

Datasheet

Multi-Rate (10 Gbps) Extended Multi-Mode XFP Transceivers

XFP-10GD-MMX



Overview

MRV Communications' XFP transceivers provide the high speeds and compact dimensions that today's demanding networks require while delivering the deployment flexibility and inventory control that network administrators demand. Designed to Multi-Source Agreement (MSA) standards for broadest compatibility, they perfectly match MRV's wide range of optical transport solutions.

The Fiber Driver® XFP Multi-mode Extender from MRV Communications increases the reach of 10 Gigabit Ethernet, 10 Gigabit Fibre Channel, and Sonet OC-192 data links to distances far beyond the defined standard. Pioneered by MRV Communications, this award-winning technology allows multi-mode (MM) fiber previously used for FDDI, Fast Ethernet, and other legacy protocols to support high-speed communication backbones. The performance and reliability of the Multi-mode Extender (MMX) technology has been proven in installations throughout the world since first appearing in the Fiber Driver 10 Gigabit Multi-mode Extender module.

Visit the MRV website at www.mrv.com or contact your nearest authorized MRV Communications dealer for more information.

Features

- XFP transceiver
- Data Rates: 9.95 - 11.3 Gbps
- Protocols:
 - SDH STM-64/SONET OC-192, and SONET OC-192 with FEC
 - 10GBASE Ethernet
 - 10 G Fibre Channel
 - 10GBASE with FEC
 - 10 G Fibre Channel with FEC
- Multi-mode fiber
- 1310 nm
- 0 to 0.5 km
- DSC connector
- Digital Diagnostics (SFF-8472)
- XFI Loopback
- Hot-swap
- Compliances (see last page for details)

Benefits

- Protects investment in existing multi-mode fiber plant while providing a clear migration path to 10 gigabit-speed protocols
- Avoids the cost, complications, and lead times associated with the installation of new fiber
- Seamlessly integrates into existing infrastructure

Specifications Overview

Data Rate	9.95 - 11.3 Gbps
Tx Wavelength	1310 nm
Tx Power (Minimum)	-6 dBm
Tx Disable	Yes
Rx Wavelength Range	1270 - 1600 nm
Rx Sensitivity @ 10.5 Gbps	-14.4 dBm
Rx Sensitivity @ 11.3 Gbps	-13.4 dBm
Rx Saturation	0.5 dBm
Extinction Ratio	6 dB
Operating Temperature Range	-5 to 75°C
Power Consumption	< 2 Watt

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Absolute Maximum Rating

Parameter	Symbol	Min.	Max.	Unit	Notes
Supply Voltage (3.3V)	V _{CC3}	-0.5	4.0	V	-
Storage Temperature	T _S	-40	85	°C	-
Case Operating Temperature	T _{OP}	-5	75	°C	-

General Specifications

Parameter	Symbol	Min	Max	Unit	Notes
Bit Rate	BR	9.95	11.3	Gbps	1
Bit Error Ratio	BER	-	10 ⁻¹²	-	2
Transmission Distance	L _{MAX}	0	0.5	km	1,3

- Notes:**
1. SONET OC-192, SDH STM I-64.1, 10GBASE Ethernet, 10 GFC, SONET OC-192 with FEC, 10GBASE Ethernet + FEC, 10 GFC + FEC.
 2. Tested with a 2³¹ – 1 PRBS
 3. Dispersion Limited

Optical Specifications

Parameter	Symbol	Minimum	Maximum	Unit	Notes
Transmitter					
Output Optical Power	P _{OUT}	-6	-1	dBm	1
Optical Wavelength	λ	1290	1330	nm	-
Optical Extinction Ratio	ER	6	-	dB	1
Sidemode Suppression Ratio	SSR _{min}	30	-	dB	-
Tx Jitter Generation (peak-to-peak)	Tx _j	-	0.1	UI	-
Tx Jitter Generation (RMS)	Tx _{jRMS}	-	0.01	UI	-
Relative Intensity Noise	RIN	-	-130	dB/Hz	-
Receiver					
Receiver Sensitivity @ 10.5Gbps	R _{SENS1}	-	-14.4	dBm	2
Receiver Sensitivity @ 11.3Gbps	R _{SENS2}	-	-13.4	dBm	2
Maximum Input Power	P _{MAX}	0.5	-	dBm	-
Optical Center Wavelength	λ _C	1270	1600	nm	-
LOS Assert	LOS _A	-32	-	dBm	-
LOS De-Assert	LOS _D	-	-18	dBm	-
LOS Hysteresis	-	0.5	-	dB	-
Receiver Reflectance	R _{rx}	-	-14	dB	-

- Notes:**
1. Having ER = 6 dB guarantees that the -6 dBm minimum output power meets IEEE 802.3ae requirement of OMA=-5.2dBm.
 2. Measured with worst ER; BER<10⁻¹²; 2³¹-1 PRBS. Complies with -12.6 dBm OMA at ER = 6 dB.

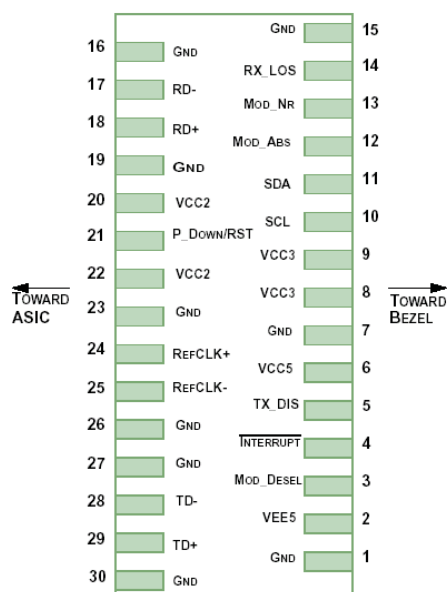
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Electrical Specifications

Parameter	Symbol	Minimum	Maximum	Unit	Notes
Supply Voltage	V_{CC3}	3.13	3.45	V	-
Supply Current	I_{CC3}	-	600	mA	-
Module Total Power	P	-	2.0	W	1
Transmitter					
Input Differential Impedance	R_{in}	80	120	Ω	2
Differential Data Input Swing	$V_{in, pp}$	120	820	mV	3
Transmit Disable Voltage	V_D	2.0	V_{CC}	V	4
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	850	mV	5
Data Output Rise Time	t_r	-	38	ps	6
Data Output Fall Time	t_f	-	38	ps	6
LOS Fault	$V_{LOS\ fault}$	GND	$V_{CC\ HOST}$	V	7
LOS Normal	$V_{LOS\ norm}$		GND+0.5	V	7
Power Supply Rejection	PSR	See Note 8 Below			8

- Notes:**
- Maximum total power value is specified across the full temperature and voltage range.
 - After internal AC coupling.
 - SONET/SDH jitter generation requirements are guaranteed with a minimum differential data input swing of 500 mV peak-to-peak.
 - Or open circuit.
 - Into 100 ohms differential termination.
 - 20 – 80 %
 - Loss Of Signal is open collector to be pulled up with a 4.7 k – 10 kohm resistor to 3.15 – 3.6 V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
 - Per Section 2.7.1. in the XFP MSA Specification (Rev 4.5 – August 2005).

Host Board Connector Pinout

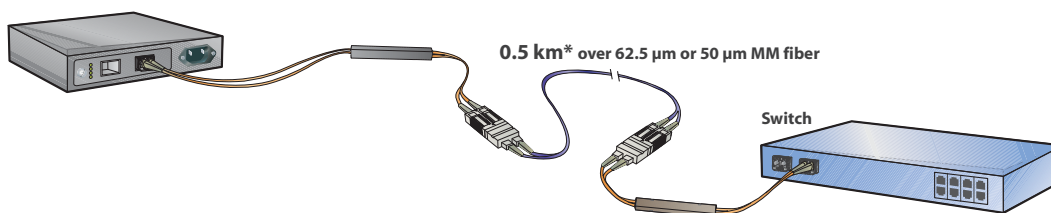


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Host Board Connector Legend

Pin	Logic	Symbol	Name/Description	Note
1	-	GND	Module Ground	1
2	-	V _{EE5}	Optional -5.2 V Power Supply (Not Required)	-
3	LVTTL-I	Mod_DeSel	Module De-Select; When Held Low Allows Module to Respond to 2-Wire Serial Interface	-
4	LVTTL-O	$\overline{\text{Interrupt}}$	$\overline{\text{Interrupt}}$; Indicates Presence of an Important Condition Which Can Be Read Over the 2-Wire Serial Interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter Laser Source Turned Off	-
6	-	V _{CC5}	+5 V Power Supply (Not Required)	-
7	-	GND	Module Ground	1
8	-	V _{CC3}	+3.3 V Power Supply	-
9	-	V _{CC3}	+3.3 V Power Supply	-
10	LVTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTL-O	Mod_Abs	Indicates Module is Not Present. Grounded in the Module	2
13	LVTTL-O	Mod_NR	Module Not Ready; Indicating Module Operational Fault	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	-	V _{CC2}	+1.8 V 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	-	V _{CC2}	+1.8 V 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

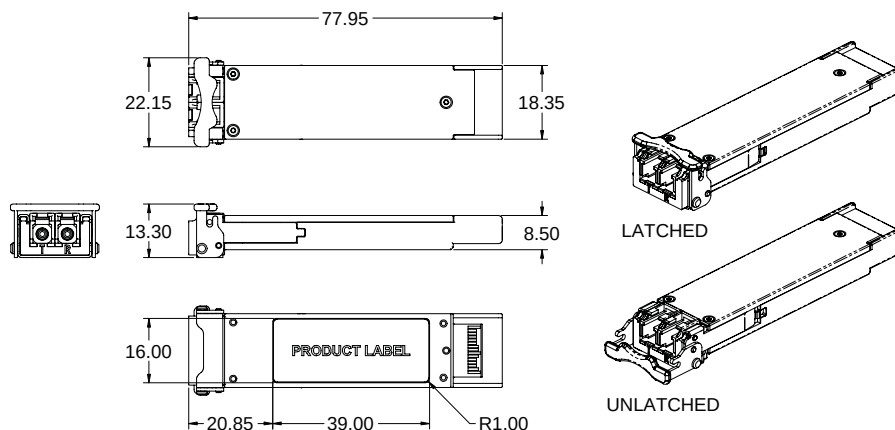
- Notes:**
1. Module circuit ground is isolated from module chassis ground within the module.
 2. Open collector; should be pulled up with 4.7 k – 10 kohms on host board to a voltage between 3.15 V and 3.6 V.
 3. A Reference Clock input is not required by the XFP-10GD-LR. If present, it will be ignored.



* 0.5 km. Maximum range depends upon grade and condition of fiber plant used.

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Mechanical Drawing



XFP Transceiver (dimensions are in mm)

Ordering Information

Model	Description	Data Rate	Wavelength (nm)	Bail Latch Color	Maximum Distance Range (km)
XFP-10GD-MMX	OC192/STM-64, 10GE or 10G FC, extended multi-mode XFP transceiver with Digital Diagnostics.	9.95 - 11.3 Gbps	1310	Blue	0 - 0.5

Regulatory and Industry Compliances

Class 1 Laser Product, Complies with 21CFR 1040.10, 1040.11 and EN 60825;
 Certified by one or more of the following agencies: TÜV, UL, CSA;
 RoHS Directive; China RoHS; California RoHS Law, REACH Directive SVHC; WEEE Directive
 The Quality Management System is certified to ISO 9001:2000 by QMI-SAI Global
 The Environmental Management System is in compliance with ISO 14001:2004

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.

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