

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

Datasheet

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Center Wavelength	λ_c	1464.5	1617.5	nm	-
Center Wavelength Stability	$\Delta\lambda D$	-6.5	6.5	nm	-
Optical Average Power	P_O	0	3	dBm	-
Optical OMA Power	$P_{om \lambda}$	-2.1	-	dBm	-
Side Mode Suppression Ratio	SMSR	30	-	dB	-
Optical Transmit Power (Disabled)	PTX_DISABLE	-	-30	dBm	-
Extinction Ratio	ER	8.2	-	dB	-
RIN21OMA	-	-	-128	dB/Hz	1
Optical Return Loss Tolerance	-	-	21	dB	-

Notes: 1. RIN measurement is made with a return loss at 21 dB.

Receiver Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Input Operating Wavelength	λ	1260	1620	nm	-
Average Receive Power	-	-	-1.0	dBm	-
Receiver Sensitivity in OMA	-	-	-14.1	dBm	-
Stressed Receiver Sensitivity in OMA	-	-	-11.3	dBm	1
Maximum Input Power	RX-overload	-	-1	dBm	-
Reflectance	Rrx	-	-27	dB	-
LOS Assert	-	-25	-	dBm	-
LOS De-assert	-	-	-16	dBm	-
LOS Hysteresis	-	0.5	-	dB	-

Notes: 1. Measured with conformance test signal for BER = 10^{-12} . The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage	V_{CC}	3.13	3.47	V	-
Supply Current	I_{CC}	-	450	mA	1
Operating Case Temperature	T_{ca}	-5	70	°C	-
Module Power Dissipation	P_m	-	1.5	W	-

Notes: 1. Supply current is shared between $V_{CC}TX$ and $V_{CC}RX$.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage	V_{CC}	-0.5	3.8	V	-
Storage Temperature	T_S	-40	85	°C	-
Relative Humidity	Rh	0	85	%	-

Datasheet

Transmitter Specifications (Electical)

Parameter	Symbol	Min	Max	Unit	Notes
Data Rate	Mra	1	11.3	Gbps	-
Input Differential Impedance	Rim	85	115	Ω	-
Differential Data Input	VtxDIFF	120	850	mV	-
Transmit Disable Voltage	VD	2.0	Vcc3 + 0.3	V	-
Transmit Enable Voltage	Ven	0	0.8	V	-
Transmit Disable Assert Time	Vn	-	100	us	-

Receiver Specifications (Electrical)

Parameter	Symbol	Min	Max	Unit	Notes
Data Rate	Mra	1	11.3	Gbps	-
Differential Output Swing	Vout P-P	350	850	mV	-
Rise/Fall Time	Tr/Tf	24	-	ps	-
Loss of Signal – Asserted	VOH	2	Vcc + 0.3	V	-
Loss of Signal – Negated	VOL	0	0.4	V	-

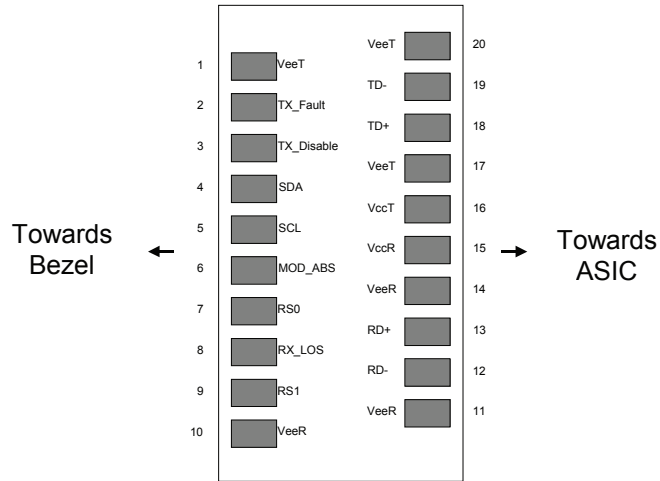
Electrical Pin-Out Details

Pin #	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground	1
2	TX_FAULT	Transmitter Fault	2
3	TX_DISABLE	Transmitter Disable	3
4	SDA	2-Wire Serial Interface Data Line	2
5	SCL	2-Wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded Within the Module.	4
7	RS0	RS0 for Rate Select: Open or Low = Module Supports ≤ 4.25 Gbps High = Module supports 9.95 Gbps to 10.3125 Gbps	5
8	RX_LOS	Loss of Signal Indication. Logic 0 Indicates Normal Operation.	2
9	RS1	No Connection Required	5
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Receiver Inverted DATA Out. AC Coupled	-
13	RD+	Receiver DATA Out. AC Coupled	-
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power Supply	-
16	VccT	Transmitter Power Supply	-
17	VeeT	Transmitter Ground	1
18	TXD+	Transmitter DATA In. AC Coupled	-
19	TXD-	Transmitter Inverted DATA In. AC Coupled	-
20	VeeT	Transmitter Ground	1

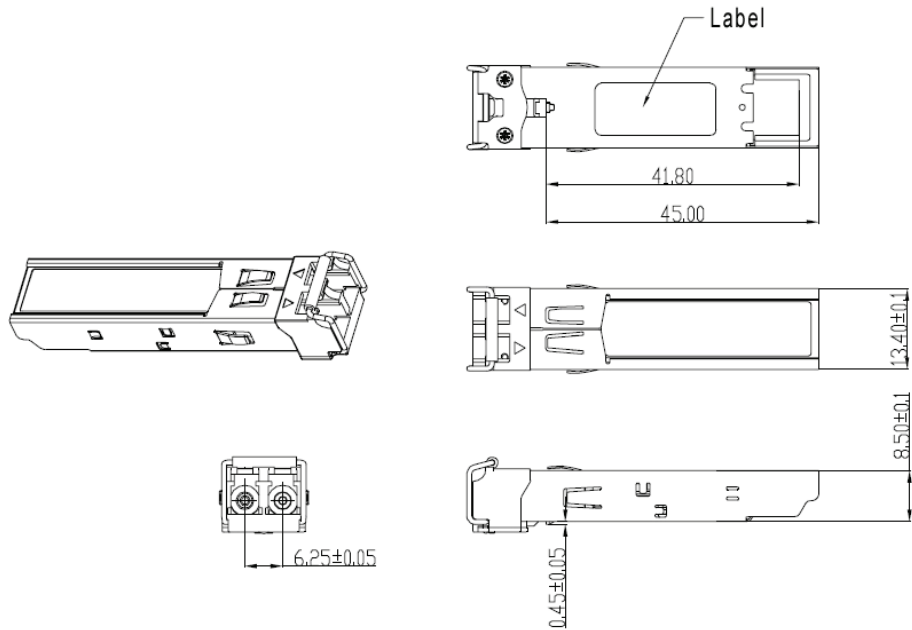
- Notes:**
1. Module circuit ground is isolated from module chassis ground within the module.
 2. Should be pulled up with 4.7 k – 10 kohms on host board to a voltage between 3.15 V and 3.6 V.
 3. Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.
 4. Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
 5. RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Datasheet

Host Board Connector Pinout



Outline Drawing



Datasheet

Ordering Information

Model	Description	Data Rate (Gbps)	Digital diagnostics	Wavelength (nm)	Distance Range (km)
SFP-10GCWER-xx *	10 Gigabit Ethernet CWDM SFP+ Transceiver	≤ 4.25 or 8.5 - 11.3	Yes	xx (see Wavelength Guide)	10 - 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 optical SFPs comply with EN 60825-1: 2007 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; SFF-8431, SFF-8432 and IEEE 802.3ae

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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