

EXB23(32)X-20D(I)

10Gb/s XFP BIDI 20km DDM Transceiver

PRODUCT FEATURES

- Supports 9.95Gb/s to 10.5Gb/s bit rates
- Hot-pluggable XFP footprint
- Maximum link length of 20KM with SMF
- 1270/1330nm DFB laser Transmitter and 1330/1270nm PIN Receiver
- XFP MSA package with LC connector
- Loop Back Support.
- +3.3V power supply
- Power dissipation <2W
- Compatible with RoHS
- Built-in digital diagnostic functions
- Case operating temperature:
Commercial: 0°C ~70°C
Industrial: -40°C ~85°C

APPLICATIONS

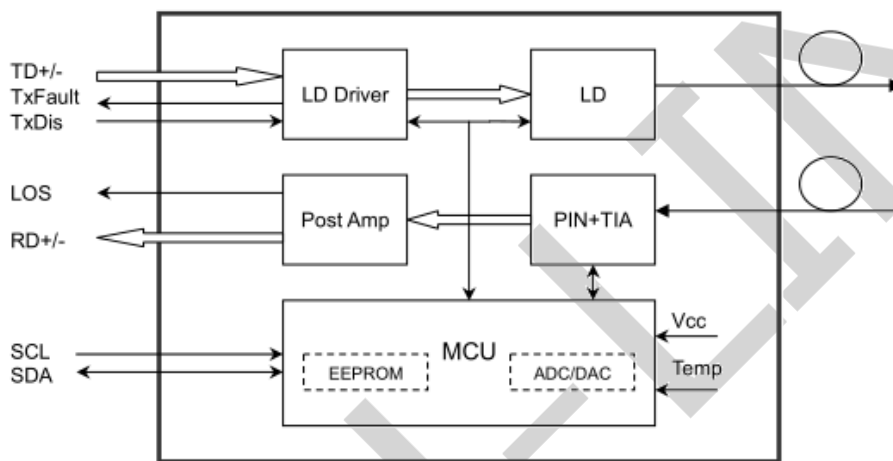
- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps
- 10GBASE-BX 10G Ethernet

DESCRIPTIONS

ETU-Link EXB23(32)X-20D(I) is compliant with the IEEE803.3ae 10Gbase-Bx. and transmission distance up to 20KM on SMF.

The transceiver module comprises a transmitter with a 1270/1330nm DFB laser transmitter, an integrated 1330/1270nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. Transmitter and receiver are separate within a wide temperature range of -40°C to +85°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10GbE systems.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
EB23X-20D	10.3125Gbps	DFB	SMF	20km	LC	0~70°C	Y
EB32X-20D	10.3125Gbps	DFB	SMF	20km	LC	0~70°C	Y
EB23X-20DI	10.3125Gbps	DFB	SMF	20km	LC	-40~85°C	Y
EB32X-20DI	10.3125Gbps	DFB	SMF	20km	LC	-40~85°C	Y

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	
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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	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-	-	600	mA	
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD	2	-	20	km	Note (1)
Coupled fiber	Single mode fiber					ITU-T G.652

Note:

- 1) Measured with SMF

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Total power supply current	Icc	-	-	600	mA	
Transmitter (Module Input)						
Differential Data Input Voltage	VDT	120	-	820	mVp-p	
Differential line input Impedance	RIN	85	100	115	Ohm	
Transmitter Fault Output-High	VFaultH	2.4	-	Vcc	V	
Transmitter Fault Output-Low	VFaultL	-0.3	-	0.8	V	
Transmitter Disable Voltage- High	VDisH	2	-	Vcc+0.3	V	
Transmitter Disable Voltage- low	VDisL	-0.3	-	0.8	V	
Receiver (Module Output)						
Differential Data Output Voltage	VDR	300	-	850	mVp-p	
Differential line Output Impedance	ROUT	80	100	120	Ohm	
Receiver LOS Pull up Resistor	RLOS	4.7	-	10	KOhm	
Data Output Rise/Fall time	tr/tf	20	-	-	ps	
LOS Output Voltage-High	VLOSH	2	-	Vcc	V	
LOS Output Voltage-Low	VLOSL	-0.3	-	0.4	V	

Optical and Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Average Launched Power	PO	-2	-	2	dBm	
Average Launched Power(Laser Off)	POUT-OFF	-	-	-30	dBm	Note (1)
Optical Modulation Amplitude	OMA	-3	-	-	dBm	Note (1)
Center Wavelength Range	λC		1270/1330		nm	
Side mode suppression ratio	SMSR	30	-	-	dB	

Optical Communications Products Alliance

Spectrum Bandwidth(-20dB)	σ	-	-	1	nm	
Extinction Ratio	ER	3.5	6	-	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
Receiver						
Input Optical Wavelength	λ_{IN}		1330/1270		nm	
Receiver Sensitivity in average	PIN	-	-	-14.4	dBm	Note (1)
Input Saturation Power (Overload)	PSAT	0.5	-	-	dBm	Note (1)
LOS Assert	PA	-30	-	-	dBm	
LOS De-Assert	PD	-	-	-16	dBm	
LOS -Hysteresis	PHys	0.5	1.0	-	dB	

Notes:

- 1) Measured with RPBS 2^31-1 test pattern @10.3125Gbs BER=<10^-12 ER=6DB

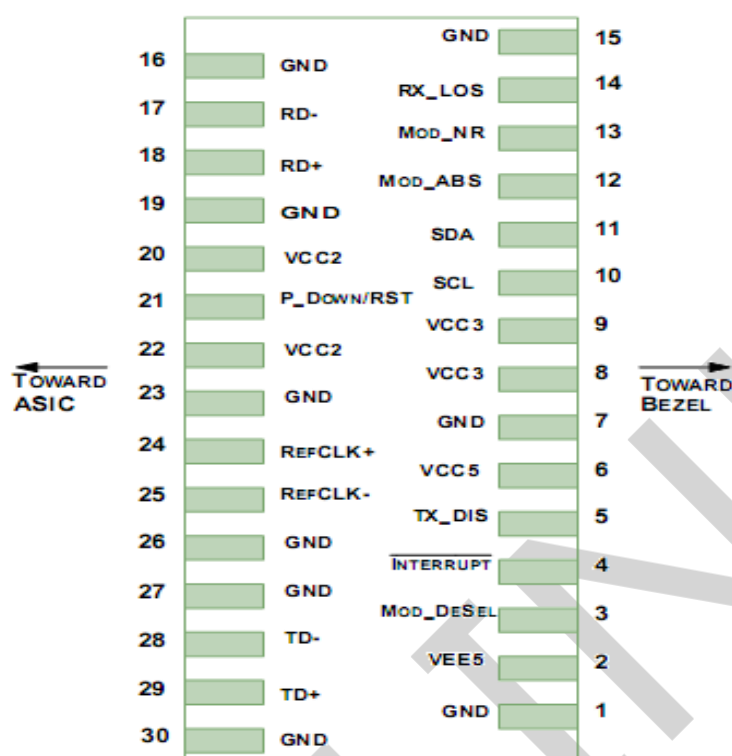
Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 85	± 3	°C	Internal
Voltage	0 to Vcc	$\pm 3\%$	V	Internal
Tx Bias Current	0 to 100	$\pm 10\%$	mA	Internal
Tx Output Power	-2 to 2	± 3	dB	Internal
Rx Input Power	-14.4 to 0.5	± 3	dB	Internal

Communication Interface Timing Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
TX_Disable Assert Time	t_off			10	us	
TX_Disable Negate Time	t_on			2	ms	
Time to Initialize	t_int			300	ms	
Interrupt assert delay	Interrupt_on			200	Ms	
Interrupt negate delay	Interrupt_off			500	us	
RX_LOS assert delay	t_loss_on			100	us	
RX_LOS negate delay	t_loss_off			100	us	

Pin Diagram



Pin Definitions

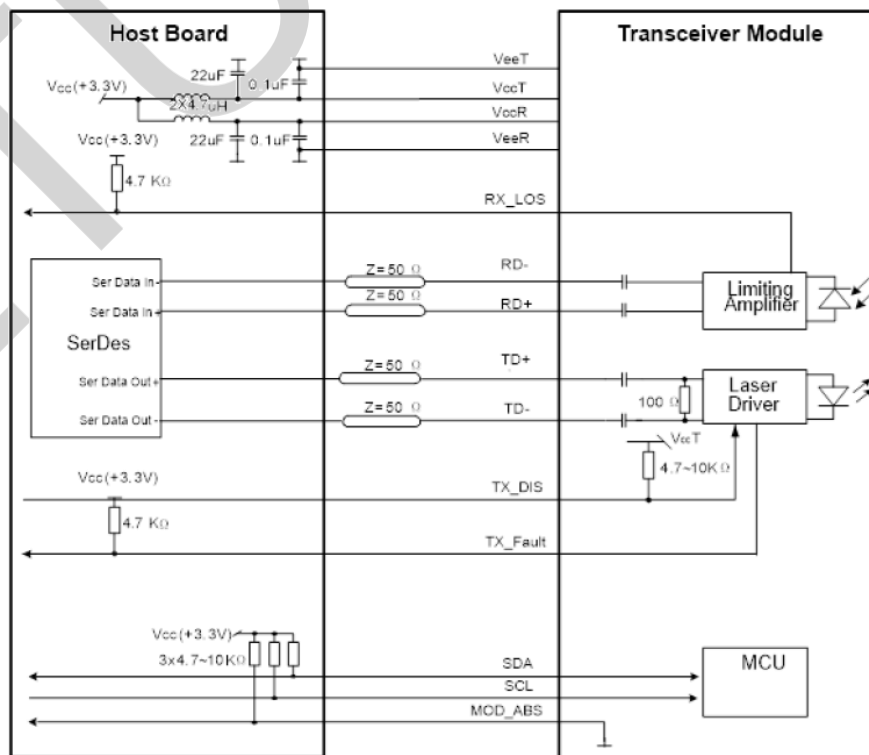
PIN #	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground	1
2		VEE5	Optional -5.2 Power Supply – Not required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important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

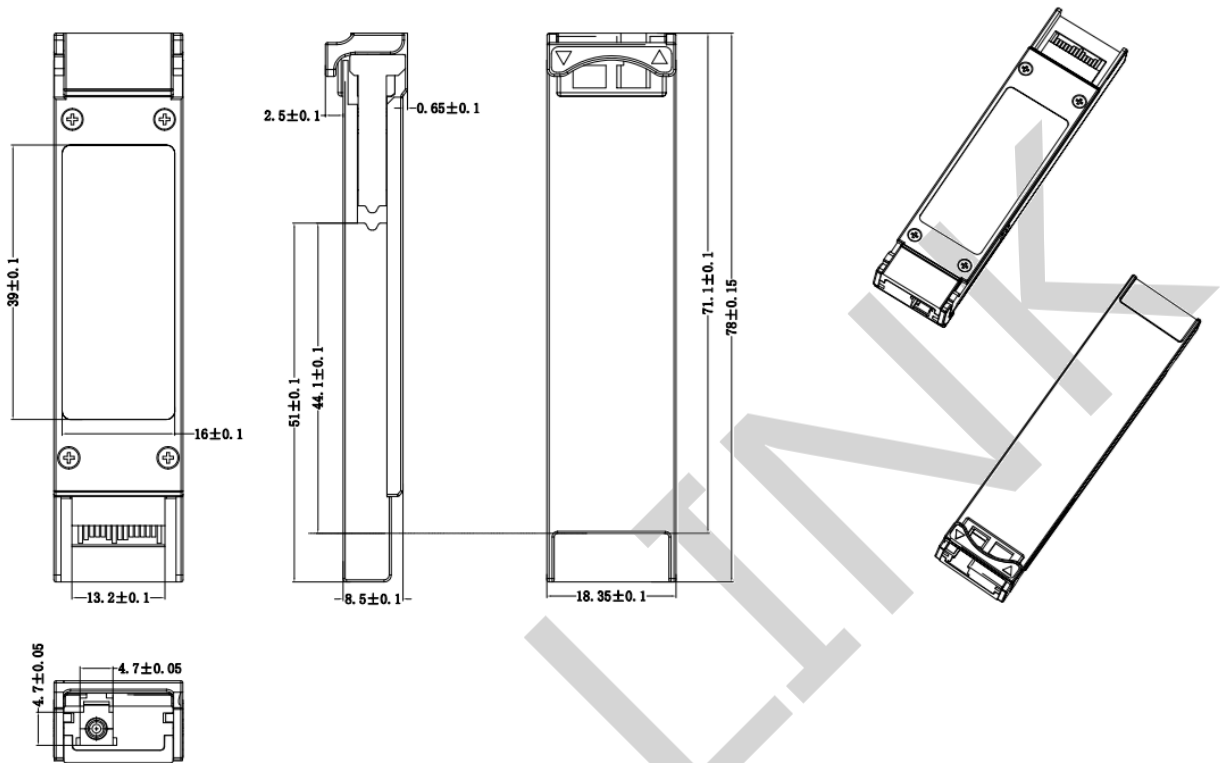
Notes:

- 1) Module circuit ground is isolated from module chassis ground within the module.
- 2) Open collector; should be pulled up with 4.7k – 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, 2023	Product upgrades
3.0	July 14, 2024	Format change

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