

## Product Features

- Compliant with IEEE Std 802.3-2008 1000BASE-BX20-U
- Uncooled 1310nm FP Laser
- Up to 1.25Gb/s bi-directional data links
- Up to 20km on 9/125µm SMF
- Simplex SC connector compliant
- Single +3.3V DC power supply
- SFF 2x5 metallic package
- Class 1 laser safety certified
- Operating temperature: -10°C to +70°C
- RoHS6 Compliant



## Applications

- 1000BASE-BX20-U
- 100BASE-BX20-U

## Descriptions

LX7302CNR is designed for Gigabit Ethernet 20km transmission transceivers, according to Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) SFF 8074i-2001, are high performance and cost effective transceivers. They are compatible with IEEE Std 802.3-2008 1000BASE-BX20-U.

LX7302CNR transceivers integrate a built-in WDM coupler which can separate 1550nm input light and 1310nm output light.

LX7302CNR are compliant with RoHS.

## Ordering Information

**Table 1. Ordering Information**

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LX7302CNR	1310nm FP	-9 ~ -3dBm	1550nm PIN	< -23dBm	20km	-10 ~ 70 °C	w/o	Compliant

## Pin Description

**Table 2. Pin Description**

Pin	Name	Function/Description	Notes
1	Rx GND	Receiver ground	-
2	Rx VCC	Receiver power supply	4
3	SD	LVTTTL Signal detection output, internally pull up. Asserts high when input optical power level is above threshold	2

4	RD-	Receiver data output-, AC coupled internally	3
5	RD+	Receiver data output+, AC coupled internally	3
6	Tx VCC	Transmitter power supply	4
7	Tx GND	Transmitter ground	-
8	Tx DIS	Transmitter Disable. Laser output disabled on high or open	1
9	TD+	LVPECL Data input+ ,AC coupled internally	5
10	TD-	LVPECL Data input- ,AC coupled internally	5
F	MS	Mounting Studs, chassis grounded or N/C	6

**Notes:**

- Tx DIS input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K $\Omega$ -10K $\Omega$  resistor.

Low (0 – 0.8V):	Transmitter on
Between (0.8V and 2V):	Undefined
High (2.0 – VccT):	Transmitter Disabled
Open :	Transmitter Disabled
- SD (signal detected) is an open collector/drain output which should be pulled up Internally with a 4.7K $\Omega$ -10K $\Omega$  resistor to supply <VccT+0.3V or VccR+0.3V. When low, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). High indicates normal operation. In the low state, the output will be pulled to <0.8V.
- RD-/+ : These are the differential receiver outputs. They are AC coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.
- VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V $\pm$ 5% at the SFF connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.
- TD-/+ : These are the differential transmitter inputs. They are AC coupled differential lines with 100 $\Omega$  differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.
- The mounting Studs are provided for module mechanical attachment to host board. They may also provide an optional connection of the module to the equipment chassis ground to improve EMI/EMC performance.

## Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

**Table 3. Absolute Maximum Ratings**

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T <sub>S</sub>	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V <sub>CC</sub>	-0.5	4.0	V
Lead Solder Temperature		-	280	°C
Lead Solder Duration		-	5	S

## Recommended Operating Conditions

**Table 4. Recommended Operating Conditions**

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T <sub>C</sub>	-10	25	70	°C
Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V
Gigabit Ethernet Data Rate	-	-	1.25	-	Gb/s

## Transceiver Electrical Characteristics

**Table 5. Transceiver Electrical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	I <sub>CC</sub>	-	-	220	mA	-
Transmitter Differential Input Voltage (TD +/-)	-	200	-	2200	mV <sub>P-P</sub>	1
Receiver Differential Output Voltage (RD +/-)	-	600	-	1200	mV <sub>P-P</sub>	2
Low speed output: Signal Detected (SD)	VOH	2.0	-	V <sub>CC</sub>	V	3
	VOL	0	-	0.8	V	-
Low speed iutput: Transmitter Enable (TX_DIS)	VIH	2.0	-	V <sub>CC</sub>	V	4
	VIL	0	-	0.8	V	-

**Notes:**

1. Internally AC coupled and terminated to 100Ω differential load.
2. Internally AC coupled, but requires a 100Ω differential termination or internal to Serializer/Deserializer.
3. Pulled up internally with a 4.7KΩ-10KΩ resistor in the module to V<sub>CCT,R</sub>.
4. TX\_DIS pulled up Internally with a 4.7KΩ-10KΩ resistor in the module to V<sub>CCT,R</sub>.

## Transmitter Optical Characteristics

**Table 6. Transmitter Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P <sub>o</sub>	-9	-	-3	dBm	-
Center Wavelength Range	λ <sub>c</sub>	1260	1310	1360	nm	-
Extinction Ratio	EX	10	-	-	dB	-
Spectral Width (RMS)	Δλ	-	-	4	nm	-
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Jitter	TJ			0.22	ns	
Optical Rise/Fall Time	T <sub>rise</sub> /T <sub>fall</sub>	-	-	260	ps	-
P <sub>out</sub> @TX-Disable Asserted	P <sub>off</sub>	-	-	-45	dBm	-
Eye Diagram		IEEE Std 802.3-2008 1000BASE-BX10-U compatible				

## Receiver Optical Characteristics

**Table 7. Receiver Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Wavelength Range	-	1480	-	1580	nm	-
Receiver Sensitivity@ Gigabit Ethernet	S	-	-	-23	dBm	1
Receiver Overload	P <sub>OL</sub>	-3	-	-	dBm	1
Optical Return Loss	ORL	12	-	-	dB	-
SD De-Assert	SD <sub>D</sub>	-	-	-24	dBm	-
SDAssert	SD <sub>A</sub>	-40	-	-	dBm	-
SD Hysteresis	-	0.5	3	5	dB	-

**Notes:**

1. Measured with PRBS 2<sup>7</sup>-1 test pattern, 1.25Gb/s, EX=10dB, BER<10<sup>-12</sup>.

## Required Host Board Components

The MSA power supply noise rejection filter is required on the host PCB to meet data sheet performance. The MSA filter incorporates an inductor which should be rated 400mA DC and 1Ω serial resistance or better. It should not be replaced with a ferrite. Figure 1 shows the recommended host board power supply circuit.

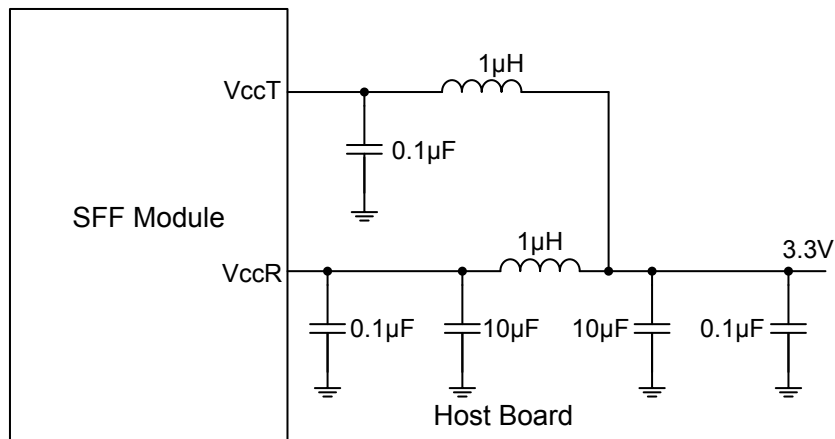


Figure1. Recommended Host Board Power Supply Circuit

### Recommended Application Interface Circuit

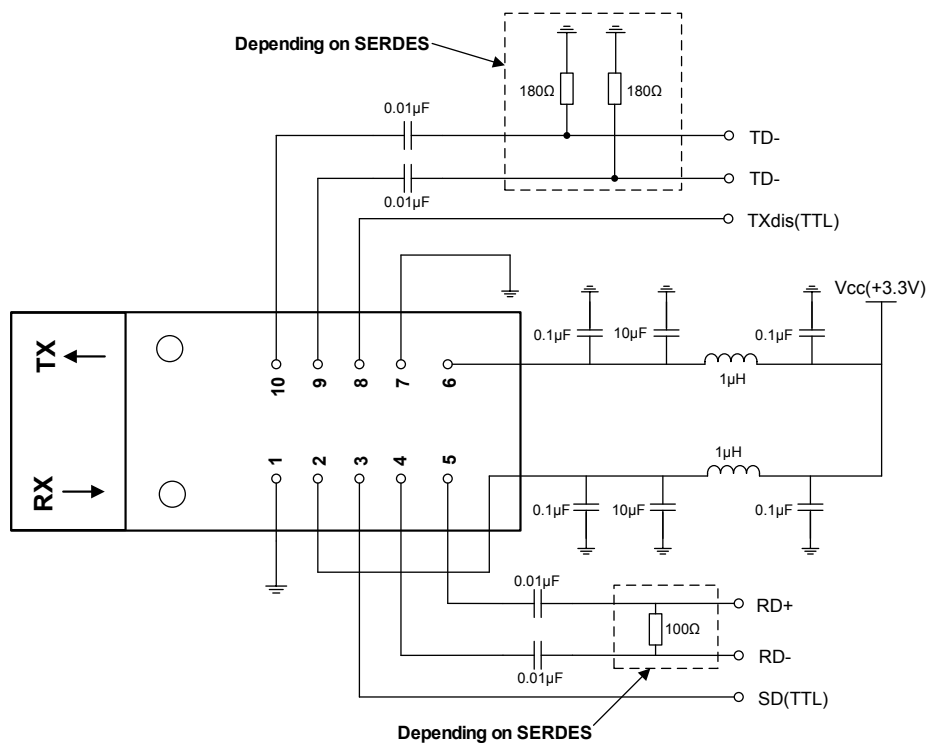


Figure 2. Recommended Application Interface Circuit

## Mechanical specifications

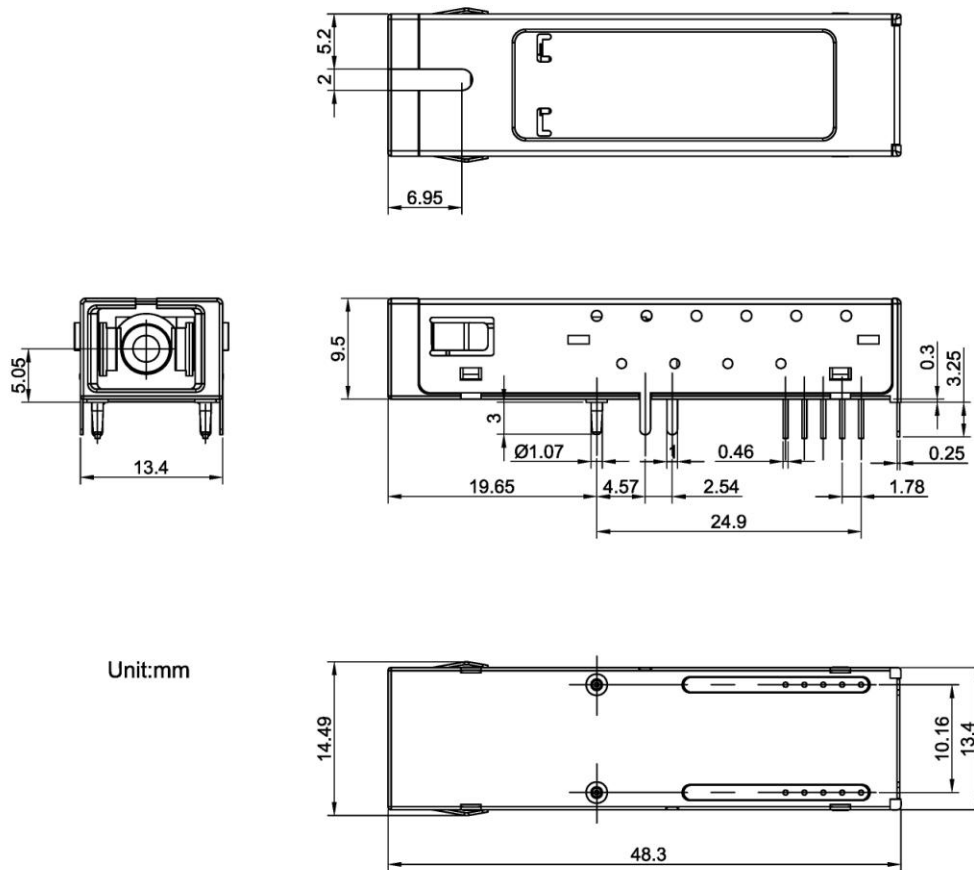


Figure 3. Outline Drawing



**LX7302CNR**  
**1.25Gb/s Bi-Directional SFF Transceiver**  
**20km 1000BASE-BX-U**

---

**For More Information**

Linktel Technologies Co., Ltd

[sales@linkteltech.com](mailto:sales@linkteltech.com)

<http://www.linkteltech.com>

**Linktel China**

No 20 University Science Park Road, East-Lake Hi-tech Development Zone, Wuhan, China

Tel: +86 27-87929302

**Linktel USA**

3391 Ingersoll Ct., San Jose, CA 95148

Tel: +1-408-2613988