XFP-S1013L-10

Optical XFP Module

10Gbps XFP LR Transceiver SM 1310nm 10KM LC

Features

- Supports 9.95Gb/s to 11.3Gb/s bit rates

- DFB laser and PIN receiver

- Maximum link length of 10km

- XFP MSA package with duplex LC connector

- Hot-pluggable XFP footprint, Built-in digital diagnose

- No reference clock required

- Single +3.3V power supply

- Power dissipation <2.0W

- Compatible with RoHS

- Operating case temperature:

   Standard: 0 to +70°C

   Industrial: -40 to +85°C

Application

- 10GBASE-LR/LW 10G Ethernet

- 10G Fiber Channel

- SONET OC-192 SR-1 SDH STM I-64.1

Standard

- Compliant with XFP MSA

- Compliant with SFF-8472

- Compliant with IEEE 802.3ae

Description

The XFP module is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), supporting data-rate of 9.95~11.3Gbps, and transmission distance up to 10km on SMF.

The transceiver module comprises a transmitter with 1310nm DFB laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	+4	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter		Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard	Tc	0		+70	°C
	Industrial		-40		+85	°C
Power Supply Voltage		Vcc	3.13	3.3	3.47	V
Power Supply Current		Icc			450	mA
Data Rate				10.3	11.3	Gbps
Fiber Length 9/125μm core SMF			-	10	-	km

Optical and Electrical Characteristics

Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Transmitter differential input voltage		120		820	mV	
Receiver differential output Voltage		340	650	850	mV	
Input differential impedance	R		100		Ω	
Transmit Disable Assert Time			10		us	
Data output rise time	tr			38	ps	
Data output fall time	tf			38	ps	
Transmit Fault (TX_Fault)	Voh	2		Vcc	V	LVTTL
	Vol	0		0.8	V	LVTTL
Loss of Signal (LOS)	Voh	Vcc-0.5		Vcc	V	LVTTL
	Vol	0		0.5	V	LVTTL
TX Disable	Vih	2		Vcc	V	LVTTL
	Vil	0		0.8	V	LVTTL

Optical Transmitter Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Launched Power (avg.)	Pout	-6		0.5	dBm	
Operating Wavelength Range	λc	1290	1310	1330	nm	
Extinction Ratio	ER	3.5			dB	2
Relative Intensity Noise	RIN			-130	dB/Hz	
Average Launch power of transmitter	P_{OFF}			-30	dBm	
Side mode Suppression ratio	SMSR		30		PS	3
Transmitter and Dispersion Penalty	TDP			3.2	dBm	
Output Eye Diagram	Complies with IEEE802.3z eye masks when filtered					
Optical Receiver Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Receiver Sensitivity	S			-15	dBm	4
Wavelength Range	λc	1270		1610	nm	
Optical Power Input Overload	P_{in-max}	+0.5			dBm	4
Receiver Reflectance	R			-14	dB	
LOS	Optical De-assert	Pd			-18	dBm	4
	Optical Assert	Pa	-32				
LOS hysteresis			0.5			dB	5

Notes:

1) The supply current is XFP module's working current.
2) For the measurements, the device was driven with10Gbps data pattern with 231-1 PRBS payload.
3) Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between
4) the 20% and 80% amplitudes relative to the logical 1 and 0 levels
5) Measured with a PRBS 231-1 test pattern, @10Gbps, ER=3.5dB, BER<10-12
6) The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

Pin Description
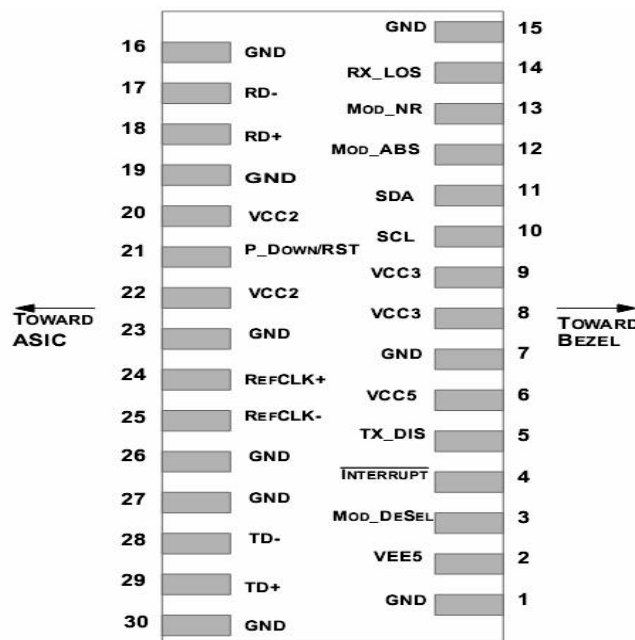
Pin	Signal Name	Description	Plug Seq.	Notes
1	GND	Module Ground		1
2	VEE5	Optional –5.2 Power Supply – Not required		
3	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	LVTTL-I	
4	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	LVTTL-O	2
5	TX_DIS	Transmitter Disable; Transmitter laser source turned off	LVTTL-I	
6	VCC5	+5 Power Supply		
7	GND	Module Ground		1

8	VCC3	+3.3V Power Supply		
9	VCC3	+3.3V Power Supply		
10	SCL	Serial 2-wire interface clock	LVTTL-I	2
11	SDA	Serial 2-wire interface data line	LVTTL-I/O	2
12	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	LVTTL-I	2
13	Mod_NR	Module Not Ready; XGIGA defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	LVTTL-I	2
14	RX_LOS	Receiver Loss of Signal indicator	LVTTL-I	2
15	GND	Module Ground		1
16	GND	Module Ground		1
17	RD-	Receiver inverted data output	CML-O	
18	RD+	Receiver non-inverted data output	CML-O	
19	GND	Module Ground		1
20	VCC2	+1.8V Power Supply – Not required		
21	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	LVTTL-I	
22	VCC2	including the 2-wire serial interface, equivalent to a power cycle. +1.8V Power Supply – Not required		
23	GND	Module Ground		1
24	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	PECL-I	3
25	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	PECL-I	3
26	GND	Module Ground		1
27	GND	Module Ground		1
28	TD-	Transmitter inverted data input	CML-I	
29	TD+	Transmitter non-inverted data input	CML-I	
30	GND	Module Ground		1

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1. Module circuit ground is isolated from module chassis ground within the module.

2. Open collector, should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

3. A Reference Clock input is not required.

Management Interface

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented.
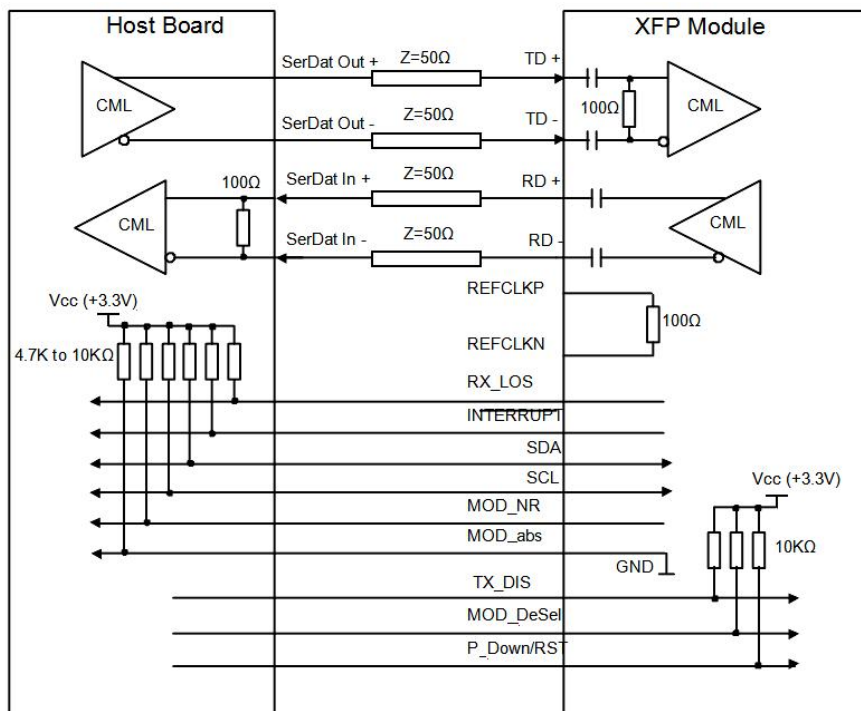
The digital diagnostic memory map specific data field defines as following.
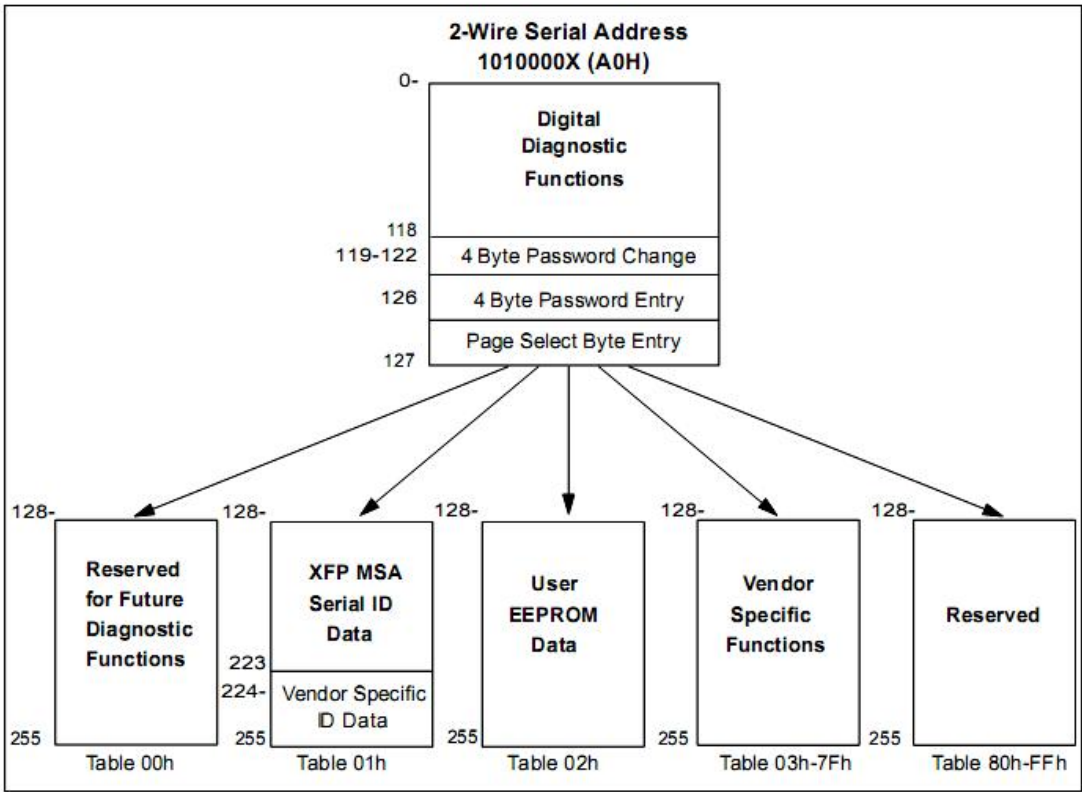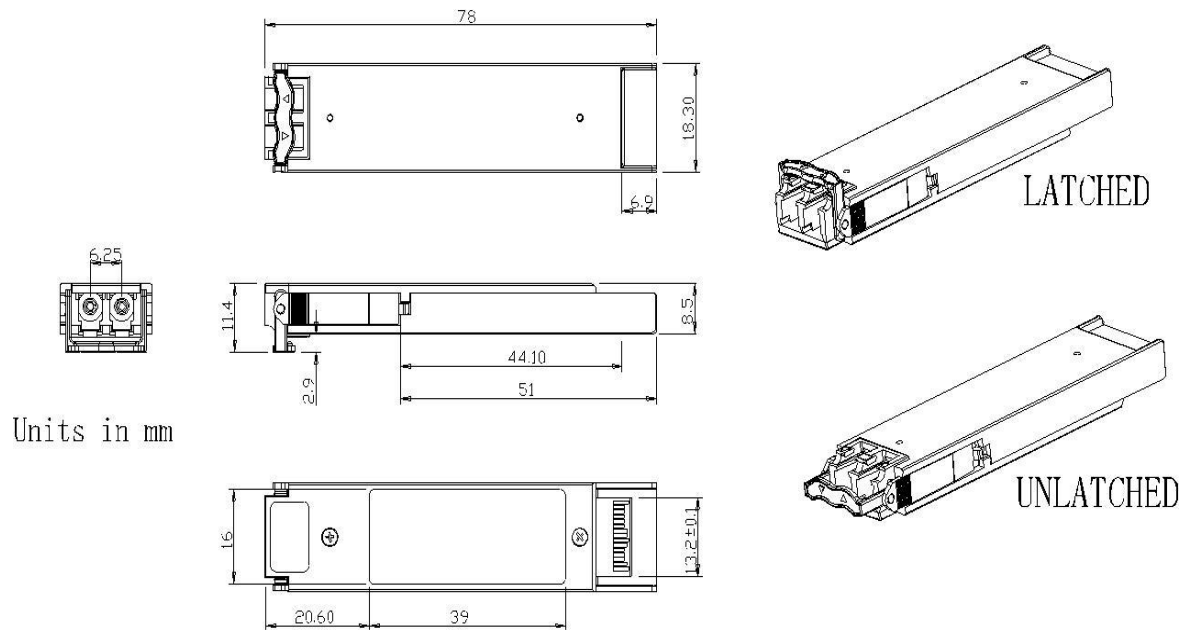
Recommended Host Board Power Supply Circuit
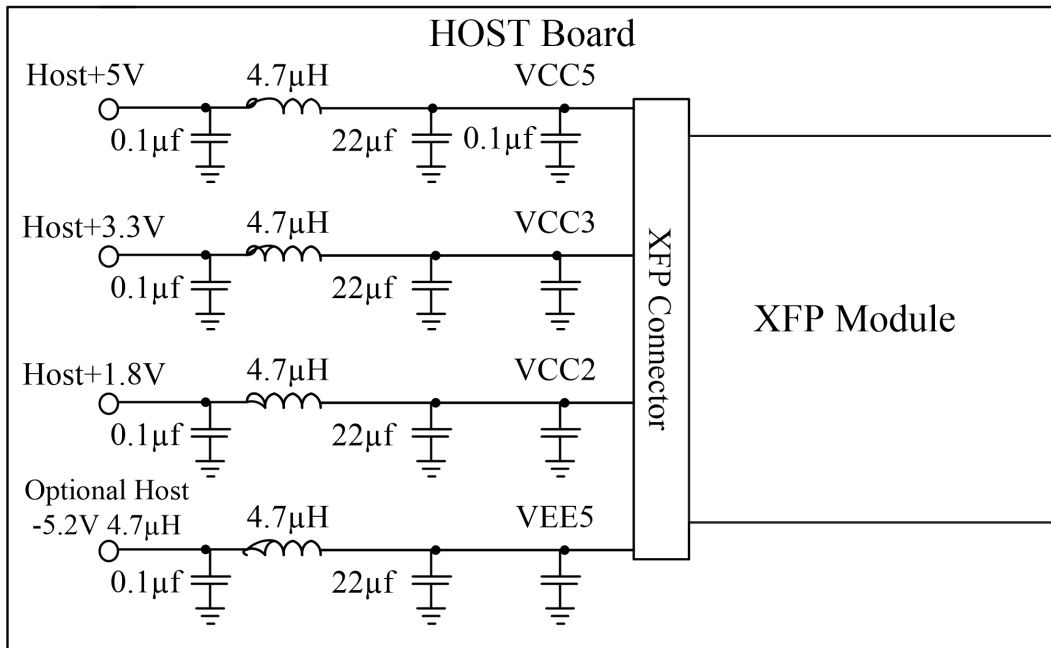
Recommended High-speed Interface Circuit

Mechanical Dimensions

Units in mm

Ordering information

Model No.	Product Description
XFP-S1013L-10	10Gbps, 1310nm, SMF, 10km, 0°C ~ +70°C, with DDM
XFP-S1013L-10I	10Gbps, 1310nm, SMF, 10km, -40°C~+85°C, with DDM

For further information, please visit our website https://www.aoatech.com