

Optosa's SFP+-10G-LR optical transceiver is a high performance, cost effective module supporting data rate of 10Gbps and 10km transmission distance with SMF. The transceiver consists of three sections: a DFB 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 and SFF-8472 digital diagnostics functions.

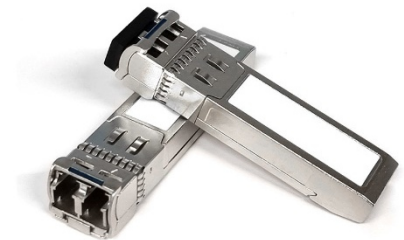
The SFP+ LR can be used for Cisco SFP-10G-LR, Aruba J9151D, Juniper QFX-SFP-10GE-LR, Extreme 10302 and for many more OEMs like D-Link, H3C, Palo Alto, Meraki, Netgear, Arista, Brocade, Huawei, Dell, Alcatel, Nokia, HP, Mellanox, Intel...

RoHS Compliance

Optosa is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

Product Features

- Up to 11.1Gbps Data Links
- Up to 10km transmission on SMF
- DFB Laser and PIN receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Power dissipation < 1.2 W
- Operating case temperature: 0 to +70°C



Applications

- 10GBASE-LR/LW & 10G Ethernet

Ordering Information

Part Number	Description
SFP+-10G-LR	SFP+ 10G 1310nm 10km SMF optical transceiver, -Temp.

Absolute Maximum Rating

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Operating Case Temperature	TOP	0	70	°C	
Power Supply Voltage	VCC	-0.3	3.6	V	
Relative Humidity (non-condensation)	RH	5	85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Power Consumption				1.2	W	
Data Rate	DR		10.3		Gbps	
Link Distance with MMF	D			10	km	

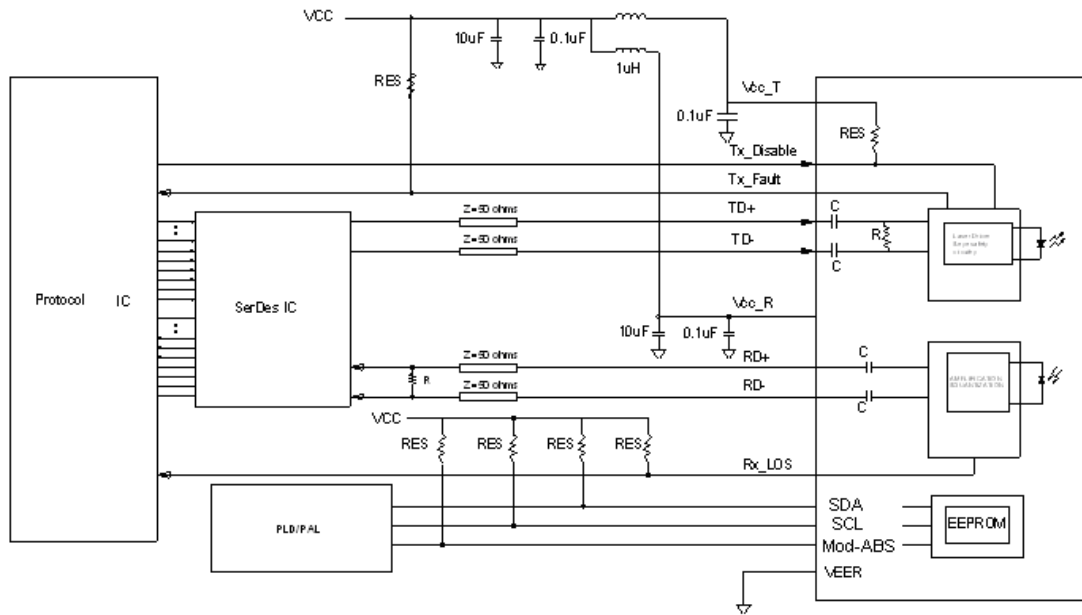
Electrical and Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Average Launched Power	PO	-8.2		0.5	dBm	
Average Launched Power(Laser Off)	Poff			-30	dBm	
Center Wavelength Range	λ_C	1260	1310	1355	nm	
Spectrum Bandwidth(-20dB)	$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio	SMSR	30		-	dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Extinction Ratio	ER	3.5			dB	1
Output Eye Mask		Compliant with IEEE 802.3ae				2
Receiver						
Input Optical Wavelength	λ_{IN}	1270		1610	nm	
Receiver Sensitivity	Psen			-14.4	dBm	3
Input Saturation Power (Overload)	PSAT	2			dBm	3
Los Of Signal Assert	PA	-30			dBm	
Los Of Signal De-assert	PD			-17	dBm	
LOS -Hysteresis	PHys	0.5	2	6	dB	

Notes:

1. Measured with a PRBS $2^{31}-1$ test pattern, @10.3125Gb/s, BER<10⁻¹²
2. Transmitter eye mask definition, Compliant with IEEE 802.3ae
3. Measured with Light source 1310nm; BER = <10⁻¹² @PRBS=2³¹-1 NRZ.

Recommended Interface Circuit



NOTE: 4.7K ohms<RES<10K ohms

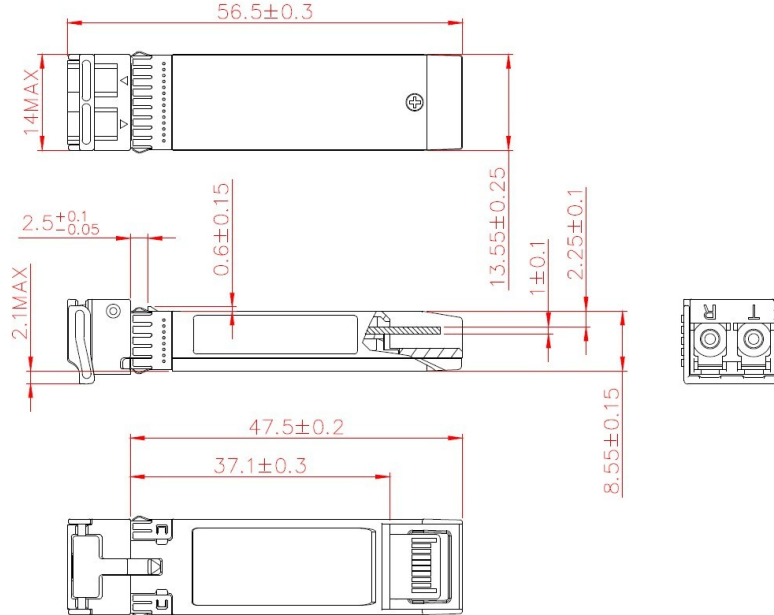
Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

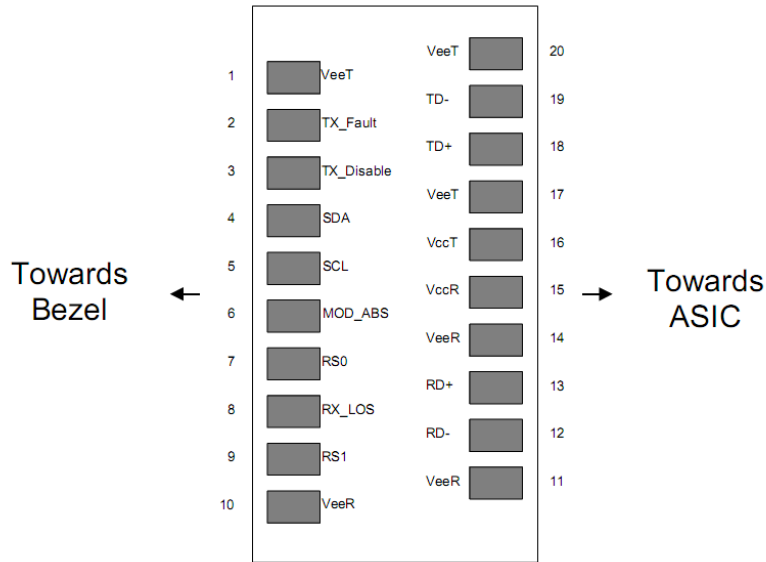
Parameter	Symbol	Min	Max	Unit
Temperature monitor absolute error	DMI_Temp	-5	5	°C
Supply voltage monitor absolute error	DMI_VCC	-0.1	0.1	V
Channel RX power monitor absolute error	DMI_RX_Ch	-3	3	dB
Channel Bias current monitor	DMI_Ibias_Ch	-10%	10%	mA
Channel TX power monitor absolute error	DMI_TX_Ch	-3	3	dB

Mechanical Dimensions

Units: nm



Pin Assignment and Description



Pin Assignment

Pin	Signal Name	Description	Plug Seq.	Notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	
3	TX DISABLE	Transmitter Disable	3	
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	
9	RS1	Not Connected	3	
10	VEER	Receiver ground	1	
11	VEER	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	
13	RD+	Received Data Out	3	
14	VEER	Receiver ground	1	
15	VCCR	Receiver Power Supply	2	
16	VCCT	Transmitter Power Supply	2	
17	VEET	Transmitter Ground	1	
18	TD+	Transmit Data In	3	
19	TD-	Inv. Transmit Data In	3	
20	VEET	Transmitter Ground	1	

ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).