

Datasheet

## 125 Mbps SGMII Single-Mode 10 km SFP Transceivers

SFP-FDSGMII-LR



### Highlights

- SFP transceiver
- Built-in PHY supporting SGMII interface
- Data Rates: 125 Mbps
- Protocols:
  - Fast Ethernet
- Single-mode fiber
- 1310 nm
- 0 to 10 km
- Duplex LC connector
- 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.

The SFP-FDSGMII requires an SGMII interface in the host system. With a SERDES interface and no clock, the SFP module supports only 125 Mbps Fast Ethernet only.

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](http://www.mrv.com) or contact your nearest authorized MRV Communications dealer for more information.

### Specifications Overview

Data Rate	125 Mbps
Tx Wavelength	1310 nm
Tx Power (Minimum)	-15 dBm
Tx Disable	Yes
Rx Wavelength Range	1260 - 1570 nm
Rx Sensitivity	-31.5 dBm
Rx Saturation	-8 dBm
Operating Temperature Range	-5 to 70 °C
Power Consumption	1.2 Watts

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### Optical Specifications

Parameter	Symbol	Minimum	Maximum	Unit	Note
<b>Transmitter</b>					
Center Wavelength	$\lambda_C$	1270	1355	nm	-
Average Output Power	$P_{OUT}$	-15	-8	dBm	1
$P_{OUT}$ @ TX Disable Asserted	$P_{OUT}$	-	-45	dBm	1
Spectral Width (RMS)	$\sigma$	-	7.7	nm	-
Extinction Ratio	EX	9	-	dB	-
Rise/Fall Time (20% ~ 80%)	$t_r/t_f$	-	3	ns	2
Optical Eye Mask	Compatible with IEEE 802.3ah-2004				3
<b>Receiver</b>					
Center Wavelength	$\lambda_C$	1260	1570	nm	-
Receiver Sensitivity	-	-	-31.5	dBm	4
Receiver Overload	-	-8	-	dBm	4
Return Loss	-	12	-	dB	-
LOS Assert	$LOS_A$	-45	-	dBm	-
LOS De-Assert	$LOS_D$	-	-32.5	dBm	-
LOS Hysteresis	-	0.5	4.5	dB	-
Total Jitter (SGMII Series Interface)	$T_j$	-	0.43	UI	-

- Notes:**
1. The optical power is launched into 9/125  $\mu$ m SMF.
  2. Unfiltered, measured with 4B/5B code for 125 Mbps
  3. Measured with 4B/5B code for 125 Mbps.
  4. Measured with 4B/5B code for 125 Mbps, worst-case extinction ratio, BER  $\leq 1 \times 10^{-10}$ .

### Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit	Note
Storage Temperature	$T_C$	-40	85	$^{\circ}$ C	-
Supply Voltage	$V_{CC}$	-0.5	3.6	V	-
Operating Relative Humidity	RH	5	95	%	-
Power Consumption	-	-	1.2	W	-

### Recommended Operating Conditions

Parameter	Symbol	Minimum	Maximum	Unit	Note
Operating Case Temperature	$T_C$	-5	70	$^{\circ}$ C	-
Power Supply Voltage	$V_{CC}$	3.10	3.5	V	-
Power Supply Current	$I_{CC}$	-	320	mA	1
Data Rate	DR	-	125	Mbps	-

- Notes:**
1. The maximum power supply current after module work stable.

### Electrical Specifications

Parameter	Symbol	Minimum	Maximum	Unit	Note
<b>Transmitter</b>					
Data Input Swing Differential (SGMII Series Interface)	$V_{IN}$	200	2100	mV	1
Input Differential Impedance	$Z_{IN}$	80	120	$\Omega$	-
TxDisable_Disable	-	2.0	$V_{CC}$	V	-
TxDisable_Enable	-	$V_{EE}$	GND + 0.8	V	-
TxFault_Fault	-	2.0	$V_{CC}$	V	-
TxFault_Normal	-	$V_{EE}$	$V_{CC} + 0.5$	V	-
<b>Receiver</b>					
Data Output Swing Differential (SGMII Series Interface)	$V_{out}$	370	2000	mV	1
Rx_LOS High	-	2.0	$V_{CC} + 0.3$	V	-
Rx_LOS Low	-	$V_{EE}$	$V_{EE} + 0.5$	V	-

- Notes:**
1. PECL logic, internally AC coupled.

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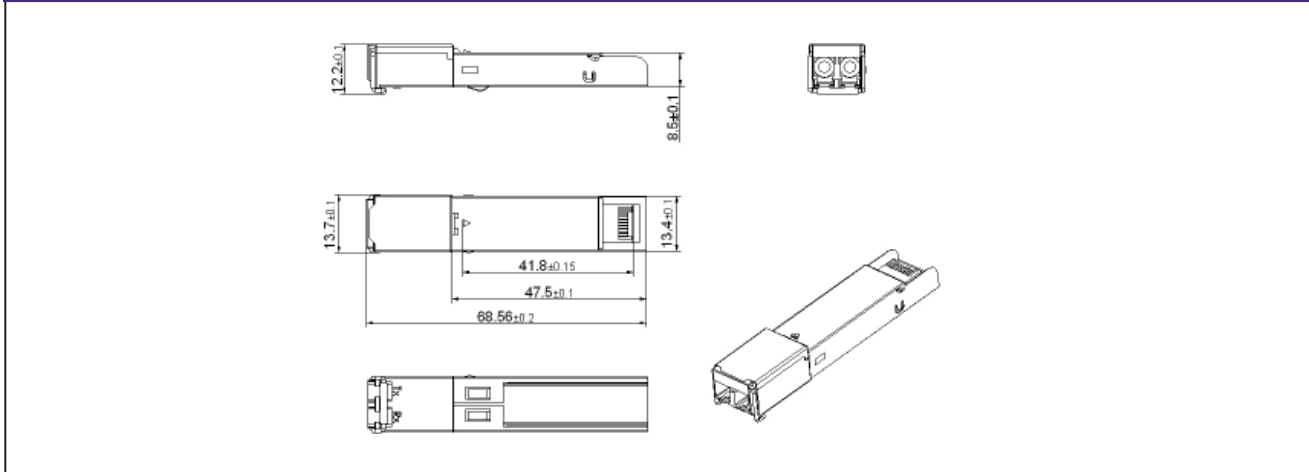
### Pin Descriptions

Pin	Function	Name/Description	Plug Seq.	Note
1	VeeT	Transmitter Ground	1	-
2	Tx Fault	Transmitter Fault Indication	3	1
3	Tx Disable	Transmitter Disable	3	2
4	MOD_DEF(2)	Module Definition 2	3	3
5	MOD_DEF(1)	Module Definition 1	3	3
6	MOD_DEF(0)	Module Definition 0	3	3
7	Rate Select	100Base-FX/1000Base-LX selection	3	7
8	LOS	Loss of Signal Indication	3	4
9	VeeR	Receiver Ground	1	-
10	VeeR	Receiver Ground	1	-
11	VeeR	Receiver Ground	1	-
12	RD-	Inverted Received Data Out	3	5
13	RD+	Received Data Out	3	5
14	VeeR	Receiver Ground	1	-
15	VccR	Receiver Power	2	-
16	VccT	Transmitter Power	2	-
17	VeeT	Transmitter Ground	1	-
18	TD+	Transmitter Data In	3	6
19	TD-	Inverted Transmitter Data In	3	6
20	VeeT	Transmitter Ground	1	-

- Notes:**
- TX Fault is an open collector output, which should be pulled up with a 4.7 k~10 kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8 V.
  - TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 k~10 kΩ resistor. Its states are:  
 Low (0~0.8 V): Transmitter on  
 (>0.8V, <2.0V): Undefined  
 High (2.0~3.465V): Transmitter Disabled  
 Open: Transmitter Disabled
  - MOD-DEF 0,1,2 are the module definition pins. They should be pulled up with a 4.7 k~10 kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.  
 MOD-DEF 0 is grounded by the module to indicate that the module is present  
 MOD-DEF 1 is the clock line of two wires serial interface for serial ID  
 MOD-DEF 2 is the data line of two wires serial interface for serial ID
  - LOS is an open collector output, which should be pulled up with a 4.7 k~10 kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8 V.
  - These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at host with SGMII interface.
  - These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.
  - When hardware rate selection has higher priority than software configuration via I2C, this pin can be used to select bit rate by host hardware.

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### Mechanical Dimensions



### Ordering Information

Model	Description	Data Rate (Mbps)	Wavelength (nm)	Connector	Bail Latch Color	Digital Diagnostics	Maximum Distance Range (km)*
SFP-FDSGMII-LR	Fast Ethernet Single-Mode SFP Transceiver	125	1310	Duplex LC	Blue	No	0 - 10

### 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

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](http://www.mrv.com). Please e-mail us at [info@mrv.com](mailto:info@mrv.com) or call us for assistance.

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