

## Datasheet

### Copper Ethernet SFPs

SFP-GC-R and SFP-GA-R



#### Highlights

- SFP-GC-R - 1000Base-T for Layer 1 devices (no MAC)
- SFP-GA-R - 1000Base-T for Layer 2 and above devices (with MAC)
- MDI/MDI-X automatic detection
- Plug-and-play functionality
- LOS support (SFP-GC-R)
- Hot-swap support
- Transmitter always on (no LIN support)
- MSA compliance
- Complete MRV SFP compatibility
- 1000 Base-T operation in host system with SGMII interface

#### Overview

MRV offers two models of Ethernet SFPs that support Gigabit Ethernet functionality for copper media application.

The SFP-GC-R model supports Gigabit Ethernet with a 1000Base-T interface. It is designed for Layer 1 network devices that do not incorporate an Ethernet MAC. The SFP-GA-R is designed for use in Layer 2 and higher protocol devices such as switches and routers that do incorporate an Ethernet MAC. It supports Gigabit Ethernet with an auto-negotiating 1000Base-T interface. SFP-GC-R and SFP-GA-R models each support MDI/MDI-X auto-detection and jumbo packet sizes 9,600+ bytes.

Installed into MRV products with an available SFP port, the SFP-GC-R plug-ins provide a simple and cost-effective way to merge copper and fiber network segments.

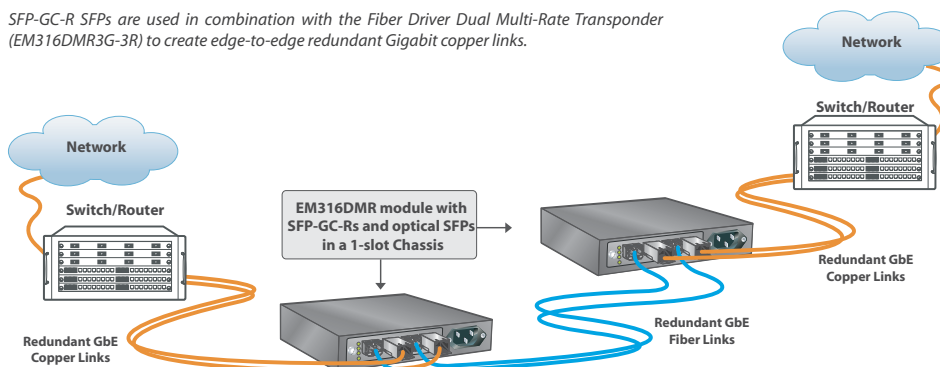
The SFP-GA-R gives network administrators greater flexibility in configuring their SFP-enabled switches and routers, allowing them to use less expensive copper cabling and interfaces for links of 100 meters or less.

The SFP-GC-R and SFP-GA-R do not convert between edge devices of different speeds or duplex mode. Connected edge devices must operate at the same speed and duplex mode to communicate. An edge device that supports auto-negotiation may require specific interface settings for fixed Gigabit Ethernet speed and duplex mode operation.

The SFP-GC-R uses the SFP's RX\_LOS pin for link indication. The SFP-GA-R is compatible with 1000Base-X autonegotiation, but does not use the RX\_LOS pin for link indication because RX\_LOS is internally grounded. The SFP-GA-R and SFP-GC-R SFPs support the 2-wire serial communication protocol outlined in the SFP MSA to communicate the link indication.

#### Application A: Gigabit Ethernet Copper-to-Fiber Conversion with Redundancy

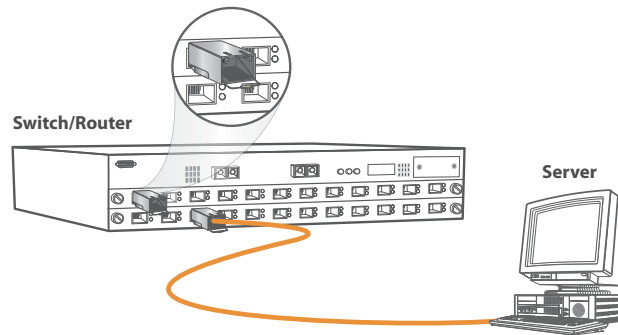
*SFP-GC-R SFPs are used in combination with the Fiber Driver Dual Multi-Rate Transponder (EM316DMR3G-3R) to create edge-to-edge redundant Gigabit copper links.*



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### Application B: SFP-Enabled GbE Switch/Router

The SFP-GA-R is used in an SFP-enabled GbE switch or router to link to a server configured with a copper GbE NIC.



### Physical Specifications

<b>Operating Temperature Range</b>	0° C to 70°C (32°F to 158°F)
<b>Storage Temperature</b>	-40°C to 85°C (-40°F to 185°F)
<b>Relative Humidity</b>	85% maximum, non-condensing
<b>Power</b>	1.5 W
<b>Regulatory Compliance</b>	FCC Part 15 (Class A); IC (Class A); EMC Directive: Emission (Class A) and Immunity; RoHS Directive; China RoHS; WEEE Directive: Wheelie Bin Mark

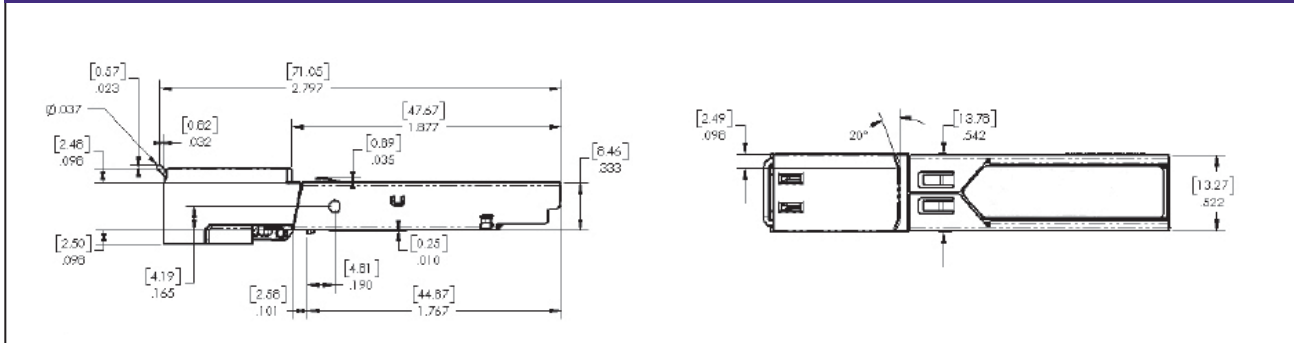
Comparison Table	SFP-GC-R	SFP-GA-R
<b>RJ-45 connector</b>	Yes	Yes
<b>Cable type</b>	CAT-5	CAT-5
<b>Maximum cable length (m)</b>	100	100
<b>Ethernet Standard</b>	1000 Base-T	1000 Base-T
<b>Supports speed auto-negotiation</b>	N/A	Yes
<b>Supports duplex auto-negotiation</b>	N/A	Yes
<b>Supports auto MDI/MDI-X detect</b>	Yes	Yes
<b>Match translates between edge devices</b>	No. Both edge devices must operate in the same duplex mode.	No. Both edge devices must operate in the same duplex mode.
<b>Used with Layer 0/1 devices (e.g. repeaters converters and WDM transponders)</b>	Yes	No
<b>Used with Layer 2 devices, e.g. switches and routers</b>	No	Yes
<b>Link Indicator on Rx_Los Pin</b>	Yes	No
<b>1000Base-X auto-negotiation enabled by default</b>	No	Yes
<b>Packet Size (bytes)</b>	9600 +	9600 +
<b>I<sup>2</sup>C Bus Clock Rate</b>	0 - 100,000 Hz	0 - 100,000 Hz

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### Notes for SFP-GC-R and SFP-GA-R:

1. By default SFP-GC-R and SFP-GA-R are full duplex devices in preferred master mode.
2. Automatic crossover (MDI/MDIX) detection is enabled. External crossover cable is not required.
3. With a SERDES that does not support SGMII, modules will operate at 1000Base-T only.

### Outline Drawing



### Ordering Information

Model	Function	Voltage (V)	Protocol	Max. Data Rate (Mbps)	Connectors	Distance Range (m)
<b>SFP-GC-R</b>	SFP, 1000Base-T for Layer 0/1 devices.	3.3	Gigabit Ethernet	1250	RJ-45	0-100
<b>SFP-GA-R</b>	SFP, 1000Base-T for Layer 2 and higher devices.	3.3	Gigabit Ethernet	1250	RJ-45	0-100

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