

# Product Specification Sheet

## OLSCxx12L-C(I)DH1

RoHS Compliant 1.25Gbps CWDM 1470nm~1610nm Optical Transceiver 100km Reach



## Product Features

- Supports bit rates up to 1.25Gbps
- Duplex LC connector
- Hot pluggable SFP footprint
- CWDM 1470nm~1610nm laser transmitter and PIN photo-detector
- Applicable for 100Km SMF connection
- Low power consumption, < 1.0W
- Digital Diagnostic Monitor Interface
- Compliant with SFP MSA and SFF-8472
- Very low EMI and excellent ESD protection
- Operating case temperature:  
Commerical: 0 to 70 °C  
Industrial: -40 to 85 °C

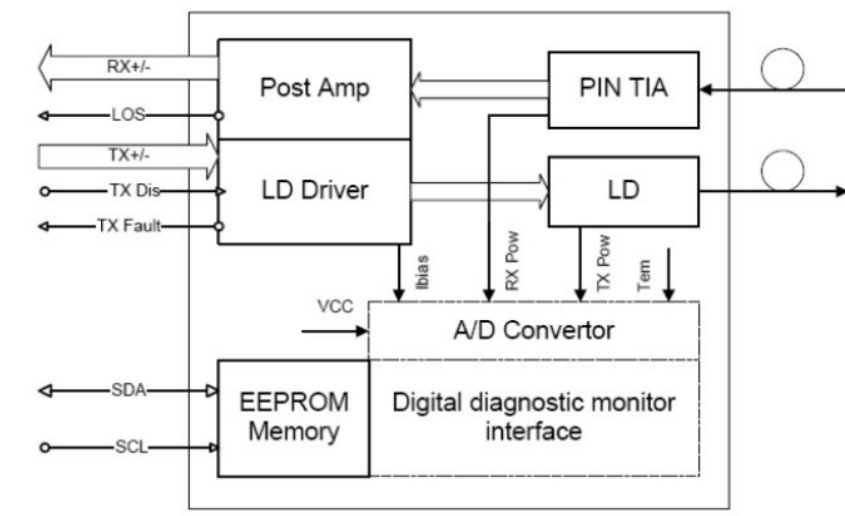
## Applications

- Gigabit Ethernet
- WDM systems
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

## Product Descriptions

Olinkphotonics' OLSCxx12L-C(I)DH1, The SFP transceivers are high performance, cost effective modules supporting data-rate of 1.25Gb/s and 100km transmission distance with SMF. The transceiver consists of three sections: an uncooled CWDM 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





## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	4.0	V	
Storage Temperature	Ts	-40	85	°C	
Relative Humidity	RH	0	85	%	

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

## General Operating Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	DR		1.25		Gb/s	
Supply Voltage	Vcc	3.13	3.3	3.47	V	
Supply Current	Iccs			300	mA	
Operating Case Temp.	Tc	0		70	°C	
	Tl	-40		85		

## Electrical Characteristics (TOP(C) = 0 to 70 °C, TOP(I) = -40 to 85 °C, VCC = 3.13 to 3.47 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
<b>Transmitter</b>						
Differential data input swing	V <sub>IN,PP</sub>	120		820	mV <sub>pp</sub>	1
Tx Disable Input-High	V <sub>IH</sub>	2.0		V <sub>cc</sub> +0.3	V	
Tx Disable Input-Low	V <sub>IL</sub>	0		0.8	V	
Tx Fault Output-High	V <sub>OH</sub>	2.0		V <sub>cc</sub> +0.3	V	2
Tx Fault Output-Low	V <sub>OL</sub>	0		0.5	V	2
Input differential impedance	R <sub>in</sub>		100		Ω	
<b>Receiver</b>						
Differential data output swing	V <sub>out,pp</sub>	300	650	800	mV <sub>pp</sub>	3
Rx LOS Output-High	V <sub>ROH</sub>	2.0		V <sub>cc</sub> +0.3	V	2
Rx LOS Output-Low	V <sub>ROL</sub>	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.

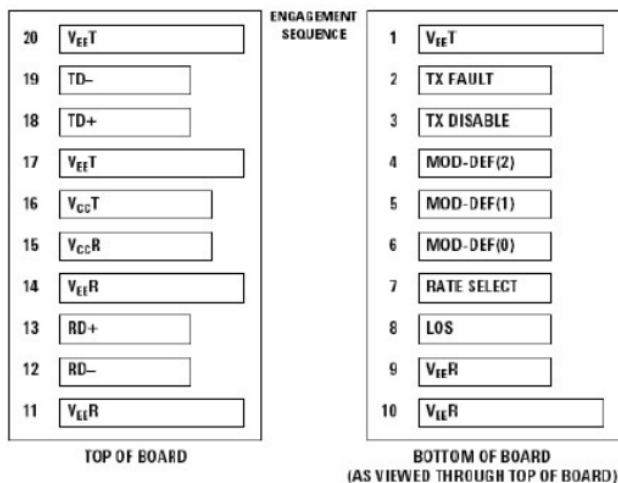
## Optical Characteristics (TOP(C)= 0 to 70 °C, TOP(I) =-40 to 85 °C,VCC = 3.13 to 3.47 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
<b>Transmitter</b>						
Operating Wavelength	$\lambda$	$\lambda-7.5\text{nm}$	$\lambda$	$\lambda+7.5\text{nm}$	nm	1
Ave. output power (Enabled)	P <sub>AVE</sub>	0		5	dBm	2
Extinction Ratio	ER	9			dB	2
RMS spectral width	$\Delta\lambda$			1	nm	
Rise/Fall time (20%~80%)	Tr/Tf			0.26	ns	3
Dispersion penalty	T <sub>DP</sub>			3.9	dB	
Output Optical Eye	ITU-T G.957 Compliant					
<b>Receiver</b>						
Operating Wavelength	$\lambda$		$\lambda$		nm	
Receiver Sensitivity	P <sub>SEN1</sub>			-28	dBm	4
Overload	P <sub>AVE</sub>	0			dBm	4
LOS Assert	P <sub>a</sub>	-40			dBm	
LOS De-assert	P <sub>d</sub>			-29	dBm	
LOS Hysteresis	P <sub>d</sub> -P <sub>a</sub>	0.5			dB	

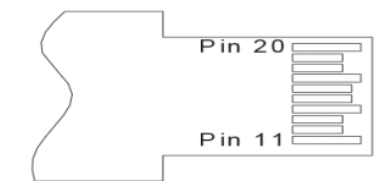
### Notes:

- $\lambda$  means 1470nm~1610nm ,Total 8wavelengths ,20nm spacing.
- Measured at 1.25Gb/s with PRBS 2<sup>23</sup>-1 NRZ test pattern.
- Unfiltered, measured with a PRBS2<sup>23</sup>-1 test pattern @1.25Gbps
- Measured at 1.25Gb/s with PRBS 2<sup>23</sup>-1 NRZ test pattern for BER < 1x10<sup>-12</sup>

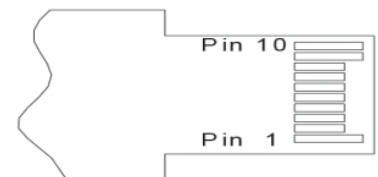
## Pin Defintion And Functionsm



TOP VIEW OF BOARD



BOTTOM VIEW OF BOARD



Pin	Symbol	Name/Description	Notes
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1	VeeT	Tx ground	
2	Tx Fault	Tx fault indication, Open Collector Output, active “H”	1
3	Tx Disable	LVTTL 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	VeeR	Rx ground	
10	VeeR	Rx ground	
11	VeeR	Rx ground	
12	RD-	Inverse received data out	5
13	RD+	Received data out	5
14	VeeR	Rx ground	
15	VccR	Rx power supply	
16	VccT	Tx power supply	
17	VeeT	Tx ground	
18	TD+	Transmit data in	6
19	TD-	Inverse transmit data in	6
20	VeeT	Tx ground	

**Notes:**

- When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should be pulled up with a 4.7 – 10KΩ resistor on the host board.
- 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 – 10KΩ resistor. Its states are:  
 Low (0 – 0.8V): Transmitter on                      (>0.8, < 2.0V): Undefined  
 High (2.0V~Vcc+0.3V): 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 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
- When high, this output indicates loss of signal (LOS). Low indicates normal operation.
- 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.
- 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.

## Digital Diagnostic Specifications

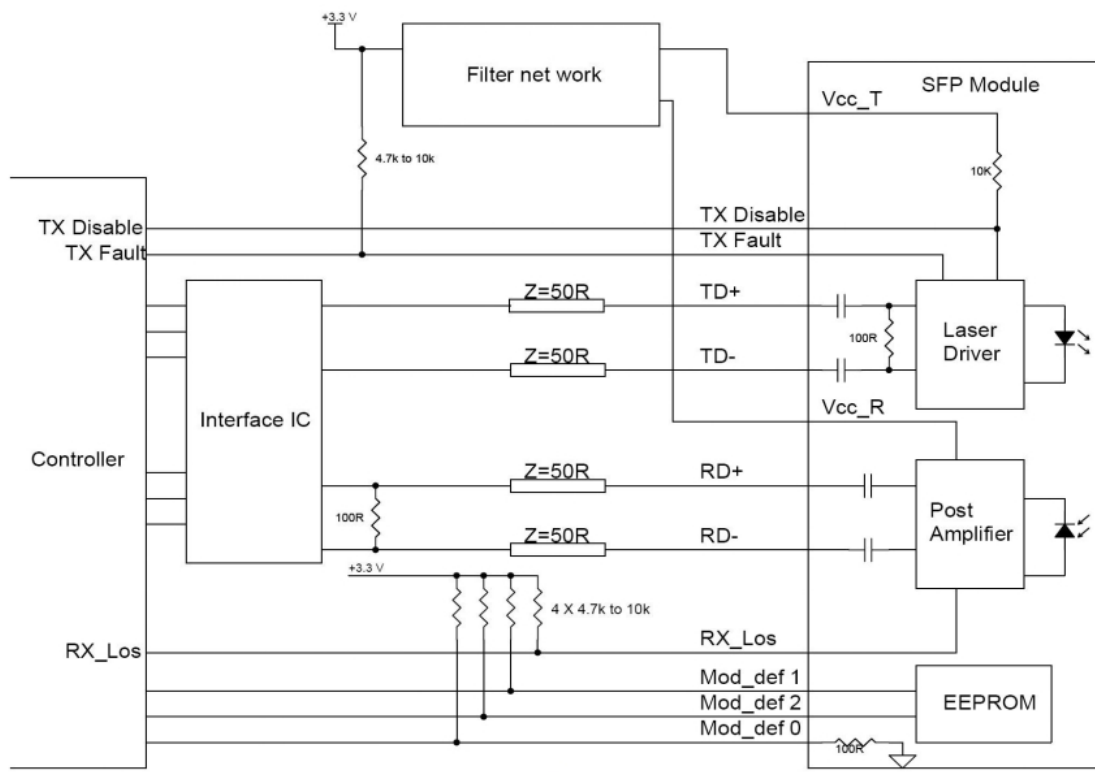
The OLSCxx12L-C(I)DH1 transceivers can be used in host systems that require either internally or externally calibrated digital diagnostics.

Parameter	Symbol	Units	Min.	Max.	Accuracy	Note
Transceiver temperature	DTemp-E	°C	-45	+90	±5°C	1
Transceiver supply voltage	DVoltage	V	2.8	4.0	±3%	
Transmitter bias current	DBias	mA	2	80	±10%	2
Transmitter output power	DTx-Power	dBm	-1	6	±3dB	
Receiver average input power	DRx-Power	dBm	-31	0	±3dB	

**Notes:**

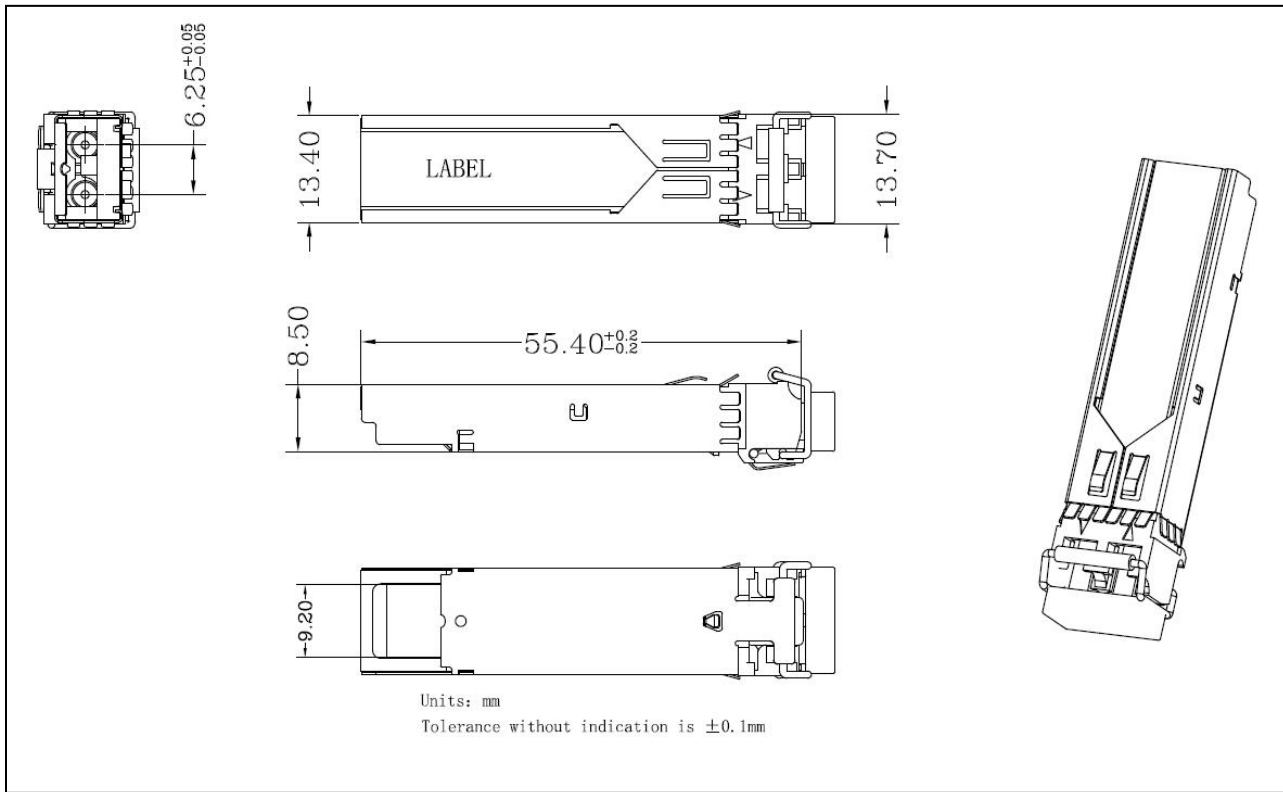
1. When Operating temp.=0~70 °C, the range will be min=-5, Max=+75
2. The accuracy of the Tx bias current is 10% of the actual current from the laser driver to the laser
3. Internal/ External Calibration compatible.

**Typical Interface Circuit**





## Package Dimensions



## Product Selection(Color of Latches)

Wavelength	XX	Latch Color	Wavelength	XX	Latch Color
1470nm	47	Gray	1550nm	55	Yellow
1490nm	49	Violet	1570nm	57	Orange
1510nm	51	Blue	1590nm	59	Red
1530nm	53	Green	1610nm	61	Brown



## Ordering Information

Part Number	Description
OLSCxx12L-CDH1	SFP,1.25G, CWDM, 100Km, 0~70°C, with Digital Diagnostic Monitor
OLSCxx12L-IDH1	SFP,1.25G, CWDM,100Km, -40~85°C, with Digital Diagnostic Monitor
xx means	47=1470nm,49=1490nm,...59=1590nm,61=1610nm

## For More Information

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