OSP10G-8503DxR

10GBASE-SR SFP+ Transceiver Module, Multimode, 850nm, 300m Reach

Features

- Supports up to 10.7Gbps bit rates
- Hot-pluggable SFP+ footprint
- Compliant with SFP+ MSA and SFF-8472
- 850nm VCSEL transmitter, PIN photo-detector
- Distance up to 300m on Multimode OM3 fiber
- Duplex LC connector
- Built-in digital diagnostic functions
- Single +3.3V power supply
- Metal enclosure,for lower EMI
- ROHS compliant and lead-free
- Operating Temperature: Standard 0~70ºC, Extended -10~85ºC, Industrial -40~85ºC

Applications

- 10GBASE-SR/10GBASE-SW Ethernet
- 10G Fibre Channel
- 10G Data Center Switches and Routers
- 10G Network interface cards and Fiber Media Converters
- Other Optical Links

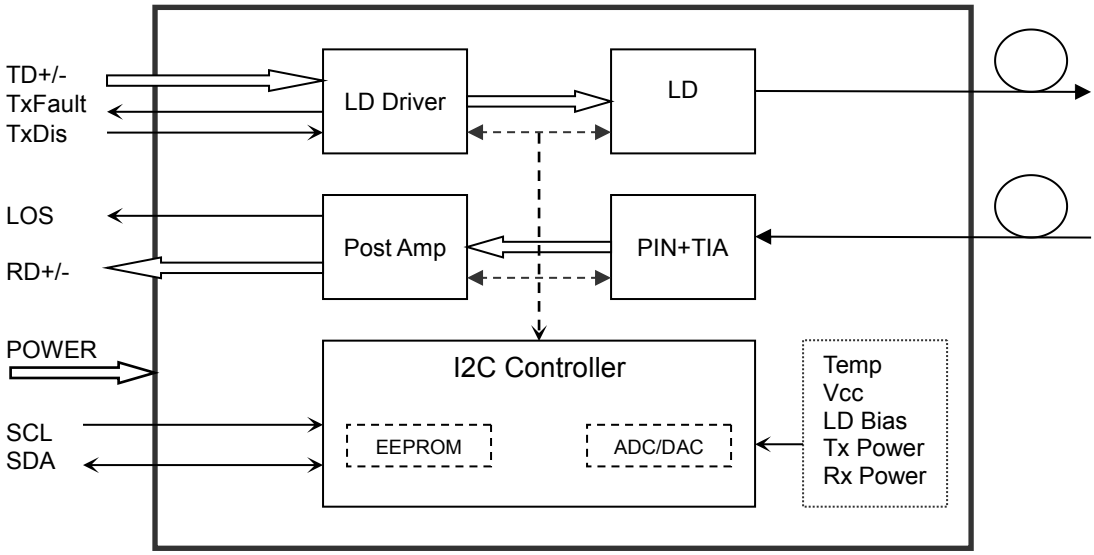
Description

Optcore's OSP10G-8503DxR is a high performance and cost-effective 10GBASE-SR SFP+ transceiver module for 10 Gigabit Ethernet links up to 300m over OM3 multimode fiber. The transceiver features a highly reliable 850nm VCSEL transmitter and PIN photo-detector into duplex LC optical connector. It complies with SFP+ MSA specifications (SFF-8431, SFF-8432), 10 Gigabit Ethernet specifications (10GBASE-SR/SW per IEEE 802.3ae), and 10G Fibre Channel (1200-MX-SN-I). It's suitable for use in 10GbE Ethernet switches, routers, network interface cards (NICs), fiber media converters and storage networking equipment.

Additionally, the 10GBASE-SR SFP+ transceiver has been integrated with an enhanced digital diagnostic monitoring interface (DDMI) per SFF-8472, which provides real-time monitoring of the transceiver temperature, laser bias current, optical power, received optical power and transceiver supply voltage. All modules are Class 1 laser products comply with FDA/CDRH and IEC-60825 standards.

There are three versions of the series 10GBASE-SR SFP+ transceiver for different applications. The Standard grade (0~70ºC) is for commonly commercial application, the Extended grade (-10~85ºC) is for Extended temperature application, and the Industrial grade (-40~85ºC) is made with robust and reliable components to meet the needs of Industrial Ethernet application under harsh environmental conditions.

Transceiver functional diagram



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5	4.5	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	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc			250	mA	
Case Operating Temperature	Tc	0		70	°C	Standard
		-10		85	°C	Extended
		-40		85	°C	Industrial
Data Rate			10.3	10.7	Gbps	
Maximum Supported Distances						
Fiber Type	850nm OFL					
62.5μm	160 MHz-km	Lmax		26	m	
	OM1 200 MHz-km			33		
50μm	400 MHz-km	Lmax		66		
	OM2 500 MHz-km			82		
	OM3 2000 MHz-km			300		
	OM4 4700 MHz-km			400		

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λc	840	850	860	nm	

Spectral Width（RMS）		Δλ			0.45	nm	
Side-Mode Suppression Ratio		SMSR	-	-	-	dB	
Average Output Power		P_{out}	-6.0		-1.0	dBm	1
Extinction Ratio		ER	3.5			dB	
Data Input Swing Differential		V_{IN}	180		950	mV	2
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λc	840	850	860	nm	
Receiver Sensitivity					-10.0	dBm	3
Receiver Overload			0.5			dBm	3
LOS De-Assert		LOS_D			-12	dBm	
LOS Assert		LOS_A	-22			dBm	
LOS Hysteresis			0.5		4	dB	
Data Output Swing Differential		V_{out}	500	700	900	mV	4
LOS		High	2.0		Vcc	V	
		Low			0.8	V	

Note :

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2^{31}-1 test pattern @10312Mbps, BER ≤1×10^{-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		100	400	KHz
MOD_DEF (0:2)-High	V_H	2		Vcc	V

MOD_DEF (0:2)-Low	V_L			0.8	V

Diagnostics

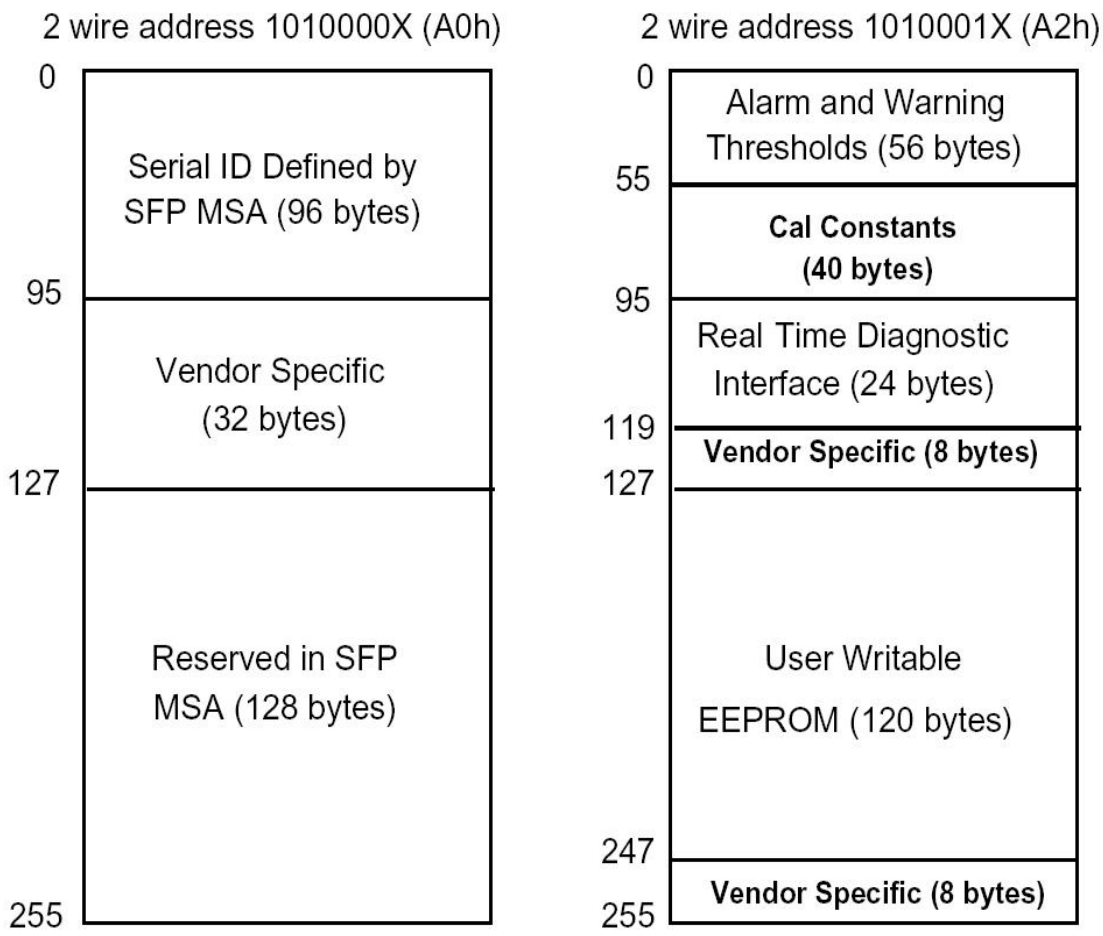
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
	-10 to +85			
	-40 to +85			
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 15	mA	±10%	Internal
TX Power	-6.0 to -0.5	dBm	±3dB	Internal
RX Power	-16 to -1	dBm	±3dB	Internal

Digital Diagnostic Memory Map

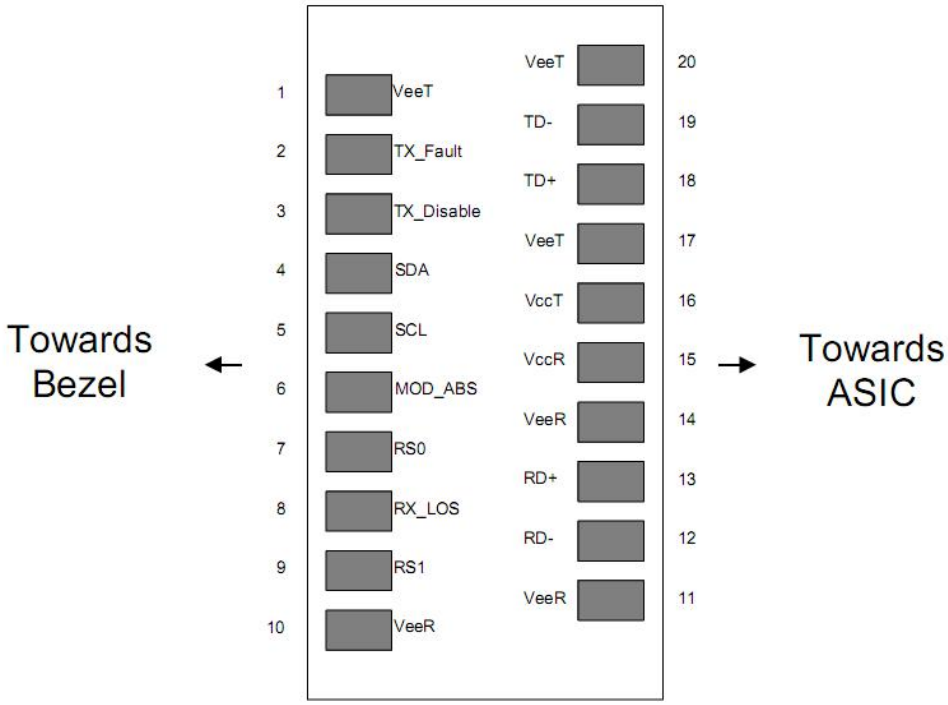
The 10GBASE-SR SFP+ transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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.

The digital diagnostic memory map specific data field defines as following.



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	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
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 5
19	TD-	Inv. Transmit Data In	3	Note 5
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.

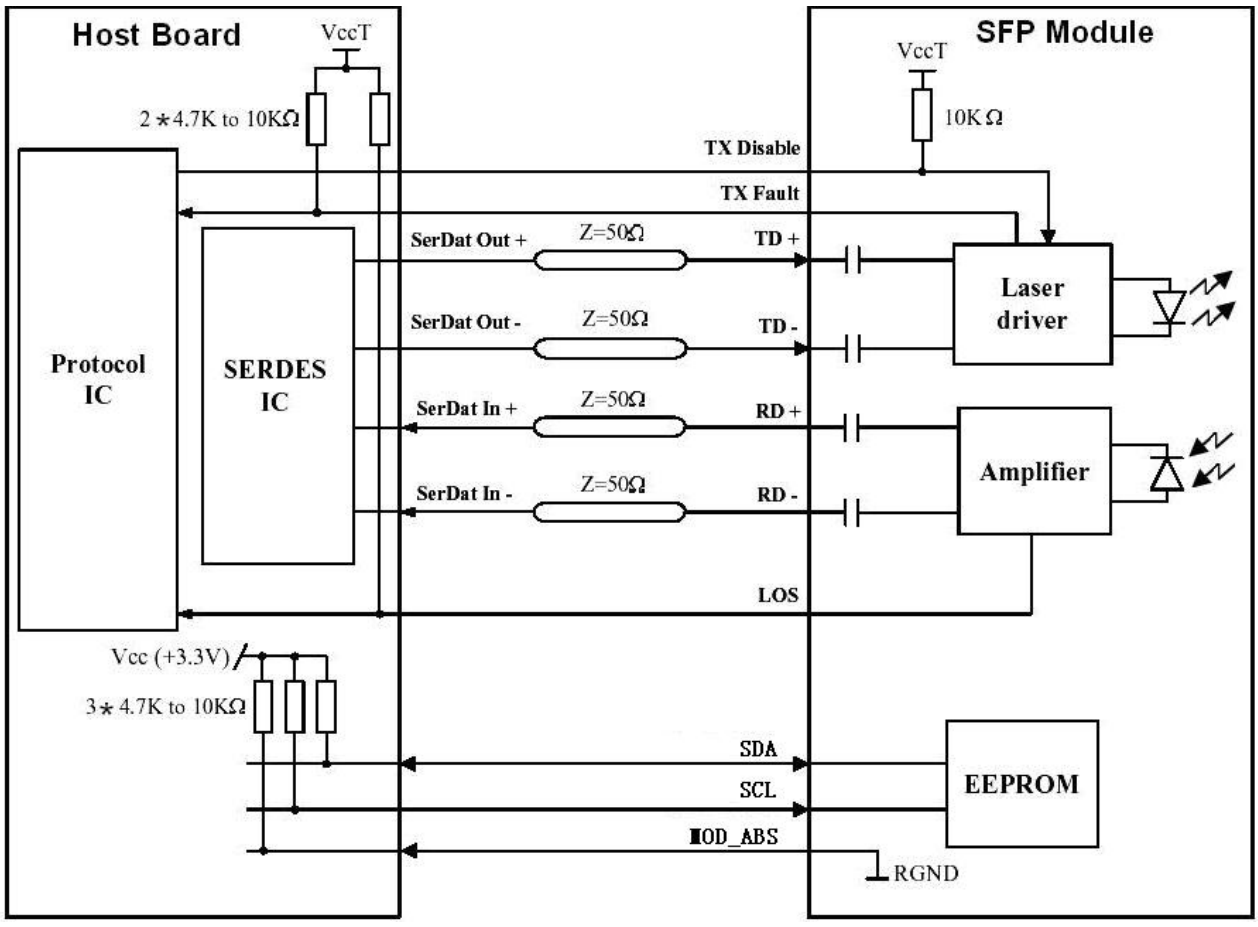
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

3. LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

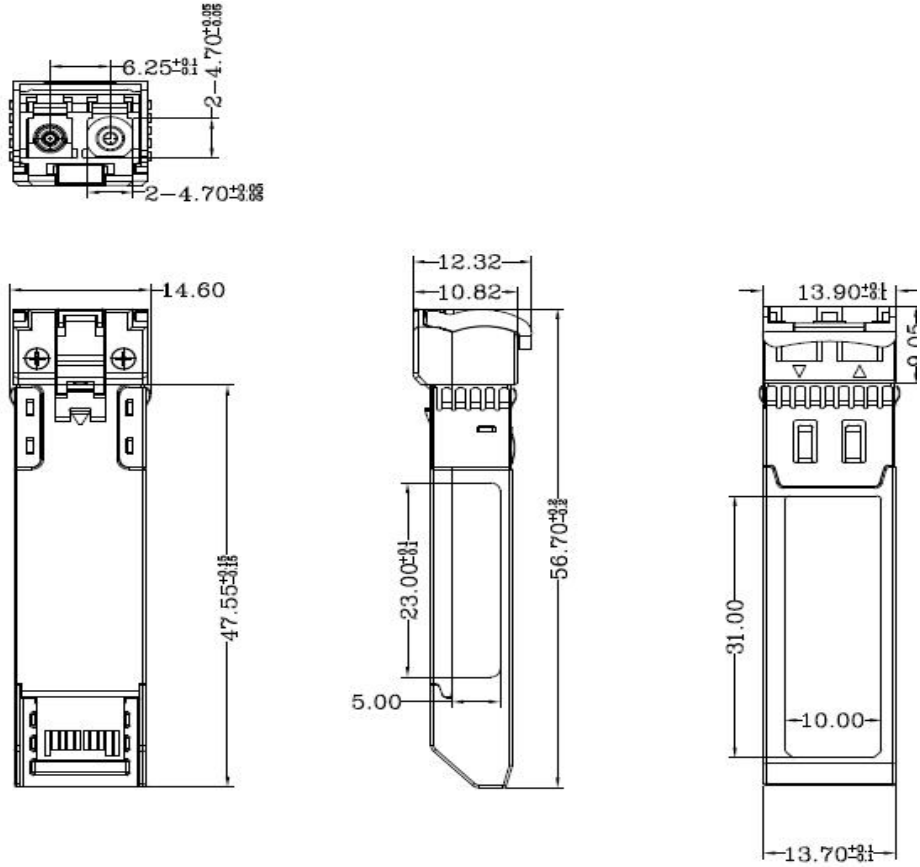
4. RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.

5. 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	Description
OSP10G-8503DCR	10GBASE-SR SFP+ Transceiver, Multi-mode, 850nm, 300m, LC, DDM, 0ºC~+70ºC
OSP10G-8503DER	10GBASE-SR SFP+ Extended Transceiver, Multi-mode, 850nm, 300m, LC, DDM, -10ºC~+85ºC
OSP10G-8503DTR	10GBASE-SR SFP+ Industrial Transceiver, Multi-mode, 850nm, 300m, LC, DDM, -40ºC~+85ºC

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