

OSP2488-5540DxR

2.5Gb/s SFP Optical Transceiver Module, SMF, 1550nm, 40km Reach

Features

- Supports up to 2.67Gbps bit rates
- Compliant with SFP MSA standard
- Compliant with SFF-8472
- 1550nm DFB laser transmitter and PIN photo-detector
- Up to 40km on 9/125µm SMF
- Hot-pluggable SFP footprint
- Duplex LC/UPC type pluggable optical interface
- Low power consumption, < 1W
- +3.3V power supply
- Support Digital Diagnostic Monitoring interface
- ROHS compliant and Lead Free
- Operating Temperature: Standard 0~70°C Extended -10~85°C Industrial -40~85°C



Applications

- SDH STM-16 and SONET OC-48 system
- 2X Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

Description

Optcore's OSP2488-5540DxR is a high performance small form factor pluggable SFP module for 2.5Gb/s serial optical data communications such as SDH STM-16 / SONET OC-48 LR-1 / 2x Fibre Channel application. This SFP transceiver module provides 40km transmission distance over single mode fiber at a nominal wavelength of 1550nm. The transmitter section incorporates a 1550nm DFB laser that is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses a high-speed InGaAs PIN photodiode (PD) and trans-impedance preamplifier. The 2.5Gb/s SFP module series is fully compliant with SFP Multi-Sourcing Agreement (MSA) and SFF-8472. For further information, please see SFP MSA and SFF-8472 standard.

Additionally, the STM-16/OC48 LR-1 SFP module also features digital diagnostic interface per SFF-8472, which provides real-time monitoring of the transceiver temperature, supply voltage, laser bias current, laser average output power and received optical power. These parameters are internally calibrated by default.

There are three versions of the series 2.5Gbps SFP 1550nm 40km optical transceiver modules for different applications. The Standard grade (0~70°C) is for commonly commercial application, the Extended grade (-10~85°C) is for Extended temperature application, and the Industrial grade (-40~85°C) is made with robust and reliable components to meet the needs of Industrial Ethernet application under harsh environmental conditions.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Maximum Supply Voltage	V _{cc}	-0.5	4.0	V	
Storage Temperature	T _s	-40	85	°C	
Operating Humidity	RH	5	85	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V	
Power Supply Current	I _{cc}			280	mA	
Operating Case Temperature	T _c	0		70	°C	Standard
		-10		85	°C	Extended
		-40		85	°C	Industrial
Data Rate	DR		2.5	2.67	Gbps	
Transmission Distance				40	km	9/125μm SMF

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_c	1530	1550	1570	nm	
Average Output Power	P_{out}	-2		3	dBm	1
Spectral Width (RMS)	σ			1	nm	
Extinction Ratio	ER	8.2			dB	1
Optical Rise/Fall Time	Tr-Tf			0.26	ns	2
Output Optical Eye	Compliant with ITU G.957 (class 1 laser safety)					
Receiver						
Center Wavelength	λ_c	1270	-	1610	nm	
Receiver Sensitivity				-20	dBm	3
Receiver Overload		-3			dBm	3
LOS De-Assert	LOSD			-21	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis		0.5	2	6	dB	

Note :

1. Measured at 2.5Gbps with PRBS 2²³-1 NRZ test pattern.
2. Unfiltered, measured with a PRBS 2²³-1 test pattern @2.5Gbps
3. Measured at 2.5Gbps with PRBS 2²³-1 NRZ test pattern for BER < 1x10⁻¹⁰

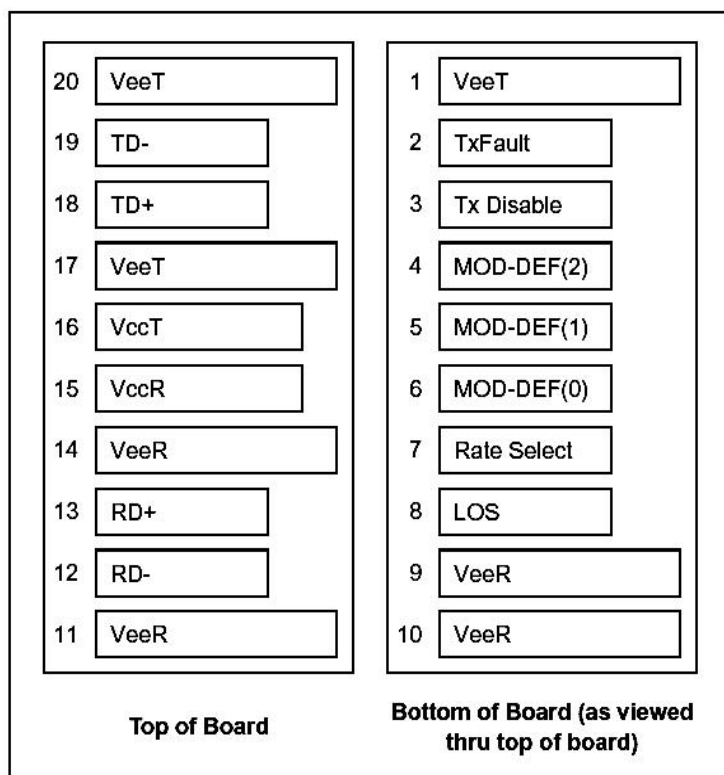
Electrical Characteristics (T_{OP(C)} = 0 to 70°C, T_{OP(I)} = -40 to 85°C, V_{CC} = 3.13 to 3.47 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
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Transmitter						
Differential data input swing	VIN,PP	300		1800	mVpp	1
Tx Disable Input-High	VIH	2.0		Vcc+0.3	V	
Tx Disable Input-Low	VIL	0		0.8	V	
Tx Fault Output-High	VOH	2.0		Vcc+0.3	V	2
Tx Fault Output-Low	VOL	0		0.8	V	2
Input differential impedance	Rin		100		Ω	
Receiver						
Differential data output swing	Vout,pp	300	650	800	mVpp	3
Rx LOS Output-High	VROH	2.0		Vcc+0.3	V	2
Rx LOS Output-Low	VROL	0		0.8	V	2

Notes:

1. TD+/- are internally AC coupled with 100Ω differential termination inside the module.
2. Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.
3. RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

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	

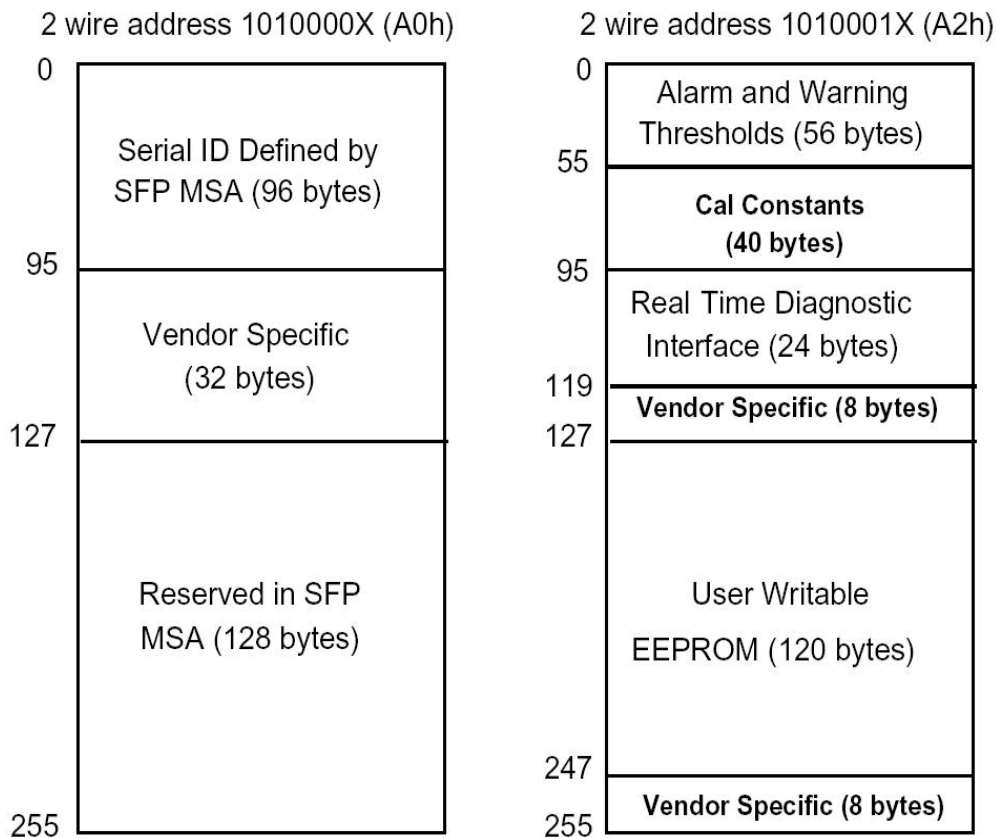
Notes:

- 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 V_{cc}+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.
- 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
- 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 V_{ccT} or V_{ccR}.
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
- LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and V_{cc}+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.
- 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.
- TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

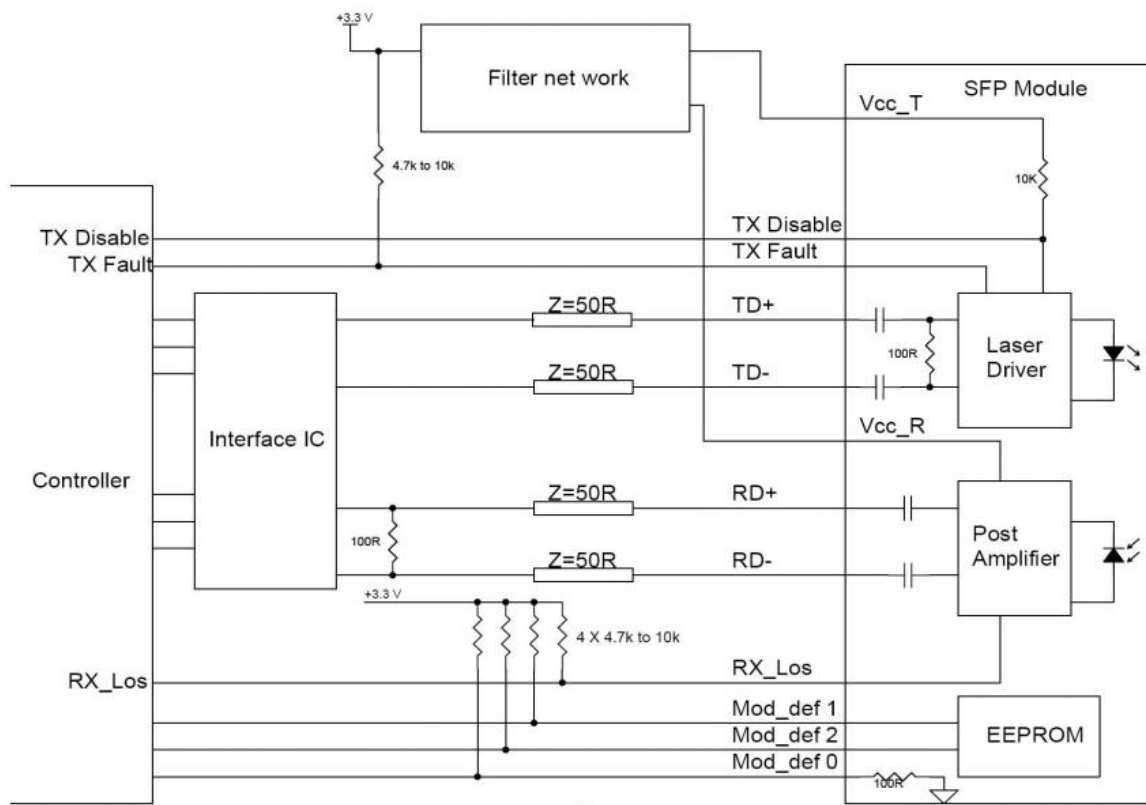
Digital Diagnostic Functions

The OC-48/STM-16 LR-1 SFP transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

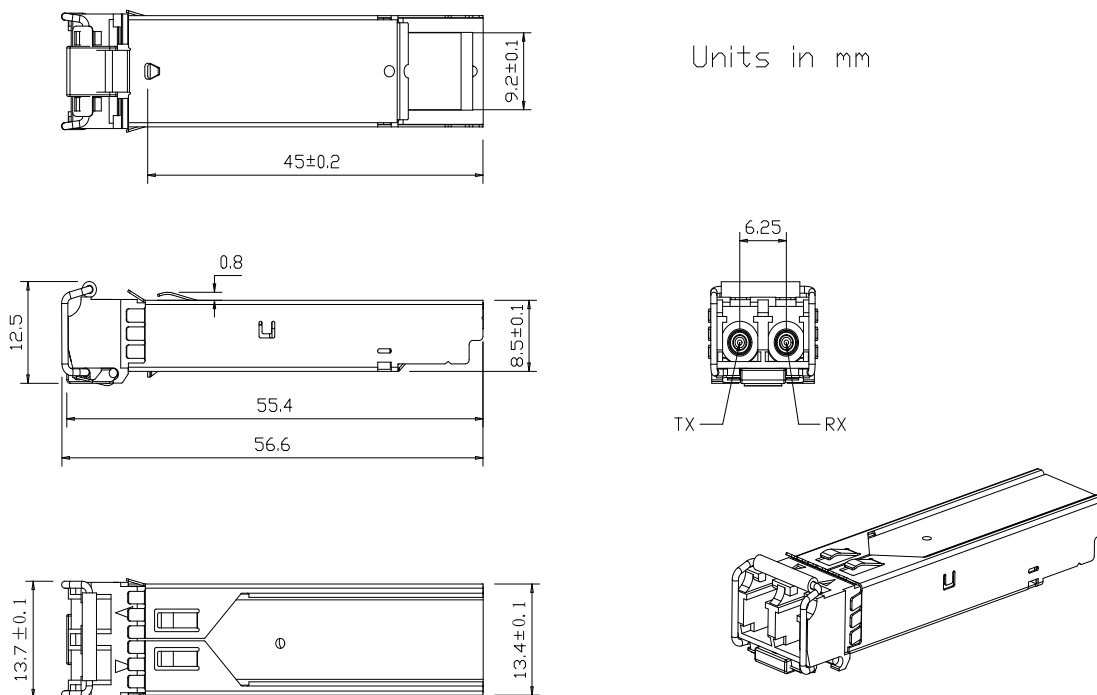
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.



Recommended Interface Circuit



Mechanical Dimensions



Ordering information

Part number	Description
OSP2488-5540DCR	2.5Gb/s SFP Transceiver, SMF, 1550nm, 40km, LC, DDM, 0°C~+70°C
OSP2488-5540DER	2.5Gb/s SFP Extended Transceiver, SMF, 1550nm, 40km, LC, DDM, -10°C~+85°C
OSP2488-5540DTR	2.5Gb/s SFP Industrial Transceiver, SMF, 1550nm, 40km, LC, DDM, -40°C~+85°C

Warnings

Process plug

The transceiver optics 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 optics 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 optics 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.

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



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