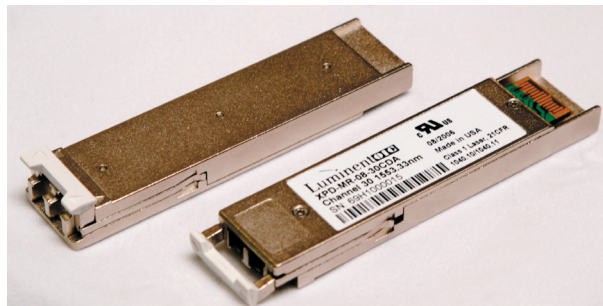


## XPD-MR-D12-xxCDA



## Features

- XFP MSA Rev 4.5 compliant
- Available in all 100GHz C-Band Wavelengths on the DWDM ITU Grid
- 120km Reach on SMF-28 fiber utilizing Electronic Dispersion Compensation (EDC)
- Supports 9.95Gb/s, 10.31Gb/s, 10.52Gb/s, 10.7Gb/s, and 11.1Gb/s
- Cooled EML with isolator
- APD Receiver
- Power dissipation <3.5W
- -5 to 70 C temperature range
- Cold Start Up Wavelength Compliance
- Digital Diagnostics
- XFI High Speed Electrical Interface
- RoHS Compliant
- Class 1 Laser, 21CFR 1040.10/1040.11
- EN 60825-1/A1:2002 Compliant
- Bail Latch Color: WHITE

## Absolute Maximum Rating

Parameter	Symbol	Min	Typical	Max	Unit
Maximum Supply Voltage (3.3V)	V <sub>cc3</sub>	-0.3	-	3.6	V
Maximum Supply Voltage (5.0V)	V <sub>cc5</sub>	-0.3	-	5.5	V
Maximum Supply Voltage (1.8V)	V <sub>cc2</sub>	-0.3	-	2	V
Storage Temperature	T <sub>st</sub>	-40	-	85	°C

## General Operations

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage (1.8V)	V <sub>cc2</sub>	1.71	1.8	1.89	V
Supply Voltage (3.3V)	V <sub>cc3</sub>	3.14	3.3	3.47	V
Supply Voltage (5V)	V <sub>cc5</sub>	4.75	5	5.25	V
Total Current on any pin	I <sub>cc</sub>	-	-	500	mA
Inrush Current (1.8V)	I <sub>inrush2</sub>	-	-	1	A
Inrush Current (3.3V)	I <sub>inrush3</sub>	-	-	0.75	A
Inrush Current (5V)	I <sub>inrush5</sub>	-	-	0.5	A
Module current ramp rate		-	-	100	mA/μs
Power on 1.8V rail	P <sub>2rail</sub>	-	-	1.8	W
Power on 3.3V rail	P <sub>3rail</sub>	-	-	2.5	W
Power on 5V rail	P <sub>5rail</sub>	-	-	2.5	W
Module Total Power consumption	P <sub>t</sub>	-	-	3.5	W
Power Consumption-P_Down mode	P <sub>p_d</sub>	-	-	1.5	W
Power Supply Noise Rejection	PSNR	Compliant to Section 2.7.2 of XFP MSA			
Bit Rate	BR	9.95	-	11.1	Gb/s
Operating Temperature (case)	T <sub>op</sub>	-5	-	70	°C
Storage Temperature	T <sub>st</sub>	-40	-	85	°C

## XPD-MR-D12-xxCDA

## Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Output Power	P <sub>o</sub>	-2	0	2	dBm
Average Launch Power Tx_Off	P <sub>off</sub>	-	-	-30	nm
Extinction Ratio	ER	8.2	-	-	dB
Eye Mask		ITU-T G.691, Telcordia GR-253-CORE, IEEE802.3 10GBASE-ZR Compliant			
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Center Wavelength	$\lambda$	ITU Grid			nm
Channel Spacing	$\Delta f$	-	100	-	GHz
Spectral Width	$\Delta\lambda_{20}$	-	-	1	nm
Jitter Generation (peak-to-peak)	J <sub>gen(pk-pk)</sub>	-	-	0.1	UI
Jitter Generation (RMS)	J <sub>gen(RMS)</sub>	-	-	0.01	UI
Dispersion Penalty at 2000 ps/nm <sup>a</sup>	DP	-	-	2	dB
Relative Intensity Noise	RIN	-	-	-130	dB/Hz
Reflectance Tolerance	ref <sub>T</sub>	-	-	-27	dB

a) Using an EDC enabled receiver

## Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedance	R <sub>in</sub>	-	100	-	$\Omega$
Differential Data Input Swing	V <sub>in,p-p</sub>	120	-	820	mV
TxDisable_Disable	V <sub>d</sub>	2	-	V <sub>cc3</sub>	V
TxDisable_Enable	V <sub>en</sub>	GND	-	GND + 0.8	V

## Receiver Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Sensitivity (9.95Gb/s) <sup>a</sup>	R <sub>x_sens995</sub>	-	-	-24	dBm
Sensitivity (10.7Gb/s) <sup>a</sup>	R <sub>x_sens1070</sub>	-	-	-23	dBm
Overload <sup>a</sup>	R <sub>x_OL</sub>	-7	-	-	dBm
Wavelength <sup>b</sup>	$\lambda$	1528	-	1561	nm
Optical Return Loss	ORL	-	-	-27	dB
LOS Assert	-	-34	-	-	dBm
LOS De-assert	-	-	-	-24	dBm
LOS Hysteresis	-	0.5	-	-	dB

a) At 8.2dB ER, 1E-12 BER, 2<sup>31</sup>-1 PRBS, back to back

b) Operational over 1200 - 1625nm range

## Receiver Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Reference Differential Output Impedance	Z <sub>d</sub>	-	100	-	$\Omega$
Differential Data Output Swing	V <sub>out,p-p</sub>	340	-	850	mV
Output Rise Time, 20-80%	t <sub>r</sub>	24	-	-	ps
Output Fall Time, 20-80%	t <sub>f</sub>	24	-	-	ps
LOS Fault	V <sub>LOS_fault</sub>	host_Vcc3 - 0.5	-	host_Vcc3	V
LOS Normal	V <sub>LOS_normal</sub>	GND	-	GND + 0.4	V

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## Reference Clock

Parameter	Symbol	Min	Typical	Max	Unit
Clock Differential Input Impedance	Z <sub>d</sub>	80	100	120	Ω
Differential Input Clock Amplitude (p-p)		640	-	1600	mV
Reference Clock Duty Cycle		40	-	60	%
Reference Clock Rise/Fall Time (20%-80%)	T <sub>r</sub> /T <sub>f</sub>	200	-	1250	ps
Reference Clock Frequency	f <sub>0</sub>	-	Baud/64	-	MHz

## λ Wavelength Ordering

## XPD-MR-D12-xxCDA

See table below for "xx" values

## λc Wavelength Guide

ITU Channel/Product Code	Frequency (THz)	Wavelength (nm)	ITU Channel/Product Code	Frequency (THz)	Wavelength (nm)
17	191.7	1563.863	40	194.0	1545.322
18	191.8	1563.047	41	194.1	1544.526
19	191.9	1562.233	42	194.2	1543.730
20	192.0	1561.419	43	194.3	1542.936
21	192.1	1560.606	44	194.4	1542.142
22	192.2	1559.794	45	194.5	1541.349
23	192.3	1558.983	46	194.6	1540.557
24	192.4	1558.173	47	194.7	1539.766
25	192.5	1557.363	48	194.8	1538.976
26	192.6	1556.555	49	194.9	1538.186
27	192.7	1555.747	50	195.0	1537.397
28	192.8	1554.940	51	195.1	1536.609
29	192.9	1554.134	52	195.2	1535.822
30	193.0	1553.329	53	195.3	1535.036
31	193.1	1552.524	54	195.4	1534.250
32	193.2	1551.721	55	195.5	1533.465
33	193.3	1550.918	56	195.6	1532.681
34	193.4	1550.116	57	195.7	1531.898
35	193.5	1549.315	58	195.8	1531.116
36	193.6	1548.515	59	195.9	1530.334
37	193.7	1547.715	60	196.0	1529.553
38	193.8	1546.917	61	196.1	1528.773
39	193.9	1546.119			

## XPD-MR-D12-xxCDA

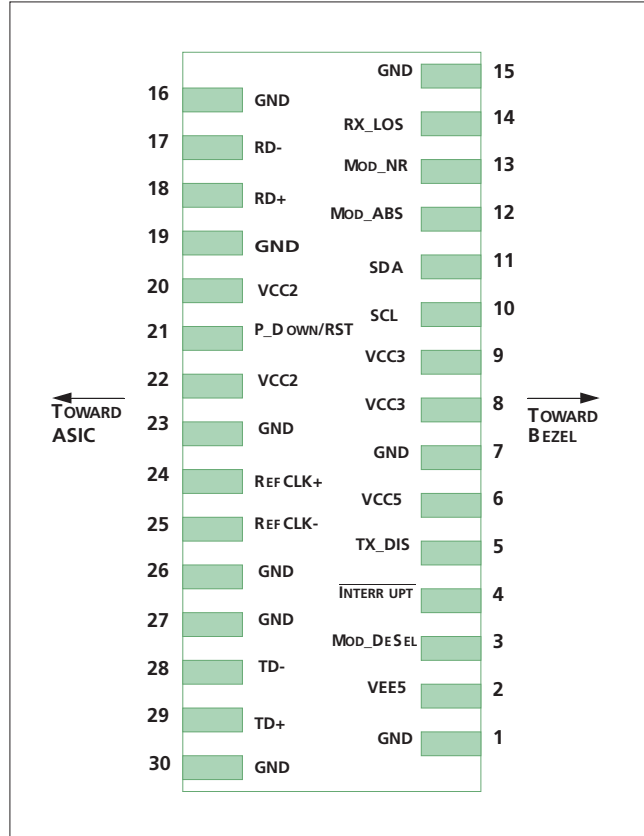
Pin Out Definition				
Pin	Logic	Symbol	Name/Description	Note
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply (not used)	
3	LVTTTL-I	Mod_DeSel	Module De-select; When held low allows module to respond to 2-wire interface	
4	LVTTTL-O	<u>Interrupt</u>	Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		Vcc5	+5V Power Supply	
7		GND	Module Ground	1
8		Vcc3	+3.3V Power Supply	
9		Vcc3	+3.3V Power Supply	
10	LVTTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTTL-O	Mod_Abs	Indicates Module is not present. Grounded in the Module	2
13	LVTTTL-O	Mod_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTTL-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	
21	LVTTTL-I	P_Down/RST	Power Down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. 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	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock Non-Inverted Input, AC coupled on the host board	
25	PECL-I	RefCLK-	Reference Clock Inverted Input, AC coupled on the host board	
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	
20		GND	Module Ground	1

## Notes:

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7k-10kohms to a voltage between 3.15V and 3.45V on the host board.

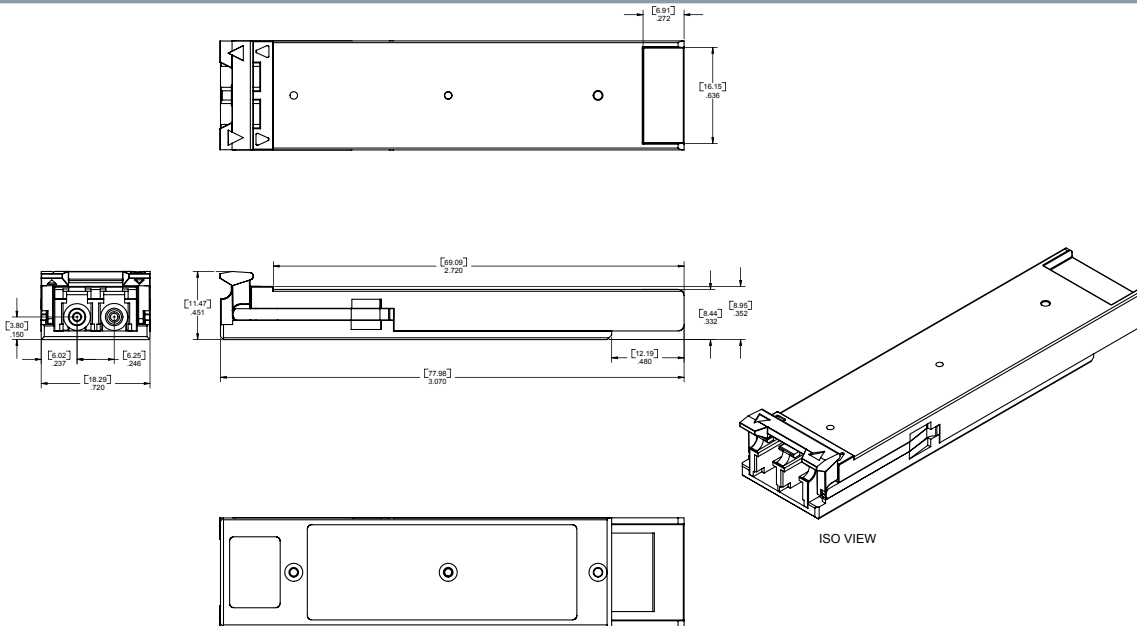
## XPD-MR-D12-xxCDA

### Pinout Diagram



Host PCB XFP Pinout Top View

### Mechanical Drawing

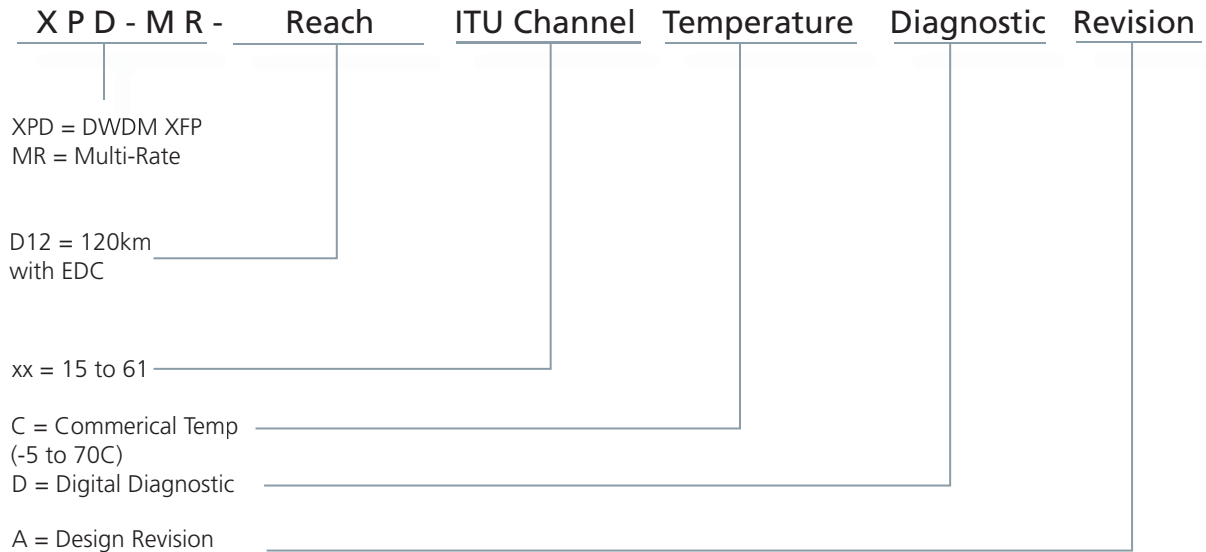


1. LUMENTUM'S XFP TRANSCEIVERS ARE COMPLIANT WITH THE DIMENSIONS DEFINED BY XFP MULTISOURCING AGREEMENT (MSA).

NOTES: UNLESS OTHERWISE SPECIFIED

Ordering Information

Part Numbering Definition:



Warnings

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Legal Notice

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