

CWDM XFP модули предназначены для создания каналов связи в CWDM системе.

Особенности:

- 23dB бюджет, 70км
- возможность горячей замены
- EML лазер, 1470 - 1610нм с шагом 20нм
- двойной LC разъем
- встроенная функция диагностики
- мощность рассеивания < 3,5Вт
- температурный диапазон от -5 до +70°C



Области применения:

- 10GBASE-LR/EW 10G Ethernet
- 1200-SM-LL-L 10G Fiber Channel

CWDM* Wavelength (-5~70°C)

Band	Nomenclature	Wavelength(nm)		
		Min.	Typ.	Max.
O-band Original	A	1264	1270	1277.5
	B	1284	1290	1297.5
	C	1304	1310	1317.5
	D	1324	1330	1337.5
	E	1344	1350	1357.5
E-band Extended	F	1364	1370	1377.5
	G	1384	1390	1397.5
	H	1404	1410	1417.5
	I	1424	1430	1437.5
	J	1444	1450	1457.5
S-band Short Wavelength	K	1464	1470	1477.5
	L	1484	1490	1497.5
	M	1504	1510	1517.5
	N	1524	1530	1537.5
C-band Conventional	O	1544	1550	1557.5

L-band Long Wavelength	P	1564	1570	1577.5
	Q	1584	1590	1597.5
	R	1604	1610	1617.5

CWDM*: 18 Wavelengths from 1270nm to 1610nm, each step 20nm.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Maximum Supply Voltage	V _{CC}	-0.5		4.0	V
Storage Temperature	T _S	-40		85	°C
Case Operating Temperature	T _{OP}	0		70	°C

Recommend Operating Condition

Parameter	Symbol	Min	Typical	Max	Units
Operating Temperature	T _{OP}	-5		70	°C
Supply Voltage 1	V _{CC5}	4.75	5	5.25	V
Supply Voltage 2	V _{CC3}	3.13	3.3	3.45	V

Electrical Characteristics

(T_{OP} = 0 to 70°C, V_{CC} = 3.15 to 3.45V)

Parameter	Symbol	Min	Typical	Max	Unit	Note	
Transmitter							
Input Differential Impedance	R _{in}		100		Ω	1	
Differential Data Input Swing	V _{in, pp}	180		820	mV		
Transmit Disable Voltage	V _{DIS}	2.0		V _{CC}	V		
Transmit Enable Voltage	V _{EN}	GND		GND+ 0.8	V		
Transmit Disable Assert Time				10	us		
Receiver							
Differential Data Output Swing	V _{out, pp}	340	650	850	mV		
Data Output Rise Time	t _r			38	ps	2	
Data Output Fall Time	t _f			38	ps	2	
LOS Fault	V _{LOS fault}	V _{CC} - 0.5		V _{CC HOST}	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. Reference the Section 2.7 of the XFP MSA Rev 4.5.

Optical Characteristics

($T_{OP} = 0$ to $70^{\circ}C$, $V_{CC} = 3.15$ to $3.45V$)

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Output Opt. Pwr: 9/125 SMF	P _{out}	0		4	dBm	1
Optical Extinction Ratio	ER	3.5			dB	
Optical Wavelength	λ	$\lambda_c - 6$	λ_c	$\lambda_c + 7.5$	nm	2
-20dB Spectrum Width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	32			dB	
Average Launch Power of OFF Transmitter	P _{OFF}			-30	dBm	
TX Jitter	TXj	Per 802.3ae requirements				
Relative Intensity Noise	RIN			-135	dB/Hz	
Receiver						
Receiver Sensitivity (OMA) @ 10.3125Gb/s	P _{min}			-23	dBm	3
Maximum Input Power	P _{max}	-9			dBm	
Optical Center Wavelength	λ	1260		1600	nm	
Receiver Reflectance	R _{rf}			-12	dB	
LOS De-Assert	LOS _D			-20	dBm	
LOS Assert	LOS _A	-28			dBm	
LOS Hysteresis		1			dB	

Notes:

1. Output power is coupled into a 9/125 μ m SMF.
2. ITU-T G.694.2 CWDM wavelength from 1470nm to 1610nm, each step 20nm.
3. Average received power; BER less than 1E-12 and PRBS 2³¹-1 test pattern.

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
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; 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/RS T	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 connect should be pulled up with 4.7k – 10k ohm on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required.

Host Board Connector Pin Out

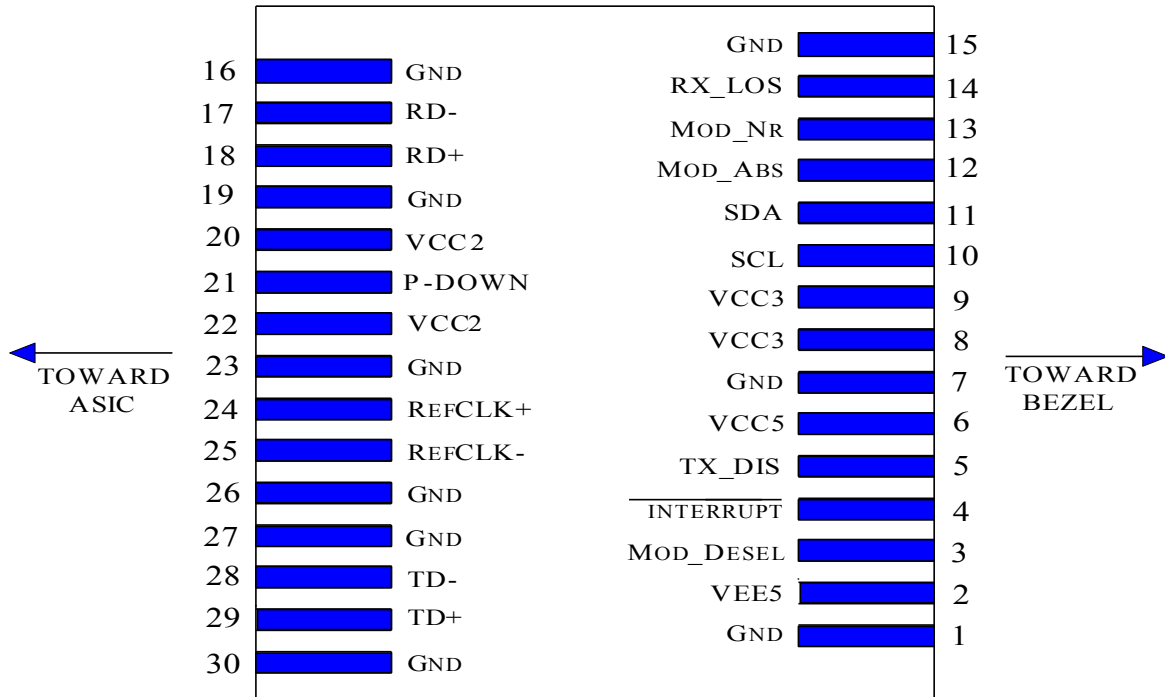


Diagram of Host Board Connector Block Pin Numbers and Names

General Specifications

Parameter	Symbol	Min	Typical	Max	Units	Note
Bit Rate	BR	9.95		11.1	Gb/s	
Bit Error Ratio	BER			10 ⁻¹²		1

Notes:

1. Tested 9.95G with 2³¹ – 1 PRBS pattern.

Digital Diagnostic Functions

XFP-CWDMxx.23 transceiver is compliant with the current XFP Multi-Source Agreement (MSA) Specification Rev 4.5.

As defined by the XFP MSA, XFP-CWDMxx.23 XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

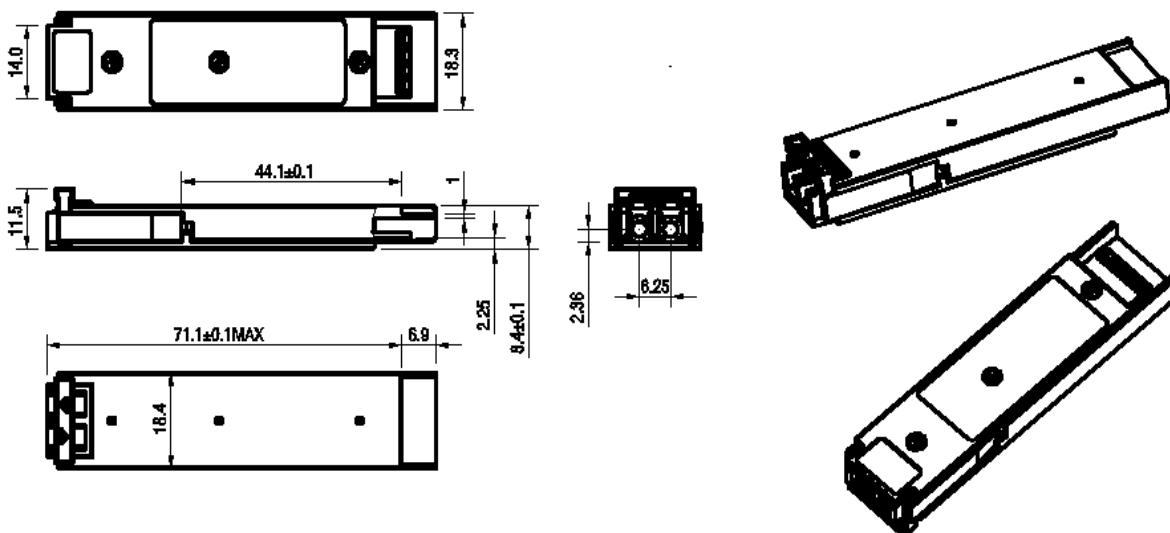
- ◆ Transceiver temperature
- ◆ Laser bias current
- ◆ Transmitted optical power
- ◆ Received optical power
- ◆ Transceiver supply voltage

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 inside the transceiver, which is accessed through the 2-wire serial interface. 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 00h to the maximum address of the memory.

Mechanical Specifications

XFP-CWDMxx.23 XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).



Eye Safety

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.