Multi-Rate (2 Gbps) CWDM 60 km SFP Transceivers

SFP27DCWEIR-*xx*

Highlights

- SFP transceiver
- Data Rates: 0.1 - 2.7 Gbps
- Protocols:
  - Ethernet (0.1 Gbps, 1 Gbps)
  - Fibre Channel (1 and 2 Gbps)
  - SDH/SONET (OC-3, OC-12, OC-48 and OC-48 with FEC)
  - FireWire
  - ESCON
  - Digital Video
- Single-mode fiber
- CWDM wavelength per ITU-T G.694.2
- 20 to 60 km
- Duplex LC connector
- Digital Diagnostics (SFF-8472)
- Hot-swap
- Industrial temperature models available

Overview

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	0.1 - 2.7 Gbps
Tx Wavelength	CWDM grid (1271 nm - 1611 nm)
Tx Power (Minimum)	0 dBm
Dispersion Penalty	1.5 dB
Tx Disable	Yes
Rx Wavelength Range	1200 - 1625 nm
Rx Sensitivity	-20 dBm
Rx Saturation	0 dBm
Rx Damage Threshold	5 dBm
Operating Temperature Range	-5 to 70 ºC
Operating Temperature Range (TH Models)	-40 to 85 ºC
Power Consumption	1 Watt

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Transmitter Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Optical Power	P_{op}	0	5	dBm	-
Average Launch Power Tx_Off	P_{off}	-	-45	dBm	-
Extinction Ratio	ER	9	-	dB	-
Eye Mask	IEEE 802.3ah, SONET/SDH compliant				-
Optical Jitter Generation	Jgen	-	0.007	UI	-
Optical Rise/Fall Time	t_r	-	160	ps	1
Mean Wavelength	λ	1xxx - 6.5 nm	1xx1 + 6.5 nm	nm	-
Spectral Width (20 dB)	Δλ	-	1	nm	-
Dispersion Penalty at 60 km	dp	-	1.5	dB	2
Relative Intensity Noise	RIN	-	-120	dB/Hz	-
Reflection Tolerance	rp	-24	-	dB	3

Notes:
1. 20%~80% values
2. Measured at BER of 10^{-12}, PRBS of 2^{23}-1, at eye center
3. 1 dB degradation of receiver sensitivity

Receiver Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Receive Power Low	$R_{sens,low}$	-	-20	dBm	1
Receive Power High	$R_{sens,high}$	0	-	dBm	1, 4
Damage Threshold For Receiver	$P_{in,damage}$	5	-	dBm	-
Wavelength	λ	1200	1625	nm	-
Maximum Reflectance Of Receiver	RX_r	-	-27	dB	-
LOS Assert	-	-30	-	dBm	2
LOS Assert	-	-38		dBm	3
LOS De-assert	-	-	-20	dBm	-
LOS Hysteresis	-	0.5	-	dB	-

Notes:
1. 10^{-10} BER, PRBS 2^{23}-1, OC-48 for SONET; 10^{-12} BER, PRBS 2^{7}-1, for Gigabit Ethernet
2. SFP27DCWEIR-*xx* options
3. SFP27DCWEIRTH-*xx* options
4. -4 dBm overload @ 155 Mbps

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature	-5 to 70	± 3	° C	External	Tc(C)=Tslope*Tad (16 bit signed twos complement value) + Toffset
Temperature (TH Models)	-40 to 85	± 3	° C	External	Tc(C)=Tslope*Tad (16 bit signed twos complement value) + Toffset
Voltage	0 to V_{CC}	0.1	V	External	V(Volts)=Vslope*Vad (16 bit unsigned integer) + Voffset
Bias Current	0 to 120	5	mA	External	I(mA)=Islope*Iad(16 bit unsigned integer)+Ioffset
TX Power	0 to 5	±3 dB	dBm	External	TX_PWR(µW)=TX_PWRslope*TX_PWRad (16 bit unsigned integer) +TX_PWRoffset
RX Power	-20 to 0	±3 dB	dBm	External	RX_PWR(µW)=A0+A1*x+A2*x^2+A3*x^3+A4*x^4

General Operating

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage	V_{cc}	3.135	3.465	V	-
Total Current, -40 to -5 ºC	I_{cc}	-	500	mA	1
Total Current, -5 to 85 ºC	I_{cc}	-	300	mA	-
Power Supply Noise Rejection	PSR	100	-	mVp-p	2
Operating Case Temperature	T_{opr}	-5	70	ºC	3
Operating Case Temperature (TH Models)	T_{opr}	-40	85	ºC	3
Storage Temperature	T_{stg}	-40	85	ºC	-
Data Rate	DR	0.1	2.7	Gbps	-

Notes:
1. Denotes deviation from MSA
2. 20Hz to 155MHz
3. Please refer to ordering information

Transmitter Specifications (Electical)

Parameter	Symbol	Min	Max	Unit	Notes
Input Differential Impedence	R_{in}	80	120	Ω	-
PECL Single Ended Data Input Swing	$V_{in,p-p}$	250	1200	mV	-
TxFault_Fault	V_{fault}	2	V_{cc}	V	-
TxFault_Normal	V_{normal}	V_{ee}	V_{ee}+0.5	V	-
TxDisable_Disable	V_d	2	V_{cc}	V	-
TxDisable_Enable	V_{en}	V_{ee}	V_{ee}+0.8	V	-

Receiver Specifications (Electrical)

Parameter	Symbol	Min	Max	Unit	Notes
PECL Single Ended Data Output Swing	$V_{out, p-p}$	185	800	mV	-
Data Output Rise/Fall Time	t_r,t_f	-	175	ps	-

Timing and Electrical

Parameter	Symbol	Min	Max	Unit	Notes
Tx Disable Negate Time	t_on	-	1	ms	-
Tx Disable Assert Time	t_off	-	10	µs	-
Time To Initialize, Including Reset Of Tx Fault	t_init	-	300	ms	-
Tx Fault Assert Time	t_fault	-	100	µs	-
Tx Disable To Reset	t_reset	10	-	µs	-
LOS Assert Time	t_loss_on	-	100	µs	-
LOS De-assert Time	t_loss_off	-	100	µs	-
Serial ID Clock Rate	f_serial_clock	-	100	KHz	-
RX_LOS Voltage (High)	RX_LOS_H	2	-	V	-
RX_LOS Voltage (Low)	RX_LOS_L	-	0.8	V	-
MOD_DEF (0:2)-High	V_H	2	V_{cc}	V	-
MOD_DEF (0:2)-Low	V_L	V_{ee}	V_{ee}+0.5	V	-
LOS Output Voltage-Fault	V_{LOS} fault	2	V_{cc}	V	-
LOS Output Voltage-Normal	V_{LOS}normal	V_{ee}	V_{ee}+0.5	V	-

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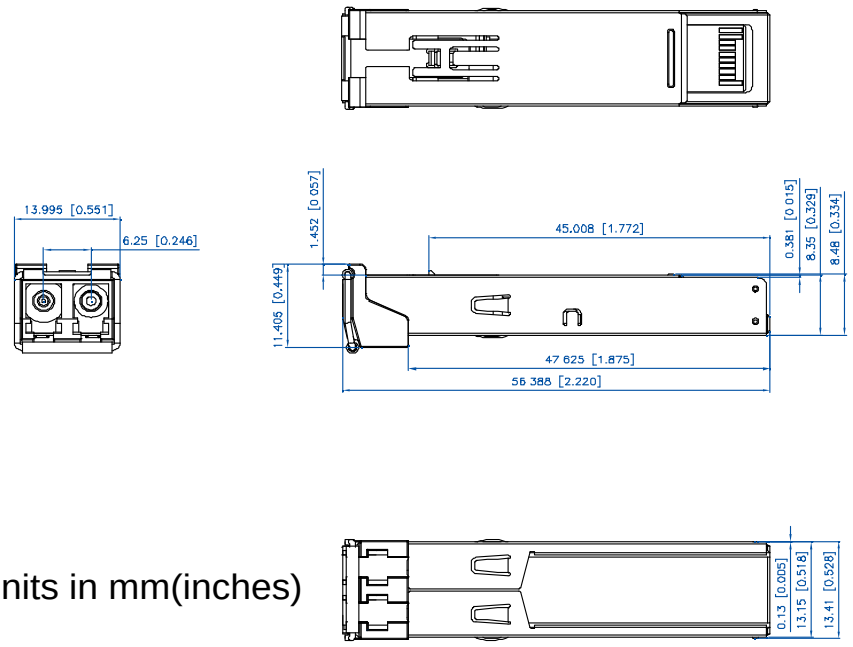
Pin	Function	Notes
1	$V_{ee}T$	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	$V_{ee}R$	RX Ground
10	$V_{ee}R$	RX Ground
11	$V_{ee}R$	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	$V_{ee}R$	RX GND
15	V_{ccR}	RX Power
16	V_{ccT}	TX Power
17	$V_{ee}T$	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{ee}T$	TX GND

Outline Drawing



Units in mm(inches)

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Ordering Information

Model	Description	Data Rate (Gbps)	Wavelength (nm)	Distance Range (km)
SFP27DCWEIR-*xx* *	Multi-Rate CWDM SFP Transceiver	0.1 - 2.7	***xx*** (see Wavelength Guide below)	20 - 60
SFP27DCWEIRTH-*xx* *	Multi-Rate CWDM SFP Transceiver, ***Temperature Hardened***	0.1 - 2.7	***xx*** (see Wavelength Guide below)	20 - 60

*See Wavelength Guide below for "***xx***" values

λc Wavelength Guide per ITU-T G.694.2

Code	λc	Unit	Bail Latch Color		Code	λc	Unit	Bail Latch Color	
27	1271	nm	Yellow		45	1451	nm	Yellow	
29	1291	nm	Yellow		47	1471	nm	Grey	
31	1311	nm	Yellow		49	1491	nm	Purple	
33	1331	nm	Yellow		51	1511	nm	Blue	
35	1351	nm	Yellow		53	1531	nm	Green	
37	1371	nm	Yellow		55	1551	nm	Yellow	
39	1391	nm	Yellow		57	1571	nm	Orange	
41	1411	nm	Yellow		59	1591	nm	Red	
43	1431	nm	Yellow		61	1611	nm	Brown	

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 descharge (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.

MRV has more than 50 offices throughout the world. Addresses, phone numbers and fax numbers are listed at www.mrv.com.
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