

Product Specification Sheet

OLSP5501L-C(D)80

RoHS Compliant 155Mbps 1550nm 80KM Reach, SFP Optical Transceiver



SFP

Product Features

- Up to 155Mbps data rate operation
- 1550nm DFB laser and PIN photo detector for 80km transmission
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Digital Diagnostic Monitor Interface
- Very low EMI and excellent ESD protection
- +3.3V single power supply
- RoHS compliant
- Case operating temperature

Commercial: 0°C to +70°C

Extended: -10°C to +80°C

Industrial: -40°C to +85°C

Applications

- SDH STM-1, S-1.1, L-1.1, L-1.2
- SONET OC-3 IR1, LR1, LR2
- Other optical transmission systems

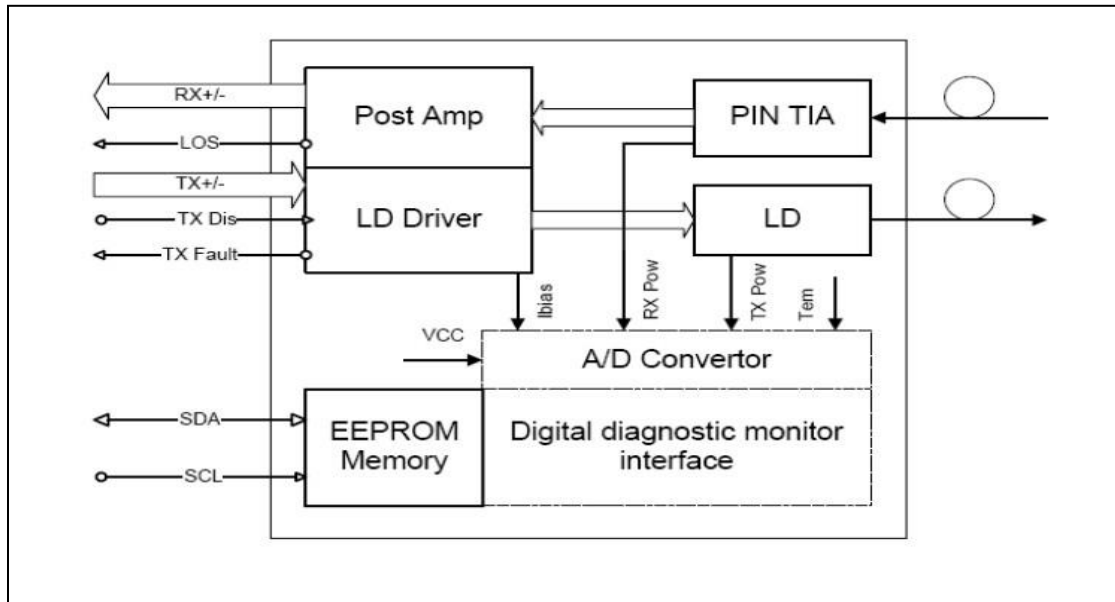
Description

The SFP transceivers are high performance, cost effective modules supporting data-rate of 155Mbps and 80km 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 (MSA) and SFF-8472. For further information, please refer to SFP MSA.

Functional Diagram



Ordering information

Product part Number	Data Rate (Mbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range(Tcase)(℃)	
OLSP5501L-C(D)80	155	Single mode fiber	1550	80	0~70	commercial
OLSP5501L-E(D)80	155	Single mode fiber	1550	80	-10~80	extended
OLSP5501L-I(D)80	155	Single mode fiber	1550	80	-45~85	industrial

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max	Unit	Notes
Supply Voltage	Vcc	-0.5	3.60	V	
Storage Temperature		-40	85	℃	
Relative Humidity		5	85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the module.

General Operating Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Rate			155		Mb/s	
Supply Voltage	V _{CC}	3.1	3.3	3.47	V	
Supply Current	I _{CC}			220	mA	
Operating Case Temperature	T _C	0		70	°C	
		-10		80		
		-45		85		

Electrical Input/Output Characteristics

• Transmitter

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Diff. Input Voltage Swing		300		1860	mV _{pp}	1
Tx Disable Input	H	V _{IH}	2.0	V _{CC} +0.3	V	
	L	V _{IL}	0	0.8		
Tx Fault Output	H	V _{OH}	2.0	V _{CC} +0.3	V	2
	L	V _{OL}	0	0.8		
Input Diff. Impedance	Z _{in}		100		Ω	

• Receiver

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Diff. Output Voltage Swing		370		1800	mV _{pp}	3
Rx LOS Output	H	V _{OH}	2.0	V _{CC} +0.3	V	2
	L	V _{OL}	0	0.8		

Note 1) TD+/- are internally AC coupled with 100Ω differential termination inside the module.

Note 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 V_{CC}+0.3V.

Note 3) RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

Optical Characteristics

• Transmitter

Parameter	Symbol	Min.	Type	Max.	Unit	Notes
Ave. Output Power (Enable)	P _o	-6		1	dBm	1
Extinction Ratio	ER	10			dB	2
Side mode Suppression Ratio	SMSR	30			dB	
Rise/Fall Time (20%-80%)	Tr-Tf			2.5	ns	
Wavelength Range		1530	1550	1570	nm	
Spectral Width (RMS)				4	nm	
Output Optical Eye	ITU G.957 Compliant					

• Receiver

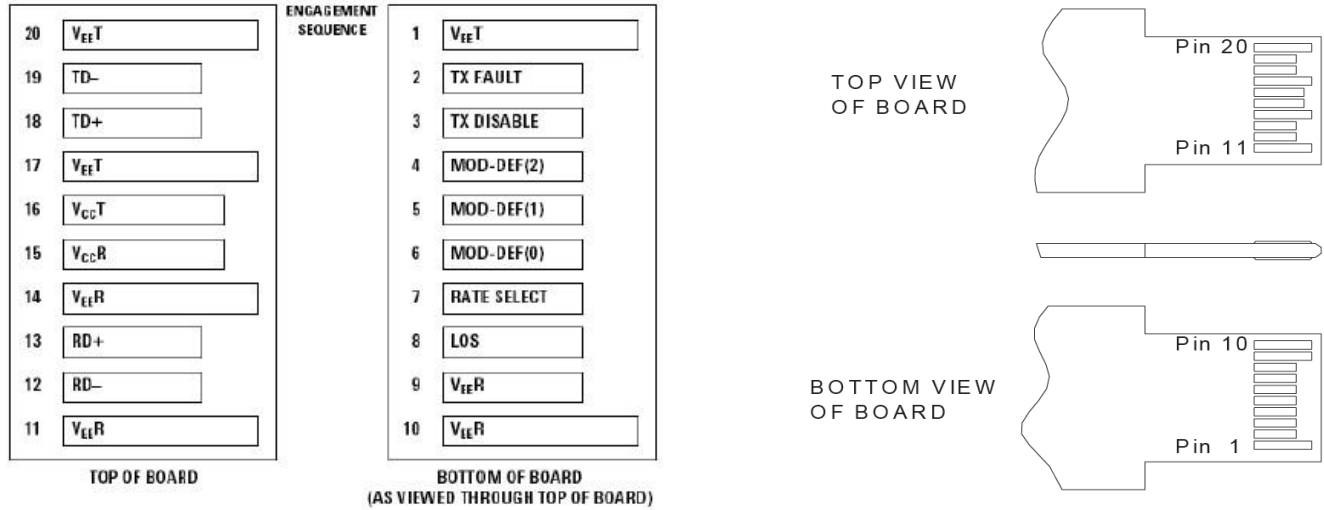
Parameter	Symbol	Min.	Type	Max.	Unit	Notes
Operating Wavelength		1270		1610	nm	
Sensitivity	P _{imin}			-36	dBm	3
Min. Overload	P _{imax}	-5			dBm	3
Optical Path Penalty				1	dB	
LOS Assert	P _a	-40			dBm	
LOS De-assert	P _d			-37	dBm	
LOS Hysteresis	P _d -P _a	0.5		6	dB	

Note 1) Measured at 155 Mb/s with PRBS 2²³ – 1 NRZ test pattern.

Note 2) Unfiltered, measured with a PRBS 2²³-1 test pattern @155Mbps

Note 3) Measured at 155 Mb/s with PRBS 2²³ – 1 NRZ test pattern for BER < 1x10⁻¹⁰

Pin Definitions and Functions



PIN #	Name	Function	Notes
1	V _{EE} T	Tx ground	
2	Tx Fault	Tx fault indication, Open Collector Output, active “H”	1
3	Tx Disable	LVTTTL Input, internal pull-up, Tx disabled on “H”	2
4	MOD-DEF2	2 wire serial interface data input/output (SDA)	3
5	MOD-DEF1	2 wire serial interface clock input (SCL)	3
6	MOD-DEF0	Model present indication	3
7	Rate select	No connection	
8	LOS	Rx loss of signal, Open Collector Output, active “H”	4
9	V _{EE} R	Rx ground	
10	V _{EE} R	Rx ground	
11	V _{EE} R	Rx ground	
12	RD-	Inverse received data out	5
13	RD+	Received data out	5
14	V _{EE} R	Rx ground	
15	V _{CC} R	Rx power supply	
16	V _{CC} T	Tx power supply	
17	V _{EE} T	Tx ground	
18	TD+	Transmit data in	6
19	TD-	Inverse transmit data in	6
20	V _{EE} T	Tx ground	

Note 1) When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should

be pulled up with a 4.7 – 10K Ω resistor on the host board.

Note 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 4.7 – 10K Ω resistor. Its states are:

Low (0 – 0.8V): Transmitter on

(>0.8 , $< 2.0\text{V}$): Undefined

High (2.0V~Vcc+0.3V): Transmitter Disabled Open: Transmitter Disabled

Note 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 between 2.0V~Vcc+0.3V.

Mod-Def 0 has been 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

Note 4) When high, this output indicates loss of signal (LOS). Low indicates normal operation

Note 5) RD+/-: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board

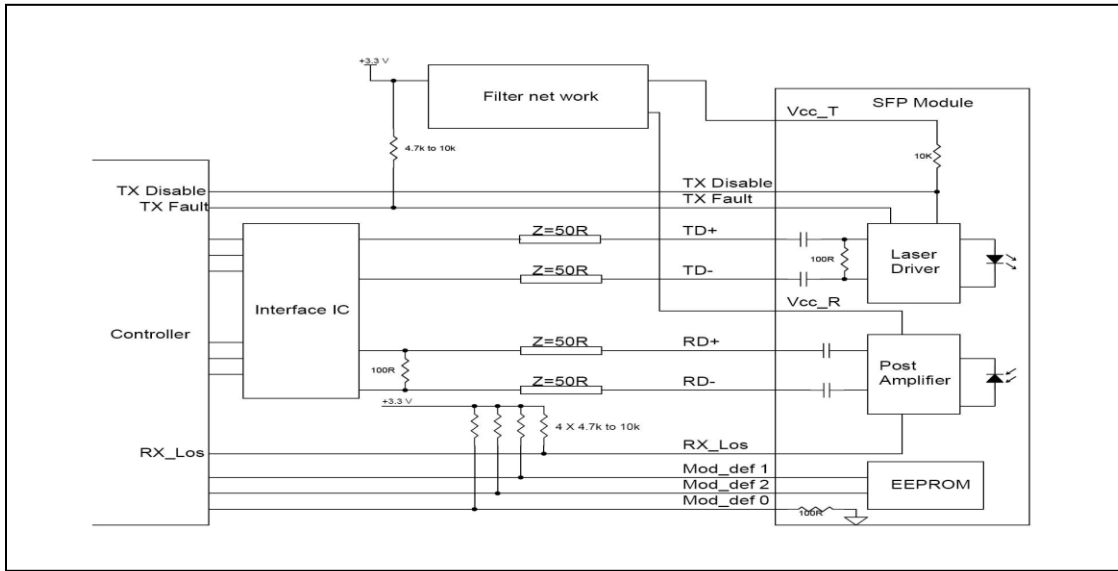
Note 6) TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

Diagnostics

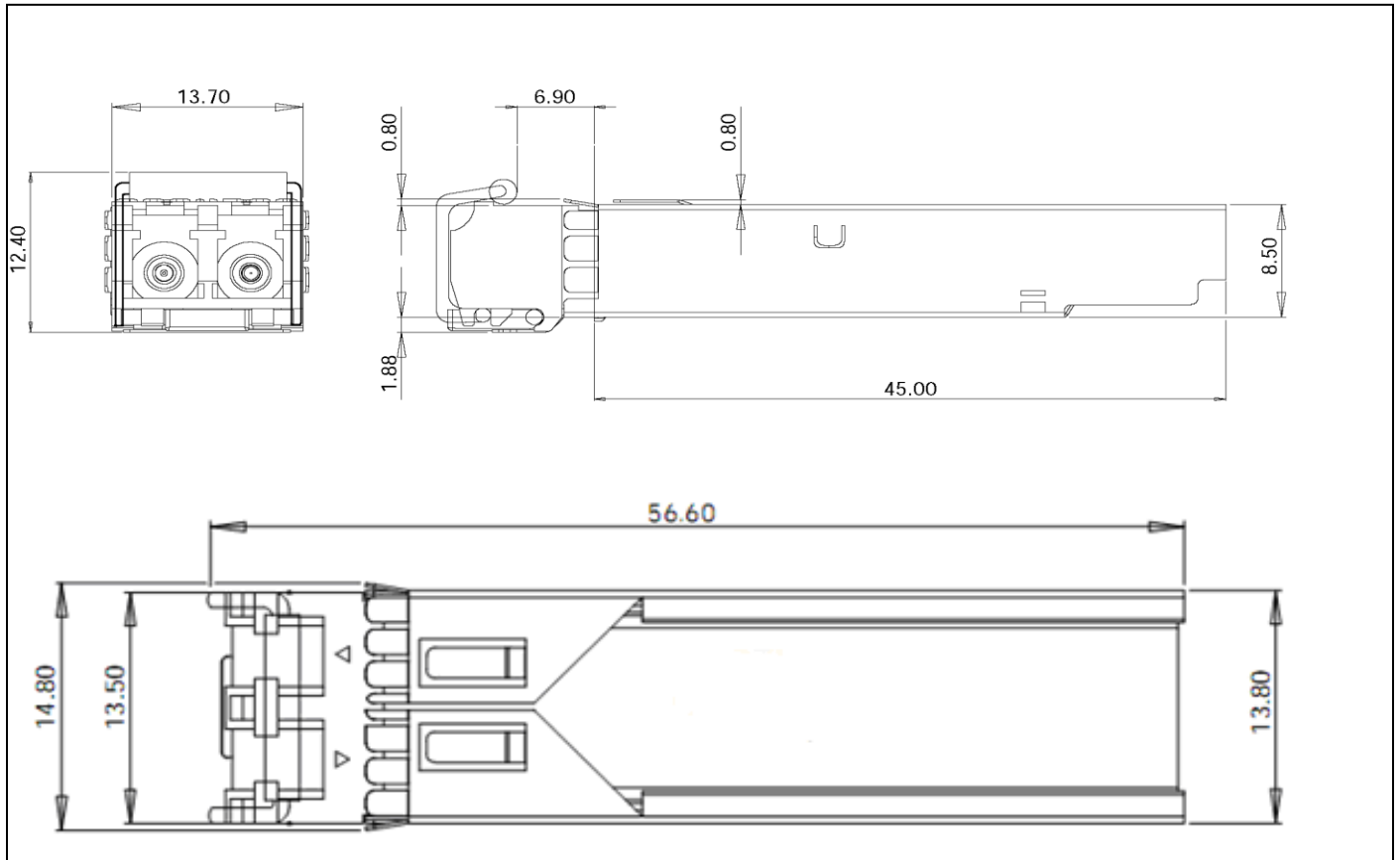
Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70 -40 to +85	°C	±3°C	Internal/ External
Voltage	3.0 to 3.6	V	±3%	Internal/ External
Bias Current	2 to 80	mA	±10%	Internal/ External
TX Power	-6 to 1	dBm	±3dB	Internal/ External
RX Power	-39 to 0	dBm	±3dB	Internal/ External

Typical Interface Circuit



Package Dimensions



Ordering Information & Related Products

OLSP5501L-CN80	Dual Fiber SFP, 155Mbps, 1550nm, 80KM, without DDM
OLSP5501L-CD80	Dual Fiber SFP, 155Mbps, 1550nm, 80KM, with DDM