FPSPP3110GL-10D

10Gbps 10Km SFP+ 1310nm Transceivers

Features

- Compliant to SFP+MSA
- 1310nm DFB Transmitter, PIN Photodiode and TIA
- SM 9/125um up to 10Km
- Duplex LC connector
- Built-in digital diagnostic monitoring functions
- All-Metal housing for superior EMI Performance
- Power dissipation < 1W, Single 3.3V power supply
- Operating Case Temperature Standard: 0℃~+70℃
- Electronic Interface compliant with SFF-8431
- Digital Diagnostic Monitor Function Compatible with SFF-8472
- Compliant with IEEE 802.3ae 10GBASE-LR/LW
- ROHS6 Compliant

Applications

- 10G Base-LR/LW
- 10G Ethernet
- 8G Fiber Channel
- 10G Fiber Channel

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	Ts	-40		85	ºC
Operating Case Temperature	Tc	-5		70	ºC
Supply Voltage	VCC	-0.5		3.6	V

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Ambient Operating Temperature	T_A	0		70	ºC
Supply Voltage	VCC	3.15	3.3	3.45	V
Data Rate	10GBASE-LR		10.3		Gbps
	10GBASE-LW		9.95		
	8G FC		8.5		
Total Supply Current	I_{CC}			300	mA

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Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Input differential impedance	Ri		100		Ω	1
Differential data input swing	Vin,pp	180		700	mV	
Transmit disable voltage	VD	2		Vcc	V	
Transmit enable voltage	VEN	Vee		Vee+0.8	V	
Data dependent input jitter	DDJ			0.1	U	
Data input Total Jitter	TJ			0.28	U	
Receiver						
Differential data output swing	Vout,pp	300		850	mV	
Data output rise time,fall time	tr	30			P	2
Los Fault	VLOS fault	2		Vcc_{host}	V	3
Los Normal	VLOS norm	Vee		Vee+0.8	V	3
Total Jitter	TJ			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 PRBS^9 is an acceptable alternative. SFF-8431 Rev 2.1
3. 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		λt	1290	1310	1330	nm	
Average Optical Power		Pav	-6.5		0.5	dBm	
Extinction Ratio		ER	3.6	5.0		dB	
Transmitter and Dispersion Penalty		TDP			3.9	dB	
Relative Intensity Noise		RIN			-128	dB/Hz	
Receiver							
Center Wavelength		λR	1260	1310	1560	nm	
Receiver Sensitivity		RPsen			-14	dBm	1
Return Loss Tolerance					-12	dB	
Receiver Overload		RPmax	0.8			dBm	2
LOS De-Assert		LOS_D			-17	dBm	
LOS Assert		LOS_A	-30			dBm	
LOS	High		2.0		Vcc+0.3	V	
	Low		0		0.8		

Notes:

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

Pin function definitions

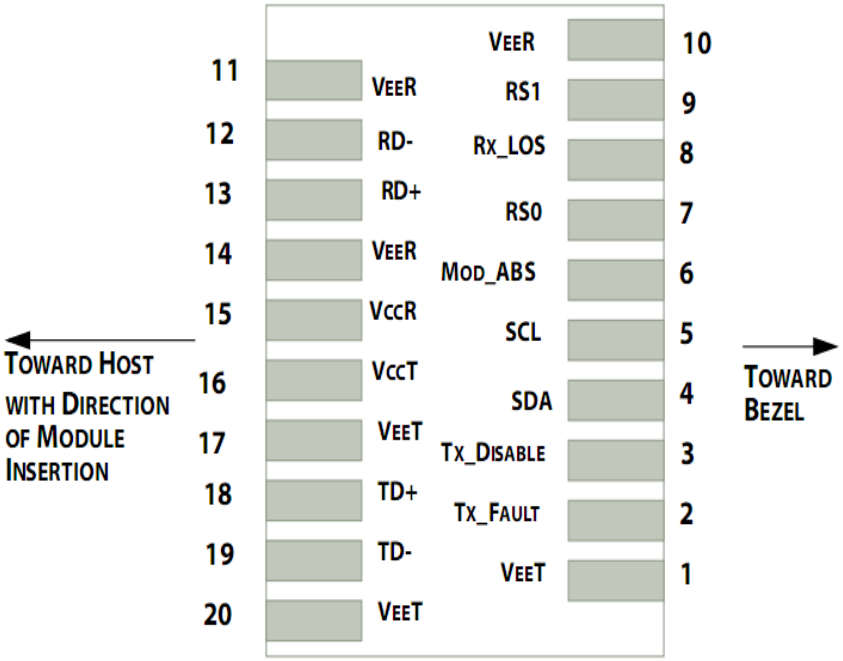


Figure 1 Transceiver pin descriptions

Pin	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

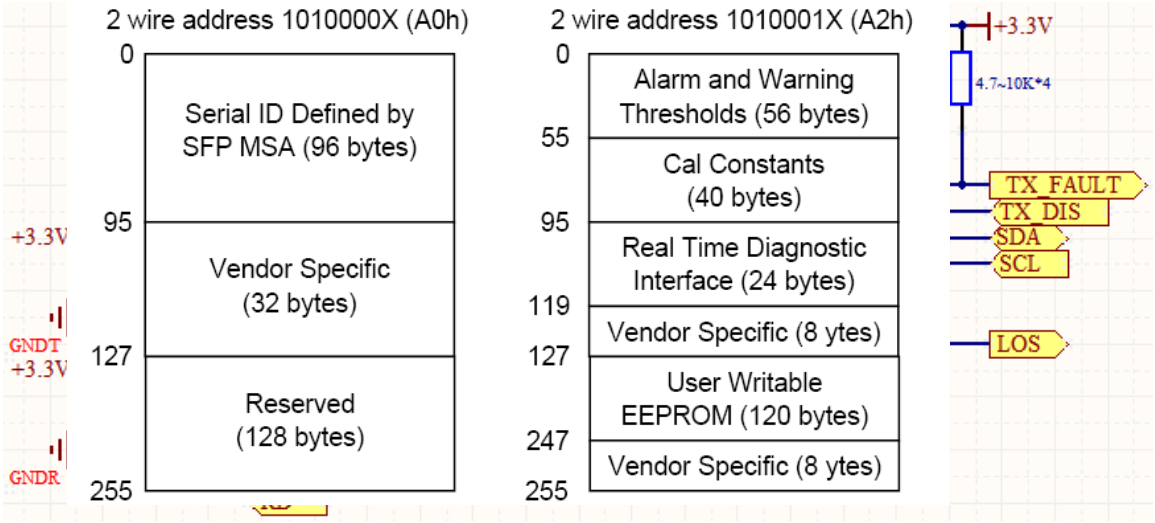
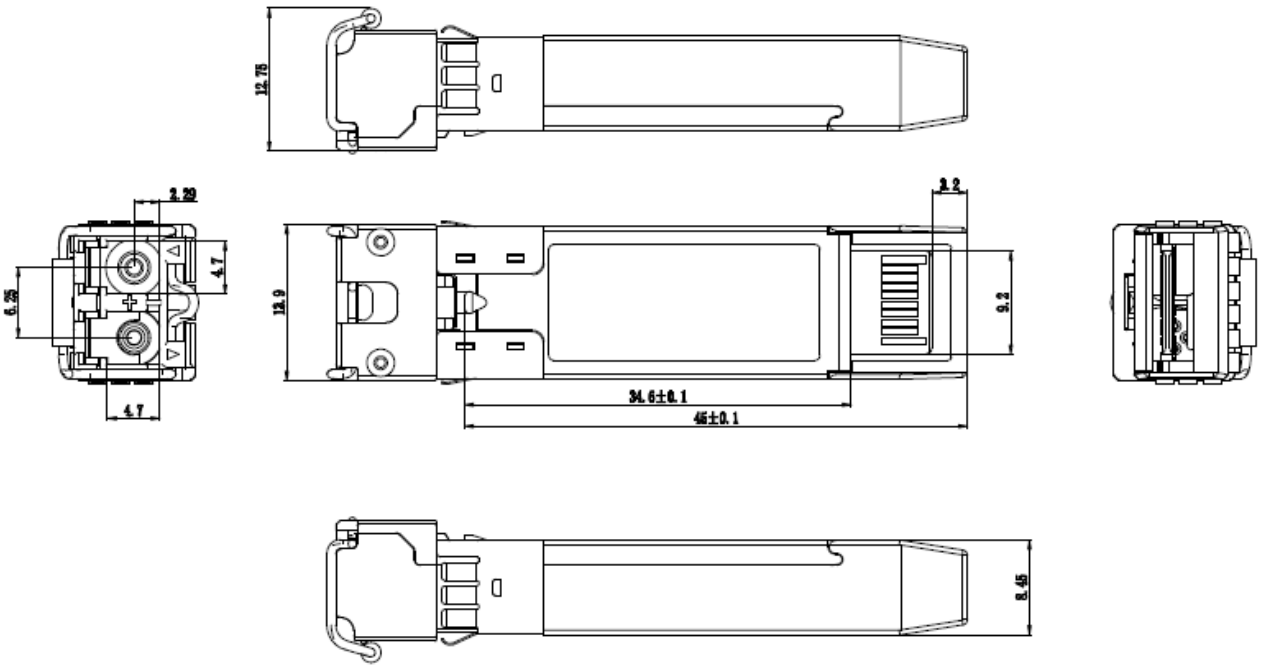


Figure 2 SFP+Electrical Interface

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.

Laser Eye Safety

Class 1 Laser Product as defined by the Internal Standard IEC 60825-1: 2014 and by USA regulations for class 1 products per CDRH 21 CFR 1040.1 and 1040.11.

Ordering information

Part No.	Data Rate	Laser	Receiver	Distance	Interface	DDM	Temp.
FPSPP3110GL-10D	10Gbps	DFB	PIN-TIA	10KM	LC	YES	C

*** 10D--- 10KM with SM 9/125um Fiber Transmission, with DDM/DOM Functional**