Output Swing Differential	V _{out}	370		1800	mV	4
LOS - High	High	2.0		V _{cc}	V	
LOS - Low	Low			0.8	V	

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2⁷-1 test pattern @1250Mbps, BER $\leq 1 \times 10^{-12}$
4. Internally AC-coupled.

TIMING AND ELECTRICAL

Parameter	Symbol	Min.	Typical	Max.	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	µs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	µs
Tx Disable To Reset	t_reset	10			µs
LOS Assert Time	t_loss_on			100	µs
LOS De-assert Time	t_loss_off			100	µs
Serial ID Clock Rate	f_serial_clock			400	KHz
MOD_DEF (0:2) - High	V _H	2		V _{cc}	V
MOD_DEF (0:2) - Low	V _L			0.8	V

DIAGNOSTICS

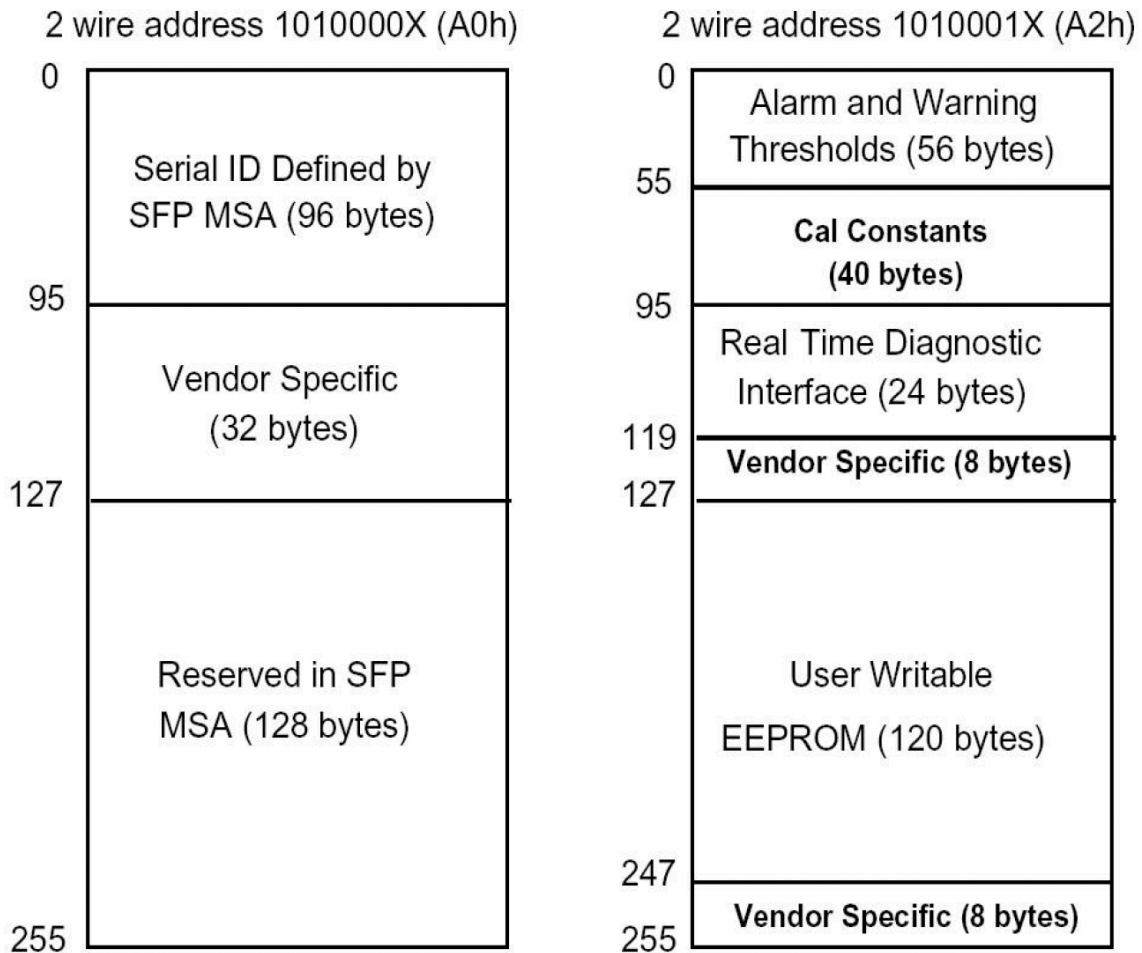
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	± 3°C	Internal / External
	-40 to +85	°C	± 3°C	Internal / External
Voltage	3.0 to 3.6	V	± 3 %	Internal / External
Bias Current	0 to 100	mA	± 10 %	Internal / External
TX Power	-9 to 0	dBm	± 3° dB	Internal / External
RX Power	-23 to -3	dBm	± 3° dB	Internal / External

DIGITAL DIAGNOSTIC MEMORY MAP

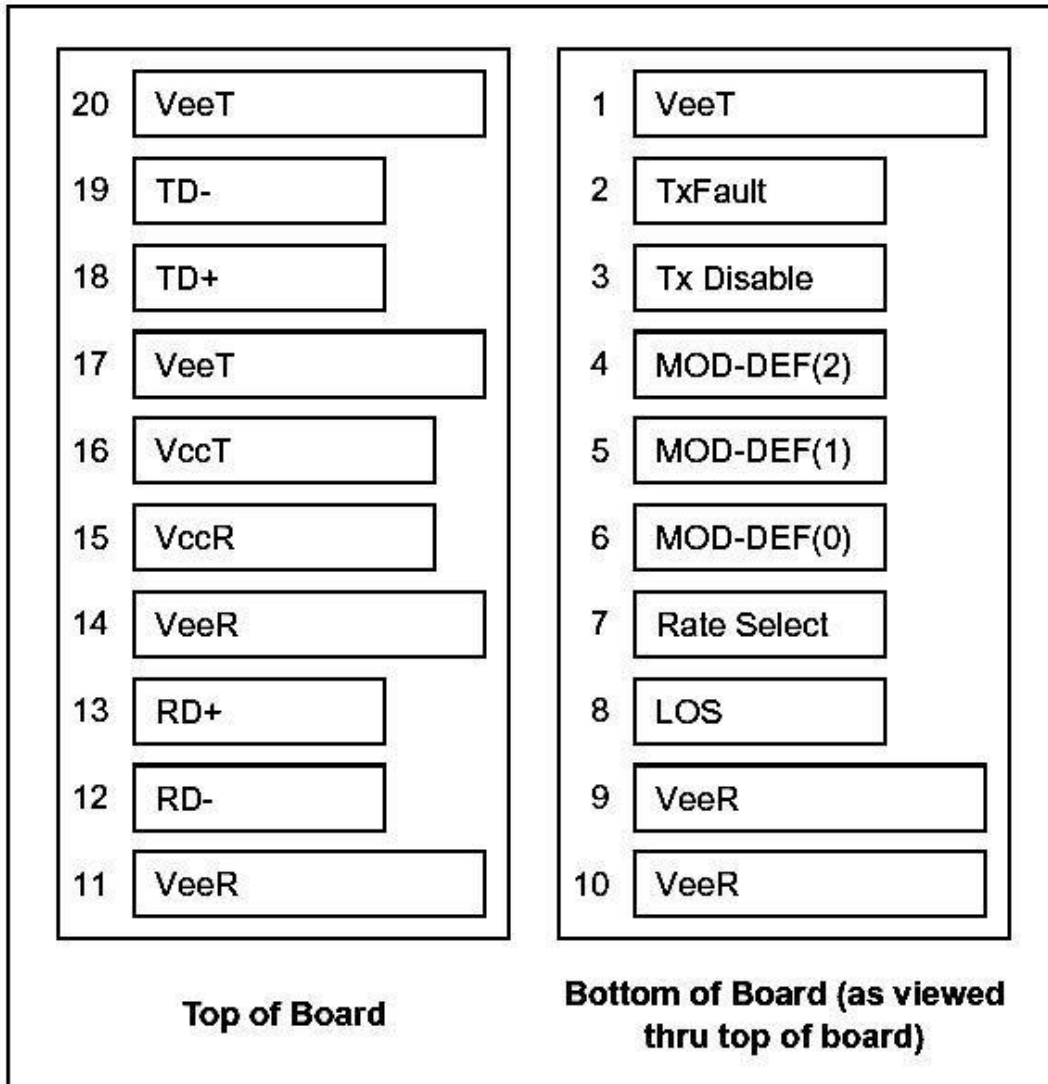
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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 ASSIGNMENT



PIN DESCRIPTION

Pin	Signal name	Description	Plug seq.	Notes
1	V EET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	1
3	TX DISABLE	Transmitter Disable	3	2
4	MOD_ DEF (2)	SDA Serial Data Signal	3	3
5	MOD_ DEF (1)	SCL Serial Clock Signal	3	3
6	MOD_ DEF (0)	TTL Low	3	3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	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	5
13	RD+	Received Data Out	3	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	6
19	TD-	Inv. Transmit Data In	3	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

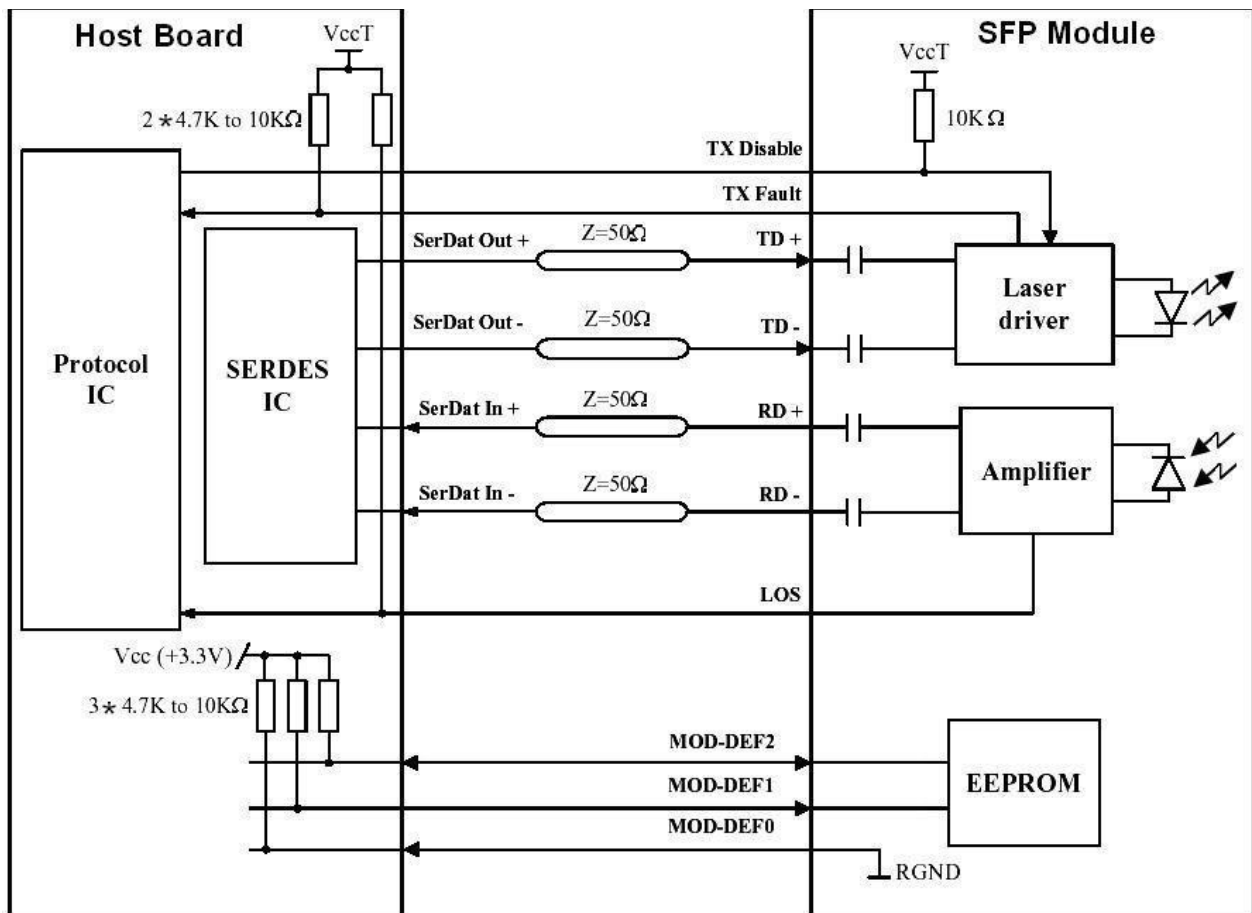
Mod-Def 2 is the data line of two wire serial interface for serial ID

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.

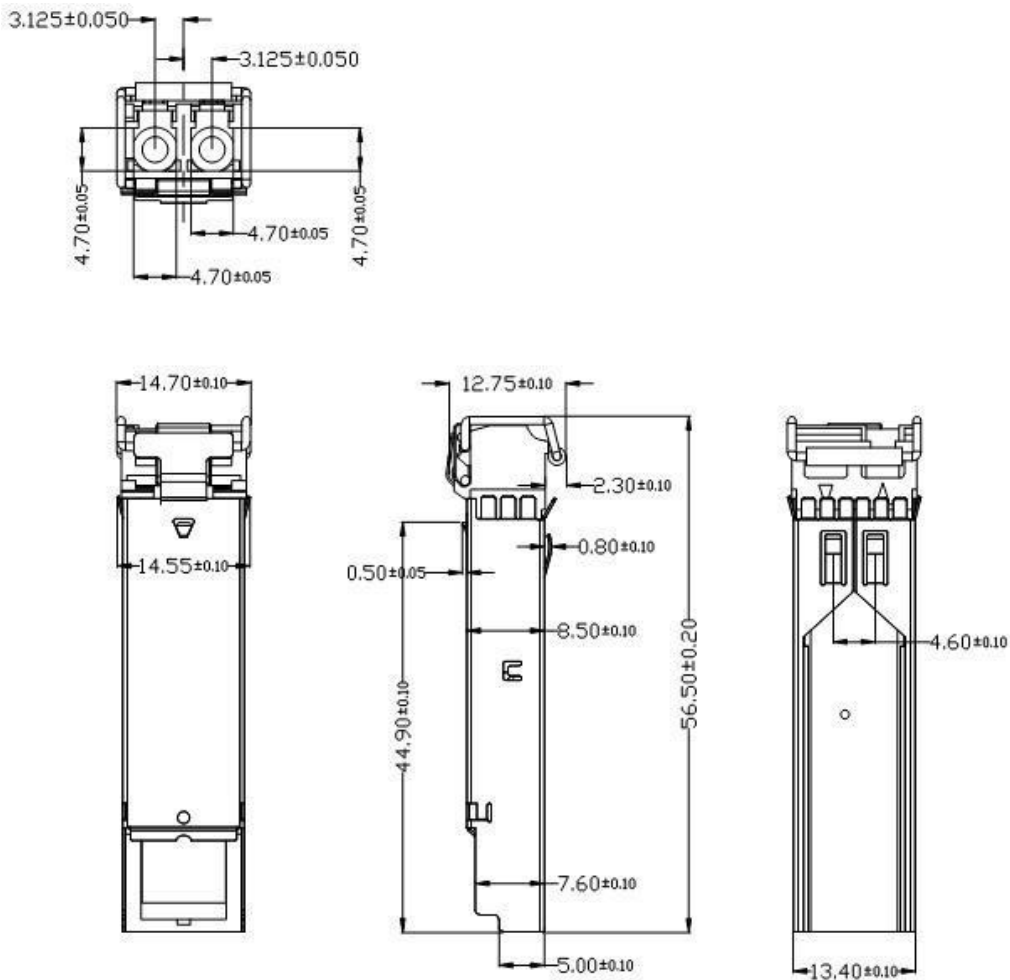
5) RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.

6) TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

RECOMMENDED INTERFACE CIRCUIT



MECHANICAL DIMENSIONS



ORDERING INFORMATION

Part Number	Product Description
SFP-1G-LXD	1310nm, 1.25Gbps, LC, 10km, 0°C~+70°C, with DDM
SFP-1G-LXD-IND	1310nm, 1.25Gbps, LC, 10km, -40°C~+85°C, with DDM

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