

10G XFP DWDM Transceiver

Hot Pluggable, Duplex LC, 100GHz DWDM EML, SMF 40KM, DDM

Part Number: FXFP-H7-Dxx-40D



Overview

FXFP-H7-Dxx-40D Small Form Factor Pluggable XFP transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. The high performance cooled DWDM EML transmitter and high sensitivity PIN receiver provide superior performance for 10GBASE-ER/EW applications up to SMF 40km optical links.

Applications

- 10GBASE-ER/EW 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
- 10G DWDM Networks

Features

- Compliant with IEEE802.3ae 10GBASE-ER/EW
- Compliant with CPRI Option 8
- Compliant with INF-8077i XFP MSA
- Support 9.953Gb/s to 11.32Gb/s Multi-Rate
- Hot Pluggable XFP footprint
- 100GHz ITU Grid, cooled C-Band DWDM EML laser transmitter
- Duplex LC connector
- No Reference Clock required
- 2-wire interface for management and diagnostic monitor
- Dual +3.3V and 5.0V power supply
- Link distance 40km over SM fiber
- Power consumption <2.5W
- 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.



Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T _{ST}	-40	+85	°C
Storage Relative Humidity	RH	5	95	%
Supply Voltage 3.3V	V _{CC3}	-0.5	+4.0	V
Supply Voltage 5.0V	V _{CC5}	-0.5	+6.0	V

Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temp. (FXFP-H7-Dxx-40D)	T _{OP}	0	-	+70	°C
Case Operating Temp. (FXFP-H7-Dxx-40Di)	T _{OP}	-40	-	+85	°C
Supply Voltage 3.3V	V _{CC3}	+3.13	+3.3	+3.47	V
Supply Voltage 5.0V	V _{CC5}	+4.75	+5.0	+5.25	
Supply Current (V _{CC3})	I _{CC3}	-	-	450	mA
Supply Current (V _{CC5})	I _{CC5}	-	-	200	mA
Power Consumption	P			2.5	W

Transmitter Electro-optical Characteristics

V_{CC} = 3.13V to 3.47V, V_{CC5} = 4.75V to 5.25V,

T_{OP} = 0 °C to 70 °C(FXFP-H7-Dxx-40D); T_{OP} = -40 °C to 85 °C(FXFP-H7-Dxx-40Di)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	9.953	10.3125	11.32	Gb/s	
Optical Launch Power	P _o	-1		+4	dBm	1
Optical Center Wavelength	λ _c	λ _c -0.1	λ _c	λ _c +0.1	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	8.2			dB	
Dispersion Penalty	DP			2	dB	
Optical Eye Mask		IEEE802.3ae				
Relative Intensity Noise	RIN			-130	dB/Hz	
Differential Data Input Swing	V _{IN}	150		820	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		V _{CC3}	V	



Tx Fault Output Voltage-Low (Tx Normal)	TFLT _{VL}	GND		0.8	V	
Tx Fault Output Voltage-High (Tx Fault)	TFLT _{VH}	2.0		V _{CC3}	V	

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

Receiver Electro-optical Characteristics

V_{CC} = 3.13V to 3.47V, V_{CC5} = 4.75V to 5.25V,

T_{OP} = 0 °C to 70 °C(FXFP-H7-Dxx-40D); T_{OP} = -40 °C to 85 °C(FXFP-H7-Dxx-40Di)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	9.953	10.3125	11.32	Gb/s	
Receiver Sensitivity	SEN			-16	dBm	1
Maximum Receive Power	P _{RX-MAX}	0			dBm	1
Optical Center Wavelength	λ _c	1260		1620	nm	
LOS De-Assert	LOS _D			-17	dBm	
LOS Assert	LOS _A	-27			dBm	
LOS Hysteresis	LOS _{HY}	0.5		5	dB	
Differential Data Output Swing	V _{OUT}	300		850	mV	
Receiver LOS Signal Output Voltage-Low	LOS _{VL}	GND		0.5	V	
Receiver LOS Signal Output Voltage-High	LOS _{VH}	V _{CC3} -0.5		V _{CC3}	V	

Note1: Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps BER<10⁻¹².



Pin Assignment

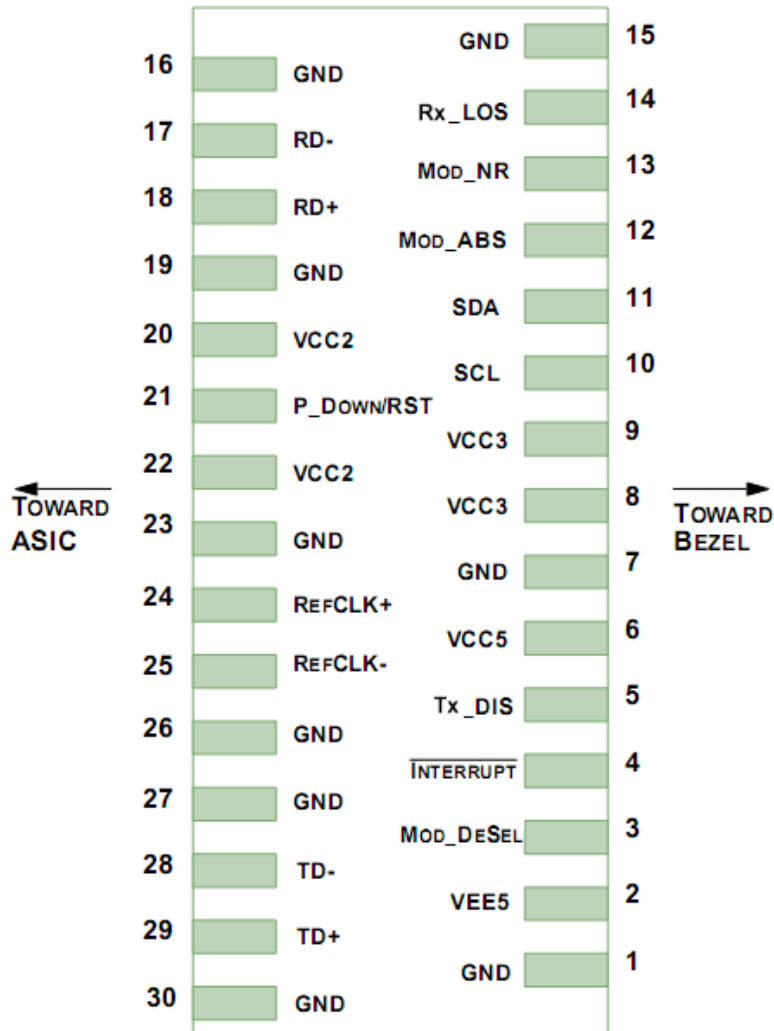


Diagram of Host Board Connector Block Pin



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
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 3.15V and 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

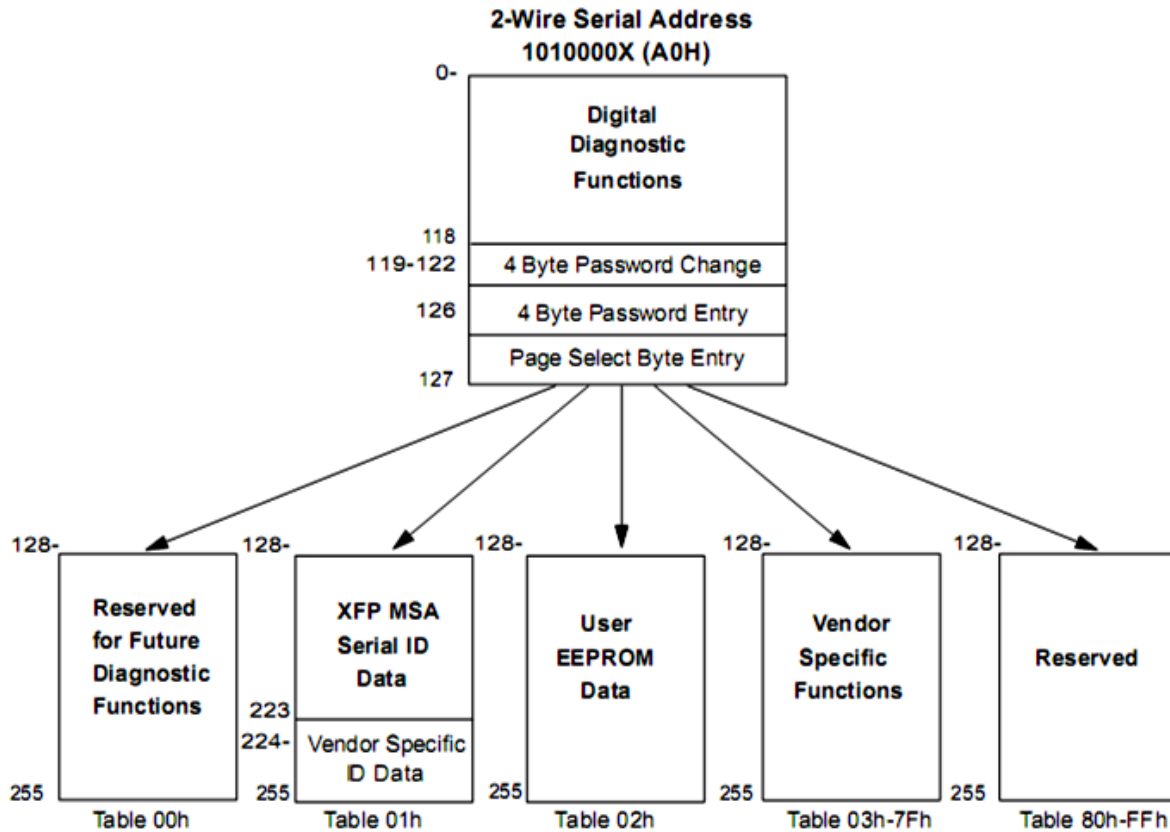
It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

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.



Digital Diagnostic Memory Map

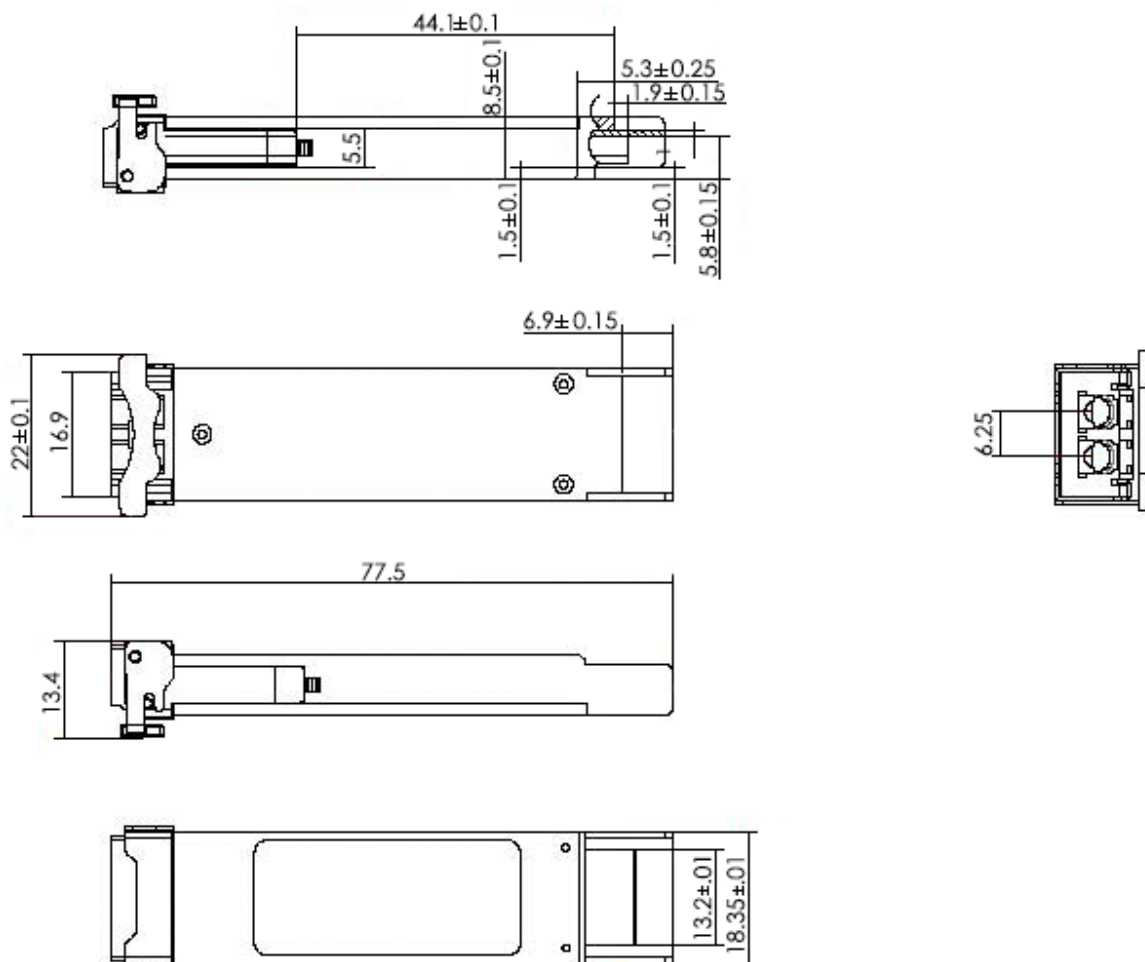


Digital Diagnostic Monitoring Characteristics

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



Mechanical Dimensions



(All Dimensions are $\pm 0.20\text{mm}$ Unless Otherwise Specified, Unit: mm)

Ordering Information

Part No.	Tx	Rx	Link	DDM	Temp.
FXFP-H7-Dxx-40D	100GHz ITU Grid C-Band DWDM	1260nm	SMF 40km	Yes	0~70°C
FXFP-H7-Dxx-40Di		~ 1620nm			-40~85°C

ps: xx=DWDM Channel Number. Please refer to appendix A for more detail.

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



Appendix A: 100GHz ITU Grid DWDM Central Wavelength Table

Channel	Central Wavelength(nm)	Frequency (THZ)
CH61	1528.77	196.1
CH60	1529.55	196.0
CH59	1530.33	195.9
CH58	1531.12	195.8
CH57	1531.90	195.7
CH56	1532.68	195.6
CH55	1533.47	195.5
CH54	1534.25	195.4
CH53	1535.04	195.3
CH52	1535.82	195.2
CH51	1536.61	195.1
CH50	1537.40	195.0
CH49	1538.19	194.9
CH48	1538.98	194.8
CH47	1539.77	194.7
CH46	1540.56	194.6
CH45	1541.35	194.5
CH44	1542.14	194.4
CH43	1542.94	194.3
CH42	1543.73	194.2
CH41	1544.53	194.1
CH40	1545.32	194.0
CH39	1546.12	193.9
CH38	1546.92	193.8
CH37	1547.72	193.7
CH36	1548.51	193.6
CH35	1549.32	193.5
CH34	1550.12	193.4
CH33	1550.92	193.3
CH32	1551.72	193.2
CH31	1552.52	193.1
CH30	1553.33	193.0
CH29	1554.13	192.9
CH28	1554.94	192.8
CH27	1555.75	192.7
CH26	1556.55	192.6
CH25	1557.36	192.5
CH24	1558.17	192.4
CH23	1558.98	192.3
CH22	1559.79	192.2
CH21	1560.61	192.1
CH20	1561.42	192.0
CH19	1562.23	191.9
CH18	1563.05	191.8
CH17	1563.86	191.7