

## **FPCPPXX10GL-80D (1470~1610nm)**

### **10G CWDM SFP+ 80KM Transceivers Module**

#### **Features**

- ✧ 1470nm to 1610nm CWDM EML Laser,APD photo-detector receiver
- ✧ Compliant with SFP+ MSA
- ✧ Compliant to 802.3ae 10GBASE-ZR
- ✧ Compliant to SFP+ SFF-8431 and SFF-8432
- ✧ Hot-pluggable SFP footprint
- ✧ Built-in digital diagnostic functions
- ✧ Maximum Link Length of 80 km
- ✧ Single power supply 3.3V
- ✧ Class 1 laser product complies with EN 60825-1
- ✧ Case temperature range: -5°C to 70°C
- ✧ Power dissipation < 1.5W



#### **Applications**

- ✧ 10GBASE-ZR/ZW

#### **Description**

The Fiberpon FPCPPXX10GL-80D is CWDM SFP+ transceiver for long distance optical communications, the distance is up to 80km. The transceivers include an APD diode and temperature stabilized DFB-EML transmitter. Digital diagnostic functions are available via an I2C. This module is designed for single mode fiber.

## Product Selection

FPCPPXX10GL-80D

Wavelength	xx	Wavelength	xx
1470 nm	47	1550 nm	55
1490 nm	49	1570 nm	57
1510 nm	51	1590 nm	59
1530 nm	53	1610 nm	61

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	Tcase	-5		70	°C	

## Electrical Characteristics (Tcase = -5 °C to 70°C, VCC = 3.14 to 3.46 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc		300	450	mA	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	180		1200	mV	
Transmit Disable Voltage	VD	Vcc-1.3		Vcc	V	

Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2	
Transmit Disable Assert Time				10	us		
<b>Receiver</b>							
Differential data output swing	Vout,pp	300		850	mV	3	
Data output rise time	tr	30			ps	4	
Data output fall time	tf	30			ps	4	
LOS Fault	VLOS fault	Vcc-1.3		VccHOST	V	5	
LOS Normal	VLOS norm	Vee		Vee+0.8	V	5	

**Notes:**

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. These are unfiltered 20-80% values
5. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

**Optical Characteristics (T<sub>case</sub> = -5°C to 70°C, VCC = 3.14 to 3.46 Volts)**

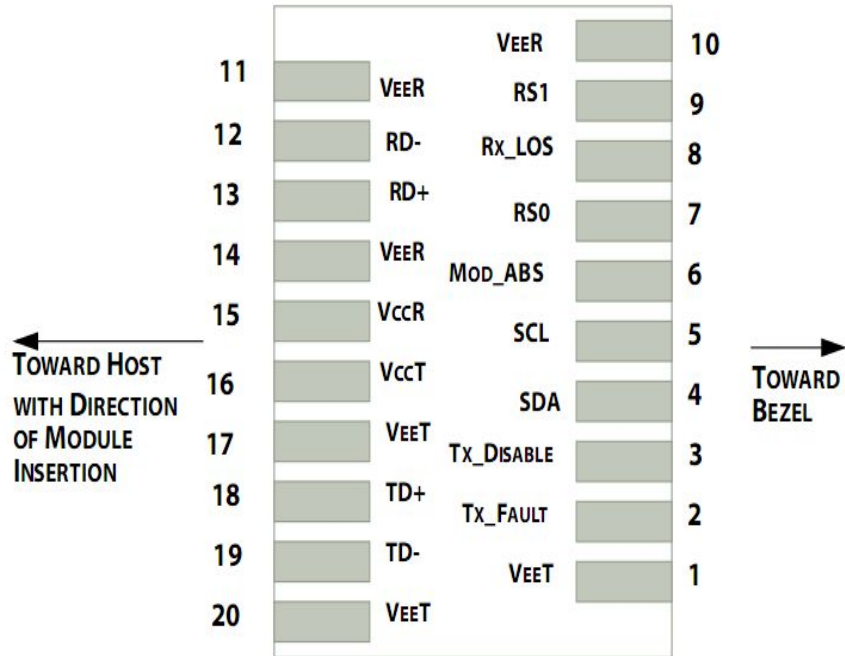
Parameter	Symbol	Min	Typ	Max	Unit	Ref
<b>Transmitter</b>						
Output Opt. Pwr	POUT	0		+5	dBm	1
Optical Wavelength	λ	λ-6.5		λ+6.5	nm	2
Wavelength Temperature Dependance			0.08	0.125	nm/°C	
Optical Extinction Ratio	ER	8.2			dB	
Transmitter and Dispersion Peanly	TDP			3.0	dB	
Side mode Supression ratio	SMSR	30			dB	
RIN	RIN			-128	dB/Hz	
Output Eye Mask		Compliant with IEEE 0802.3ae				
<b>Receiver</b>						
Rx Sensitivity	RSNS			-23	dBm	3
Input Saturation Power (Overload)	Psat	-7			dBm	

Wavelength Range	$\lambda$ C	1270		1610	nm	
LOS De -Assert	LOSD			-26	dBm	
LOS Assert	LOSA	-34			dBm	
LOS Hysteresis		0.5			dB	

**Notes:**

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. "λ" is:1470,1490,1510,1530,1550,1570,1590,1610, please the "product selection"
3. With worst-case extinction ratio. Measured with a PRBS 231-1 test pattern, @10.325Gb/s, BER<10-12 .

**Pin Descriptions**



**Figure 1 Transceiver pin descriptions**

## Pin Function Definitions

Pin Number	Symbol	Name/Description	Ref.
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault.	2
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	No connection required	1
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	RS1	No connection required	1
10	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
11	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

### Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T<sub>FAULT</sub> is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on T<sub>DIS</sub> >2.0V or open, enabled on T<sub>DIS</sub> <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD\_ABS pulls line low to indicate module is plugged in.
5. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

## Typical application circuit

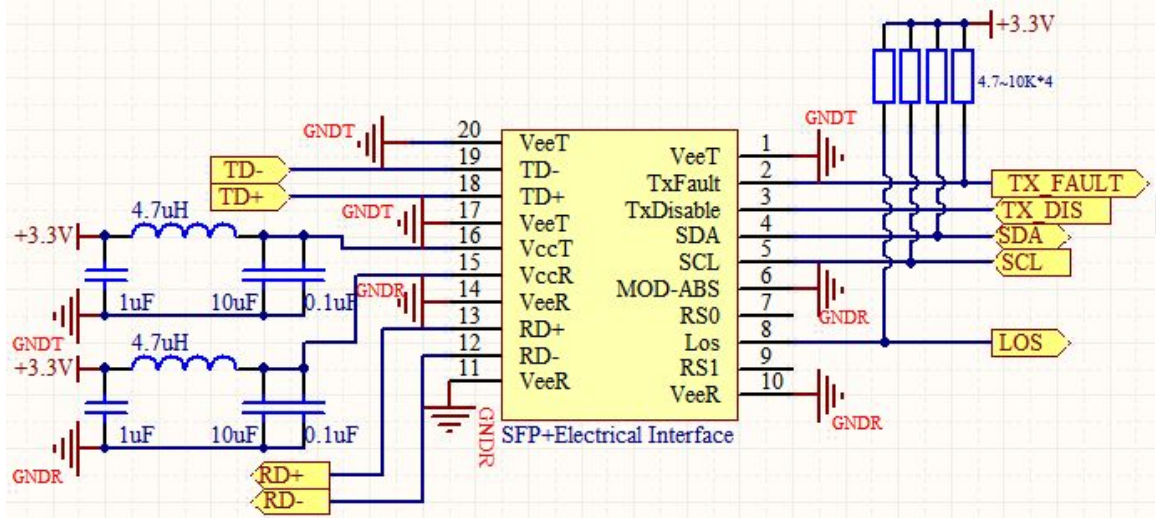
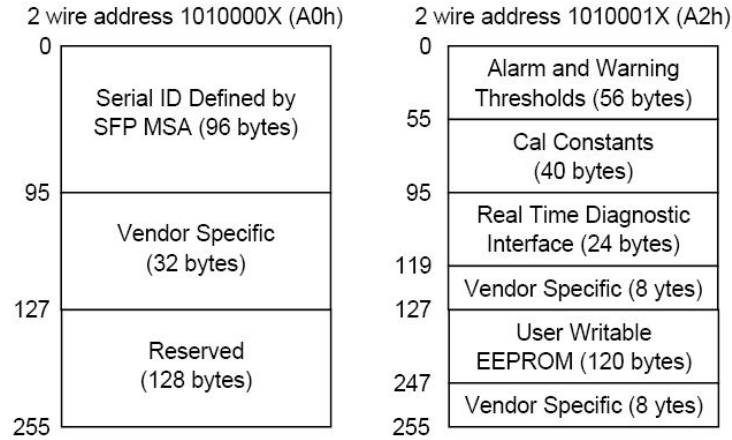


Figure 2 SFP+Electrical Interface

## Digital Diagnostic Functions

Fiberpon's FPCPPXX10GL-80D transceivers support the 2-wire serial communication protocol as defined in the SFP MSA.

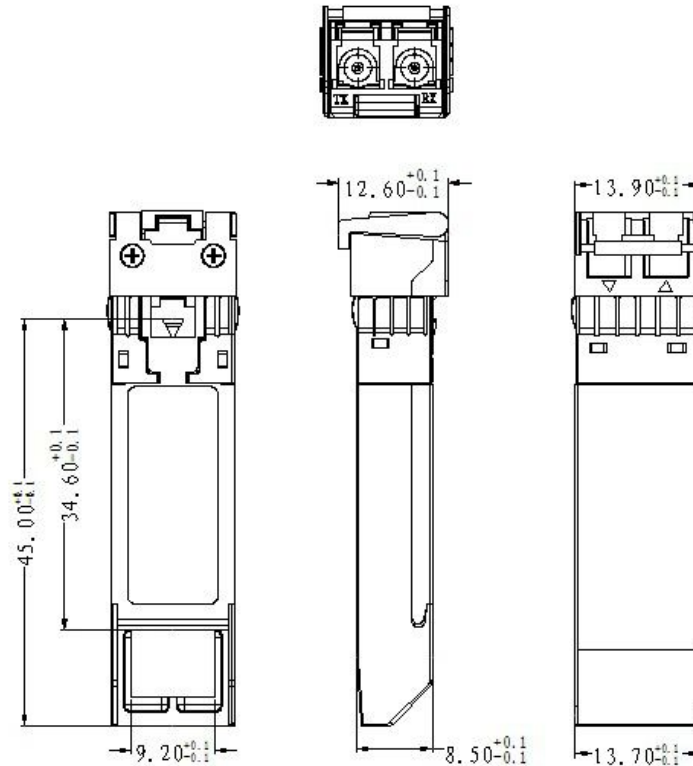
The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h).



**Figure 3 Digital Diagnostic Memory Map**

## Outline Dimensions

Comply to SFF-8432 rev5.0, the improved Pluggable form factor specification.





## **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.

## **Ordering information**

<b>Product Number</b>	<b>Data Rate</b>	<b>Laser</b>	<b>Receiver</b>	<b>Distance</b>	<b>Interface</b>	<b>DDM</b>	<b>Temp.</b>
FPCPPXX10GL-80D	10.3Gbps	CWDM EML	APD	80KM	LC	YES	C

**\* XX ---1470,1490,1510,1530,1550,1570,1590,1610, please the "product selection"**

**\* 80D --- 80KM with SM 9/125um Fiber, with DDM Functional**

## **Notice**

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