1.25 Gbps Single Fiber Bidirectional 38 km SFP Transceivers

SFP-GD-BD35 and SFP-GD-BD53

Highlights

- SFP transceiver
- Data Rates: 1250 Mbps
- Protocols:
  - IEEE 802.3ah
- Single-mode fiber
- Single fiber, bi-directional
- Two wavelength options:
  - Tx 1310 nm and Rx 1550 nm
  - Tx 1550 nm and Rx 1310 nm
- 6 to 38 km
- Simplex 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	1250 Mbps
Tx Wavelength for **SFP-GD-BD35**	1310 nm
Tx Wavelength for **SFP-GD-BD53**	1550 nm
Tx Power (Minimum)	-5 dBm
Extinction Ratio	9 dBm
Tx Disable	Yes
Rx Wavelength for **SFP-GD-BD35**	1500 to 1600 nm
Rx Wavelength for **SFP-GD-BD53**	1260 to 1360 nm
Rx Sensitivity	-24 dBm
Rx Saturation	-3 dBm
Operating Temperature Range	-5 to 70 ºC
Damage Threshold	0 dBm
Power Consumption	1 Watt

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Optical Power	P_{op}	-5	0	dBm	-
Optical Crosstalk	XT	-	-40	dB	-
Average Launch Power of Off Tx	P_{off}	-	-45	dBm	-
Extinction Ratio	ER	9	-	dB	-
Eye Mask	-	IEEE 802.3ah compliant			-
Optical Rise Time (20% to 80% values)	t_r	-	260	ps	-
Optical Fall Time (20% to 80% values)	t_f	-	260	ps	-
Mean Wavelength for **SFP-GD-BD35**	λ	1260	1360	nm	-
Mean Wavelength for **SFP-GD-BD53**	λ	1500	1600	nm	-
RMS Width	Δλ	-	1	nm	-
Relative Intensity Noise	RIN	-	-120	dB/Hz	-
Transmitter Reflectance	-	-	-12	dB	-
Reflection Tolerance	rp	12	-	dB	-

Receiver Specifications (Optical)

Parameter	Symbol	Min	Max	Unit	Notes
Receive Power	$R_{sens,low/high}$	-24	-3	dBm	1
Damage Threshold	$P_{in,damage}$	0	-	dBm	-
Wavelength for **SFP-GD-BD35**	λ	1500	1600	nm	-
Wavelength for **SFP-GD-BD53**	λ	1260	1360	nm	-
LOS Assert	-	-45	-	dBm	-
LOS De-assert	-	-	-20	dBm	-
LOS Hysteresis	-	0.5	-	dB	-
Receiver Reflectance	-	-	-12	dB	-

Notes: 1. Measured at 10^{-12} BER, PRBS 2^7-1, 6 dB ER

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Bit Value	Formula
Temperature	-5 to 70	± 3	° C	Internal	1/256 C	Tc(C)=Tad(16 bit signed twos complement)/256
Temperature (TH Models)	-40 to 85	± 3	° C	Internal	1/256 C	Tc(C)=Tad(16 bit signed twos complement)/256
Voltage	0 to V_{cc}	± 0.1	V	Internal	100µV	V(Volts)=Vad(16 bit unsigned integer)*0.1
Bias Current	0 to 120	± 5	mA	External	-	I(mA)=Islope*Iad(16 bit unsigned integer)+Ioffset
TX Power	-5 to 0	±3	dBm	External	-	TX_PWR(µW)=TX_PWRslope*TX_PWRad(16 bit unsigned integer +TX_PWRoffset
RX Power	-24 to -3	±3	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}	-
Operating Temperature of SFP Case	T_{opr}	-5	70	ºC	1
Operating Temperature (TH Models)	T_{opr}	-40	85	ºC	1
Storage Temperature	T_{stg}	-40	85	ºC	-
Data Rate	DR	-	1250	Mbps	-

Notes: 1. Maximum Relative Humidity is 85%, non-condensing

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 Time	t_r	-	500	ps	-
Data Output Fall Time	t_f	-	500	ps	-

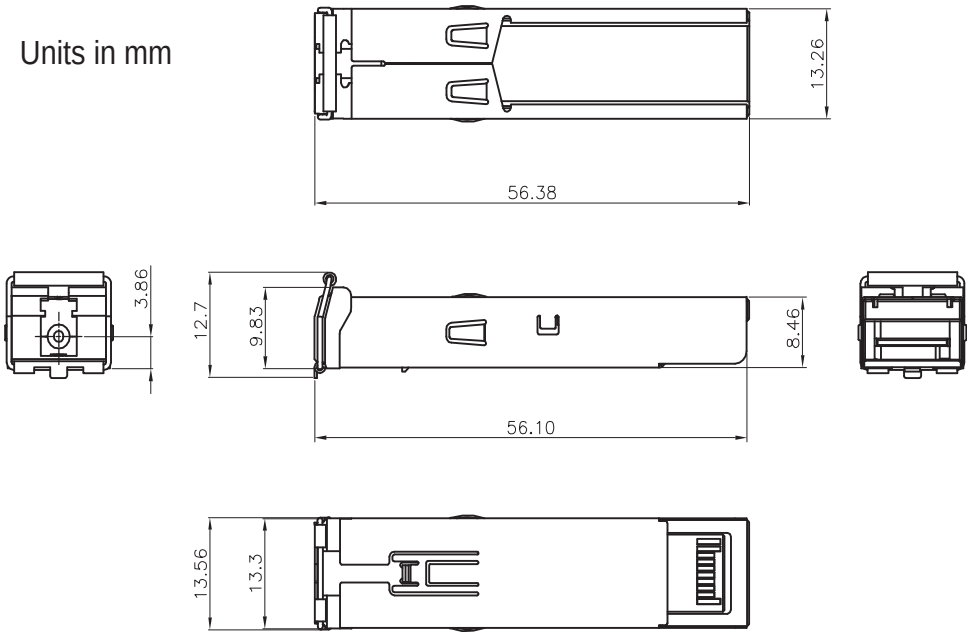
Electrical Specifications and Timing

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_{cc}	V	-
RX_LOS Voltage (Low)	RX_LOS_L	-	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	Function	Name / Description	Notes
1	$V_{ee}T$	Module Transmitter Ground	-
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	$V_{ee}R$	Module Receiver Ground	-
10	$V_{ee}R$	Module Receiver Ground	-
11	$V_{ee}R$	Module Receiver Ground	-
12	RXD-	Receiver Data Negative	-
13	RXD+	Receiver Data Positive	-
14	$V_{ee}R$	Module Receiver Ground	-
15	$V_{cc}R$	Module Receiver Power Supply	-
16	$V_{cc}T$	Module Transmitter Power Supply	-
17	$V_{ee}T$	Module Transmitter Ground	-
18	TXD+	Transmitter Data Positive	-
19	TXD-	Transmitter Data Negative	-
20	$V_{ee}T$	Module Transmitter Ground	-

Outline Drawing

Units in mm



Datasheet

Ordering Information

Model	Description	Data Rate (Mbps)	Wavelength (nm)		Connector Type	Digital Diagnostics	Bail Latch Color	Distance Range (km)
			Tx	Rx				
SFP-GD-BD35	SFP Bidirectional Transceiver	1250	1310	1550	LC	Yes	Blue	6 - 38
SFP-GD-BD53	SFP Bidirectional Transceiver	1250	1550	1310	LC	Yes	Yellow	6 - 38
SFP-GD-BD35TH	SFP Bidirectional Transceiver *(Temperature Hardened)*	1250	1310	1550	LC	Yes	Blue	6 - 38
SFP-GD-BD53TH	SFP Bidirectional Transceiver *(Temperature Hardened)*	1250	1550	1310	LC	Yes	Yellow	6 - 38

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; Telcordia 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.

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