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

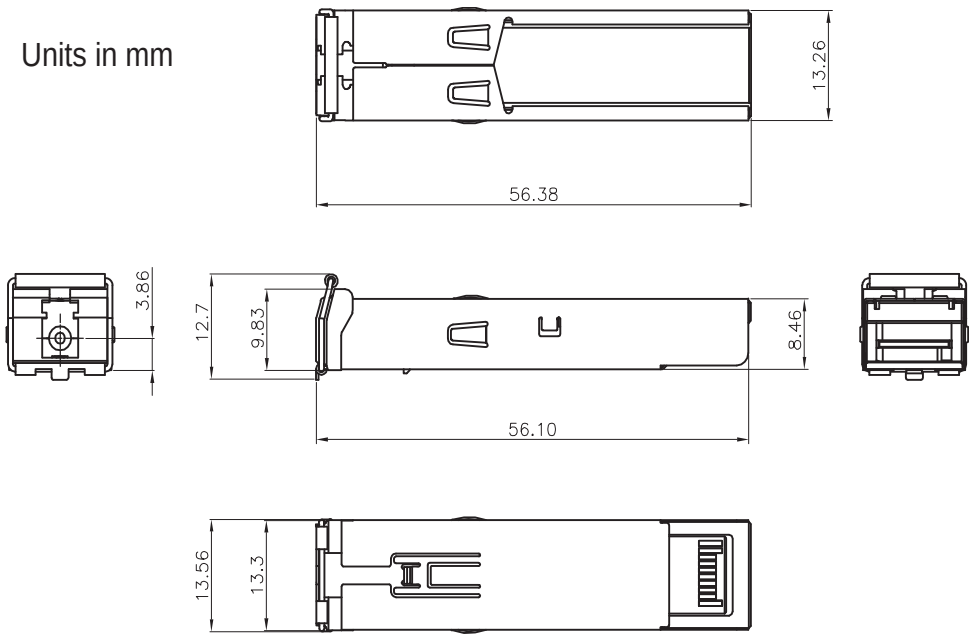
Parameter	Symbol	Min	Max	Unit	Notes
Tx Disable Negate Time	t_on	-	1	ms	-
Tx Disable Assert Time	t_off	-	10	µs	-
Time to Initialize, Including Reset of Tx Fault	t_init	-	300	ms	-
Tx Fault Assert Time	t_fault	-	100	µs	-
Tx Disable To Reset	t_reset	10	-	µs	-
LOS Assert Time	t_loss_on	-	100	µs	-
LOS De-assert 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	-

Datasheet

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



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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.

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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