

Datasheet

Dual Multi-Rate 10 Gbps CWDM 40 km SFP+ Transceivers

SFP-10GCWER-xx*



Highlights

- SFP+ transceiver
- Data Rates: ≤ 4.25 Gbps or 8.5 - 11.3 Gbps
- Protocols:
 - 10G Ethernet (10GBase-ER/EW [LAN/-WAN]) with/without FEC
 - 10G Fibre Channel with/without FEC
 - SONET OC-192/STM-64 with/without FEC
 - 1/2/4/8 Gbps Fibre Channel
 - Gigabit Ethernet
- Single-mode fiber
- CWDM wavelength per ITU-T G.694.2
- 10 to 40 km
- Duplex LC connector
- Digital Diagnostics (SFF-8472)
- Hot-swap

Overview

Enhanced Small Form-Factor Pluggable (SFP) interfaces from MRV Communications provide flexible high speed links in a small industry-standard package. They deliver the deployment options and inventory control that network administrators demand for growing networks.

SFPs are designed to Multi-Source Agreement (MSA) standards to ensure network equipment compatibility. They are a perfect addition to MRV's extensive lines of networking equipment.

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

Specifications Overview

Data Rate	≤ 4.25 Gbps or 8.5 - 11.3 Gbps
Tx Wavelength	CWDM wavelengths (see Wavelength Guide for xx values)
Tx Power (Minimum)	0 dBm
Tx Disable	Yes
Rx Wavelength Range	1260 - 1620 nm
Rx Sensitivity (OMA)	-14.1 dBm
Rx Saturation	-1 dBm
Operating Temperature Range	-5 to 70 °C
Power Consumption	1.5 Watt

* See Wavelength Guide for xx values

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Transmitter Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Data Rate	B	8	11.3	Gbps	-
Center Wavelength	λ_c	See Ordering Information Table		nm	1
Average Optical Output Power	P_{avg}	0	4	dBm	-
Extinction Ratio	ER	8.2	-	dB	-
Relative Intensity Noise	RIN	-	-128	dB/Hz	-
Side Mode Suppression Ratio	SMSR	30	-	dB	-
Optical Return Loss Tolerance	-	-	-21	dB	-
Dispersion Penalty (@10.3125Gbps)	DP	-	3	dB	-
Optical Output Eye	-	Compliant with IEEE 802.3ae			-

Notes: 1. BOL: +/-0.05nm from ITU grid; EOL: +/-0.1nm from ITU grid.

Receiver Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Data Rate	B	8	11.3	Gbps	-
Wavelength of Operation	λ	1528	1565	nm	-
Receiver Sensitivity (@10.3125Gbps)	P_{min}	-	-23	dBm	1
Maximum Input Power (10^{-12} BER)	P_{max}	-8	-	dBm	-
Reflectance Of Receiver	-	-	-27	dB	-
LOS Hysteresis	-	0.5	-	dB	-
LOS Thresholds (Increasing Light Input)	P_{los+}	-	-25	dBm	-
LOS Thresholds (Decreasing Light Input)	P_{los-}	-38	-	dBm	-

Notes: 1. Specified with BER $<1 \times 10^{-12}$ and PRBS $2^{31}-1$

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature Range	T_{ST}	-40	85	°C	-
Operating Case Temperature	T_{OP}	-5	70	°C	1
Operating Relative Humidity	RH	0	85	%	2
Supply Voltage Range	V_{CC}	-0.5	3.6	V	-

Notes: 1. Measured on top side of SFP+ module at the front center vent hole of the cage.
2. Non condensing

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Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Max	Unit	Notes
Differential Input Impedance	Z_d	80	120	Ω	-
Differential Input Voltage Swing	$V_{PP-DIFF}$	180	700	mV	-
Input High Voltage (TX Disable)	V_{IH}	2.0	V_{CC}	V	1
Input LOW Voltage (TX Disable)	V_{IL}	0	0.8	V	1
Output High Voltage (TX Fault)	V_{OH}	2.0	$V_{CC} + 0.3$	V	2
Output LOW Voltage (TX Fault)	V_{OL}	0	0.8	V	2

- Notes:**
1. There is an internal 4.7 to 10 k Ω pull-up resistor to VccT
 2. Open collector compatible, 4.7 to 10 k Ω pull-up resistor to Vcc (Host Supply Voltage)

Receiver Specifications (Electrical)

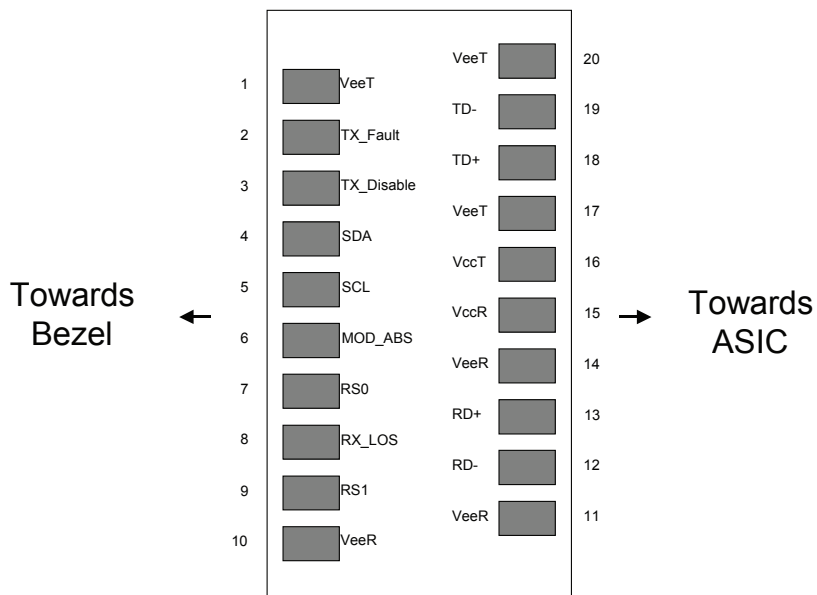
Parameter	Symbol	Min	Max	Unit	Notes
Differential Output Impedance	Z_d	80	120	Ω	-
Differential Output Swing	$V_{PP-DIFF}$	300	850	mV	-
Output Rise and Fall time (20% to 80%)	t_{RH}, t_{FH}	28	-	ps	-
Output HIGH Voltage (LOS)	V_{OH}	$V_{CC} - 1.3$	$V_{CC} - 0.3$	V	1
Output Low Voltage (LOS)	V_{OL}	0	0.8	V	1

- Notes:**
1. Open collector compatible, 4.7 to 10 k Ω pull-up resistor to Vcc (Host Supply Voltage)

Power Supply Specifications (Electrical)

Parameter	Symbol	Min	Max	Unit	Notes
Power Supply Voltage	V_{CC}	3.13	3.47	V	-
DC Common Mode Voltage	V_{CM}	0	3.6	V	-
Supply Current	I_{VCM}	-	340	mA	-
Power Consumption	P_W	-	1.12	W	-

Host Board Connector Pinout

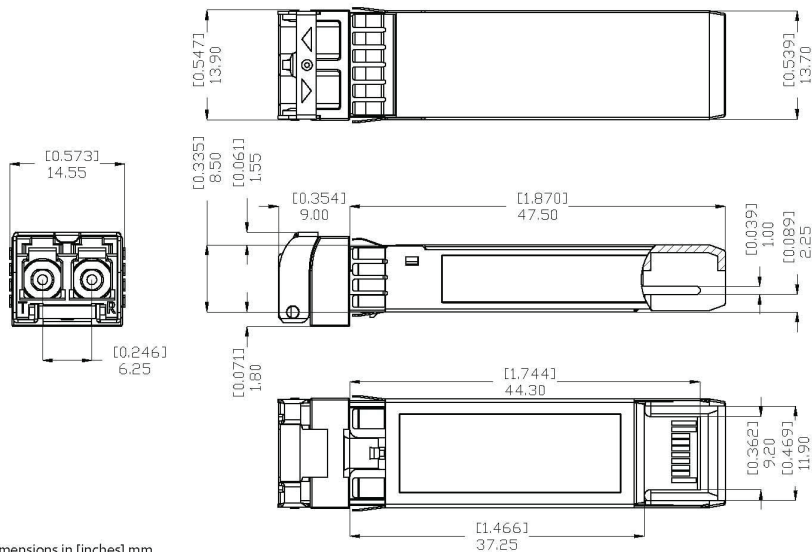


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Pin Descriptions

Pin	Logic	Symbol	Description
1	-	VeeT	Module Transmitter Ground
2	LVTTL-O	TX_FAULT	Module Transmitter Fault
3	LVTTL-I	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line
5	LVTTL-I/O	SCL	2-Wire Serial Interface Clock
6	-	MOD-ABS	Module Definition, Grounded in the module
7	LVTTL-I	RS0	No function implemented
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication
9	LVTTL-I	RS1	No function implemented
10	-	VeeR	Module Receiver Ground
11	-	VeeR	Module Receiver Ground
12	CML-O	RD-	Receiver Inverted Data Output
13	CML-O	RD+	Receiver Non-Inverted Data Output
14	-	VeeR	Module Receiver Ground
15	-	VccR	Module Receiver 3.3V Supply
16	-	VccT	Module Transmitter 3.3V Supply
17	-	VeeT	Module Transmitter Ground
18	CML-I	TD+	Transmitter Non-Inverted Data Input
19	CML-I	TD-	Transmitter Inverted Data Input
20	-	VeeT	Module Transmitter Ground

Outline Drawing



Dimensions in [inches] mm
 Millimeters are the primary units.
 Tolerances are in accordance with
 SFF-8432 Rev.5

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Ordering Information

Model	Wavelength (nm)	Frequency (THz)	Channel Number	Distance (km)
SFP-10GDWZR-H61	1528.38	196.15	H61	80
SFP-10GDWZR-C61	1528.77	196.10	C61	80
SFP-10GDWZR-H60	1529.16	196.05	H60	80
SFP-10GDWZR-C60	1529.55	196.00	C60	80
SFP-10GDWZR-H59	1529.94	195.95	H59	80
SFP-10GDWZR-C59	1530.33	195.90	C59	80
SFP-10GDWZR-H58	1530.73	195.85	H58	80
SFP-10GDWZR-C58	1531.12	195.80	C58	80
SFP-10GDWZR-H57	1531.51	195.75	H57	80
SFP-10GDWZR-C57	1531.90	195.70	C57	80
SFP-10GDWZR-H56	1532.29	195.65	H56	80
SFP-10GDWZR-C56	1532.68	195.60	C56	80
SFP-10GDWZR-H55	1533.07	195.55	H55	80
SFP-10GDWZR-C55	1533.47	195.50	C55	80
SFP-10GDWZR-H54	1533.86	195.45	H54	80
SFP-10GDWZR-C54	1534.25	195.40	C54	80
SFP-10GDWZR-H53	1534.64	195.35	H53	80
SFP-10GDWZR-C53	1535.04	195.30	C53	80
SFP-10GDWZR-H52	1535.43	195.25	H52	80
SFP-10GDWZR-C52	1535.82	195.20	C52	80
SFP-10GDWZR-H51	1536.22	195.15	H51	80
SFP-10GDWZR-C51	1536.61	195.10	C51	80
SFP-10GDWZR-H50	1537.00	195.05	H50	80
SFP-10GDWZR-C50	1537.40	195.00	C50	80
SFP-10GDWZR-H49	1537.79	194.95	H49	80
SFP-10GDWZR-C49	1538.19	194.90	C49	80
SFP-10GDWZR-H48	1538.58	194.85	H48	80
SFP-10GDWZR-C48	1538.98	194.80	C48	80
SFP-10GDWZR-H47	1539.37	194.75	H47	80
SFP-10GDWZR-C47	1539.77	194.70	C47	80
SFP-10GDWZR-H46	1540.16	194.65	H46	80
SFP-10GDWZR-C46	1540.56	194.60	C46	80
SFP-10GDWZR-H45	1540.95	194.55	H45	80
SFP-10GDWZR-C45	1541.35	194.50	C45	80
SFP-10GDWZR-H44	1541.75	194.45	H44	80
SFP-10GDWZR-C44	1542.14	194.40	C44	80
SFP-10GDWZR-H43	1542.54	194.35	H43	80
SFP-10GDWZR-C43	1542.94	194.30	C43	80
SFP-10GDWZR-H42	1543.33	194.25	H42	80
SFP-10GDWZR-C42	1543.73	194.20	C42	80

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Ordering Information

Model	Wavelength (nm)	Frequency (THz)	Channel Number	Distance (km)
SFP-10GDWZR-H41	1544.13	194.15	H41	80
SFP-10GDWZR-C41	1544.53	194.10	C41	80
SFP-10GDWZR-H40	1544.92	194.05	H40	80
SFP-10GDWZR-C40	1545.32	194.00	C40	80
SFP-10GDWZR-H39	1545.72	193.95	H39	80
SFP-10GDWZR-C39	1546.12	193.90	C39	80
SFP-10GDWZR-H38	1546.52	193.85	H38	80
SFP-10GDWZR-C38	1546.92	193.80	C38	80
SFP-10GDWZR-H37	1547.32	193.75	H37	80
SFP-10GDWZR-C37	1547.72	193.70	C37	80
SFP-10GDWZR-H36	1548.12	193.65	H36	80
SFP-10GDWZR-C36	1548.52	193.60	C36	80
SFP-10GDWZR-H35	1548.92	193.55	H35	80
SFP-10GDWZR-C35	1549.32	193.50	C35	80
SFP-10GDWZR-H34	1549.72	193.45	H34	80
SFP-10GDWZR-C34	1550.12	193.40	C34	80
SFP-10GDWZR-H33	1550.52	193.35	H33	80
SFP-10GDWZR-C33	1550.92	193.30	C33	80
SFP-10GDWZR-H32	1551.32	193.25	H32	80
SFP-10GDWZR-C32	1551.72	193.20	C32	80
SFP-10GDWZR-H31	1552.12	193.15	H31	80
SFP-10GDWZR-C31	1552.52	193.10	C31	80
SFP-10GDWZR-H30	1552.93	193.05	H30	80
SFP-10GDWZR-C30	1553.33	193.00	C30	80
SFP-10GDWZR-H29	1553.73	192.95	H29	80
SFP-10GDWZR-C29	1554.13	192.90	C29	80
SFP-10GDWZR-H28	1554.54	192.85	H28	80
SFP-10GDWZR-C28	1554.94	192.80	C28	80
SFP-10GDWZR-H27	1555.34	192.75	H27	80
SFP-10GDWZR-C27	1555.75	192.70	C27	80
SFP-10GDWZR-H26	1556.15	192.65	H26	80
SFP-10GDWZR-C26	1556.56	192.60	C26	80
SFP-10GDWZR-H25	1556.96	192.55	H25	80
SFP-10GDWZR-C25	1557.36	192.50	C25	80
SFP-10GDWZR-H24	1557.77	192.45	H24	80
SFP-10GDWZR-C24	1558.17	192.40	C24	80
SFP-10GDWZR-H23	1558.58	192.35	H23	80
SFP-10GDWZR-C23	1558.98	192.30	C23	80
SFP-10GDWZR-H22	1559.39	192.25	H22	80
SFP-10GDWZR-C22	1559.79	192.20	C22	80

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Ordering Information

Model	Wavelength (nm)	Frequency (THz)	Channel Number	Distance (km)
SFP-10GDWZR-H21	1560.20	192.15	H21	80
SFP-10GDWZR-C21	1560.61	192.10	C21	80
SFP-10GDWZR-H20	1561.01	192.05	H20	80
SFP-10GDWZR-C20	1561.42	192.00	C20	80
SFP-10GDWZR-H19	1561.83	191.95	H19	80
SFP-10GDWZR-C19	1562.23	191.90	C19	80
SFP-10GDWZR-H18	1562.64	191.85	H18	80
SFP-10GDWZR-C18	1563.05	191.80	C18	80
SFP-10GDWZR-H17	1563.46	191.75	H17	80
SFP-10GDWZR-C17	1563.86	191.70	C17	80

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 SFF-8074i; 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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