

Product Specification

10GBASE-ZR/ZW 80Km XFP Transceiver

EXFP10G-55ZRS

ePHOTON

Preliminary

EXFP10G-55ZRS 10GBASE-ZR/ZW 80Km XFP Transceiver

1 Features

- 1.1 10Gb/s serial optical interface compliant to 802.3ae, 10GBASE ZR/ZW
- 1.2 1550nm cooled EML transmitter with TEC, APD PD
- 1.3 XFP Mechanical interface with bail latch and hot pluggable
- 1.4 XFI High Speed Electrical Interface
- 1.5 2-wire interface for management and digital diagnostic monitor
- 1.6 Operating case temperature: 0 to 70°C
- 1.7 All-metal housing for superior EMI performance
- 1.8 Advanced firmware allow customer system encryption information to be stored in transceiver
- 1.9 RoHS compliant
- 1.10 No reference clock needed



2 Applications

- 2.1 SONET(OC-192)/SDH(STM64) line card
- 2.2 10GBASE-ER (10.3125Gbps)
- 2.3 10GBASE-EW (9.953Gbps)
- 2.4 10GE Ethernet switches and routers
- 2.5 10GE Storage

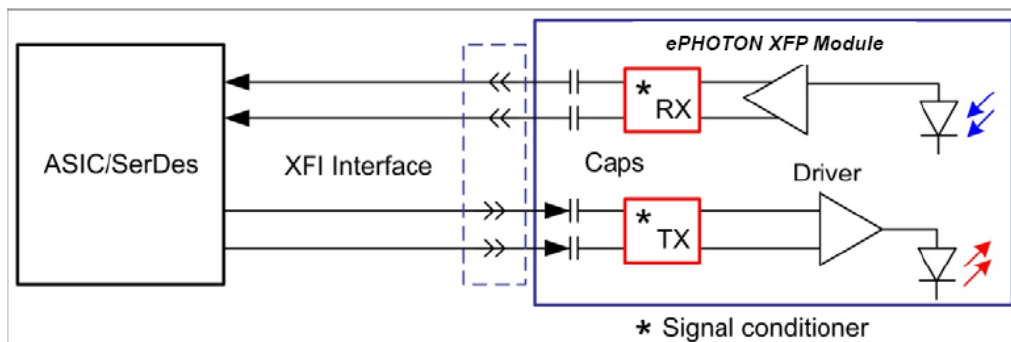


Figure 1: Interface to Host

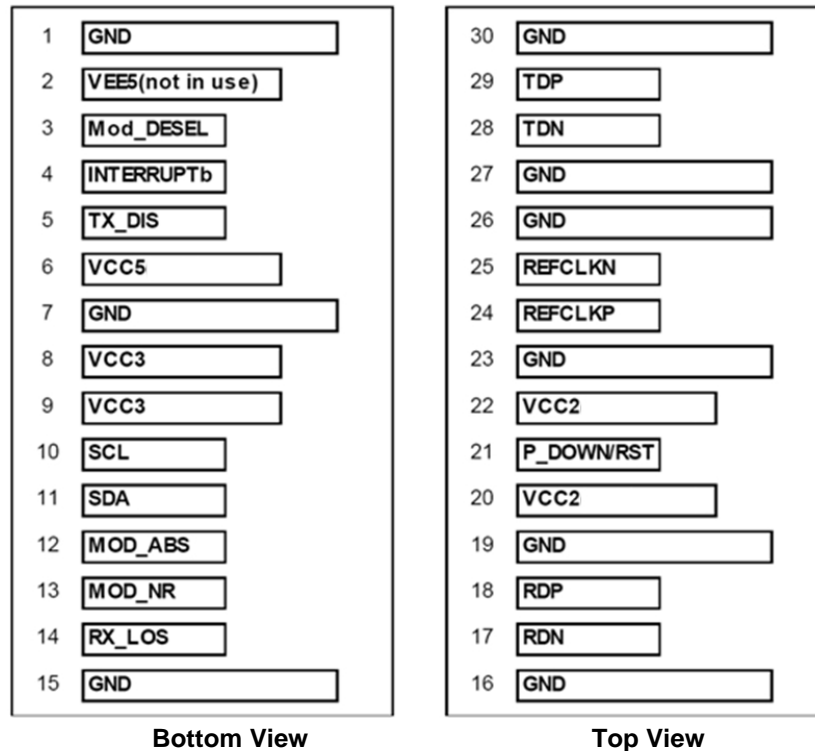
3 General Description

The EXFP10G-55ZRS is a very compact 10Gb/s optical transceiver module for serial optical communication applications at 10Gb/s. The EXFP10G-55ZRS converts a 10Gb/s serial electrical data stream to 10Gb/s optical output signal and a 10Gb/s optical input signal to 10Gb/s serial electrical data streams. The high speed 10Gb/s electrical interface is fully compliant with XFI specification and allows FR4 host PCB trace up to 200mm.

The EXFP10G-55ZRS is designed for use in a variety of 10Gb/s SONET/SDH equipment including FEC (9.95Gb/s to 10.7Gb/s) and Ethernet LAN (10.3Gb/s) and WAN (9.95Gb/s) applications. The high performance cooled 1550nm EML transmitter and high sensitivity APD receiver provide superior performance for SONET/SDH and Ethernet applications at up to 80km links. The fully XFP compliant form factor provides hot pluggability easy optical port upgrades and low EMI emission.

5.1 Pin Assignment and pin description

XFP Transceiver Electrical Pad Layout



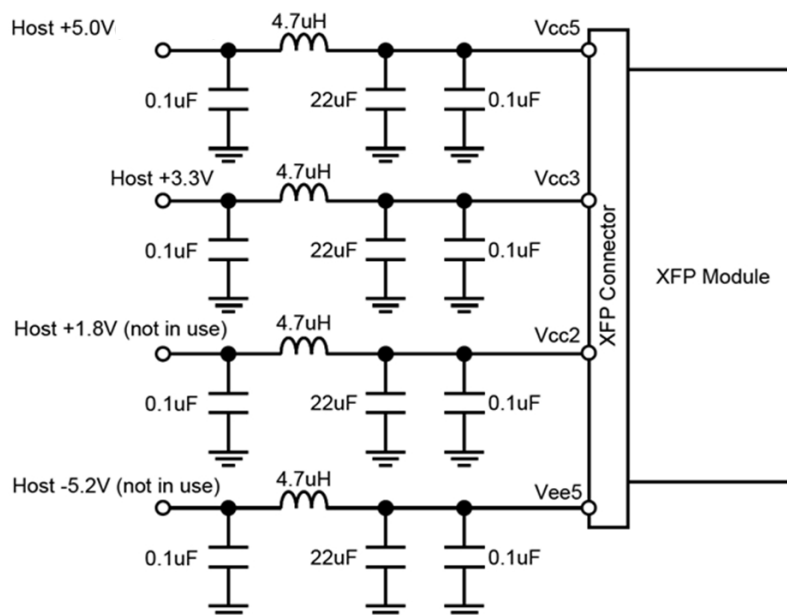
Pin#	Name	Logic	Description	Note
1	GND		Module Ground	1
2	VEE5		-5.2V Power Supply , not in use	
3	MOD_DESEL	LVTTL-I	Module De-select; When held Low allows module to respond to 2-wire serial interface	
4	INTERRUPTb	LVTTL-O	Indicates presence of an important condition, which can be read over the 2-wire serial interface. This pin is an open collector output and must be pulled up to host_Vcc on the host board.	2
5	TX_DIS	LVTTL-I	Transmitter Disable; When asserted High, transmitter output is turned off. This pin is pulled up to VCC3 in the module	
6	VCC5		+5V Power Supply	
7	GND		Module Ground	1
8	VCC3		+3.3V Power Supply	
9	VCC3		+3.3V Power Supply	
10	SCL	I/O	2-wire serial interface clock. Host shall resistor connected to host_Vcc of +3.3V.	2
11	SDA	I/O	2-wire serial interface data. Host shall use a pull-up resistor connected to host_Vcc of +3.3V.	2
12	MOD_ABS	LVTTL-O	Indicates Module is not present. Host shall pull up this pin, and grounded in the module. "High" when the XFP module is absent from a host board.	2
13	MOD_NR	LVTTL-O	Module not ready; When High, Indicates Module Operational Fault. This pin is an open collector and must be pulled to host_Vcc on the host board.	2,3,4

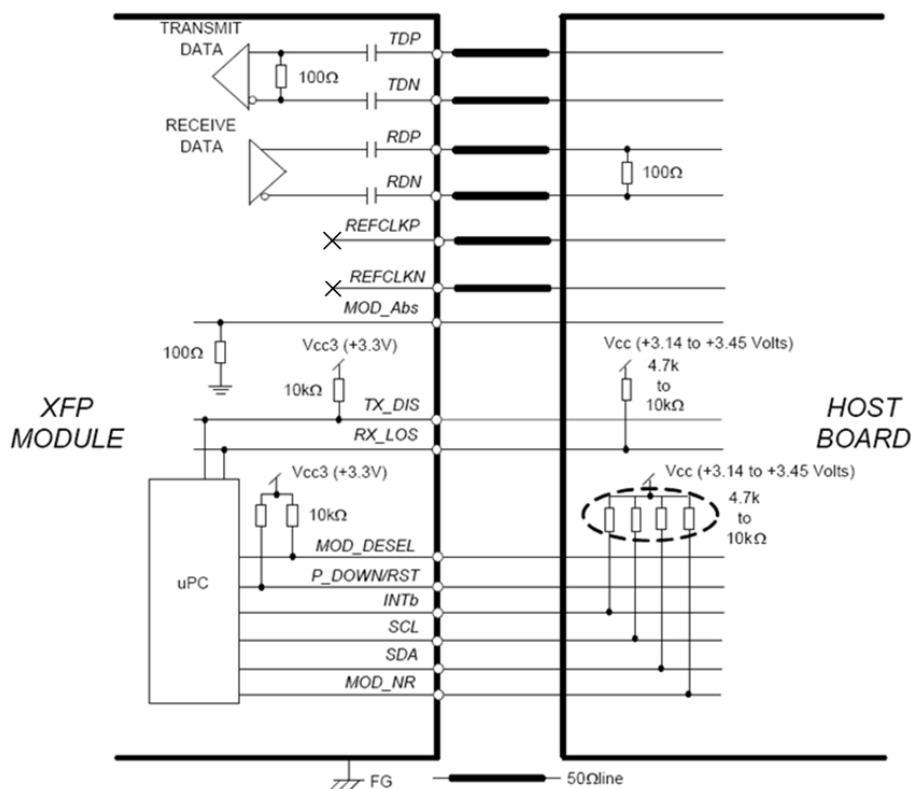
14	RX_LOS	LVTTTL-O	Receiver Loss of Signal; When high, indicates insufficient optical input power to the module. This pin is an open collector and must be pulled to host_Vcc on the host board.	2
15	GND		Module Ground	
16	GND		Module Ground	
17	RDN	CML-O	Receiver Inverted Data Output; AC coupled inside the module.	
18	RDP	CML-O	Receiver Non-Inverted Data Output; AC coupled in side the module.	
19	GND		Module Ground	1
20	VCC2		+1.8V Power Supply, not in use	
21	P_DOWN/RST	LVTTTL-I	Power down; When High, module is limited power mode. Low for normal operation. Reset; The falling edge indicates complete reset of the module. This pin is pulled up to VCC3 in the module.	
22	VCC2		+1.8V Power Supply, not in use	
23	GND		Module Ground	1
24	REFCLKP	PECL-I	Reference clock Non-Inverted Input; not in use	
25	REFCLKN	PECL-I	Reference clock Inverted Input; not in use	
26	GND		Module Ground	1
27	GND		Module Ground	1
28	TDN	CML-I	Transmitter Inverted Data Input; AC coupled inside the module.	
29	TDP	CML-I	Transmitter Non-Inverted Data Input; AC coupled inside the	
30	GND		Module Ground	1

Notes:

1. Module ground pins are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7k to 10k ohm to a voltage between 3.15V and 3.45V on the host board.
3. Response time: typ. 20msec (XFP MSA Rev.4.5 1msec)
4. MOD_NR = (TX LOL) OR (RX LOL).

5.2 Recommended Power Supply Filter





6 Performance Specifications

6.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	Tst	-40	85	degC	
Relative Humidity (non-condensation)	RH	-	85	%	
Operating Case Temperature	Topc	0	70	degC	1
Supply Voltage #3	VCC3	-0.5	3.6	V	
Supply Voltage #5	VCC3	-0.5	6.0	V	
Voltage on LVTTTL Input	Vilvttl	-0.5	VCC3+0.5	V	
LVTTTL Output Current	Iolvttl	-	15	mA	
Voltage on Open Collector Output	Voco	0	6	V	
Receiver Input Optical Power(Average)	Mip	-	-7	dBm	2

Notes:

1. Ta: -10 to 60degC with 1.5m/s airflow with an additional heat sink.
2. APD Receiver

6.2 Recommended Conditions and Supply Requirement

Parameter	Symbol	Min	Max	Unit
Operating Case Temperature	Topc	0	70	degC
Relative Humidity (non-condensing)	Rhop	-	85	%
Main Power Supply Voltage #3	VCC3	3.13	3.45	V
Main Power Supply Current #3	ICC3	-	750	mA
Power Supply Voltage #5	VCC5	4.75	5.25	V
Power Supply Current #5	ICC5	-	300	mA
Total Power Consumption	Pd	-	3.5	W

6.3 Low Speed Control and Alarm Signals Electrical Interface

Parameter	Symbol	Min	Max	Units	Note
XFP Interrupt, Mod_NR, RX_LOS	Vol	0.0	0.4	V	1
	Voh	Vcc-0.5	Vcc+0.3		2
XFP TX_DIS, P_DOWN/RST	Vil	-0.3	0.8	V	3
	Vih	2.0	VCC3+0.3		4
XFP SCL and SDA Output	Vol	0.0	0.4	V	1
	Voh	Vcc-0.5	Vcc+0.3		2
XFP SCL and SDA Input	Vil	-0.3	VCC3*0.3	V	5
	Vih	VCC3*0.7	VCC3+0.5		6
Capacitance for XFP SCL and SDA I/O pin	Ci	-	14	pF	
Total bus capacitive load for SCL and SDA	Cb	-	100	pF	7
			400	pF	8

Notes:

1. Pull-up resistor must be connected to host_Vcc on the host board. Iol(max)=3mA
2. Pull-up resistor must be connected to host_Vcc on the host board.
3. Pull-up resistor connected to VCC3 within XFP module. Iil(max)= -10μA.
4. Pull-up resistor connected to VCC3 within XFP module. Iih(max)= 10μA.
5. Pull-up resistor must be connected to host_Vcc on the host board. Iol(max)= -10μA.
6. Pull-up resistor must be connected to host_Vcc on the host board. Iol(max)= 10μA.
7. At 400KHz, 3.0kohms pull-up resistor, at 100kHz 8.0kohms pull-up resistor max.
8. At 400KHz, 0.8kohms pull-up resistor, at 100kHz 2.0kohms pull-up resistor max.

6.4 Optical Interface

Transmitter Optical Interface						
Parameter	Symbol	M	Typical	Max	Unit	Note
Operating Data Rate	-	9.95		10.70	Gb/s	1
Output Center Wavelength	l _{tc}	1530	1550	1565	nm	
SMSR	SMSR	30		-	dB	
Average Output Power	P _o	0		+4	dBm	2
Disabled Power	P _{off}	-		-30	dBm	2
Extinction Ratio	ER	9	10	-	dB	2
Eye Mask 1(SONET/SDH)		GR-253-CORE/ITU-T G.691				2
Eye Mask 2 (10G Ethernet)		IEEE802.3ae				3
Generation Jitter 1 (20kHz-80MHz)		-		0.15	UIp-p	2,4
Generation Jitter 2 (4MHz-80MHz)		-		0.1	UIp-p	2,4

RIN	RIN	-	-130	dB/Hz
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Receiver Optical Interface						
Parameter	Symbol	Min	Typical	Max	Unit	Note
Operating Data Rate	-	9.95		10.70	Gb/s	1
Input Center Wavelength	Irc	1260		1600	nm	
Overload	Rovl	-7	-	-	dBm	
Minimum Sensitivity	Pmin	-	-	-24.0	dBm	2
RX LOS Assert Level	RLOSa	-35			dBm	
RX LOS Deassert Level	RLOSd			-30	dBm	
RX LOS Hysteresis	RLOSh	1		5	dB	
Optical Path Penalty	PN	-		2	dB	1
Optical Return Loss	ORL	27		-	dB	
Jitter Tolerance	JTL	GR-253-CORE/ITU-T G.783				

Notes:

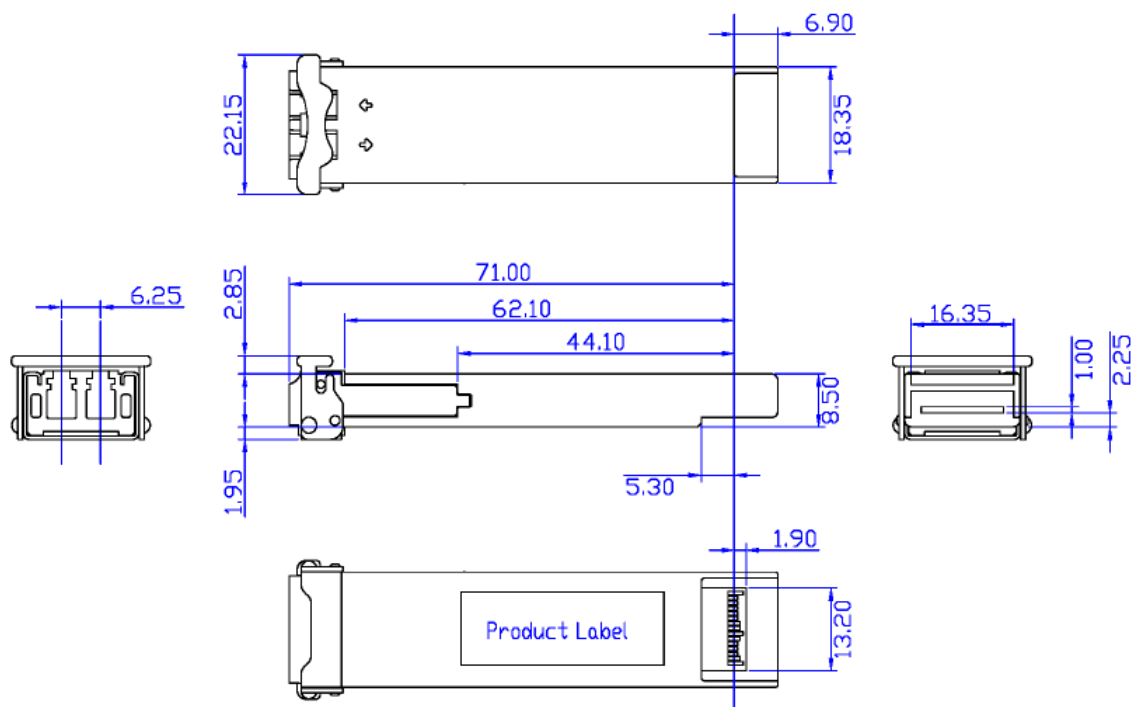
- Data rate tolerance
- IR-2/S-64.2b, 10GBASE-ZW: typ. +/-20ppm
- 10GBASE-ZR: typ. +/-100ppm
- Measured at 10.3125Gbps, Non-framed PRBS2³¹-1, NRZ
- Measured by using ePHOTON XFP evaluation board.

7 Digital Diagnostic Function

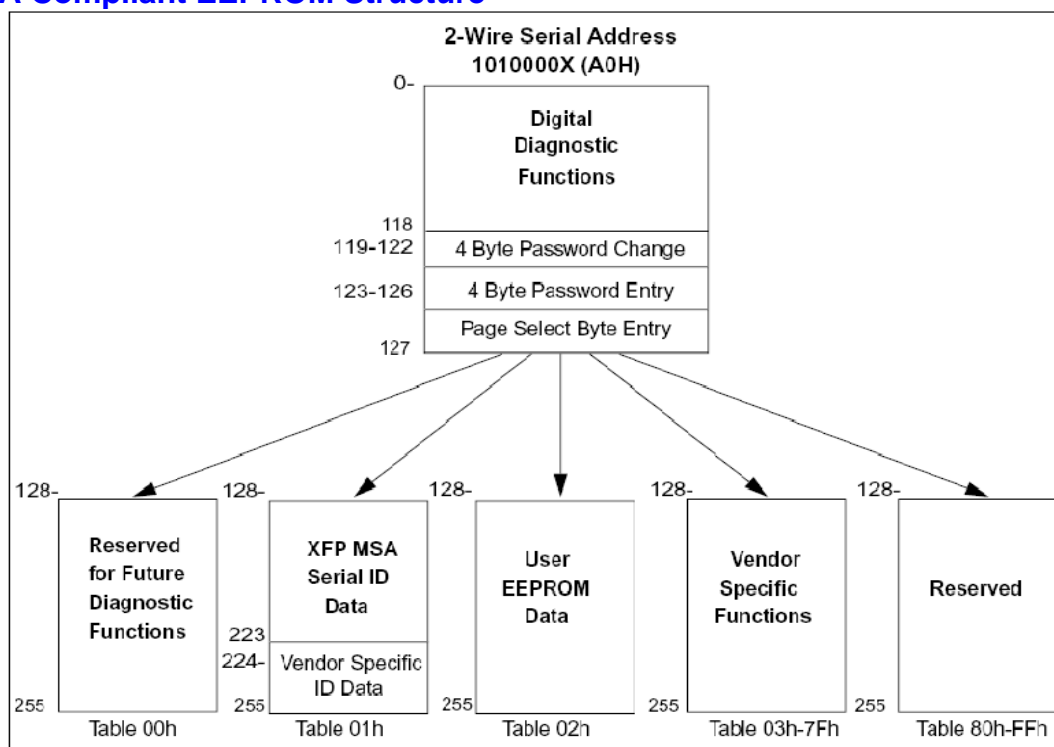
The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF8472 Rev9.2 with internal calibration mode. For external calibration mode please contact our sales staff.

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-2.5	2.5	degC	Over operating temp
Laser power monitor absolute error	DMI_TX	-2.5	2.5	dB	
RX power monitor absolute error	DMI_RX	-2.5	2.5	dB	-1dBm to -15dBm range
Supply voltage monitor absolute error	DMI_VCC	-0.08	0.08	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	10%	mA	

8 Package Information



9 MSA Compliant EEPROM Structure



10 ESD

This transceiver is specified as ESD threshold 2kV for all electrical input pins, tested per MIL-STD-883, Method 3015.4/JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment

11 Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:1993:+A1:1997+A2:2001. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (July 26, 2001)

12 Ordering Information

Part Number	Description
EXFP10G-55ZRS	10GBASE ZR/ZW 80Km XFP, 0~70°C

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