

## 10G XFP LR 1310nm 10km Optical Transceiver NX-31192-L1CD

### Features

Supports 9.95Gb/s to 11.1Gb/s bit rates

Hot-pluggable XFP footprint

Maximum link length of 10km with SMF

1310nm uncooled DFB laser

XFP MSA package with duplex LC connector

No reference clock required

XFI and lineside loopback Mode Supported

-5°C to 70°C Operating Case Temperature

Diagnostic Performance Monitoring of module temperature,

Supply Voltages, laser bias current, transmit optical power, and receive optical power

RoHS6 compliant (lead free)



### Applications

10GBASE-LR/LW 10G Ethernet

10G Fibre Channel

SONET OC-192 / SDH STM-64

OTN OTU2e

### Description

NX-31192-L1CD is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), supporting data-rate of 10.3125Gbps(10GBASE-LR) or 9.953Gbps 10GBASE-LW), and transmission distance up to 10km on SMF. The transceiver module comprises a transmitter with 1310nm Uncooled DFB laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range of 0°C to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10G systems.

## Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage3	Vcc1	-0.5	4.0	V
Supply Voltage 2	Vcc2	-0.5	2	V
Storage Temperature	Tst	-40	85	°C
Case Operating Temperature	Top	-5	70	°C

## Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Operating Case Temperature Range	Tc	0		+70	°C	
Power Supply Voltage @ 3.3V	Vcc3	3.13	3.3	3.47	V	
Module total power	P			2.5	W	
<b>Transmitter</b>						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	120		820	mV	
Transmit Disable Voltage	VD	2.0		Vcc	V	
Transmit Enable Voltage	VEN	GND		GND+0.8	V	
Transmit Disable Assert Time				10	us	
<b>Receiver</b>						
Differential data output swing	Vout,pp	350		850	mV	
Data output rise time	tr			40	ps	2
Data output fall time	tf			40	ps	2
LOS Fault	V <sub>LOS fault</sub>	Vcc - 0.5		V <sub>CCHOST</sub>	V	3
LOS Normal	V <sub>LOS norm</sub>	GND		GND+0.5	V	3
Power Supply Rejection	PSR		See Note 3 below			4

### Notes:

1. After internal AC coupling.
2. 20 – 80 %
3. Loss Of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
4. Per Section 2.7.1. in the XFP MSA Specification.

## Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref.	
<b>Transmitter</b>							
Optical output Power	P	-8.2		+0.5	dBm		
Optical Wavelength	λ	1260		1355	nm		
Optical Extinction Ratio	ER	3.5			dB	1	
Side Mode Suppression Ratio	SMSR	30			dB		
Average Launch power of OFF	POFF	-30			dBm		
Tx Jitter	Tx <sub>j</sub>	Compliant with each standard requirements					
<b>Receiver</b>							
Stressed receiver sensitivity in OMA (max)	RSNS			-10.3	dBm	2	
Receiver Sensitivity in OMA	RSNS			-12.6	dBm	2	
Maximum Input Power	P <sub>MAX</sub>			0.5	dBm		
Optical Center Wavelength	λ <sub>C</sub>	1260		1600	nm		
LOS De-Assert	LOS <sub>D</sub>			-15	dBm		
LOS Assert	LOS <sub>A</sub>	-28			dBm		
LOS Hysteresis		0.5			dB		

### Notes:

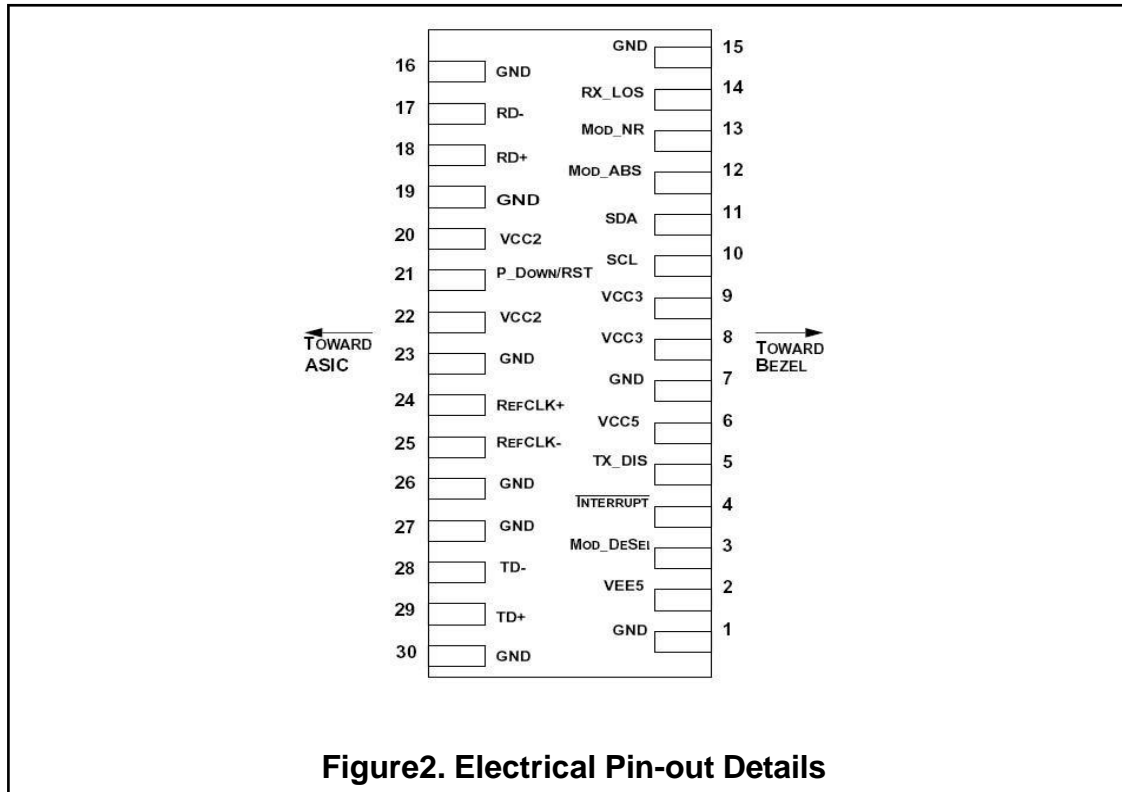
- 1, PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps.
- 2, PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps, BER≤10<sup>-12</sup>.

## Pin Descriptions

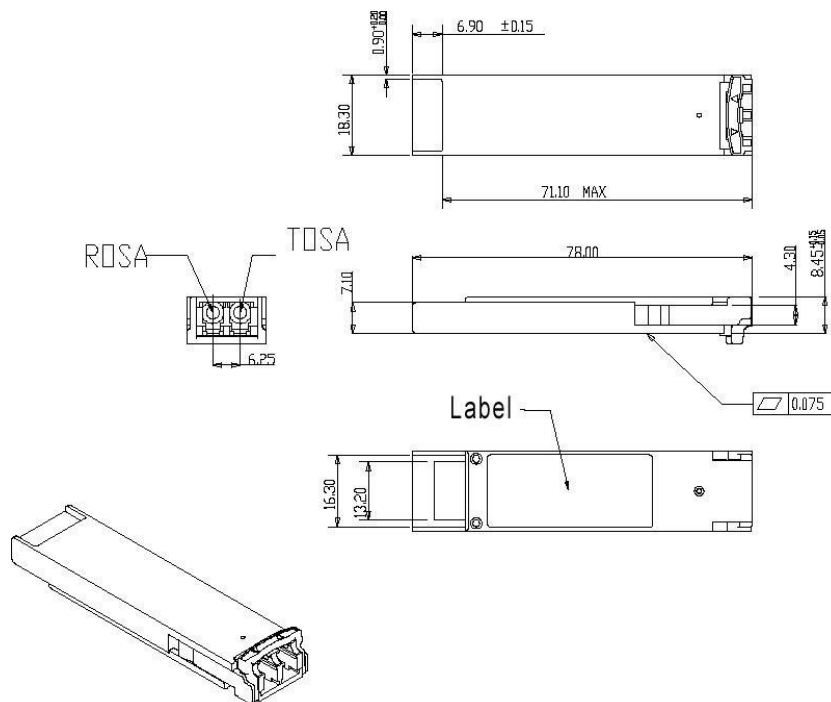
Pin	Logic	Symbol	Name/Description	Ref
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – <b>Not required</b>	
3	LVTTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply – <b>Not required</b>	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTTL-	SDA	Serial 2-wire interface data line	2
12	LVTTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTTL-O	Mod_NR	Module Not Ready;	2
14	LVTTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply	
21	LVTTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – <b>Not required</b>	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – <b>Not required</b>	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

### Notes:

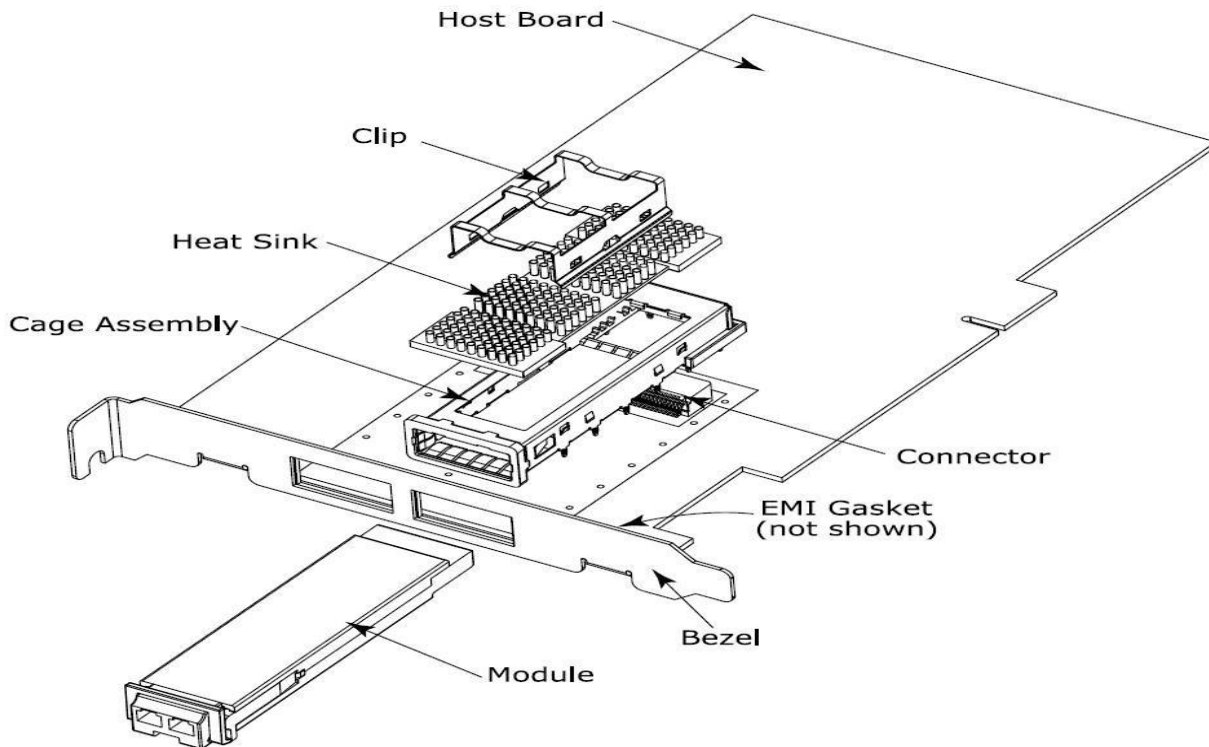
1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required.



**Figure2. Electrical Pin-out Details**



**Figure3. Mechanical Specifications**



**Figure4. XFP Mechanical Components**

**The mechanical components defined:**

1. The module, clip and connector dimensions are constant for all applications. While the bezel, cage assembly, EMI gasket and heat sink can be designed and/or adjusted for the individual application.
2. The relatively small form factor of the XFP module combined with an adaptable heatsink option allows host system design optimization of module location, heatsink shape/dimension/fins design, and airflow control. The module can be inserted and removed from the cage with the heat sink and clip attached.

**Regulatory Compliance**

XFP transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120288-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008706/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003 -	WT10093768-D-E-E

**Ordering information**

Part Number	Product Description
NX-31192-L1CD	XFP LR, 11.1Gb/s, 1310nm, 10km, SMF, Duplex LC

**References**

1. 10 Gigabit Small Form Factor Pluggable Module (XFP) Multi-Source Agreement (MSA), Rev 4.5 – August 2005.
2. IEEE802.3ae – 2002
3. ITU-T G.709 / ITU-T G.959.1
4. Telcordia GR-253-CORE