

Datasheet

100/155 Mbps Dual-Rate 120 km CWDM SFP Transceiver

SFP-O3D-XLR-xx



Highlights

- SFP transceiver
- Data Rates: 100 - 155 Mbps
- Protocols:
 - Fast Ethernet
 - OC-3/STM-1
- Single-mode fiber
- CWDM wavelength per ITU-T G.694.2
- 60 to 120 km
- Duplex LC connector
- Digital Diagnostics (SFF-8472)
- Hot-swap

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	100 - 155 Mbps
Tx Wavelength	CWDM wavelength (see Wavelength 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	-42 dBm
Rx Saturation	-10 dBm
Rx Damage Threshold	4 dBm
Operating Temperature Range	-5 to 70 °C
Power Consumption	1 Watt

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Optical Transmitter Specifications

Parameter	Symbol	Min	Max	Unit	Note
Optical Power	P_{op}	1	5	dBm	-
Average Launch Power (Tx: Off)	P_{off}	-	-30	dBm	-
Extinction Ratio	ER	10	-	dB	-
Eye Mask	SONET/SDH Compliant				-
Optical Jitter Generation	J_{gen}	-	0.002	UI	-
Optical Rise/Fall Time	t_r, t_f	-	1000	ps	1
Wavelength	λ	1xx1 - 6.5	1xx1 + 6.5	nm	-
Spectral Width (20 dB)	$\Delta\lambda$	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	dB	-
Dispersion Penalty (120 km)	DP	-	2	dB	-
Relative Intensity Noise	RIN	-	-120	dB/Hz	-
Reflection Tolerance	rp	-24	-	dB	-

Notes: 1. 20% - 80% values

Optical Receiver Specifications

Parameter	Symbol	Min	Max	Unit	Note
Receive Power	$R_{sens,low/high}$	-42	-10	dBm	1
Damage Threshold for Receiver	$P_{in,damage}$	4	-	dBm	-
Mean Rx Wavelength	λ	1260	1620	nm	2
LOS Assert	LOS_A	-52	-	dBm	-
LOS De-assert	LOS_D	-	-42	dBm	-
LOS Hysteresis	HYS	0.5	-	dB	-

Notes: 1. At 10^{-10} BER, PRBS 2²³-1
2. Operational over 1200 nm to 1625 nm range

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula	Note
Temperature	-5 to 70	± 3	° C	Internal	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$	-
Voltage	0 to V_{CC}	0.1	V	Internal	$V(\text{Volts}) = V_{ad}(16 \text{ bit unsigned integer}) * 0.1$	-
Bias Current	0 to 120	5	mA	External	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$	-
TX Power	0 to 5	±3	dBm	External	$TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$	-
RX Power	-42 to -10	±5	dBm	External	$RX_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$	-

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General Operations

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	V_{cc}	3.135	3.465	V	-
Total Current	I_{cc}	-	300	mA	-
Power Supply Noise Rejection	PSR	100	-	mV _{p-p}	1
Operating Temperature of SFP Case	T_{op}	-5	70	°C	-
Storage Temperature	T_{st}	-40	85	°C	-
Data Rate OC-3/STM-1	DR	100	155	Mbps	-

- Notes:**
1. 20 Hz to 155 MHz
 2. Maximum Relative Humidity is 85%, non-condensing

Electical Transmitter Specifications

Parameter	Symbol	Min	Max	Unit	Note
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	-

Electical Receiver Specifications

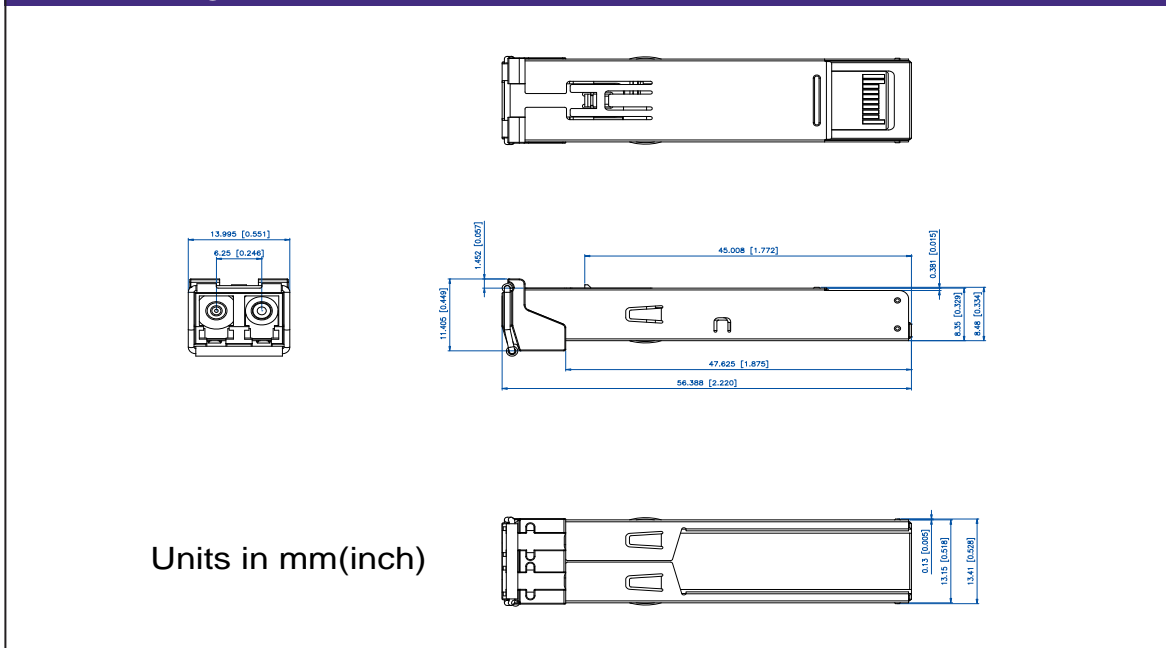
Parameter	Symbol	Min	Max	Unit	Note
PECL Single Ended Data Output Swing	$V_{out,p-p}$	185	800	mV	-
Data Output Rise Time	t_r	-	1000	ps	-
Data Output Fall Time	t_f	-	1000	ps	-

Timing and Electrical

Parameter	Symbol	Min	Max	Unit	Note
Tx Disable Negate Time	t_{on}	-	5	ms	-
Tx Disable Assert Time	t_{off}	-	10	μ s	-
Time to Initialize, Including Reset of Tx Fault	t_{init}	-	300	ms	-
Tx Fault Assert Time	t_{fault}	-	100	μ s	-
Tx Disable To Reset	t_{reset}	10	-	μ s	-
LOS Assert Time	$t_{loss_{on}}$	-	100	μ s	-
LOS De-assert Time	$t_{loss_{off}}$	-	100	μ s	-
Serial ID Clock Rate	f_{serial_clock}	-	100	KHz	-
RX_LOS Voltage (High)	-	2	-	V	-
RX_LOS Voltage (Low)	-	-	0.8	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	-
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	-

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Pin	Function	Notes
1	V _{ee} T	TX Ground
2	TX_FAULT/INT	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 Ground
15	V _{cc} R	RX Power
16	V _{cc} T	TX Power
17	V _{ee} T	TX Ground
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	V _{ee} T	TX Ground

Outline Drawing


**Datasheet****Ordering Information**

Model	Description	Data Rate (Mbps)	Wavelengths (nm)	Connector	Bail Latch Color	Distance Range (km)
SFP-O3D-XLR-xx*	SFP FE/OC3 CWDM Transceiver	100 - 155	1260 - 1620	Dual LC	See table below	60 - 120

* See Wavelength Guide below for "xx" values

λc Wavelength Guide

Code (xx)	λc	Unit	Bail Latch Color	Code (xx)	λc	Unit	Bail Latch Color
47	1471	nm	Grey	55	1551	nm	Yellow
49	1491	nm	Purple	57	1571	nm	Orange
51	1511	nm	Blue	59	1591	nm	Red
53	1531	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 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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