

Datasheet

1.25 Gbps Single Fiber Bidirectional 96 km SFP Transceivers

SFP-GD-BZ45 and SFP-GD-BZ54



Highlights

- SFP transceiver
- Data Rates: 1250 Mbps
- Protocols:
 - Gigabit Ethernet
- Single-mode fiber
- Single fiber, bi-directional
- Two wavelength options:
 - Tx 1490 nm and Rx 1570 nm
 - Tx 1570 nm and Rx 1490 nm
- 32 to 96 km
- Simplex 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 | 1250 Mbps |
| Tx Wavelength for SFP-GD-BZ45 | 1490 nm |
| Tx Wavelength for SFP-GD-BZ54 | 1570 nm |
| Tx Power (Minimum) | 0 dBm |
| Tx Extinction Ratio | 9 dBm |
| Tx Disable | Yes |
| Rx Wavelength for SFP-GD-BZ45 | 1550 to 1590 nm |
| Rx Wavelength for SFP-GD-BZ54 | 1470 to 1510 nm |
| Rx Sensitivity | -24 dBm |
| Rx Saturation | -3 dBm |
| Rx Damage Threshold | 0 dBm |
| Operating Temperature Range | -5 to 70 °C |
| Power Consumption | 1 Watt |

Datasheet

Transmitter Specifications (Optical)

| Parameter | Symbol | Min | Max | Unit | Notes |
|---------------------------------------|-----------------|------------------------|------|-------|-------|
| Optical Power | P_{op} | 0 | 5 | 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-BZ45 | λ | 1470 | 1510 | nm | - |
| Mean Wavelength for SFP-GD-BZ54 | λ | 1550 | 1590 | nm | - |
| RMS Width | $\Delta\lambda$ | - | 1 | nm | - |
| Relative Intensity Noise | RIN | - | -120 | dB/Hz | - |
| Transmitter Reflectance | - | - | -12 | dB | - |
| Optical Return Loss Tolerance | ORLT | - | 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-BZ45 | λ | 1550 | 1590 | nm | - |
| Wavelength for SFP-GD-BZ54 | λ | 1470 | 1510 | nm | - |
| LOS Assert | - | -45 | - | dBm | - |
| LOS De-assert | - | - | -24 | dBm | - |
| LOS Hysteresis | - | 0.5 | - | dB | - |
| Receiver Reflectance | - | - | -12 | dB | - |

Notes: 1. Measured at 10^{-12} BER, PRBS 2⁷-1, 9 dB ER

Digital Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration | Bit Value | Formula |
|--------------|---------------|----------|------|-------------|-----------|---|
| Temperature | -5 to 70 | ± 3 | °C | Internal | 1/256 C | $T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$ |
| Voltage | 0 to V_{CC} | ± 0.1 | V | Internal | 100µV | $V(\text{Volts}) = V_{ad}(16 \text{ bit unsigned integer}) * 0.1$ |
| 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 3.5 | ±3 | dBm | External | - | $TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$ |
| RX Power | -24 to -3 | ±3 | dBm | External | - | $RX_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$ |

Datasheet

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 | °C | 1 |
| Storage Temperature | T_{stg} | -40 | 85 | °C | - |
| 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)

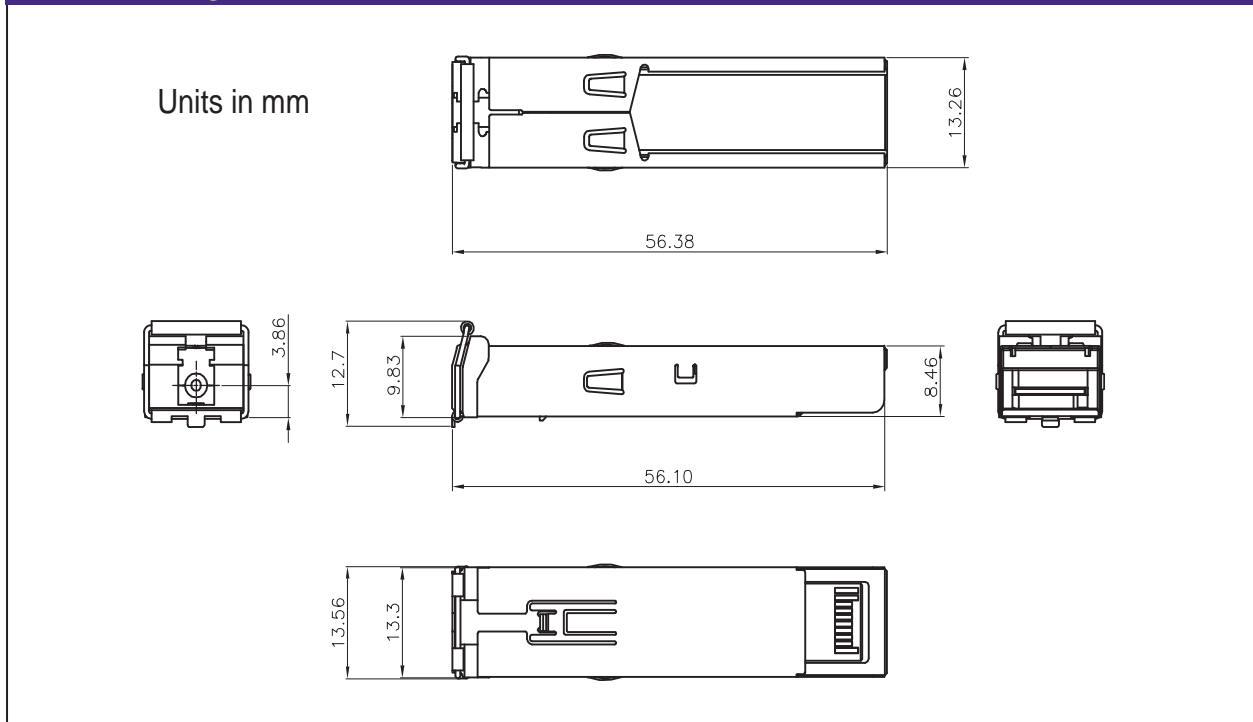
| Parameter | Symbol | Min | Max | Unit | Notes |
|-------------------------------------|---------------|-----|-----|------|-------|
| PECL Single Ended Data Output Swing | $V_{out,p-p}$ | 185 | 800 | mV | - |
| Data Output Rise Time | t_r | - | 175 | ps | - |
| Data Output Fall Time | t_f | - | 175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




Datasheet

Ordering Information

| Model | Description | Data Rate (Mbps) | Wavelength (nm) | | Connector Type | Digital Diagnostics | Bail Latch Color | Distance Range (km) |
|--------------------|-------------------------------|------------------|-----------------|------|----------------|---------------------|------------------|---------------------|
| | | | Tx | Rx | | | | |
| SFP-GD-BZ45 | SFP Bidirectional Transceiver | 1250 | 1490 | 1570 | LC | Yes | Purple | 32 - 96 |
| SFP-GD-BZ54 | SFP Bidirectional Transceiver | 1250 | 1570 | 1490 | LC | Yes | Orange | 32 - 96 |

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 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.

MRV has more than 50 offices throughout the world. Addresses, phone numbers and fax numbers are listed at www.mrv.com.
Please e-mail us at info@mrv.com or call us for assistance.

MRV Los Angeles
20415 Nordhoff Street
Chatsworth, CA 91311
800-338-5316
818-773-0900

MRV Boston
300 Apollo Drive
Chelmsford, MA 01824
800-338-5316
978-674-6800

MRV International
Business Park Moerfelden
Waldeckerstrasse 13
64546 Moerfelden-Walldorf
Germany
Tel. (49) 6105/2070
Fax (49) 6105/207-100

All statements, technical information, and recommendations related to the products herein are based upon information believed to be reliable or accurate. However, the accuracy or completeness thereof is not guaranteed, and no responsibility is assumed for any inaccuracies. Please contact MRV Communications for more information. MRV Communications and the MRV Communications logo are trademarks of MRV Communications, Inc. Other trademarks are the property of their respective holders.