

EXB45(54)X-80D(I)

10Gb/s XFP BIDI 80km DDM Transceiver

PRODUCT FEATURES

- Supports 9.95Gb/s to 11.3Gb/s bit rates
- 1490nm EML laser and APD receiver
- 1550nm EML laser and APD receiver
- Up to 80km on 9/125μm SMF
- Hot-pluggable XFP footprint
- Duplex LC/UPC type pluggable optical interface
- Metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Maximum power consumption 2.5W
- No Reference Clock required
- Case operating temperature:
Commercial: 0°C ~70°C
Industrial: -40°C ~85°C

APPLICATIONS

- 10GBASE-ER/EW 10G Ethernet
- OTN OTU2

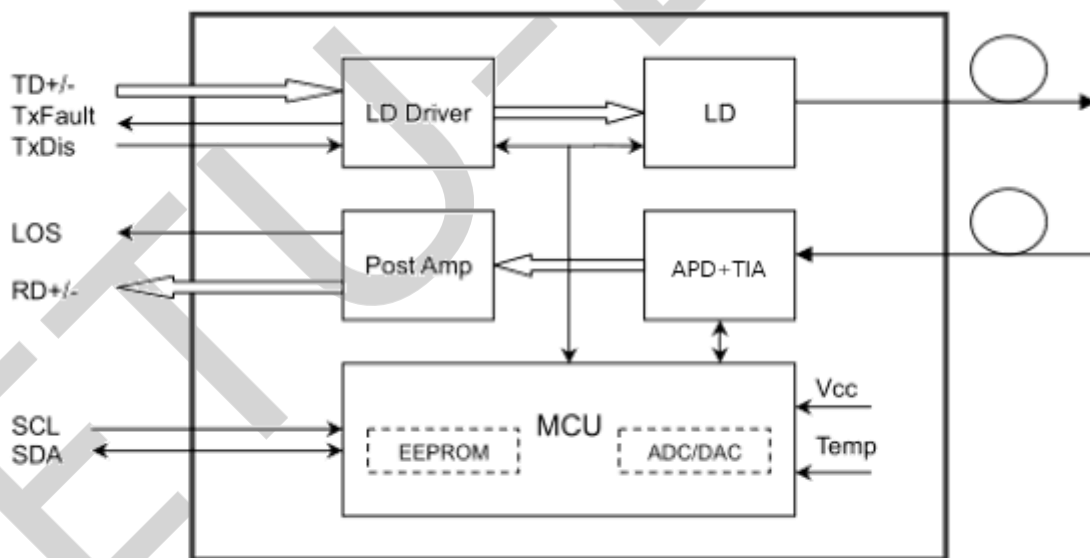
DESCRIPTIONS

ETU-Link EXB45(54)X-80D(I) transceiver is designed for use in 10-Gigabit Ethernet links up to 80km over single mode fiber. The module consists of EML Laser, APD and Preamplifier in a high-integrated optical sub-assembly. Digital diagnostics functions are available via a 2-wire serial interface, as specified in XFP MSA.

EXBxxX-80D(I) transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The XFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
EB45X-80D	10.3125Gbps	EML	SMF	80km	LC	0~70°C	Y	White

EB54X-80D	10.3125Gbps	EML	SMF	80km	LC	0~70°C	Y	White
EB45X-80DI	10.3125Gbps	EML	SMF	80km	LC	-40~85°C	Y	White
EB54X-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 _s	-40	-	85	°C	
Power Supply Voltage	V _{cc}	-0.5	-	3.6	V	
Relative Humidity (non-condensation)	RH	5	-	95	%	
Damage Threshold	TH _d	0	-		dBm	
Storage Temperature	T _s	-40	-	85	°C	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Case Operating Temperature	T _{op}	0	-	70	°C	Commercial
		-40		85		Industrial
Power Supply Voltage	V _{cc}	3.135	3.3	3.465	V	
Data Rate			10.3125		Gb/s	
Control Input Voltage High		2		V _{cc}	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			80	km	9/125um

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Consumption	P			2.5	W	1
Supply Current	I _{cc}			750	mA	
Transmitter (Module Input)						
Single-ended Input Voltage Tolerance	V _{cc}	-0.3		4.0	V	
Differential Input Voltage Swing	V _{in,pp}	120		820	mV _{pp}	
Differential Input Impedance	Z _{in}	85	100	115	Ohm	2
Transmit Disable Assert Time				10	us	
Transmit Disable Voltage	V _{dis}	V _{cc} -1.3		V _{cc}	V	3
Transmit Enable Voltage	V _{en}	V _{ee}		V _{ee} +0.8	V	
Receiver (Module Output)						
Differential Output Voltage Swing	V _{out,pp}	300	650	850	mV _{pp}	
Differential Output Impedance	Z _{out}	80	100	120	Ohm	4

Optical Communications Products Alliance

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

Notes:

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.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_c	1480	1490	1500	nm	EXB45X-80D(I)
		1540	1550	1560	nm	EXB54X-80D(I)
Optical Spectral Width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	PO	0		5	dBm	EXB45X-80D(I)
		0		3	dBm	EXB54X-80D(I)
Optical Extinction Ratio	ER	6.0			dB	
Average Launched Power(Laser Off)	Poff			-30	dBm	
Transmitter Eye Mask	Compliant with IEEE802.3ae					
Receiver						
Center Wavelength	λ_c	1540	1550	1560	nm	EXB54X-80D(I)
		1480	1490	1500	nm	EXB45X-80D(I)
Receiver Sensitivity (Average Power)	Sen.			-24	dBm	2
Input Saturation Power (overload)	Psat	-6			dBm	
LOS Assert	LOSA	-38			dBm	
LOS De-assert	LOSD			-26	dBm	
LOS Hysteresis	LOSH	0.5		6	dB	

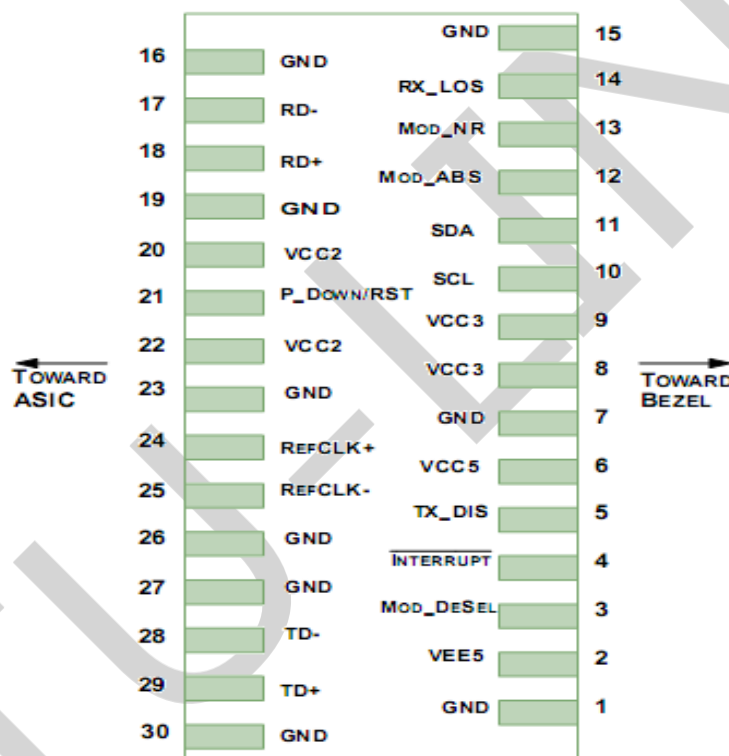
Notes:

1. Average power figures are informative only, per IEEE 802.3ae.
2. Measured with Light source 1490nm and 1550nm, ER=6.0dB; BER =<10⁻¹² @10.3125Gbps, PRBS=2³¹-1 NRZ.

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	-24 to -6	±3	dB	Internal

Pin Diagram



Pin Definitions

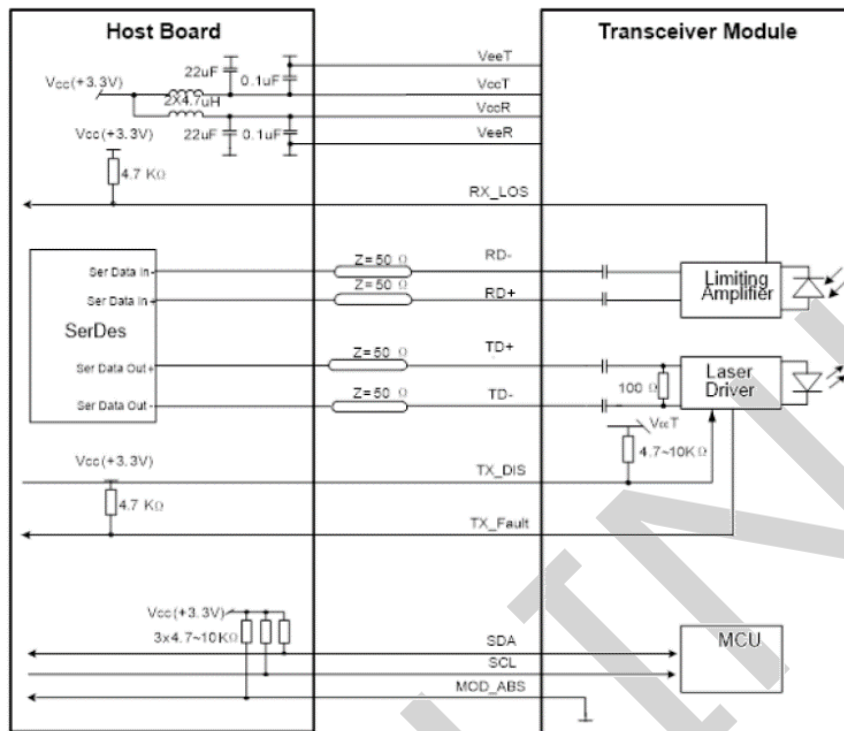
PIN #	Name	Function	Notes
1	GND	Module Ground	1
2	VEE5	Optional -5.2 Power Supply – Not required	
3	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	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	SCL	Serial 2-wire interface clock	
11	SDA	Serial 2-wire interface data line	2
12	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	Mod_NR	Module Not Ready; XGIGA's defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	2
14	RX_LOS	Receiver Loss of Signal indicator	2
15	GND	Module Ground	1
16	GND	Module Ground	1
17	RD-	Receiver inverted data output	
18	RD+	Receiver non-inverted data output	
19	GND	Module Ground	1
20	VCC2	+1.8V Power Supply – Not required	
21	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	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	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	TD-	Transmitter inverted data input	
29	TD+	Transmitter non-inverted data input	
30	GND	Module Ground	1

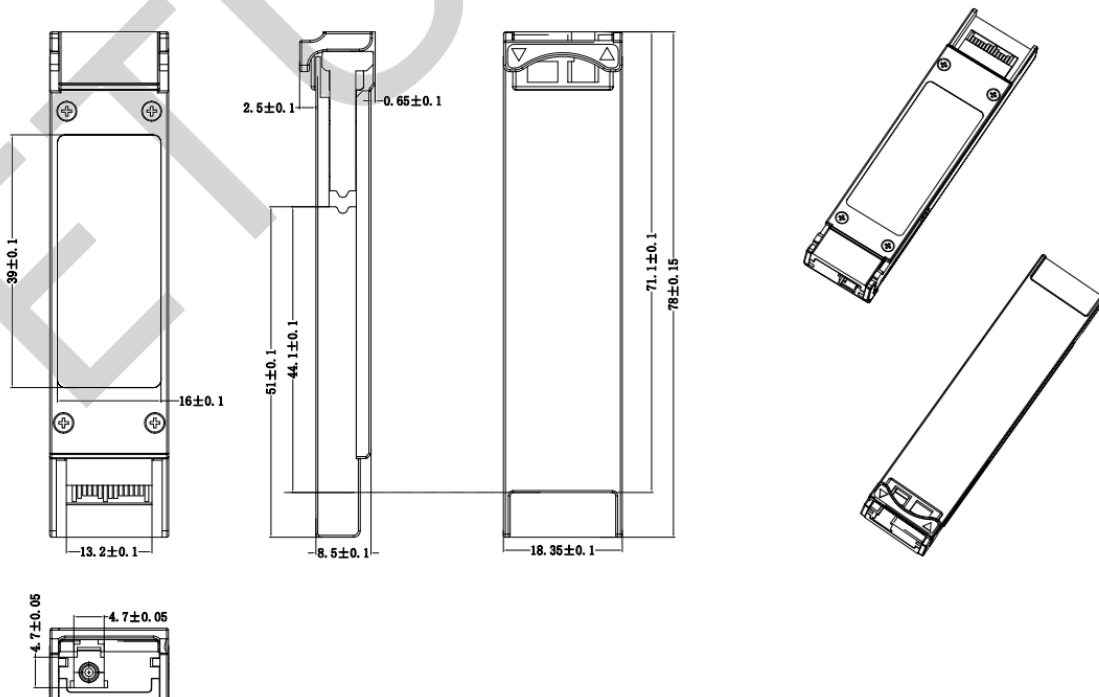
Notes:

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

Recommended Interface Circuit



Mechanical Diagram



Revision History

Version No.	Date	Description
1.0	February 18, 2016	Preliminary datasheet
2.0	September 28, 2019	Product upgrades
3.0	July 16, 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.

Please e-mail us at sales@etulinktechnology.com or call us for assistance.