

Datasheet

## Multi-Rate 10 Gbps CWDM 40 km XFP Transceivers

XFP-10GCWER-xx



### Highlights

- XFP transceiver
- Data Rates: 9.95 - 11.3 Gbps
- Protocols:
  - SONET OC-192/SDH STM 64 with/without FEC
  - Ethernet (10GBase-ER/EW [LAN/WAN]) with/without FEC
  - Fibre Channel (10 Gbps) with/without FEC
- Single-mode fiber
- CWDM wavelengths (1470 - 1610 nm)
- Up to 40 km
- Duplex LC connector
- Digital Diagnostics (SFF-8472)
- Hot-swap
- XFI Loopback

### 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.

Visit the MRV website at [www.mrv.com](http://www.mrv.com) or contact your nearest authorized MRV Communications dealer for more information.

### Specifications Overview

Data Rate	9.95 - 11.3 Gbps
Tx Wavelengths	CWDM wavelength (see Wavelengths Guide for xx values)
Tx Power (Minimum)	-1 dBm
Tx Dispersion Penalty	2 dB
Tx Disable	Yes
Rx Wavelength Range	1260 - 1620 nm
Rx Sensitivity	-16 dBm
Rx Saturation	-1 dBm
Operating Temperature Range	-5 to 70 °C
Power Consumption	3.5 Watt

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**Transmitter Specifications (Optical)**

Parameter	Symbol	Min	Max	Unit	Notes
Data Rate Multirate	Mra	9.95	11.3	Gbps	-
Center Wavelength	$\lambda_c$	1464.5	1617.5	nm	-
Center Wavelength Stability	$\Delta\lambda_D$	- 6.5	6.5	nm	-
Optical Transmit Power	Po	-1	2	dBm	-
Optical Transmit Power (Disabled)	PTX_DISABLE	-	-40	dBm	-
Extinction Ratio	ER	8.2	-	dB	-
Channel Spacing	$\Delta f$	-	20	nm	-
Jitter Generation	TJP-P	-	0.1	UI	-
Spectral Width (-20 dB)	DI20	-	0.3	nm	-
Side Mode Suppression Ratio	SMSR	30	-	dB	-
Dispersion Penalty (800ps/nm)	DP	-	2	dB	-
Eye Mask	-	Compliant with ITU-T G.691 STM-64 Eye Mask			-

**Receiver Specifications (Optical)**

Parameter	Symbol	Min	Max	Unit	Notes
Data Rate Multirate	Mra	9.95	11.3	Gbps	-
Receiver Sensitivity	Rsens	-	-16	dBm	-
Receiver Sensitivity(OMA)	Rsens-2	-	-14.1	dBm	-
Maximum Input Power	RX-overload	-	-1	dBm	-
Input Operating Wavelength	$\lambda$	1260	1620	nm	-
Reflectance	Rrx	-	-27	dB	-
LOS Assert	-	-28	-	dBm	-
LOS De-assert	-	-	-22	dBm	-
LOS Hysteresis	-	0.5	-	dB	-

**Recommended Operating Conditions**

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage 1	Vcc3	3.13	3.47	V	-
Supply Current 1	Icc3	-	750	mA	-
Supply Voltage 2	Vcc5	4.75	5.25	V	-
Supply Current 2	Icc5	-	500	mA	-
Supply Voltage 3	Vcc2	1.71	1.89	V	-
Supply Current 3	Icc2	-	750	mA	-
Operating Case Temperature	Tca	-5	70	°C	-
Module Power Dissipation	Pm	-	3.5	W	-

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### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage 1	Vcc3	-0.5	4.0	V	-
Supply Voltage 2	Vcc5	-0.5	6.0	V	-
Supply Voltage 3	Vcc2	-	2	V	-
Storage Temperature	Tst	-40	85	°C	-
Optical Input Received Power	PIN	-	4	dBm	-

### Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Max	Unit	Notes
Input Differential Impedence	Rim	80	120	Ω	-
Differential Data Input Swing	VtxDIFF	120	1000	mV	-
Transmit Disable Voltage	VD	2.0	Vcc3+0.3	V	-
Transmit Enable Voltage	Ven	0	0.8	V	-
Transmit Disable Assert Time	Vn	-	10	us	-

### Receiver Specifications (Electrical)

Parameter	Symbol	Min	Max	Unit	Notes
Differential Data Output Swing	Vout P-P	400	800	mV	-
Data Output Rise/Fall Time	Tr / Tf	24	-	ps	-
Loss of Signal – Asserted	VOH	2	Vcc3+0.3	V	-
Loss of Signal – Negated	VOL	0	0.8	V	-

### Low Speed Electrical Signal Timings

Parameter	Symbol	Min	Max	Unit	Notes
TX Disable, Power_Down/RST	VIH	2.0	Vcc3+0.3	V	-
	VIL	-0.3	0.8	V	
Interrupt, Mod_NR, Rx_Los	VOH	Vdd3-0.5	Vdd3+0.3	V	-
	VOL	0	0.4	V	
SCL, SDA (IN)	VIH	Vdd3*0.7	Vdd3+0.5	V	-
	VIL	-0.3	Vdd3*0.3	V	
SCL, SDA (OUT)	VOH	Vdd3-0.5	Vdd3+0.3	V	-
	VOL	0	0.4	V	
I2C Clock Rate	t_reset	-	400	KHz	-
Leakage Current	IL	-	100	uA	-

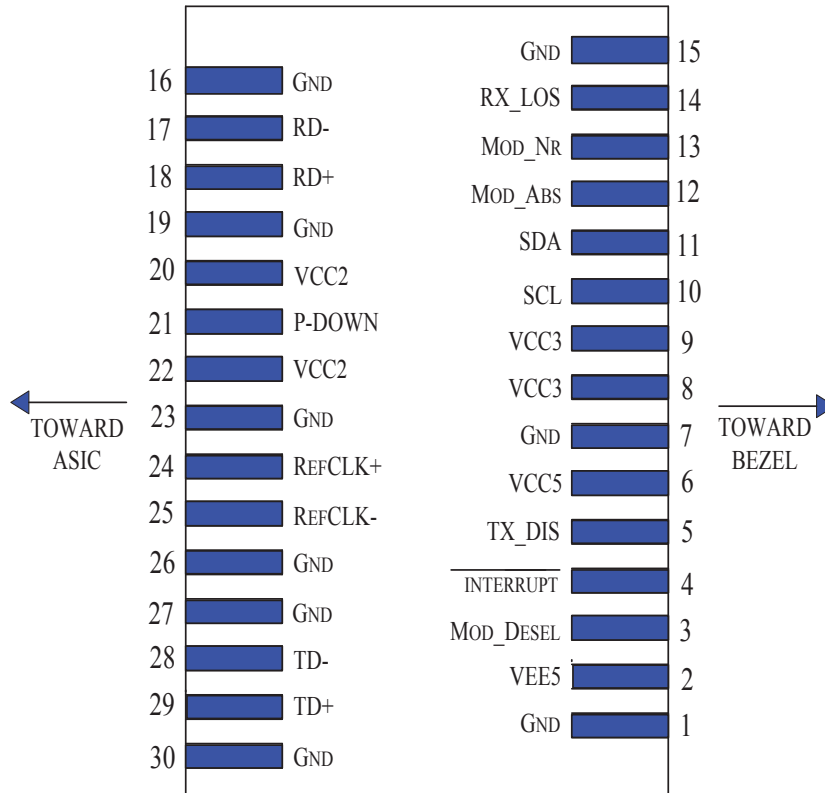
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Pin Descriptions				
Pin #	Logic	Symbol	Name/Description	Notes
1	-	GND	Module Ground	1
2	-	VEE5	Optional -5.2 Power Supply – Not Required	-
3	LVTTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	-
4	LVTTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	-
6	-	VCC5	+5 Power Supply - Not Required	-
7	-	GND	Module Ground	1
8	-	VCC3	+3.3V Power Supply	-
9	-	VCC3	+3.3V Power Supply	-
10	LVTTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTTL-I/O	SDA	Serial 2-wire interface data line	2
12	LVTTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTTL-O	Mod_NR	Module Not Ready	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 – Not required	-
21	LVTTTL-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	-	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

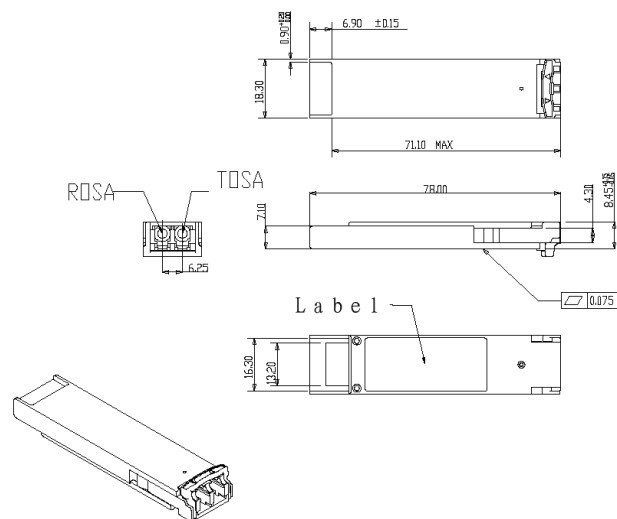
- Notes:**
1. Module circuit ground is isolated from module chassis ground within the module.
  2. Open connect should be pulled up with 4.7 k – 10 k ohm on host board to a voltage between 3.15 V and 3.6 V.
  3. A Reference Clock input is not required.

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Host Board Connector Pinout



Outline Drawing



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### Ordering Information

Model	Description	Data Rate (Gbps)	Digital Diagnostics	Wavelength (nm)	Distance (km)
XFP-10GCWER-xx*	Multi-rate 10 Gbps CWDM 40 km XFP Transceiver	9.95 - 11.3	Yes	xx (see Wavelengths Guide)	up to 40

\*See Wavelength Guide below for "xx" values

### λc Wavelength Guide per ITU-T G.694.2

Code (xx)	Typ λc	Unit	Code (xx)	Typ λc	Unit
47	1470	nm	55	1550	nm
49	1490	nm	57	1570	nm
51	1510	nm	59	1590	nm
53	1530	nm	61	1610	nm

### Regulatory and Industry Compliances

Class 1 Laser Product, complies with EN 60825-1 and 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

MSA INF-8077i; Digital Diagnostic SFF-8472

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 by QMI-SAI Global

The Environmental Management System is in compliance with ISO 14001

### 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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