

EX31X-40D (I)

10Gbps 1310nm 40KM XFP Optical Transceiver

PRODUCT FEATURES

- Hot-pluggable XFP footprint
- Supports 9.95Gb/s to 11.3Gb/s bit rates
- XFI Loopback Mode
- RoHS-6 Compliant (lead-free)
- Power dissipation <2W
- Temperature Range:
 - Commercial: 0°C ~70°C
 - Extended: -10°C ~80°C
 - Industrial: -40°C ~85°C
- Maximum link length of 20km
- Uncooled 1310nm DFB laser
- Full Duplex LC connector
- No Reference Clock required
- Built-in digital diagnostic functions
- Standard bail release mechanism

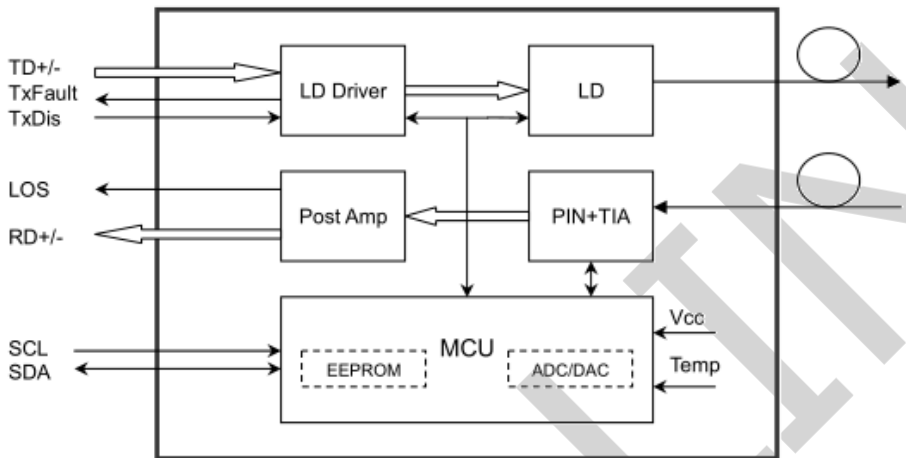
APPLICATIONS

- 10GBASE-LR/LW 10G Ethernet
- 10G Fiber Channel

DESCRIPTIONS

ETU-Link's EX31X-40D Small Form Factor 10G (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification¹. They comply with 10-Gigabit Ethernet 10GBASE-LR/LW per IEEE 802.3ae and 10G Fiber Channel. Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA. The transceiver is RoHS compliant and lead-free per Directive 2002/95/EC³.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
EX31X-40D	10.3125Gbps	DFB	SMF	40km	LC	0~70°C	Y	Red
EX31X-40DE	10.3125Gbps	DFB	SMF	40km	LC	-10~80°C	Y	Red
EX31X-40DI	10.3125Gbps	DFB	SMF	40km	LC	-40~85°C	Y	Red

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	Ts	-40	-	85	°C	
Storage Ambient Humidity	HA	5	-	95	%	
Operating Relative Humidity	RH	-	-	85	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage	VCC	Vcc-0.3	-	Vcc+0.3	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Case Operating Temperature	Top	0	-	70	°C	Commercial
		-40		85		Industrial
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V	
Transmission Distance	TD	-	-	40	km	Over SMF

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Total power supply current	I _{cc}	-	-	600	mA	
Transmitter (Module Input)						
Differential Data Input Voltage	V _{DT}	120	-	820	mVp-p	
Differential line input Impedance	R _{IN}	85	100	115	Ohm	
Transmitter Fault Output-High	V _{FaultH}	2.4	-	V _{cc}	V	
Transmitter Fault Output-Low	V _{FaultL}	-0.3	-	0.8	V	
Transmitter Disable Voltage- High	V _{DisH}	2	-	V _{cc} +0.3	V	
Transmitter Disable Voltage- low	V _{DisL}	-0.3	-	0.8	V	
Receiver (Module Output)						
Differential Data Output Voltage	V _{DR}	300	-	850	mVp-p	
Differential line Output Impedance	R _{OUT}	80	100	120	Ohm	
Receiver LOS Pull up Resistor	R _{LOS}	4.7	-	10	KOhm	
Data Output Rise/Fall time	tr/ff	20	-	-	ps	
LOS Output Voltage-High	V _{LOSH}	2	-	V _{cc}	V	
LOS Output Voltage-Low	V _{LOSL}	-0.3	-	0.4	V	

Optical and Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Average Launched Power	P _O	0	-	3	dBm	
Average Launched Power(Laser Off)	P _{OUT-OFF}	-	-	-30	dBm	Note (1)
Optical Modulation Amplitude	O _{MA}	-3	-	-	dBm	Note (1)
Center Wavelength Range	λ _C	1260	1310	1355	nm	
Side mode suppression ratio	S _{MSR}	30	-	-	dB	
Spectrum Bandwidth(-20dB)	σ	-	-	1	nm	
Extinction Ratio	E _R	4		-	dB	Note (2)
Output Eye Mask	Compliant with FC_PI_4 REV 7.0					Note (2)

Notes:

- 1) The optical power is launched into SMF
- 2) Measured with RPBS 2*31-1 test pattern @10.3125Gbs

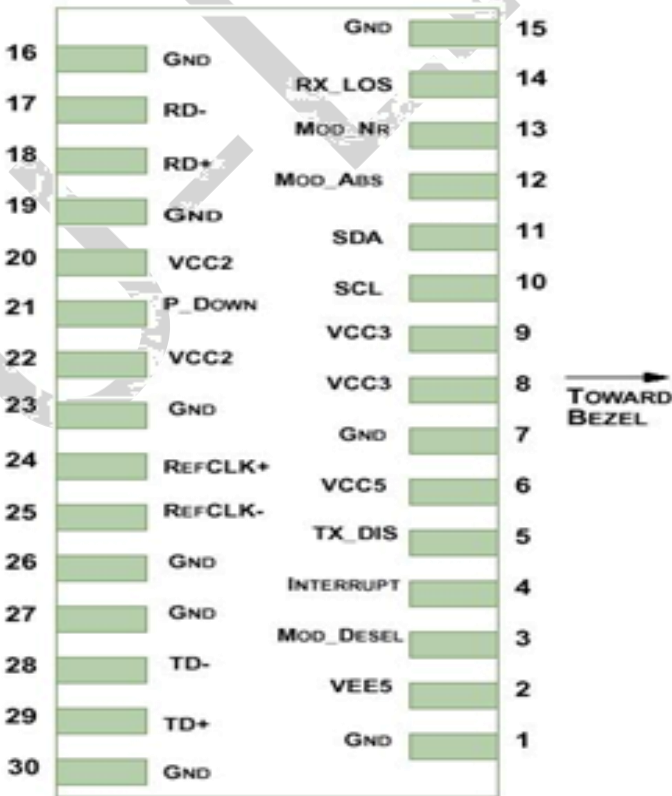
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
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Receiver						
Input Optical Wavelength	λIN	1260	1310	1355	nm	
Receiver Sensitivity in average	PIN	-	-	-15	dBm	Note (1)
Input Saturation Power (Overload)	PSAT	0.5	-	-	dBm	Note (1)
LOS Assert	PA	-30	-	-	dBm	
LOS De-Assert	PD	-	-	-20	dBm	
LOS -Hysteresis	PHys	0.5	1.0	-	dB	

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 85	±3	°C	Internal
Voltage	0 to Vcc	±3%	V	Internal
Tx Bias Current	0 to 100	±10%	mA	Internal
Tx Output Power	0 to 5	±3	dB	Internal
Rx Input Power	-15 to 0.5	±3	dB	Internal

Pin Diagram



Pin Definitions

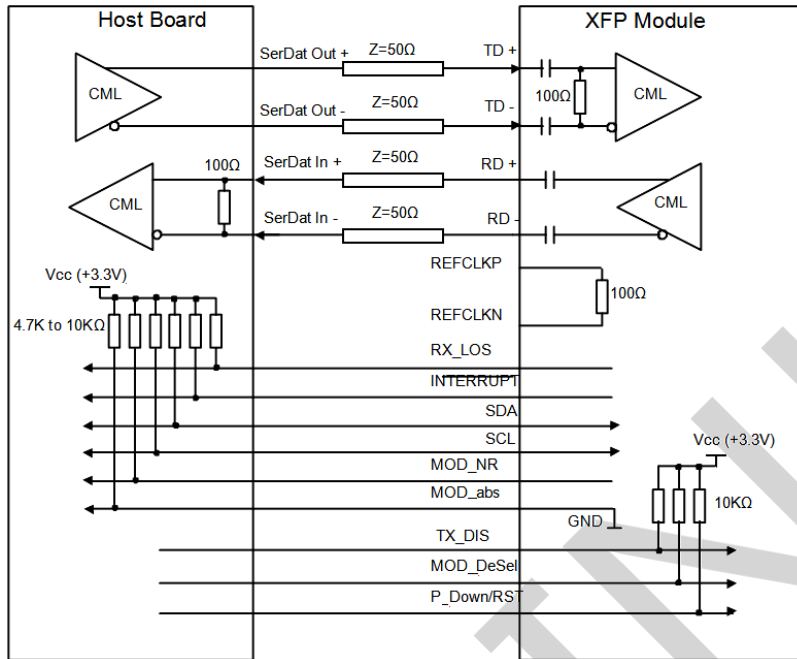
Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Module Ground	1
2		VEE5	Optional -5.2 Power Supply – Not required	

3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply – Not required	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	
11	LVTTL-I/ O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready; ETU-LINK's defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	2
14	LVTTL-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 – Not required	
21	LVTTL-I	P_Down/R ST	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 – Not required	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	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

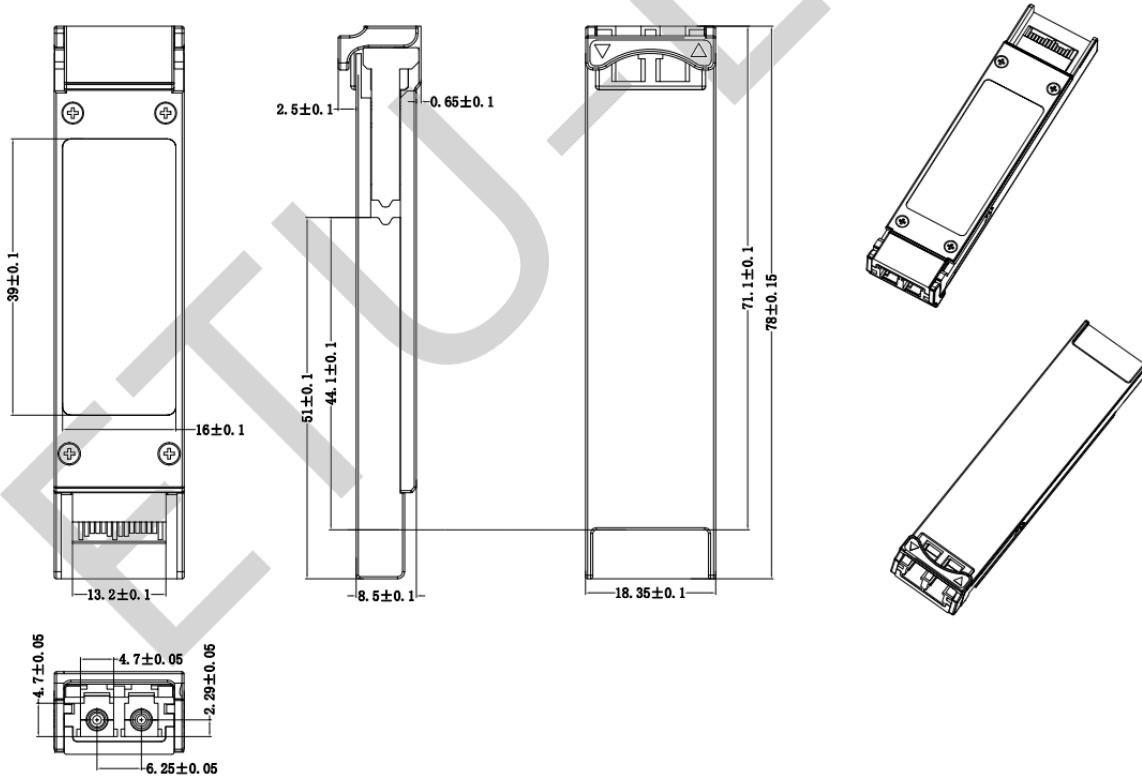
Notes:

- 1) Module circuit ground is isolated from module chassis ground within the module.
- 2) Open collector; should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.
- 3) A Reference Clock input is not required by the EX31X-3LCD20. If present, it will be ignored.

Recommended Interface Circuit



Mechanical Diagram



Revision History

Version No.	Date	Description
1.0	February 8, 2016	Preliminary datasheet
2.0	July 26, 2024	Format change

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