FS

10GBASE-LR XFP 1310nm 10km DOM Transceiver

XFP-10GLR-31

Application

- 10GBASE-LR/LW Ethernet
- SONET OC-192/SDH STM-64
- 1200-SM-LL-L 10G Fiber Channel
- Other Optical Links

Features

- Support multi protocol from 9.95Gb/s to 11.3Gb/s
- Hot pluggable 30 pin connector
- Compliant with XFP MSA
- Transmission distance of 10km over Single mode fiber

- 1310nm DFB laser transmitter
- Duplex LC connector
- 2-wire interface for management and diagnostic monitor
- XFI electrical interface with AC coupling

- Single power supply voltages : +3.3V
- Temperature range: 0°C to 70°C
- Power dissipation: <1.5W
- RoHS compliant

Description

The XFP-10GLR-31 Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. They comply with 10-Gigabit Ethernet 10GBASE-LR/LW per IEEE 802.3ae and 10G Fibre Channel 1200-SM-LL-L. Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T_{ST}	-40	+85	°C
Operating Temperature	T_{op}	0	+70	°C
Supply Voltage	V_{CC}	-0.5	+4.0	V

II. Electrical Characteristics (Condition: $T_a=T_{OP}$)

Parameter	Symbol	Min	Typ.	Max	Units	Note
Supply Voltage	V_{cc}	3.13		3.45	V	
Supply Current	I_{cc}			450	mA	
Module Total Power	P			1.5	W	
Transmitter						
Input Differential Impedance	R_{in}		100		Ω	1
Differential Data Input Swing	$V_{in,pp}$	150		820	mV	
Transmit Disable Voltage	V_D	2.0		V_{cc}	V	
Transmit Enable Voltage	V_{EN}	GND		GND+ 0.8	V	
Transmit Disable Assert Time	T_{off}			100	ms	
Tx Enable Assert Time	T_on			100	ms	

Receiver

Differential Data Output Swing	$V_{out,pp}$	300	500	850	mV	
Data Output Rise Time	tr			35	ps	2
Data Output Fall Time	tf			35	ps	2
LOS Fault	$V_{LOS\ fault}$	Vcc − 0.5		V_{ccHOST}	V	3
LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V	3
Power Supply Rejection	PSR		See Note 4 below			4

Notes:

1. After internal AC coupling.

2. 20-80 %

3. Loss Of Signal is open collector to be pulled up with a 4.7k-10kohm resistor to 3.15-3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

4. Per Section 2.7.1. in the XFP MSA Specification.
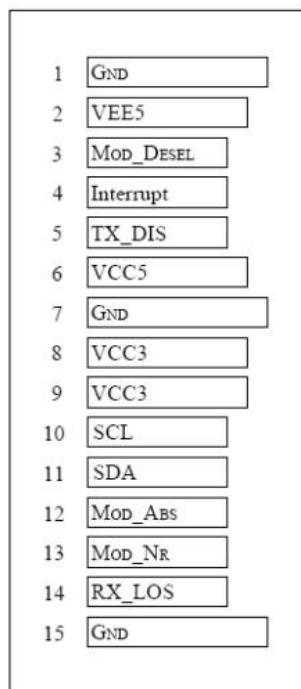
III. Optical Characteristics (Condition: $T_a=T_{OP}$)

Parameter	Symbol	Min	Typ.	Max	Units	Ref.
Transmitter						
Operating Date Rate	BR	9.95		11.3	Gb/s	
Bit Error Rate	BER			10^{-12}		
Launch Power	P_{out}	-6		0	dBm	1
Optical Wavelength	λ	1260	1310	1355	nm	
Optical Extinction Ratio	ER	3.5			dB	
Spectral Width@-20dB	Δλ			1	nm	
Side Mode Suppression Ratio	SMSRmin	30			dB	

Rise/Fall Time (20%~80%)	Tr/Tf			35	ps	
Average Launch Power of OFF Transmitter	P_{OFF}			-30	dBm	
Tx Jitter	Txj	Compliant with each standard requirements				
Optical Eye Mask		IEEE802.3ae				2

Receiver

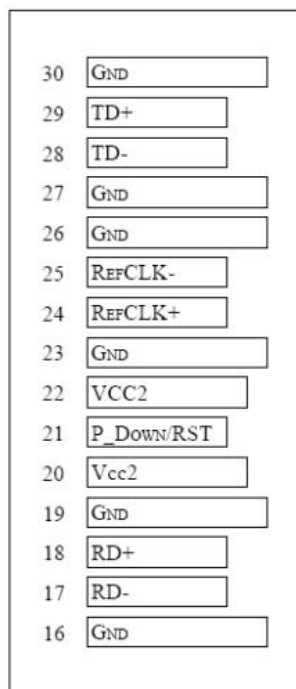|						
Operating Date Rate	BR	9.95		11.3	Gb/s	
Receiver Sensitivity	Sen			-12.6	dBm	2
Maximum Input Power	P_{MAX}	0			dBm	2
Optical Center Wavelength	λ_C	1260		1355	nm	
Receiver Reflectance	R_{rx}			-12	dB	
LOS De-Assert	LOS_D			-13	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Hysteresis	LOS_H	0.5		5	dB	

Notes:

1. The optical power is launched into SMF

2. Measured with a PRBS 231-1 test pattern @10.3125Gbps BER<10-12.

IV. Pin Assignment

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Bottom of Board                          Top of Board
1   GND                                  30  GND
2   VEE5                                 29  TD+
3   MOD_DESEL                            28  TD-
4   Interrupt                            27  GND
5   TX_DIS                               26  GND
6   VCC5                                 25  REFCLK-
7   GND                                  24  REFCLK+
8   VCC3                                 23  GND
9   VCC3                                 22  VCC2
10  SCL                                  21  P_DOWN/RST
11  SDA                                  20  Vcc2
12  MOD_ABS                              19  GND
13  MOD_NR                               18  RD+
14  RX_LOS                               17  RD-
15  GND                                  16  GND
```

Bottom of Board
(As view through top of board)

Top of Board

Diagram of Host Board Connector Block Pin Numbers and Name

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

7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTL- I/O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver Inverted Data Output	
18	CML-O	RD+	Receiver Non-inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply – Not required	
21	LVTTL-I	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 including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply – Not required	
23		GND	Module Ground	1

24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

Notes:

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 3.15V and 3.6V.

3. A Reference Clock input is not required .

V. Digital Diagnostic Functions

As defined by the XFP MSA, XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

• Transceiver temperature

• Laser bias current

• Transmitted optical power

• Received optical power
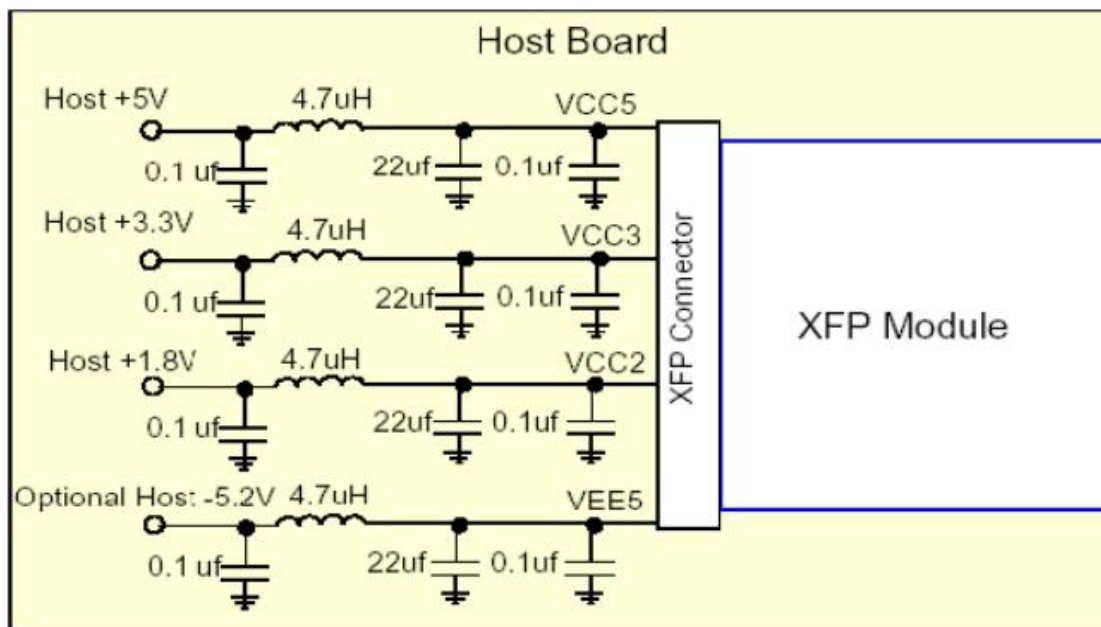
• Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

For more detailed information including memory map definitions, please see the XFP MSA Specification.
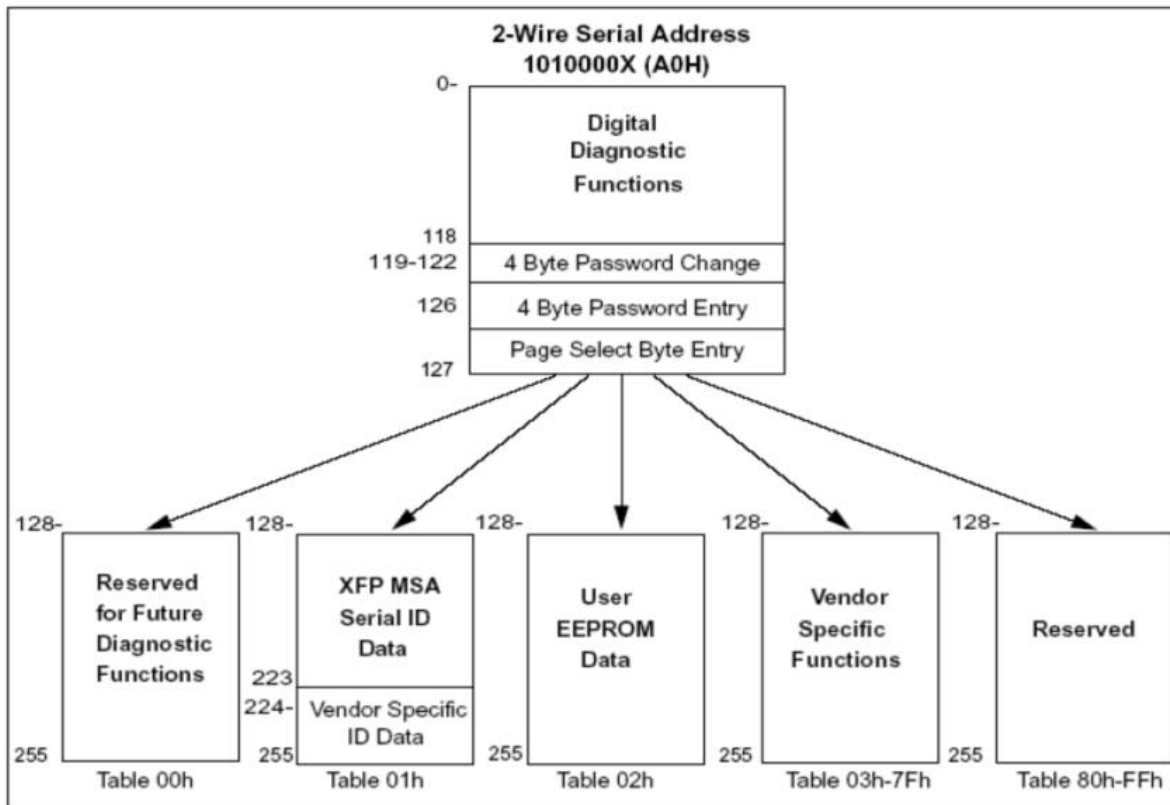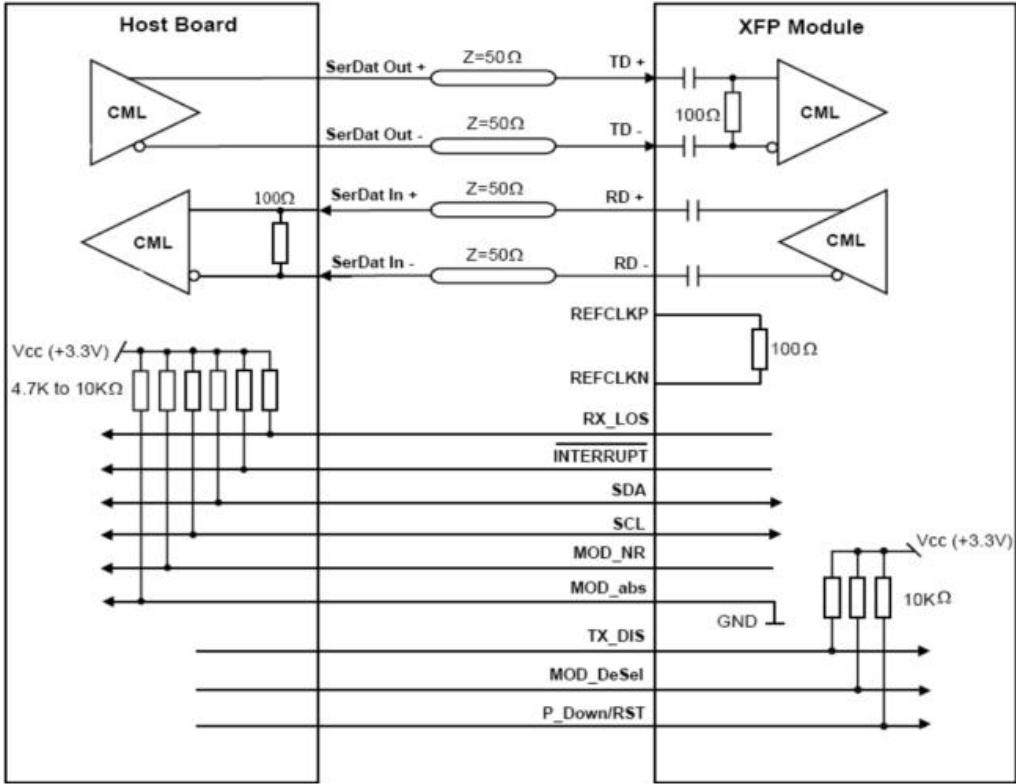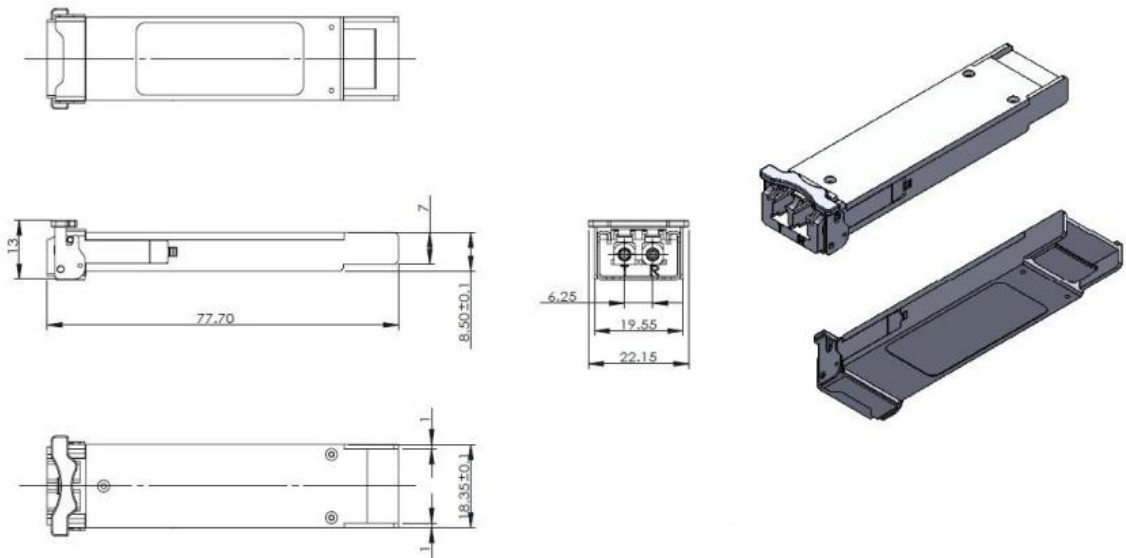
VI. Recommended Circuit

Recommended Host Board Power Supply Circuit

Recommended High-speed Interface Circuit

VII. Mechanical Specifications

Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.

Cisco ASR 9000 Series(A9K-MPA-1X40GE)

ARISTA 7050S-64(DCS-7050S-64)

Juniper MX960

Brocade ICX 7750-26Q

Extreme Networks X670V VIM-40G4X

Mellanox M3601Q


Dell N4032F

HP 5406R ZL2 V3(J9996A)

AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.

Our smart data system allows effective product management and quality control according to the unique serial number, properly tracing the order, shipment and every part.
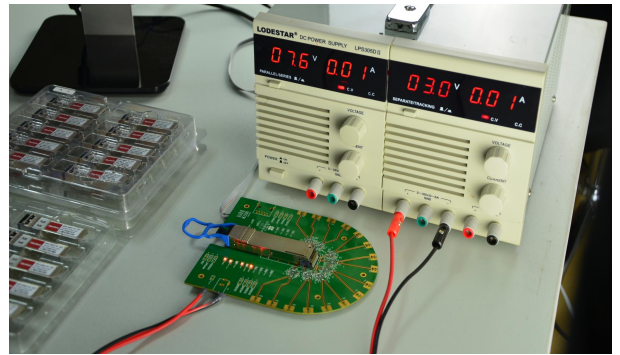
Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.

With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

The last test assured step to ensure our products to be shipped with perfect package.

Order Information

Part Number	Description
XFP-10GSR-85	10GBASE-SR XFP 850nm 300m DOM Transceiver
XFP-10GLRM-31	10GBASE-LRM XFP 1310nm 220m DOM Transceiver
XFP-10GLRM-31	10GBASE-LRM XFP 1310nm 2km DOM Transceiver
XFP-10GLR-31	10GBASE-LR XFP 1310nm 10km DOM Transceiver
XFP-10GER-55	10GBASE-ER XFP 1550nm 40km DOM Transceiver
XFP-10GZR-55	10GBASE-ZR XFP 1550nm 80km DOM Transceiver
XFP-10GZRC-55	10GBASE-ZRC XFP 1550nm 100km DOM Transceiver

Note:

10G XFP transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.

United Kingdom Russia

Germany

United States

China

Singapore

Australia

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