4.25 Gbps Multi-Rate Fibre Channel 80 km SFP Transceiver

SFPFC408

Highlights

- SFP transceiver
- Data Rates: 1.0625 to 4.25 Gbps
- Protocols:
  - 1/2/4 Gbps Fibre Channel
  - Gigabit Ethernet compatible
- Single-mode fiber
- Dual fiber, bi-directional
- 1550 nm
- 30 to 80 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	1.0625 to 4.25 Gbps
Tx Wavelength	1550 nm
Tx Power (Minimum)	0 dBm
Tx Dispersion Penalty	3 dB
Tx Disable	Yes
Rx Wavelength	1200 to 1625 nm
Rx Sensitivity	-24 dBm
Rx Saturation	-6 dBm
Rx Damage Threshold	5 dBm
Operating Temperature Range	-5 to 70 ºC
Power Consumption	1 Watt

Optical Transmitter Specifications

Parameter	Symbol	Min	Max	Unit	Notes
Optical Power	P_{op}	0	4	dBm	-
Average Launch Power of Off Tx	P_{off}	-	-45	dBm	-
Eye Mask	-	Fibre Channel Compliant			-
Extinction Ratio	ER	5	-	dB	-
Optical Rise Time	t_r	-	120	ps	1
Optical Fall Time	t_f	-	120	ps	1
Mean Wavelength	λ	1530	1570	nm	-
Spectral Width (20 dB)	$\Delta\lambda_{20}$	-	1	nm	-
Dispersion Penalty (80 km, 1600 ps/nm)	dp	-	3	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 $1e^{-12}$, PRBS of 2^7-1, at eye center
3. 1 dB degradation of receiver sensitivity

Optical Receiver Specifications

Parameter	Symbol	Min	Max	Unit	Notes
Receive Power	$R_{sens,low/high}$	-24	-6	dBm	1
Damage Threshold	$P_{in,damage}$	5	-	dBm	-
Mean Wavelength	λ	1200	1620	nm	-
Maximum Reflectance of Receiver	RX_r	-	-27	dB	-
LOS Assert	-	-34	-	dBm	-
LOS De-assert	-	-	-24	dBm	-
LOS Hysteresis	-	0.5	-	dB	-

Notes:
1. At 4.25 Gbps, $1e^{-12}$ BER, PRBS of 2^7-1

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
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 4	±3 dB	dBm	External	TX_PWR(µW)=TX_PWRslope*TX_PWRad(16 bit unsigned integer +TX_PWRoffset)
RX Power	-24 to -6	±3 dB	dBm	External	RX_PWR(µW)=A0+A1*x+A2*x^2+A3*x^3+A4*x^4

General Operations

Parameter	Symbol	Min.	Max.	Unit	Notes
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	ºC	2
Storage Temperature	T_{st}	-40	85	ºC	-
Data Rate	DR	1062.5	4250	Mbps	-

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

Electical Transmitter Specifications

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	-

Electrical Receiver Specifications

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

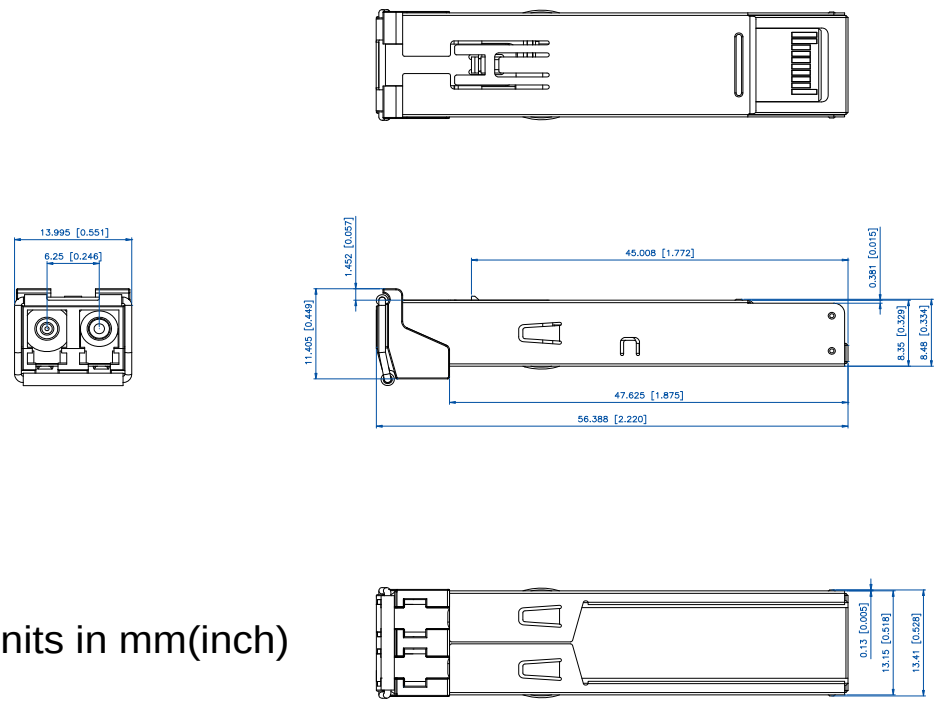
Timing and Electrical

Parameter	Symbol	Min	Max	Unit	Notes
Tx Disable Negate Time	t_on	-	50	µs	-
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	2	100	KHz	-
RX_LOS Voltage (High)	-	2	V_{cc}	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	-

Pin Descriptions

Pin	Function	Name/Description
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(inch)

Optical Communications Systems™

Datasheet

Ordering Information

Model	Description	Data Rates (Mbps)	Wavelength (nm)	Connector Type	Digital Diagnostics	Bail Latch Color	Distance Range (km)
SFPFC408	1/2/4 Gbps Fibre Channel and 1 Gigabit Ethernet SFP Tranceiver	1062.5 to 4250	1550	LC	Yes	Green	30 - 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; Telecordia Gr-468; 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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