

## Product Specification

# XFP 10G WDM ER 60km LC TX1330 Transceiver



### 1. 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
- Case operating temperature: -5°C ~ 70°C
- Single Mode LC Receptacle Bi-directional Transceiver
- Up to 60km transmission on SMF
- 1330nm DFB laser and APD receiver
- 2-wire interface with integrated Digital Diagnostic monitoring
- EEPROM with Serial ID Functionality
- Compliant with XFP MSA with duplex LC connector

### 2. Applications

- 10GBASE-BX 10.3125Gb/s Ethernet
- 10GBASE-BX 9.953Gb/s Ethernet
- SONET OC-192 SR-1 SDH STM I-64.1

### 3. Product Description

XFP 10G WDM ER 60km LC TX1330 is hot pluggable 3.3 V Small-Form-Factor transceiver module. It designed expressly for high-speed communication applications that require rates up to 11.3Gb/s, it designed to be compliant with XFP MSA. The module data link up to 60km in 9/125um single mode fiber. The optical output can be disabled by a LVTTTL logic high-level input of Tx Disable. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner.

#### 4. Absolute Maximum Ratings

Rating	Symbol	Min.	Max.	Units
Storage Temperature	Ts	-40	85	°C
Storage Ambient Humidity	HA	5	95	%
Operating Relative Humidity	RH	-	85	%
Power Supply Voltage	V <sub>cc</sub>	-0.3	4	V
Signal Input Voltage	V <sub>cc</sub>	V <sub>cc</sub> -0.3	V <sub>cc</sub> +0.3	V

#### 5. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Units
Case Operating Temperature	T <sub>case</sub>	-5	-	70	°C <sup>[2]</sup>
Power Supply Voltage	V <sub>CC</sub>	3.14	3.3	3.47	V
Power Supply Current	I <sub>CC</sub>	-	-	450	mA
Data Rate	BR	9.95	10.3125	11.3	Gbps
Transmission Distance	TD		-	60	km <sup>[1]</sup>
Coupled fiber					Single mode fiber

**Notes:**

- [1] Measured with SMF
- [2] Without air flow

#### 6. Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Average Launched Power	PO	0	-	5	dBm
Average Launched Power(Laser Off)	POUT-OFF	-	-	-45	dBm <sup>[1]</sup>
Centre Wavelength Range	λ <sub>C</sub>	1320	1330	1340	nm
Side mode suppression ratio	SMSR	30	-	-	dB
Spectrum Bandwidth(-20dB)	σ	-	-	1	nm
Extinction Ratio	ER	3.5		-	dB <sup>[2]</sup>
Output Eye Mask					Compliant with IEEE 802.3 ae <sup>[2]</sup>
<b>Receiver</b>					
Input Optical Wavelength	λ <sub>IN</sub>	1260	1270	1280	nm
Receiver Sensitivity in average	PIN	-	-	-22	dBm <sup>[3]</sup>
Input Saturation Power (Overload)	PSAT	-6	-	-	dBm <sup>[3]</sup>
LOS -Assert Power	PA	-38	-	-	dBm

Parameter	Symbol	Min.	Typical	Max.	Unit
LOS -Deassert Power	PD	-	-	-23	dBm
LOS -Hysteresis	PHys	0.5	-	4	dB

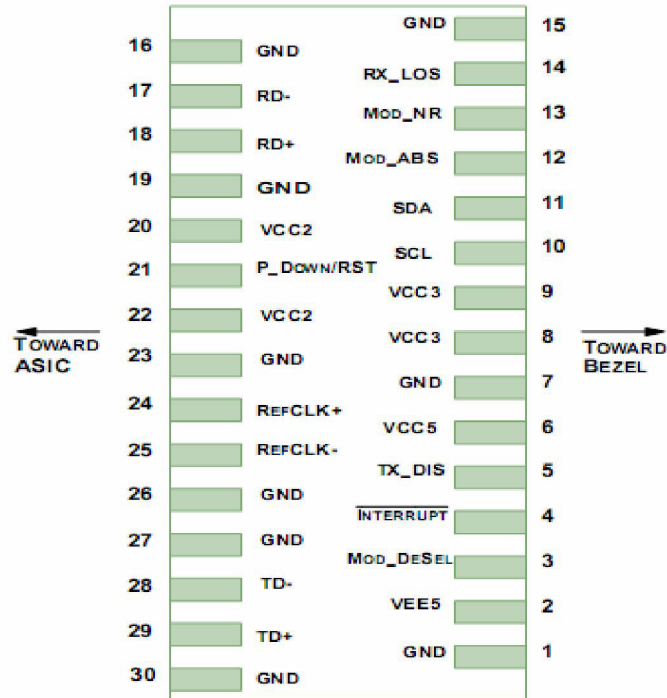
**Notes:**

- [1] The optical power is launched into SMF
- [2] Measured with RPBS 2<sup>31</sup>-1 test pattern @10.3125Gbs
- [3] Measured with RPBS 2<sup>31</sup>-1 test pattern @10.3125Gbs BER=<10<sup>-12</sup> ER=6dB

## 7 Electrical Interface Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
Total power supply current	Icc	-	-	350	mA
<b>Transmitter</b>					
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
<b>Receiver</b>					
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

## 8. Pin Description



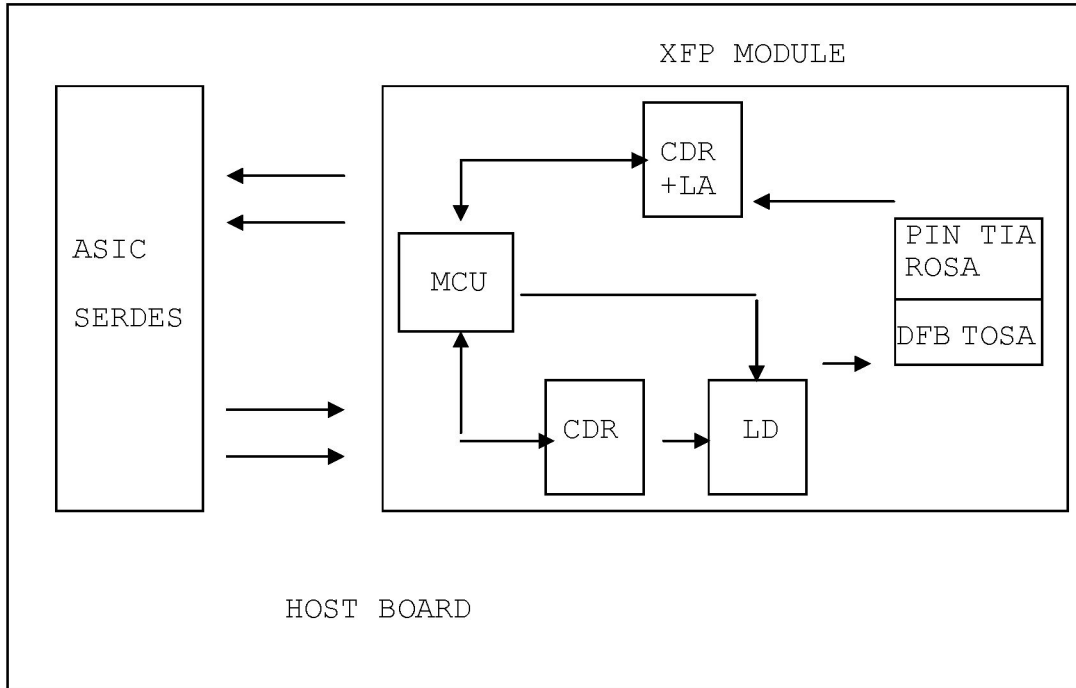
Pin	Logic	Symbol	Name/Description
1		GND	Module Ground <sup>[1]</sup>
2		VEE5	Optional -5.2 Power Supply - Not required
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface <sup>[2]</sup>
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off
6		VCC5	+5 Power Supply
7		GND	Module Ground <sup>[1]</sup>
8		VCC3	+3.3V Power Supply
9		VCC3	+3.3V Power Supply
10	LVTTL-I	SCL	Serial 2-wire interface clock <sup>[2]</sup>
11	LVTTLI/O	SDA	Serial 2-wire interface data line <sup>[2]</sup>
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module. <sup>[2]</sup>
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. <sup>[2]</sup>
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator <sup>[2]</sup>

Pin	Logic	Symbol	Name/Description
15		GND	Module Ground <sup>[1]</sup>
16		GND	Module Ground <sup>[1]</sup>
17	CML-O	RD-	Receiver inverted data output
18	CML-O	RD+	Receiver non-inverted data output
19		GND	Module Ground <sup>[1]</sup>
20		VCC2	+1.8V Power Supply - Not required
21	LVTTL-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 <sup>[1]</sup>
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board - Not required <sup>[3]</sup>
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board - Not required <sup>[3]</sup>
26		GND	Module Ground <sup>[1]</sup>
27		GND	Module Ground <sup>[1]</sup>
28	CML-I	TD-	Transmitter inverted data input
29	CML-I	TD+	Transmitter non-inverted data input
30		GND	Module Ground <sup>[1]</sup>

**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 3.15 V and 3.6V.
- [3] A Reference Clock input is not required by the XFBL-332796-60D. If present, it will be ignored.

## 9. Recommended Block Circuit



## 10. Mechanical Specifications

