

Datasheet

Multi-Rate (2 Gbps) Single-Mode 60 km SFP Transceivers

SFP-MR27D-IR2



Highlights

- SFP transceiver
- Data Rates: 0.1 - 2.7 Gbps
- Protocols:
 - Fast Ethernet
 - 1 Gbps Ethernet
 - 1 Gbps Fibre Channel
 - 2 Gbps Fibre Channel
 - Digital Video
 - OC-3/STM-1 to OC-48/STM-16 and OC-48 with FEC
- Single-mode fiber
- Dual Fiber (Tx/Rx)
- 1550 nm
- 0 to 60 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 | 0.1 - 2.7 Gbps |
| Tx Wavelength | 1550 nm |
| Tx Power (Minimum) | -5 dBm |
| Tx Dispersion Penalty | 1 dB |
| Tx Disable | Yes |
| Rx Wavelength Range | 1200 - 1625 nm |
| Rx Sensitivity | -20 dBm |
| Rx Saturation | 0 dBm |
| Damage Threshold | 5 dBm |
| Operating Temperature Range | -5 to 70 °C |
| Power Consumption | 1 Watt |

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Transmitter Specifications, Optical

| Parameter | Symbol | Min | Max | Unit | Notes |
|--------------------------------|------------------|-------------------------------------|-------|-------|-------|
| Optical Power | P _{op} | -5 | 0 | dBm | - |
| Average Launch Power (Tx: Off) | P _{off} | - | -30 | dBm | - |
| Extinction Ratio | ER | 8.2 | - | dB | - |
| Eye Mask | - | IEEE 802.3z and SONET/SDH compliant | | | - |
| Optical Jitter Generation | J _{gen} | - | 0.007 | UI | - |
| Optical Rise Time | t _r | - | 160 | ps | 1 |
| Optical Fall Time | t _f | - | 160 | ps | 1 |
| Mean Wavelength | λ | 1430 | 1580 | nm | - |
| Spectral Width (20 dB) | Δλ | - | 1 | nm | - |
| Dispersion Penalty (60 km) | dp | - | 1 | dB | 2 |
| Relative Intensity Noise | RIN | - | -120 | dB/Hz | - |
| Reflectance Tolerance | rp | -24 | - | dB | - |

- Notes:**
- 20% - 80% values
 - Measured at BER of 1e⁻¹², PRBS of 2²³-1, at eye center

Receiver Specifications, Optical

| Parameter | Symbol | Min | Max | Unit | Notes |
|---------------------|------------------------|------|------|------|-------|
| Receive Power Low | R _{sens,low} | - | -20 | dBm | 1 |
| Receive Power High | R _{sens,high} | 0 | - | dBm | 1 |
| Damage Threshold | P _{in,damage} | 5 | - | dBm | - |
| Wavelength | λ | 1430 | 1580 | nm | 2 |
| Maximum Reflectance | RX _r | - | -27 | dB | - |
| LOS Assert | - | -30 | - | dBm | - |
| LOS De-assert | - | - | -20 | dBm | - |
| LOS Hysteresis | - | 0.5 | - | dB | - |

- Notes:**
- Measured at 10⁻¹⁰ BER, PRBS 2²³-1 for SONET, 10⁻¹² BER, PRBS 2⁷-1 for Gigabit Ethernet
 - Operational over 1200 - 1625 nm range

Digital Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration | Formula |
|--------------|----------------------|----------|------|-------------|---|
| Temperature | -5 to 70 | ± 3 | °C | External | T _c (C) = T _{ad} (16 bit signed twos complement)/256 |
| Voltage | 0 to V _{CC} | ± 0.1 | V | External | V(Volts) = V _{ad} (16 bit unsigned integer)*0.1 |
| Bias Current | 0 to 120 | ± 5 | mA | External | I(mA) = I _{slope} *I _{ad} (16 bit unsigned integer)+I _{offset} |
| Tx Power | -5 to 0 | ±3 | dBm | External | Tx_PWR(μW) = Tx_PWRslope*T _{x_PWRad} (16 bit unsigned integer)+Tx_PWRoffset |
| Rx Power | -24 to 0 | ±2 | dBm | External | Rx_PWR(μW) = A0+A1*x+A2*x^2+A3*x^3+A4*x^4 |

General Operating

| 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 | T _{op} | -5 | 70 | °C | - |
| Storage Temperature | T _{st} | -40 | 85 | °C | - |
| Data Rate | DR | 0.1 | 2.7 | Gbps | - |

- Notes:**
- 20 Hz to 155 MHz

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Transmitter Specifications, Electrical

| Parameter | Symbol | Min | Max | Unit | Notes |
|------------------------------------|---------------------|-----------------|----------------------|------|-------|
| Input Differential Impedance | 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 Output

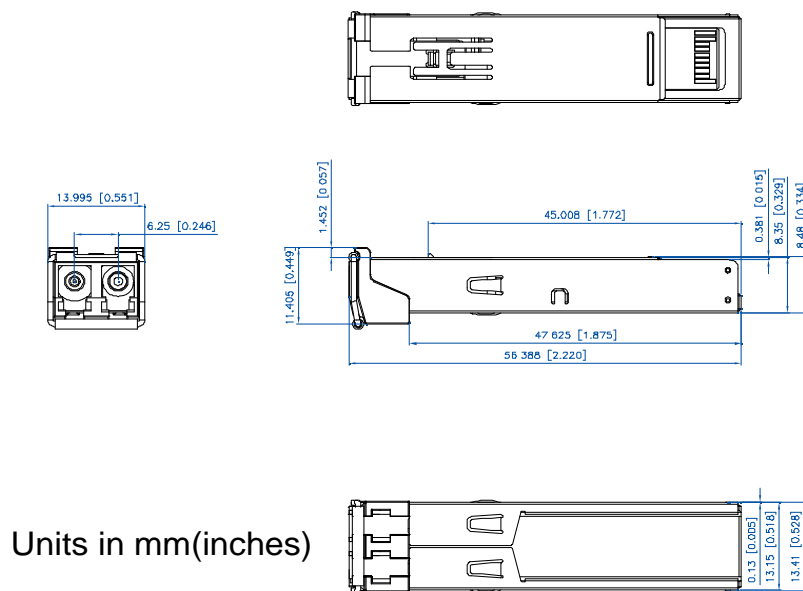
| Parameter | Symbol | Min | Max | Unit | Notes |
|-------------------------------------|----------------------|-----|-----|------|-------|
| PECL Single Ended Data Output Swing | V _{out,p-p} | 185 | 800 | mV | - |
| Data Output Rise Time | t _r | - | 175 | ps | - |
| Data Output Fall Time | t _f | - | 175 | ps | - |

Timing and Electrical

| Parameter | Symbol | Min | Max | Unit | Notes |
|---|---------------------------|-----------------|----------------------|------|-------|
| Tx Disable Negate Time | t _{on} | - | 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 | - |
| 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 | - |

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| Pin | Function | Notes |
|-----|------------------|------------------------|
| 1 | V _{eeT} | TX 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 _{eeR} | RX Ground |
| 10 | V _{eeR} | RX Ground |
| 11 | V _{eeR} | RX Ground |
| 12 | RXD- | RX Data Negative |
| 13 | RXD+ | RX Data Positive |
| 14 | V _{eeR} | RX Ground |
| 15 | V _{ccR} | RX Power |
| 16 | V _{ccT} | TX Power |
| 17 | V _{eeT} | TX Ground |
| 18 | TXD+ | TX Data Positive |
| 19 | TXD- | TX Data Negative |
| 20 | V _{eeT} | TX Ground |

Outline Drawing




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Ordering Information

| Model | Description | Data Rate (Gbps) | Wavelength (nm) | Bail Latch Color | Distance Range (km) |
|---------------|--|------------------|-----------------|------------------|---------------------|
| SFP-MR27D-IR2 | Multi-Rate (Ethernet, Fibre Channel, SONET, DV) SFP Transceiver with Digital Diagnostics | 0.1 - 2.7 | 1550 | Red | 0 -60 |

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.

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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