OSP1250-8505DxR

1.25G SFP Transceiver Module, MMF, 850nm, 550m, LC, DDM

Features

- Support up to 1.25Gb/s data links
- Compliant with SFP MSA standard
- Compliant with IEEE 802.3z
- Hot pluggable SFP footprint
- Single 3.3V power supply
- Built-in Digital Diagnostic Monitor Interface
- Duplex LC connector
- Low power dissipation <0.8W
- Metal enclosure provides lower EMI
- Operating Temperature: Standard 0~70ºC, Industrial -40~85ºC
- RoHS compliant and lead-free

Applications

- 1G Fiber Channel, Switch to Switch Interface
- Gigabit Ethernet, Switched Backplane Applications
- Broadband aggregation and wireless infrastructure
- Router/Server Interface
- Other Optical networking

Description

The Optcore OSP1250-8505DxR is a high performance and cost-effective 1.25Gb/s SFP SX optical transceiver. This

SFP SX fiber optical transceiver module is designed to meet the Gigabit Ethernet application. The 1.25Gb/s SFP SX optical transceiver module consists of two sections: the transmitter section consists of a high-reliability 850nm VCSEL with a monitor photodetector (MPD) in eye safety; the receiver section consists of a high-speed GaAs PIN photodiode (PD) and trans-impedance preamplifier. The output of the PD drives the post-amplification, quantizing, and optical signal detection circuits. The receiver is built in the LOS monitoring function. For further information, please see SFP MSA and SFF-8472 standards.

This series 1G SFP SX transceiver provides two versions for different applications.

● The standard commercial-grade SFP transceiver (OSP1250-8505DCR) supports operating temperature 0~70º for commercial applications and at a lower cost.

● The Industrial grade SFP transceiver (OSP1250-8505DTR) supports operating temperature -40~85ºC. It is made with robust and reliable components to meet the needs of Industrial Ethernet application under harsh industrial environmental conditions, such as industrial automation, government, rail, and intelligent transportation systems (ITSs), military, oil and gas, mining, and outdoor applications.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5	4.0	V	
Storage Temperature	T_S	-40	85	°C	
Operating Humidity	RH	5	95	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc			220	mA	
Case Operating Temperature	Tc	0		70	°C	Standard
		-40		85	°C	Industrial
Data Rate			1.25		Gbps	Gigabit Ethernet
			1.06		Gbps	Fiber Channel
Transmission Distance				550	m	50/125μm MMF

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	830	850	860	nm	
Average Output Power	P_{out}	-9		-3	dBm	1
Spectral Width (RMS)	σ			0.65	nm	
Extinction Ratio	ER	9			dB	1
Optical Rise/Fall Timel	Tr-Tf			0.26	ns	2

Total Jitter				0.431	UI	
Output Optical Eye	Compliant with IEEE802.3 z (class 1 laser safety)					
Receiver						
Center Wavelength	λ_C	770	-	860	nm	
Receiver Sensitivity				-18	dBm	3
Receiver Overload		0			dBm	3
LOS De-Assert	LOSD			-19	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis		0.5		6	dB	

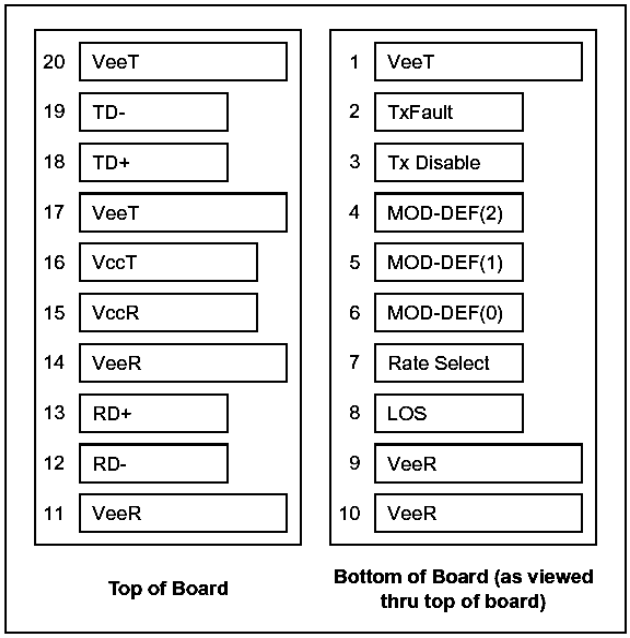
Note :

1. Measured at 1.25Gbps with PRBS 2^7– 1 NRZ test pattern.
2. Unfiltered, measured with a PRBS 2^7-1 test pattern @1.25Gbps
3. Measured at 1250 Mb/s with PRBS 2^7– 1 NRZ test pattern for BER < $1x10^{-12}$

Electrical Input/Output Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Input differential impedance	Z_{IN}		100		Ω	
Data Input Swing Differential	Vin,pp	300		1600	mV	
TX Disable - High	V_{IH}	2.0		Vcc+0.3	V	
TX Disable - Low	V_{IL}	0		0.8	V	
TX Fault - High	V_{OH}	2.0		Vcc+0.3	V	
TX Fault - Low	V_{OL}	0		0.5	V	
Receiver						
Data Output Swing Differential	Vout,pp	400		1000	mV	
RX LOS - High	V_{LOS}	2.0		Vcc+0.3	V	
RX LOS - Low	V_{LOS}	0		0.8	V	

Pin Definitions



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)	Model present indication	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-	Inverse 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:

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.

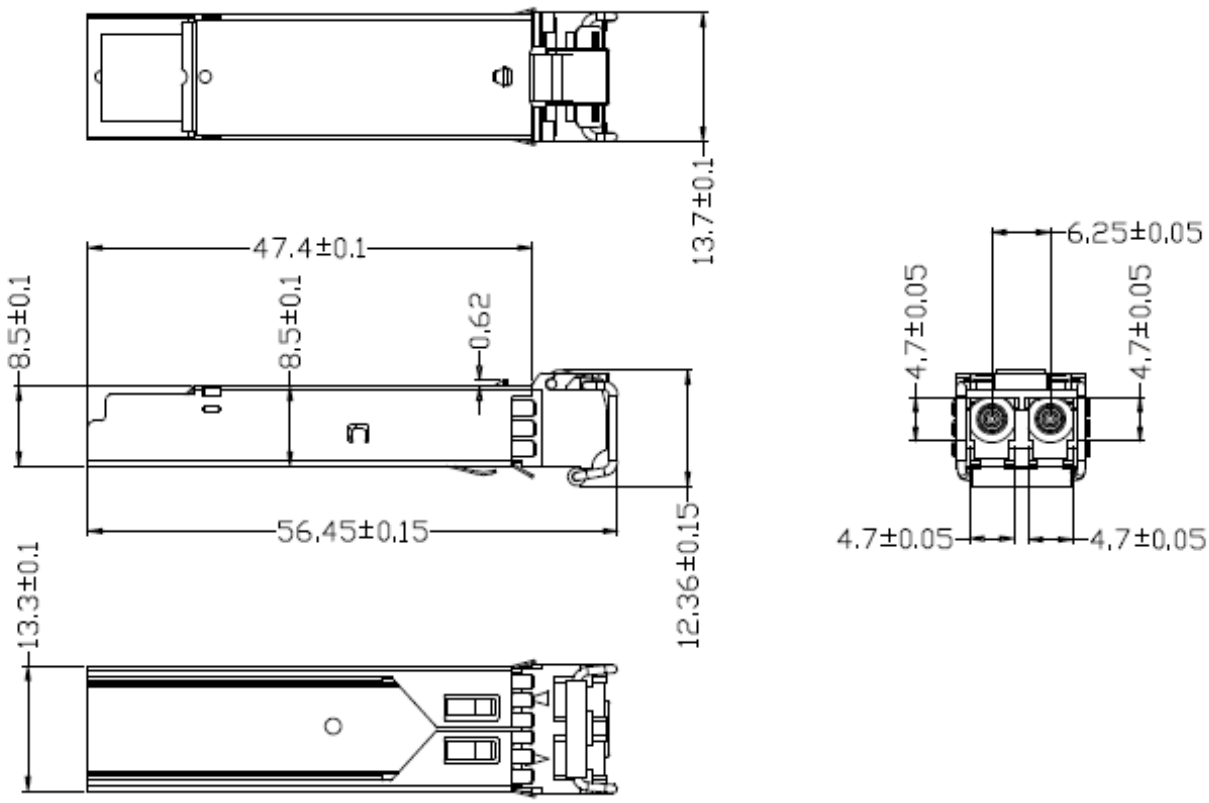
Digital Diagnostic Functions

Optcore 1.25Gb/s SFP SX optical transceiver supports the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the EEPROM defined in the GBIC standard, with the same electrical specifications. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Optcore 1.25Gb/s SFP SX optical transceiver provides an optional enhanced digital diagnostic monitoring (DDM/DOM) interface. It allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power, and transceiver supply voltage. It also defines a sophisticated alarm and warning flags system, which alerts end-users when particular operating parameters are outside of a factory set normal range.

Digital diagnostics for this 1.25G SFP SX optical transceiver is internally calibrated by default.

Mechanical Dimensions



Ordering Information

Part number	Description
OSP1250-8505DCR	1.25G SFP Transceiver, Multimode, 850nm, 550m, LC, DDM, 0ºC~+70ºC
OSP1250-8505DTR	1.25G SFP Industrial Transceiver, Multimode, 850nm, 550m, LC, DDM, -40ºC~+85ºC

Warnings

Process plug

The transceiver module is supplied with a dust cover. This plug protects the transceiver optics during standard manufacturing processes by preventing contamination from air borne particles.It is recommended that the dust cover remain in the transceiver whenever an optical fiber connector is not inserted.

Handling Precautions

The transceiver module is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety

The transceiver module is a Class 1 laser product per international standard IEC 60825-1. Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Appendix A. Document Revision

Version No	Date	Description
DS/V170510/EN	2017-05-10	Preliminary datasheet
DS/V211102/EN	2021-11-02	Update outline dimension
DS/V4.0/EN	2025-04-14	Update Logo, datasheet template, outline dimension and image

For more product information, visit us on the web at www.optcore.net