

## EX55X-40D (I)

### 10Gbps 1550nm 40KM XFP Optical Transceiver

#### PRODUCT FEATURES

- XFP MSA Compliant
- Data rate from 9.95Gbps to 11.3Gbps
- No Reference Clock required
- Cooled 1550nm EML and PIN receiver
- link length up to 40km
- +3.3V Supply Voltage
- Low Power Dissipation 2W Maximum
- XFI and lineside loopback Mode Supported
- Temperature Range:
  - Commercial: 0°C ~70°C
  - Extended: -10°C ~80°C
  - Industrial: -40°C ~85°C
- RoHS compliant and lead-free
- Support Digital Diagnostic Monitoring interface

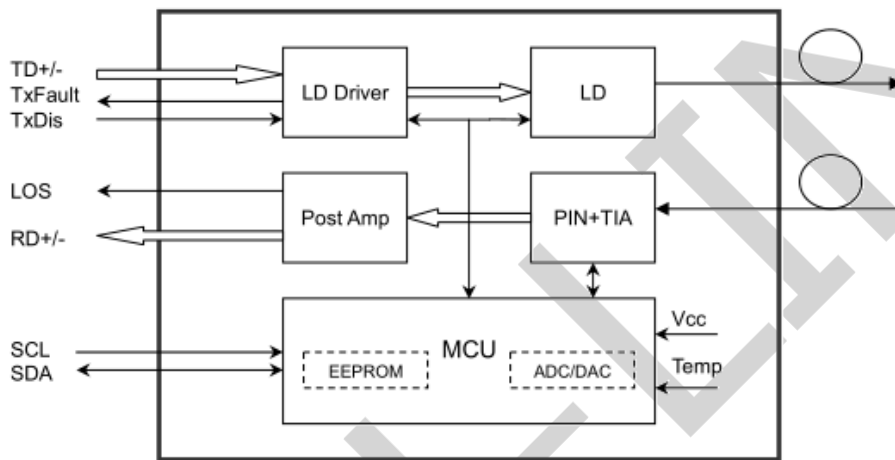
#### APPLICATIONS

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

## DESCRIPTIONS

ETU-Link 40km XFP EX55X-40D(I) transceiver comply with XFP 4.5MSA, and can support diverse applications for SDH/SONET equipment including FEC (9.95 GB/s to 10.7 GB/s), as well as Ethernet LAN (10.325 GB/s) and WAN (9.95 GB/s) applications. The high performance cooled 1550nm cooled EML transmitter and high sensitivity PIN receiver. 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-40D	10.3125Gbps	EML	SMF	40km	LC	0~70°C	Y	Red
EX55X-40DE	10.3125Gbps	EML	SMF	40km	LC	-10~80°C	Y	Red
EX55X-40DI	10.3125Gbps	EML	SMF	40km	LC	-40~85°C	Y	Red

## 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	

## Recommended Operating Conditions

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

## Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Consumption	P			2	W	1
Supply Current	Icc			600	mA	
<b>Transmitter (Module Input)</b>						
Single-ended Input Voltage Tolerance	Vcc	-0.3		4.0	V	
Differential Input Voltage Swing	Vin,pp	120		820	mVpp	
Differential Input Impedance	Zin	85	100	115	Ohm	2
Transmit Disable Assert Time				10	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	3
Transmit Enable Voltage	Ven	Vee		Vee +0.8	V	
<b>Receiver (Module Output)</b>						
Differential Output Voltage Swing	Vout,pp	300	650	850	mVpp	
Differential Output Impedance	Zout	80	100	120	Ohm	4
Data output rise/fall time	Tr/Tf			40	ps	5
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	6
LOS De-assert Voltage	VlosL	Vee		Vee +0.8	V	6
Power Supply Rejection	PSR					7

1. Maximum total power value is specified across the full temperature and voltage range.
2. After internal AC coupling.
3. Or open circuit.
4. In to 100 ohms differential termination.
5. These are unfiltered 20-80% values
6. Loss of Signal is open collector to be pulled up with a 4.7kΩ – 10kΩ resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
7. 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	3.5			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			-16	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			-27	dBm	
LOS Assert	LOSA	-37			dBm	
LOS Hysteresis		0.5			dB	

**Notes:** Measured with worst ER; BER<10<sup>-12</sup> @ 10.3Gbps, 2<sup>31</sup> – 1 PRBS.

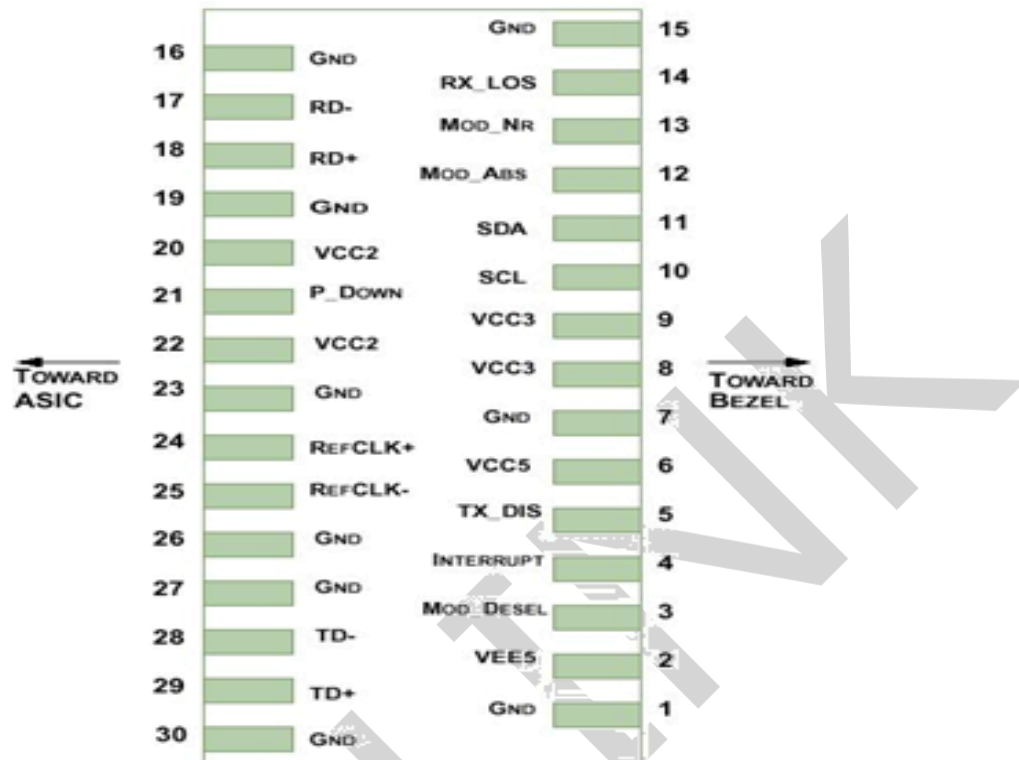
## Digital Diagnostics

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 4	±3	dB	Internal
Rx Input Power	-16 to -6	±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 <sub>loss_on</sub>			100	us	
RX_LOS negate delay	t <sub>loss_off</sub>			100	us	

## Pin Diagram



## Pin Definitions

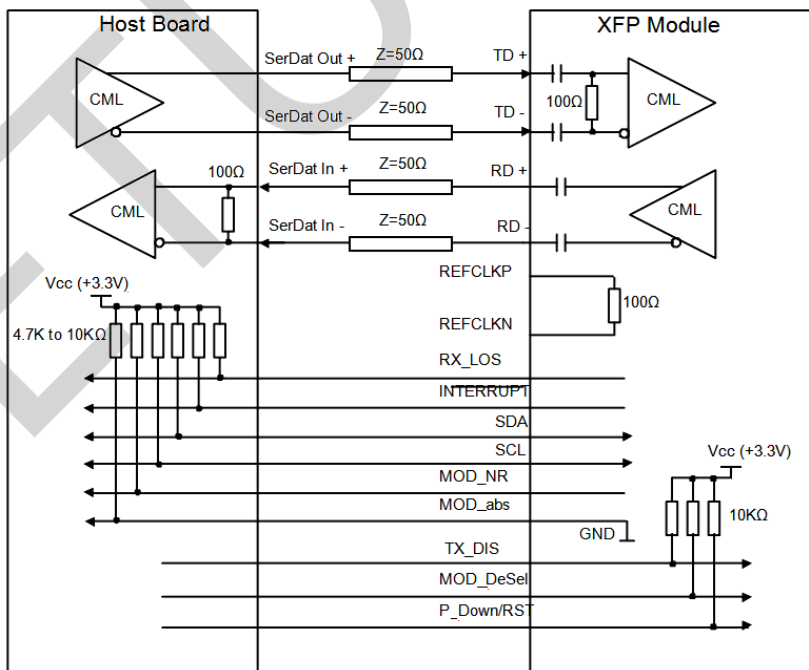
Pin	Logic	Symbol	Name/Description	Ref
1		GND	Module Ground	1
2		VEE5	Optional -5.2 Power Supply – Not required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important 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/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 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

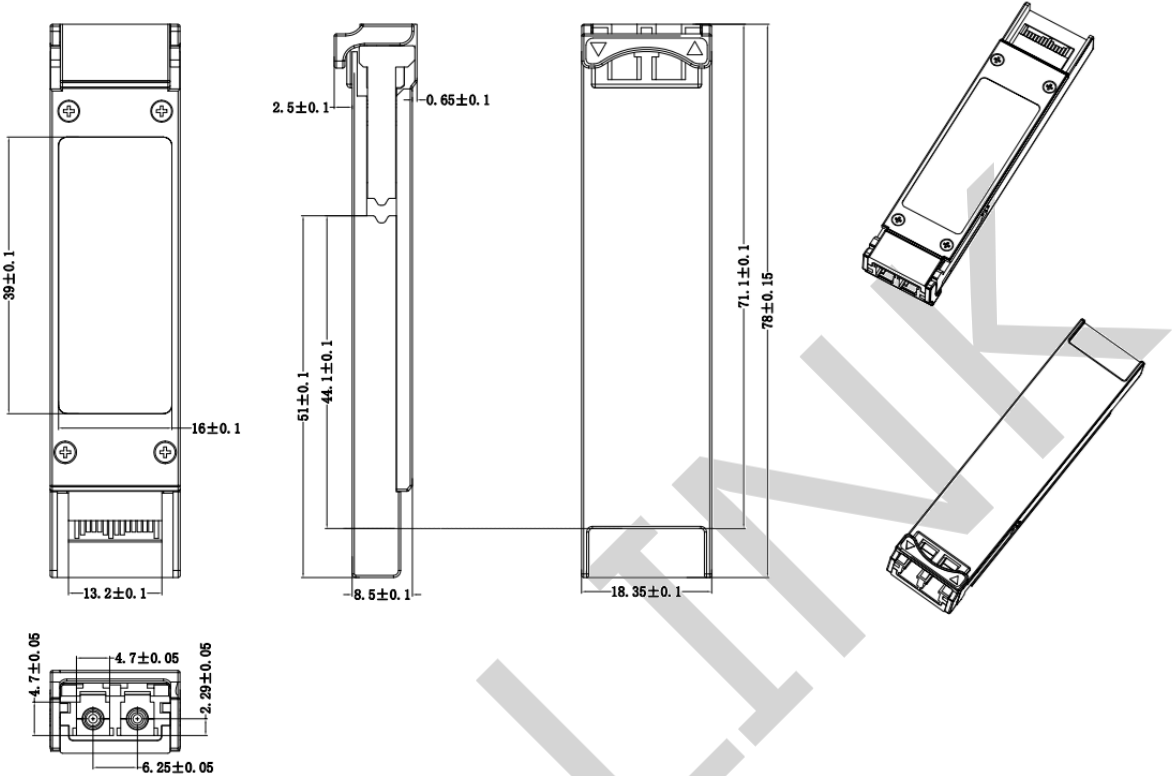
**Notes:**

- 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.
- 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

Company: ETU-Link Technology Co., LTD  
 Production base: Right side of 3rd floor, No. 102 building, Longguan expressway, Dalang street, Longhua District, Shenzhen city, Guangdong Province, China 518109  
 R&D base: Floor 4, Building 4, Nanshan Yungu Phase LI, Taoyuan Community, Xili Street, Nanshan District, Shenzhen  
 Tel: +86-755 2328 4603

Addresses and phone number also have been listed at [www.etulinktechnology.com](http://www.etulinktechnology.com).  
 Please e-mail us at [sales@etulinktechnology.com](mailto:sales@etulinktechnology.com) or call us for assistance.