10G XFP BX(BR)-U Transceiver
Hot Pluggable, Bidi LC, Tx1270nm DFB / Rx1330nm, SMF 20KM, DDM

Part Number: FXFP-H8-C27-20D

Overview

FXFP-H8-C27-20D Small Form Factor Pluggable XFP transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. The high performance uncooled 1270nm DFB transmitter and high sensitivity PIN receiver provide superior performance for 10GBASE Ethernet applications up to 20km optical links.

Applications

- 10GBASE-BX(BR) Ethernet @10.3125G
- Fiber Channel 1200-SM-LL-L 10GFC @10.51875G
- SONET OC-192 & SDH STM-64 @9.953G
- CPRI Option #8 @10.1376G
- OTN OTU2 @10.7G, OTU2e @11.09G, OTU2f @11.32G

Features

- Compatible with IEEE802.3ae 10GBASE-BX(BR)
- Compliant with CPRI Option 8
- Compliant with INF-8077i XFP MSA
- Support 9.953Gb/s to 11.32Gb/s Multi-Rate
- Built-in CDR on both Transmitter and Receiver
- Hot Pluggable XFP footprint
- 1270nm DFB laser transmitter
- Simplex LC connector
- 2-wire interface for management and diagnostic monitor compliant with SFF-8472
- Single +3.3V power supply
- Link distance 20km over SM fiber
- RoHS Compliant

Laser Safety

- This is a Class 1 Laser Product complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.
- Caution: Use of control or adjustments or performance of procedure other than those specified herein may result in hazardous radiation exposure.

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Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T_{ST}	-40	+85	°C
Storage Relative Humidity	RH	5	95	%
Supply Voltage	V_{CC3}	-0.5	+4.0	V

Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temp. (FXFP-H8-C27-20D)	T_{OP}	0	-	+70	°C
Case Operating Temp. (FXFP-H8-C27-20Di)	T_{OP}	-40	-	+85	°C
Supply Voltage	V_{CC}	+3.13	+3.3	+3.47	V
Supply Current (FXFP-H8-C27-20D)	I_{CC}			460	mA
Supply Current (FXFP-H8-C27-20Di)	I_{CC}			520	mA
Power Consumption (FXFP-H8-C27-20D)	P			1.6	W
Power Consumption (FXFP-H8-C27-20Di)	P			1.8	W

Transmitter Electro-optical Characteristics

V_{CC} = 3.13V to 3.47V, T_{OP} = 0 °C to 70 °C) (FXFP-H8-C27-20D); **T_{OP} = -40 °C to 85 °C**(FXFP-H8-C27-20Di)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	9.953	10.3125	11.32	Gb/s	
Optical Launch Power	Po	-2		+3	dBm	1
Optical Center Wavelength	λc	1260	1270	1280	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5			dB	
Optical Eye Mask			IEEE802.3ae			
Relative Intensity Noise	RIN			-128	dB/Hz	
Data Input Differential Voltage	V_{IN}	180		950	mV	
Tx Disable Input Voltage-Low (Tx ON)	$TDISV_L$	GND		0.8	V	
Tx Disable Input Voltage-High (Tx OFF)	$TDISV_H$	2.0		Vcc	V	
Tx Fault Output Voltage-Low (Tx Normal)	$TFLTV_L$	GND		0.8	V	
Tx Fault Output Voltage-High (Tx Fault)	$TFLTV_H$	2.0		Vcc	V	

Note1: The optical power is launched into a 9/125μm single mode fiber.

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Receiver Electro-optical Characteristics

V_{CC} = 3.13V to 3.47V, T_{OP} = 0 °C to 70 °C(FXFP-H8-C27-20D); T_{OP} = -40 °C to 85 °C(FXFP-H8-C27-20Di)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	9.953	10.3125	11.32	Gb/s	
Receiver Sensitivity	SEN			-14.5	dBm	1
Maximum Receive Power	P_{RX_MAX}	+0.5			dBm	1
Optical Center Wavelength	λc	1320	1330	1340	nm	
LOS De-Assert	LOS_D			-15.5	dBm	
LOS Assert	LOS_A	-26			dBm	
LOS Hysteresis	LOS_{HY}	0.5		4	dB	
Differential Data Output Swing	V_{OUT}	400		800	mV	
Receiver LOS Signal Output Voltage-Low	$LOSV_L$	GND		0.8	V	
Receiver LOS Signal Output Voltage-High	$LOSV_H$	2.0		Vcc	V	

Note1: Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps BER<10^{-12}.

Pin Assignment

16 GND	GND 15
17 RD-	Rx_LOS 14
18 RD+	Mod_NR 13
19 GND	Mod_ABS 12
20 VCC2	SDA 11
21 P_Down/RST	SCL 10
22 VCC2	VCC3 9
23 GND	VCC3 8
24 RefCLK+	GND 7
25 RefCLK-	VCC5 6
26 GND	Tx_DIS 5
27 GND	INTERRUPT 4
28 TD-	Mod_DeSel 3
29 TD+	VEE5 2
30 GND	GND 1

TOWARD ASIC ←

TOWARD BEZEL →
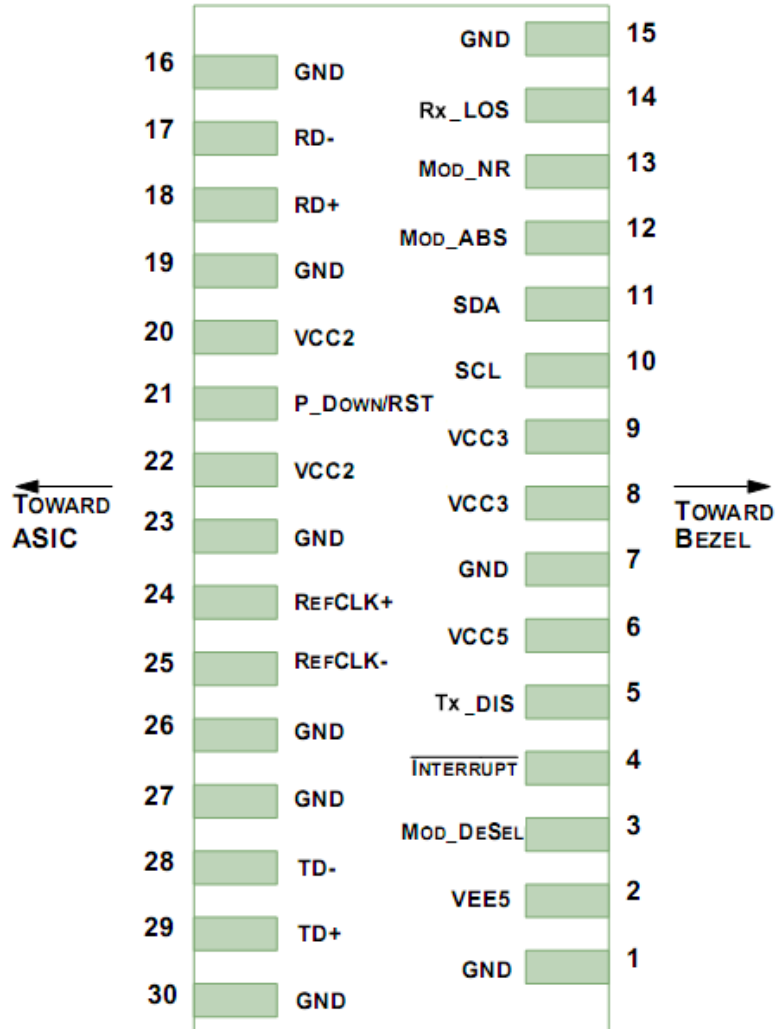
Diagram of Host Board Connector Block Pin

Pin Description

Pin	Name	Function / Description
1	GND	Module Ground
2	VEE5	Optional -5.2V Power Supply (Not required)
3	Mod-DeSel	Module De-select; When held low allows the module to, respond to 2-wire serial interface commands
4	$\overline{\text{INTERPUPT}}$	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface
5	Tx_DIS	Transmitter Disable; Transmitter laser source turned off
6	VCC5	+5V Power Supply (Not required)
7	GND	Module Ground
8	VCC3	+3.3V Power Supply
9	VCC3	+3.3V Power Supply
10	SCL	Serial 2-wire interface clock
11	SDA	Serial 2-wire interface data line
12	Mod_ABS	Module Absent; Indicates module is not present. Grounded in the module
13	Mod_NR	Module Not Ready; Indicating Module Operational Fault
14	Rx_LOS	Receiver Loss of Signal indicator
15	GND	Module Ground
16	GND	Module Ground
17	RD-	Receiver inverted data output
18	RD+	Receiver non-inverted data output
19	GND	Module Ground
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 including the 2-wire serial interface, equivalent to a power cycle.
22	VCC2	+1.8V Power Supply (Not required)
23	GND	Module Ground
24	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board (Not required)
25	RefCLK-	Reference Clock inverted input, AC coupled on the host board (Not required)

26	GND	Module Ground
27	GND	Module Ground
28	TD-	Transmitter inverted data input
29	TD+	Transmitter non-inverted data input
30	GND	Module Ground

Note1: Module circuit ground is isolated from module chassis ground within the module.

Note2: Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

Note3: A Reference Clock input is not required.

Digital Diagnostic Functions

As defined by the XFP MSA, Ficer's 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
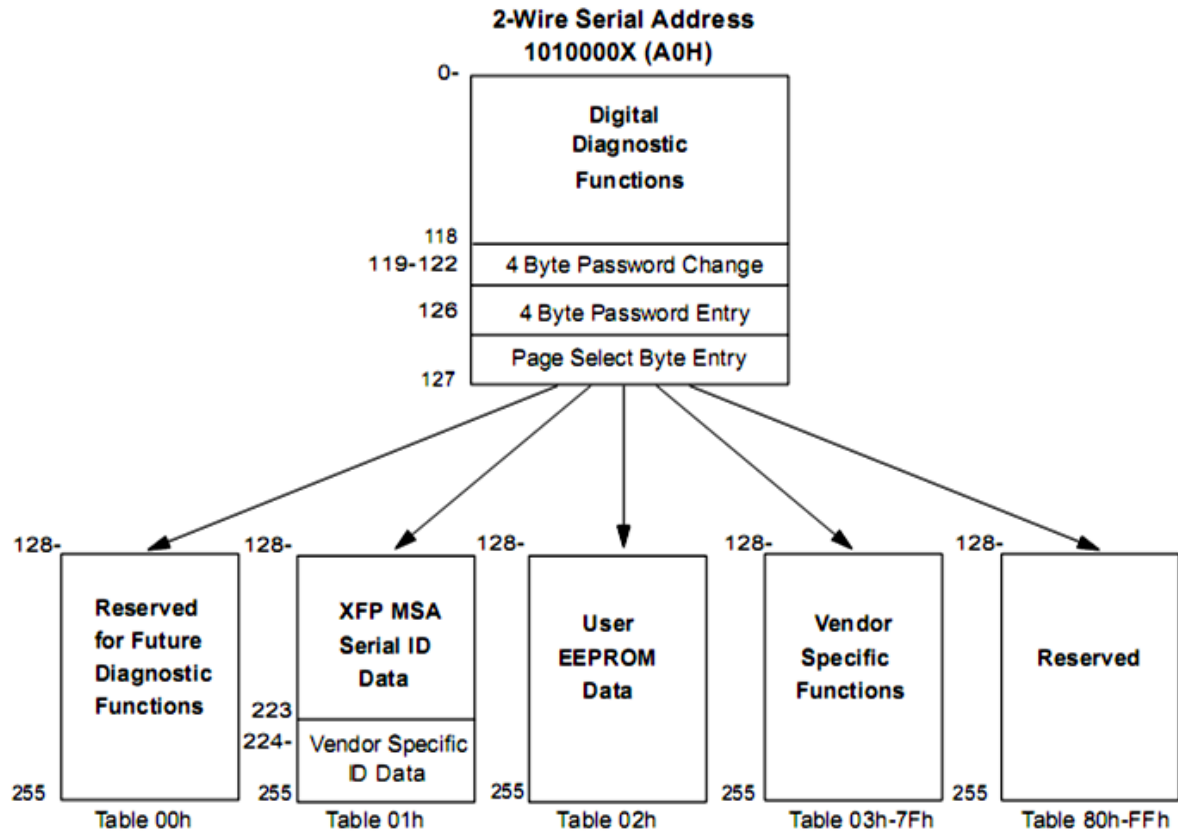- Received optical power
- Transceiver supply voltage

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 Controller (DDC) 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.

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

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Digital Diagnostic Memory Map

Digital Diagnostic Monitoring Characteristics

Parameter	Accuracy	Unit	Note
Temperature	±3	°C	Internal Calibration
Supply Voltage	±0.1	V	Internal Calibration
Tx Bias Current	±5	mA	Internal Calibration
Tx Output Power	±3	dB	Internal Calibration
Rx Received Optical Power	±3	dB	Internal Calibration

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Mechanical Dimensions
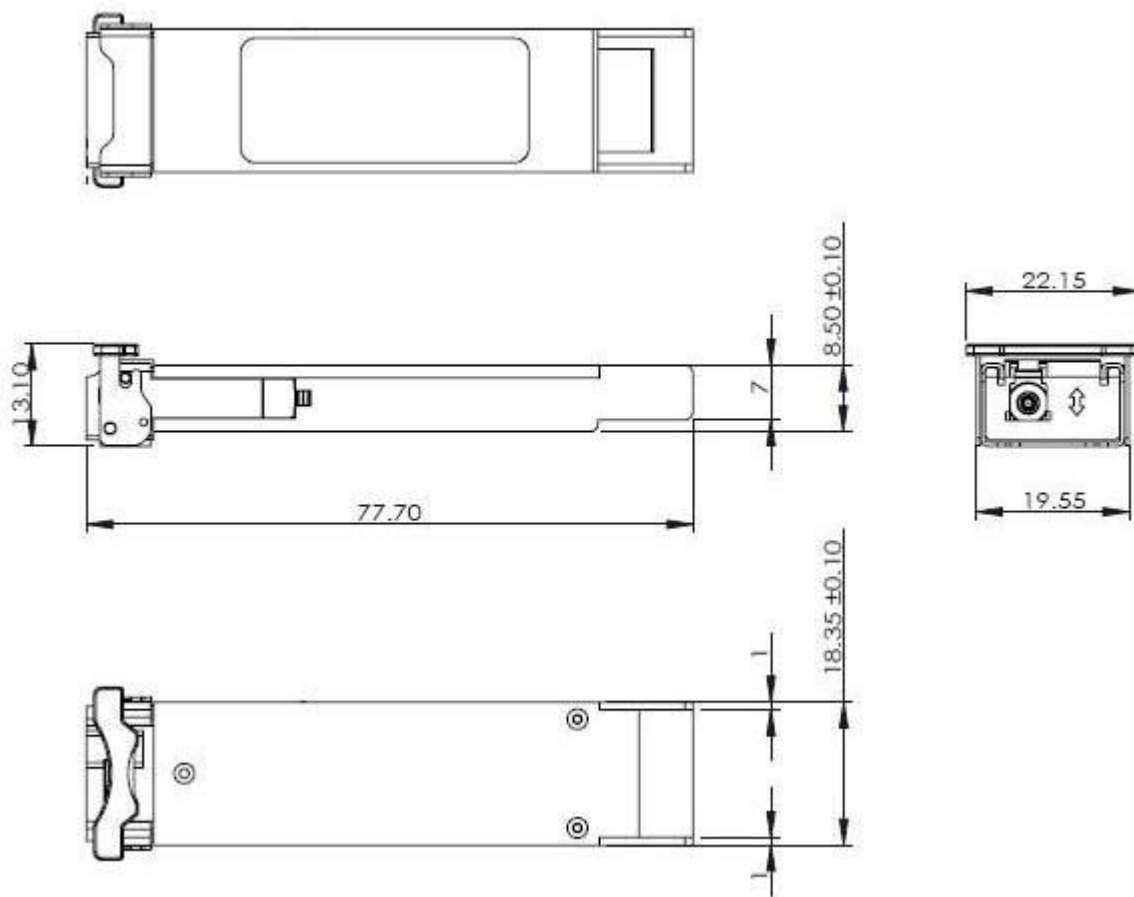
(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)

Ordering Information

Part No.	Tx	Rx	Link	DDM	Temp.
FXFP-H8-C27-20D					0~70°C
FXFP-H8-C27-20Di	1270nm	1330nm	20km	Yes	-40~85°C

Note1: Distances are indicative only. To calculate a more precise link budget based on specific conditions in your application, please refer to the optical characteristics.

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