

FPBPP3710GL-60D

10G SFP+ BIDI 60KM TX1330nm/RX1270nm

Transceiver Module

Features

- ✧ Compliant to SFP+MSA
- ✧ 1330nm DFB Transmitter, APD Receiver and TIA
- ✧ SM 9/125um up to 60Km
- ✧ Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- ✧ Built-in digital diagnostic monitoring functions
- ✧ All-Metal housing for superior EMI Performance
- ✧ Power dissipation < 1.5W, Single 3.3V power supply
- ✧ Operating Case Temperature Standard: 0°C~+70°C
- ✧ Electronic Interface compliant with SFF-8431
- ✧ Digital Diagnostic Monitor Function Compatible with SFF-8472
- ✧ Compliant with IEEE 802.3ae 10GBASE-ER/EW
- ✧ ROHS6 Compliant



Applications

- ✧ 10G Ethernet
- ✧ 8G Fiber Channel
- ✧ 10G Fiber Channel

Product Description

Fiberpon's FPBPP3710GL-60D Single-Mode Transceiver is SFP+ modules for duplex data communication as 8G Fiber Channel, IEEE 802.3ae 10G Base-ER/EW. It is SFP+ 20-PIN Connector to allow hot plug capability.

Digital diagnostic monitor functions are available via I²C. This module is designed and operates at DFB Laser 1270nm wavelength.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	Ts	-40		85	°C
Operating Case Temperature	Tc	0		70	°C
Supply Voltage	VCC	-0.5		3.6	V

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Ambient Operating Temperature	T _{AB}	0		70	°C
Supply Voltage	VCC	3.15	3.3	3.45	V
Data Rate	BR	8	10.3	11.3	Gbps
Total Supply Current	I _{CC}			400	mA

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Input differential impedance	R _i		100		Ω	1
Differential data input swing	V _{in,pp}	180		700	mV	
Transmit disable voltage	V _D	2		V _{cc}	V	
Transmit enable voltage	V _{EN}	V _{ee}		V _{ee} +0.8	V	
Data dependent input jitter	DDJ			0.1	U	
Data input Total Jitter	T _J			0.28	U	
Receiver						
Differential data output swing	V _{out,pp}	300		850	mV	
Data output rise time,fall time	t _r	30			P	2
Los Fault	V _{LOS} fault	2		V _{cc}	V	3
Los Normal	V _{LOS} norm	V _{ee}		V _{ee} +0.8	V	3
Total Jitter	T _J			0.70	U	
Deterministic Jitter	DJ			0.42	U	

Notes:

1. Connected directly to TX data input pins, AC coupling from pins into laser drive
2. 20 – 80 % . Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's

in sequence in the PRBS⁹ is an acceptable alternative. SFF-8431 Rev 2.1

- LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 3.6V

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_t	1320	1330	1340	nm	
Average Optical Power	P_{av}	0		5	dBm	
Extinction Ratio	ER	5	6		dB	
Transmitter Dispersion Penalty	TDP			1.5	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Receiver						
Center Wavelength	λ_R	1260	1270	1280	nm	
Receiver Sensitivity	RP_{sen}			-23	dBm	1
Return Loss Tolerance				-12	dB	
Receiver Overload	RP_{max}	0.8			dBm	2
LOS De-Assert	LOS_D			-25	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS	High	2.0		$V_{cc}+0.3$	V	
	Low	0		0.8		

Notes:

- Measured with a PRBS $2^{31}-1$ test pattern @10.3125Gbps, $BER \leq 10^{-12}$
- Receiver Overload specified in OMA and under the worst comprehensive stressed conditions

Pin function definitions

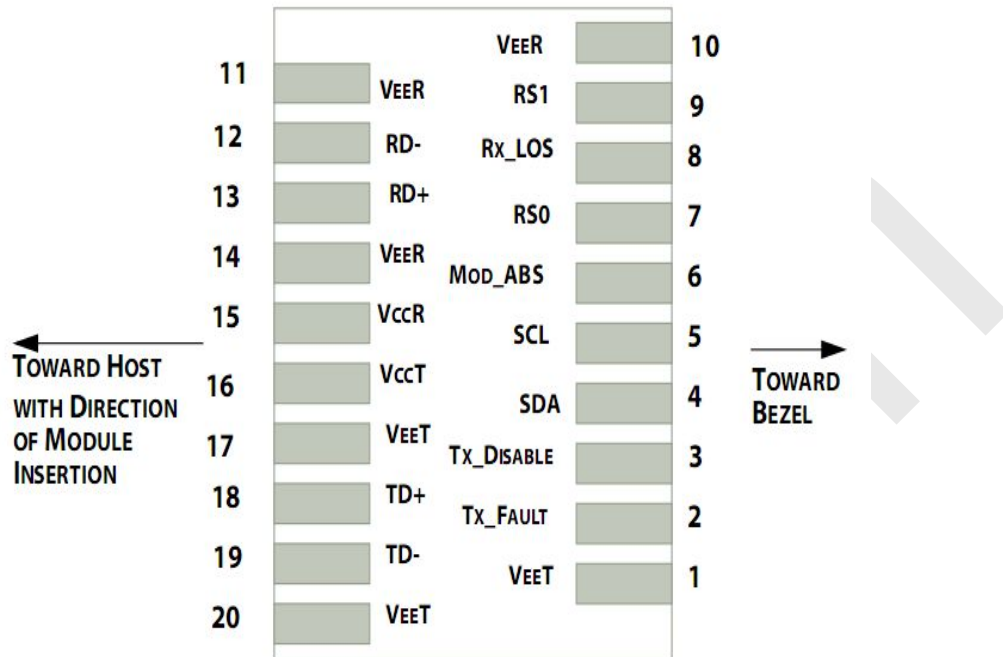


Figure 1 Transceiver pin descriptions

Pin Number	Symbol	Name/Description	Ref.
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault.	2
3	T _{DIS}	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 _{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EER}	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 _{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	

17	V _{EET}	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 _{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} 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_{DIS} >2.0V or open, enabled on T_{DIS} <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

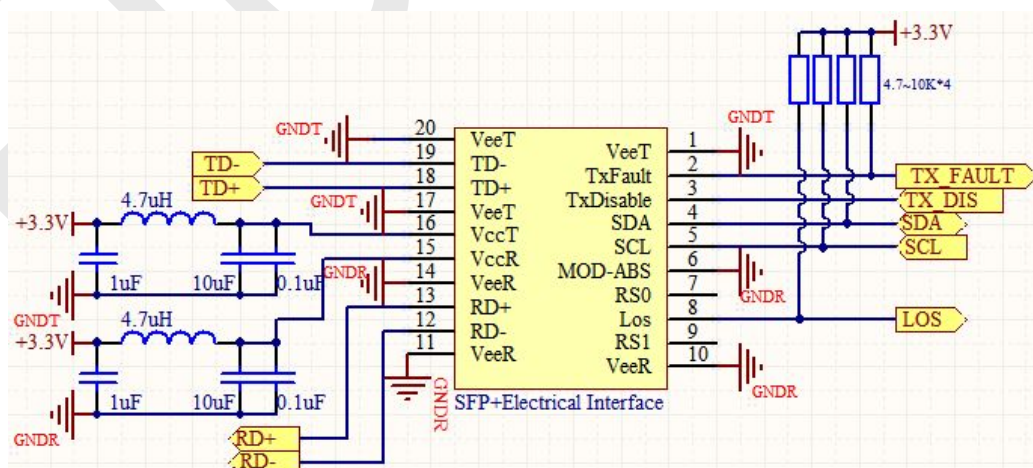


Figure 2 SFP+Electrical Interface

Digital Diagnostic Functions

Fiberpon’s FPBPP3710GL-60D 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).

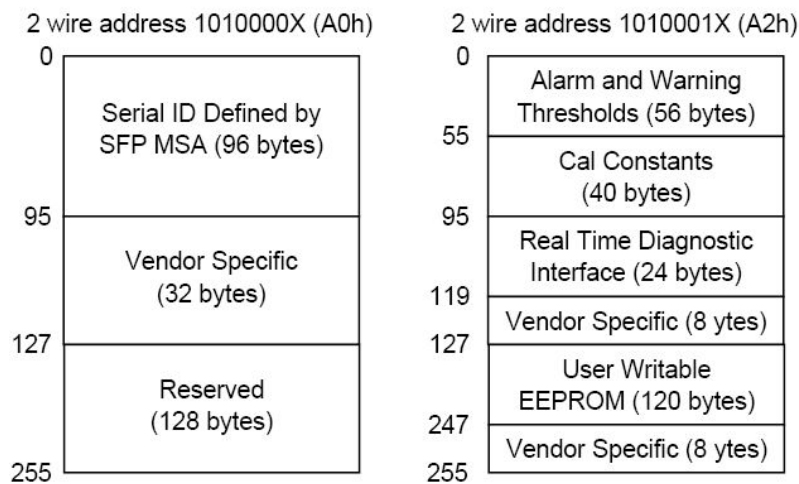
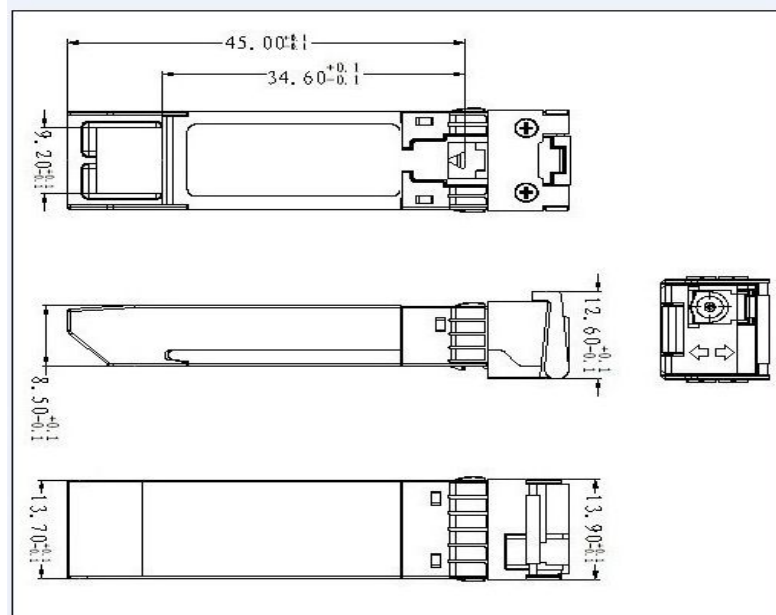


Figure 3 Digital Diagnostic Memory Map

Mechanical Specifications



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

Product Number	Data Rate	Laser	Receiver	Distance	Interface	DDM	Temp.
FPBPP3710GL-60D	10Gbps	DFB	APD	60Km	LC	YES	C

* 60D--- 60Km with SM 9/125um Fiber Transmission, with DDM/DOM Functional

Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and



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