

## EX55X-80D (I)

### 10Gbps 1550nm 80KM XFP Optical Transceiver

#### PRODUCT FEATURES

- XFP MSA Rev 4.5 Compliant
- Data rate from 9.95Gbps to 11.1Gbps
- No Reference Clock required
- Cooled 1550 nm EML and APD receiver
- link length up to 80km
- +3.3V Supply Voltage
- Low Power Dissipation 2.5 W Maximum
- XFI and lineside loopback Mode Supported
- Temperature Range:
  - Commercial: 0°C ~70°C
  - Extended: -10°C ~80°C
  - Industrial: -40°C ~85°C
- Diagnostic Performance Monitoring
- RoHS6 compliant (lead free)

#### APPLICATIONS

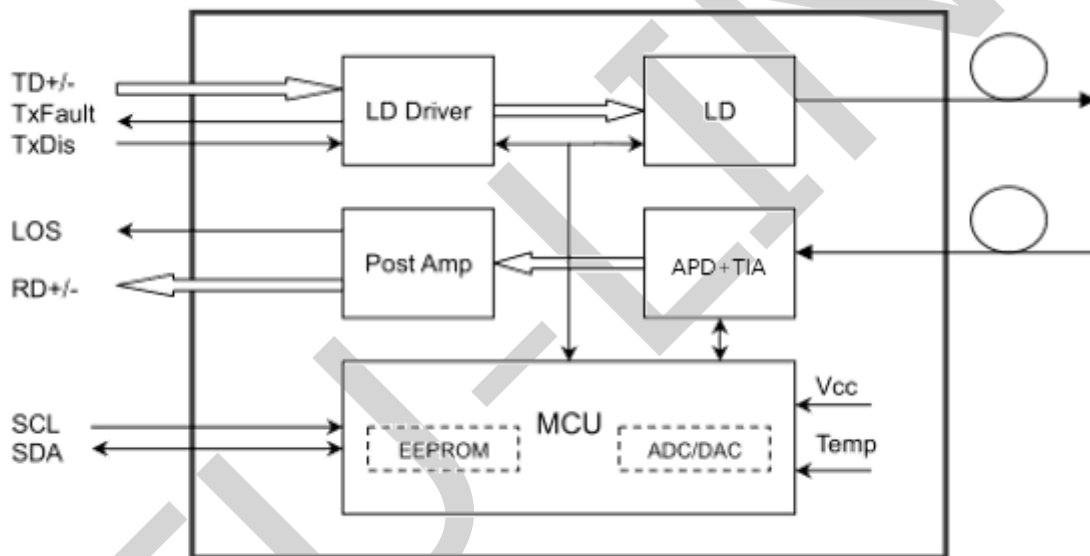
- 10GBASE ZR/ZW (with / without FEC)
- 10G Fiber Channel

## DESCRIPTIONS

ETU-Link 80km XFP EX55X-80D Transceiver exhibits excellent wavelength stability, Designed for 10G SDH/SONET, 10GBASE-ZR and 10G Fiber- Channel applications.

The transceiver consists of two sections: The transmitter section incorporates a cooled EML laser. And the receiver section consists of an APD photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. ETU-Link XFP transceiver provides an enhanced monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage.

## Module Block Diagram



## Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
EX55X-80D	10.3125Gbps	EML	SMF	80km	LC	0~70°C	Y	White
EX55X-80DE	10.3125Gbps	EML	SMF	80km	LC	-10~80°C	Y	White
EX55X-80DI	10.3125Gbps	EML	SMF	80km	LC	-40~85°C	Y	White

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T <sub>s</sub>	-40	-	85	°C	
Power Supply Voltage	V <sub>cc</sub>	-0.5	-	3.6	V	

Relative Humidity (non-condensation)	RH	5	-	95	%	
Damage Threshold	TH <sub>d</sub>	0	-		dBm	
Storage Temperature	T <sub>s</sub>	-40	-	85	°C	

## 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 <sub>CC</sub>	3.13	3.3	3.47	V	
Transmission Distance	TD	-	-	80	km	Over SMF

## Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Consumption	P			2.5	W	1
Supply Current	I <sub>CC</sub>			750	mA	
<b>Transmitter (Module Input)</b>						
Single-ended Input Voltage Tolerance	V <sub>CC</sub>	-0.3		4.0	V	
Differential Input Voltage Swing	V <sub>in,pp</sub>	120		820	mV <sub>pp</sub>	
Differential Input Impedance	Z <sub>in</sub>	85	100	115	Ohm	2
Transmit Disable Assert Time				10	us	
Transmit Disable Voltage	V <sub>dis</sub>	V <sub>CC</sub> -1.3		V <sub>CC</sub>	V	3
Transmit Enable Voltage	V <sub>en</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.8	V	
<b>Receiver (Module Output)</b>						
Differential Output Voltage Swing	V <sub>out,pp</sub>	300	650	850	mV <sub>pp</sub>	
Differential Output Impedance	Z <sub>out</sub>	80	100	120	Ohm	4
Data output rise/fall time	T <sub>r</sub> /T <sub>f</sub>			40	ps	5
LOS Assert Voltage	V <sub>losH</sub>	V <sub>CC</sub> -1.3		V <sub>CC</sub>	V	6
LOS De-assert Voltage	V <sub>losL</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.8	V	6
Power Supply Rejection	PSR					7

### Notes:

- Maximum total power value is specified across the full temperature and voltage range.
- After internal AC coupling.
- Or open circuit.
- Into 100 ohms differential termination.
- These are unfiltered 20-80% values
- 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.
- Per Section 2.7.1. In the XFP MSA Specification1.

## Optical and Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Output Optical Power	Pf	0		4	dBm	
Optical Wavelength	$\lambda$	1530	1550	1570	nm	
Sidemode Suppression ratio	SMSRmin	30			dB	
Optical Extinction Ratio	ER	6			dB	
Tx Jitter Generation(peak-to-peak)	Txj1			0.1	UI	
Tx Jitter Generation(RMS)	Txj2			0.01	UI	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Launch power of OFF transmitter	POFF			-30	dBm	
Relative Intensity Noise	RIN			-130	dB/Hz	
<b>Receiver</b>						
Receiver Sensitivity	RSENS			-24	dBm	1
Input Saturation Power (Overload)	Psat	-6			dBm	
Wavelength Range	$\lambda_c$	1270		1610	nm	
Receiver Reflectance	Rrx			-27	dB	
LOS De-Assert	LOSD			-28	dBm	
LOS Assert	LOSA	-34			dBm	
LOS Hysteresis		0.5			dB	

**Notes:** Measured with worst ER; BER <  $10^{-12}$  @ 10.3Gbps,  $2^{31} - 1$  PRBS.

## Digital Diagnostics

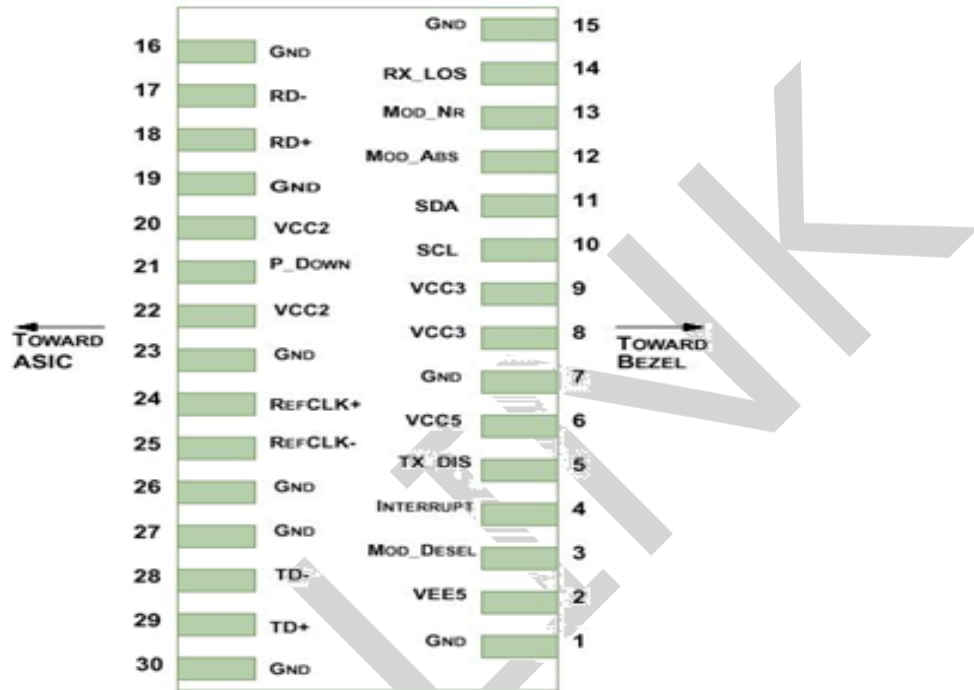
Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 85	$\pm 3$	$^{\circ}\text{C}$	Internal
Voltage	0 to Vcc	$\pm 3\%$	V	Internal
Tx Bias Current	0 to 100	$\pm 10\%$	mA	Internal
Tx Output Power	0 to 4	$\pm 3$	dB	Internal
Rx Input Power	-24 to -6	$\pm 3$	dB	Internal

## Communication Interface Timing Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
TX_Disable Assert Time	t <sub>off</sub>			10	us	
TX_Disable Negate Time	t <sub>on</sub>			2	ms	
Time to Initialize	t <sub>int</sub>			300	ms	
Interrupt assert delay	Interrupt <sub>on</sub>			200	Ms	
Interrupt negate delay	Interrupt <sub>off</sub>			500	us	

RX_LOS assert delay	t_loss_on			100	us	
RX_LOS negate delay	t_loss_off			100	us	

## 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	
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	2
11	LVTTL/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 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

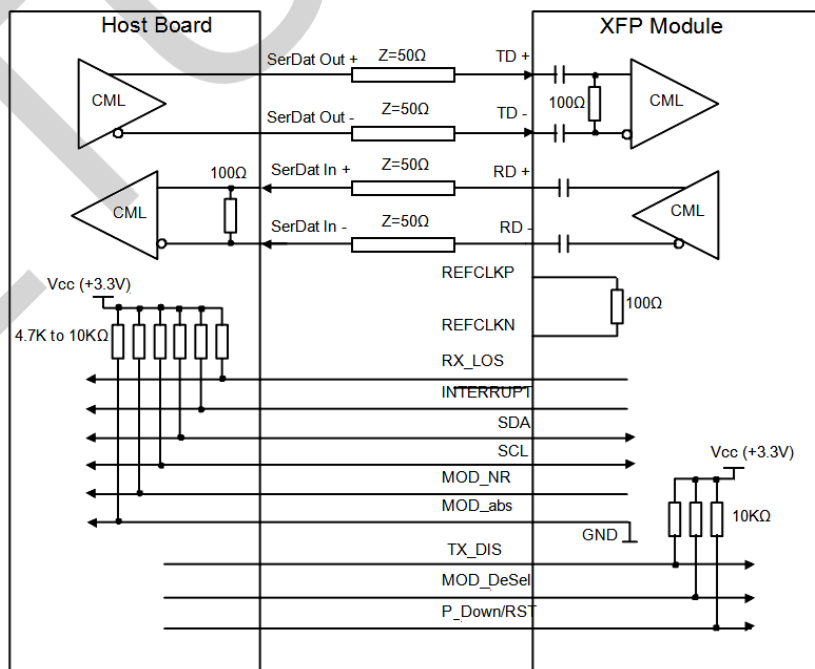
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply – Not required	
21	LVTTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a 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 – 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:**

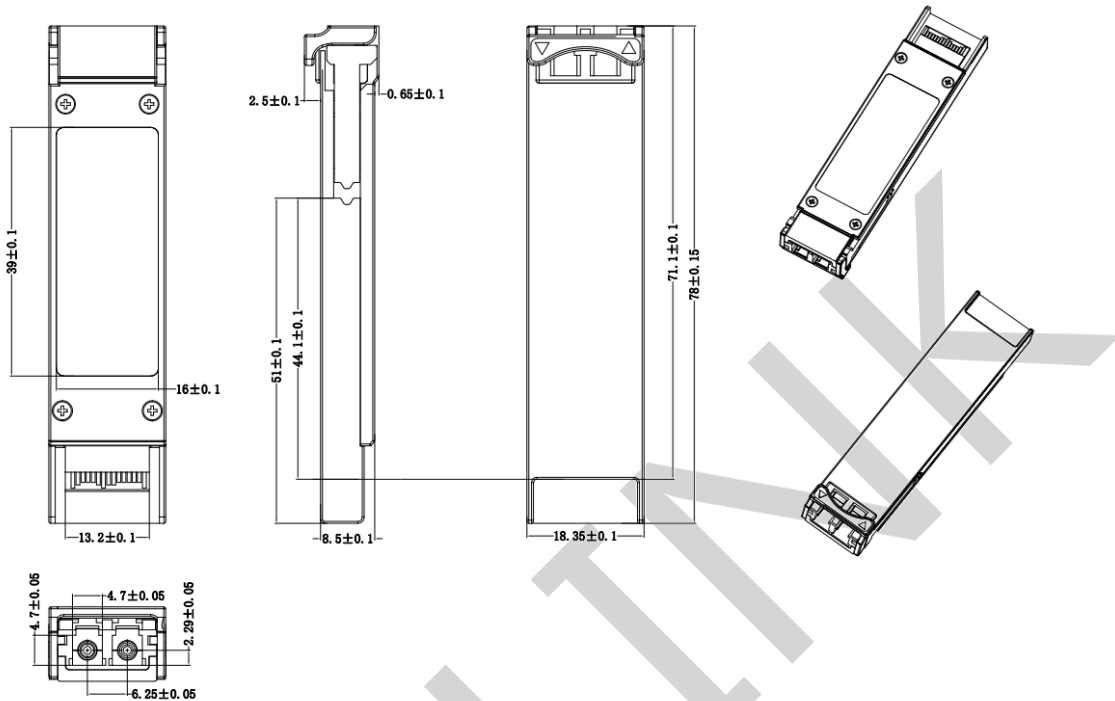
- 1) Module circuit ground is isolated from module chassis ground within the module.
- 2) Open collector; should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.

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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