RF Over Fiber Analog/Digital Link 35GHz

(10MHz to 35GHz, SM28 Fiber, Multimode 50/125 Fiber)

DATASHEET

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The RFOF is designed to form an RF link between two points using fiber optical cables. It features immunity to interferences, high bandwidth, low signal loss over long distances, low signal distortion, low power consumption, high reliability, and is easy to implement. It converts an input RF electrical signal into an optical signal via an electro-optical modulator coupled with a DFB laser (transmitter) and re-converts the optical signal back into the RF signal at the other end of the fiber link via a high linearity photodiode integrated with low noise amplifier (receiver). The transmitter and receiver pair form a transceiver that provides a transparent data transmission channel. They are available in wavelengths 1550nm C-band, providing a versatile wavelength division multiplexing (WDM) capability. For example, bidirectional RF communication can be established with a single fiber link using two different wavelength transceivers and matching WDM cable adaptors. Another example is that three channels can be transmitted through a single fiber link by combining three transceivers of different wavelengths with our WDM cable adaptors. The module is packaged in a rack mount box or ruggedized outdoor aluminum case. Temperature compensation is built into the transmitter.

The RFOF modules are suitable for telecommunications, satellites, radio telescopes, distribution antennas, broadcasting audio and video, and timing synchronization. For example, point-to-point antennas can be connected from several meters to many kilometers away from the control room by fiber cables; Base stations can be connected through fiber to remote sector antennas; Satellite antennas can be connected through fiber cable to remote sites by RF over Fiber solutions.

Features

- Up to 35GHz
- SM28 Fiber
- Low Loss
- Low Cost
- Stable

Applications

- GSM Repeater
- CDMA Repeater
- WCDMA Repeater
- PHS Repeater
- Digital TV Repeater
- Broadcast Repeater

RoHS COMPLIANT

Specifications

Parameter	Min	Typical	Max	Unit
Optical Wavelength	1520		1580	nm
Optical Output Power		10		mW
Optical Input Power	-16		-6	dBm
RF Frequency Range	0.01		35	GHz
RF Gain		-21		dB
Gain Flatness (p-p)			± 6	dB
RF Output Power	-20		16	dBm
Input RF Return Loss		18		dB
RF Transmitter Input Power	-10		+10	dBm
Spurious Free Dynamic Range	100			$dB/H^{2/3}$
Noise Figure			30	dB
Phase Noise (@10KHz)			-122	dBc/Hz
Transmit Gain Control (AGC)				
Receive Gain Control (AGC)				
Link Gain	0	5		dB
CNR	35			dB
Fiber Type		SM28		
Modul Monitoring		RS232/USB		
RF Impedance		50		Ω
RF Connector	GPPO Male to 2.92mm Female			
DC Voltage	5V			12V
Power Consumption	3			W
Weight	0.5			kg
Operating Temperature	-20		50	°C
Storage Temperature	-45		85	°C

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Rev 06/25/26

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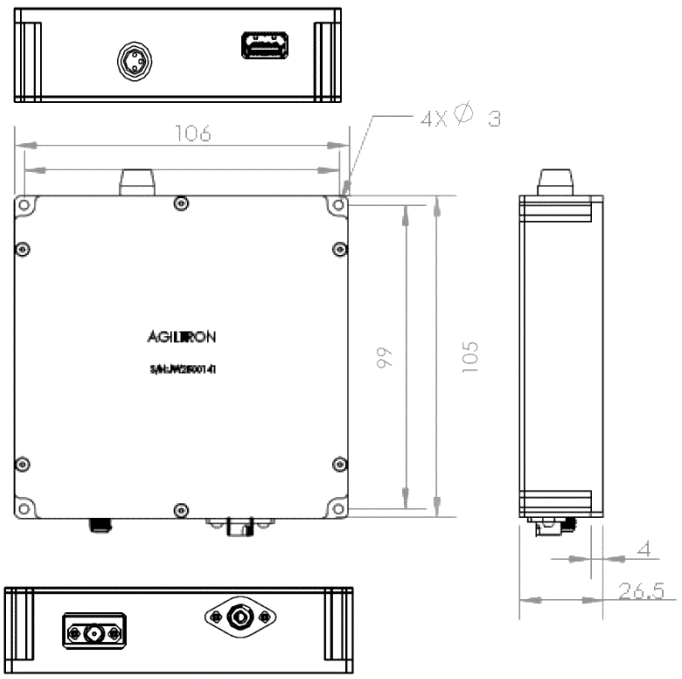
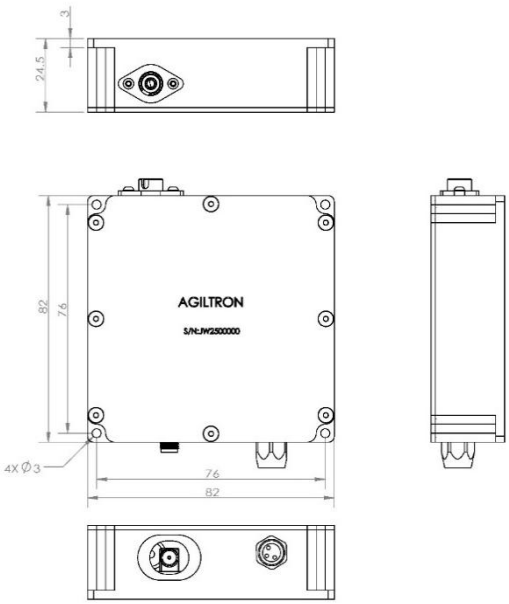
Dimensions Module (Unit: mm)

Transmitter



Receiver



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Ordering Information (Part Number)

	35☐	☐	☐	☐	☐	☐
Prefix	**RF Frequency**	**Wavelength**	**TX/RX**	**Package**	**Bidirectional ***	**Fiber Connector[1]**
RFOF-	35GHz SM = 35G 35GHz MM = 35M	1550 nm = 1 1560 nm = 2 Special = 0	Receiver = 1 Transmitter = 2 Pair = 3	Module = 1 Rack = 2 Special = 0	None = 1 Yes = 2 Special = 0	FC/APC = 2 FC/UPC = 3 SC/APC = 4 SC/UPC = 5 LC/APC = A LC/UPC = U Special = 0

Note:

* Bidirectional means two-way communications via a single fiber link. The price is double since it comprises two pairs of transceivers and receivers with WDM (different wavelength) or circulator (same wavelength) cable jumpers.

[1]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

Red marked -- Special order

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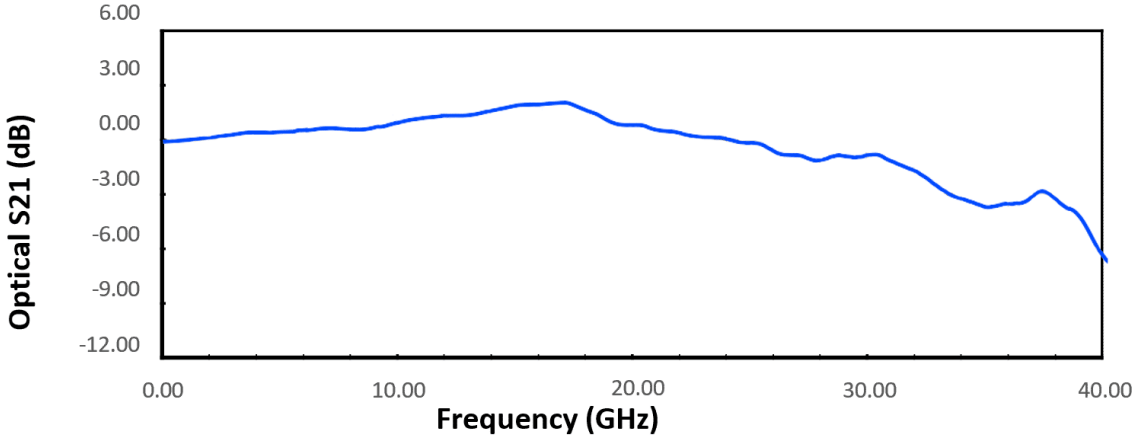
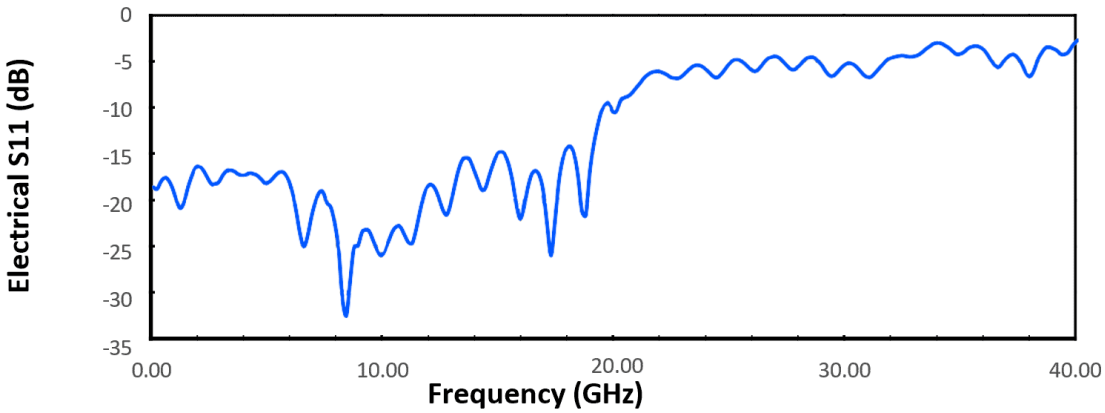
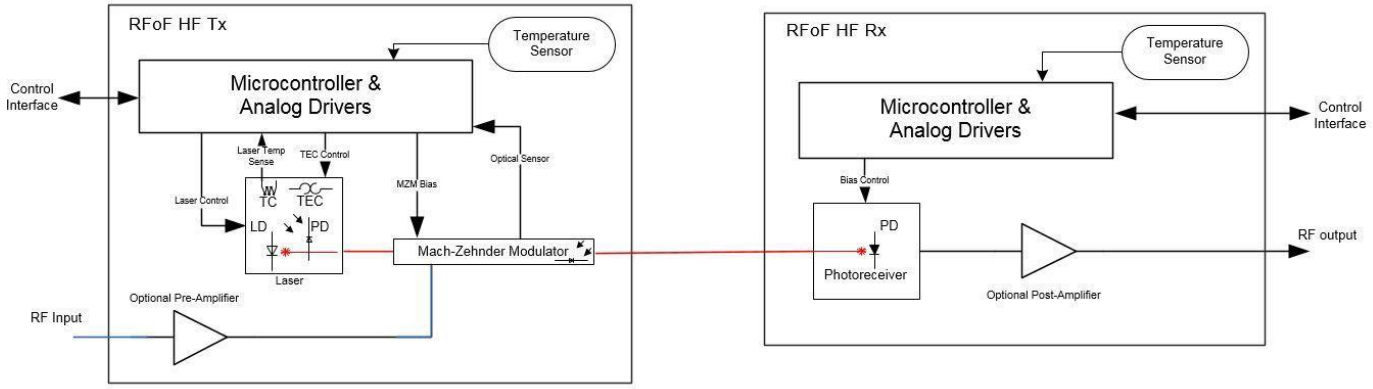
Typical Response





Construction Diagram



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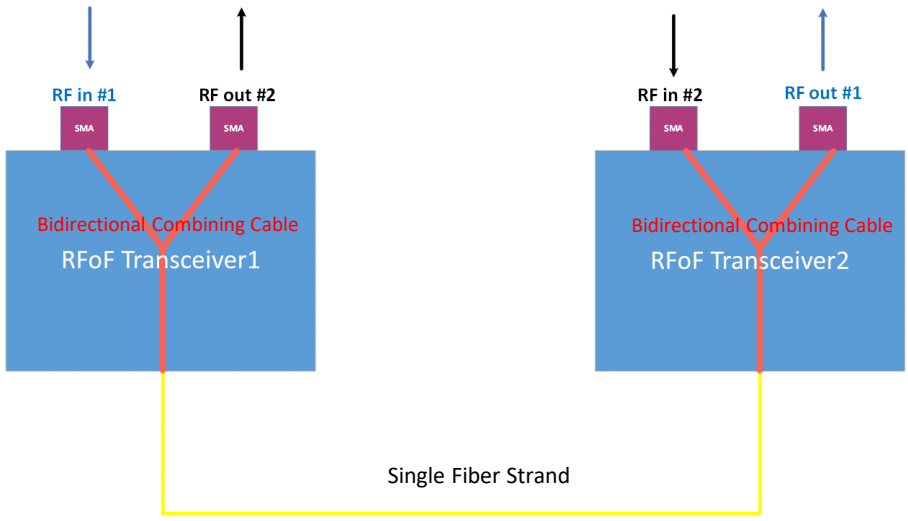
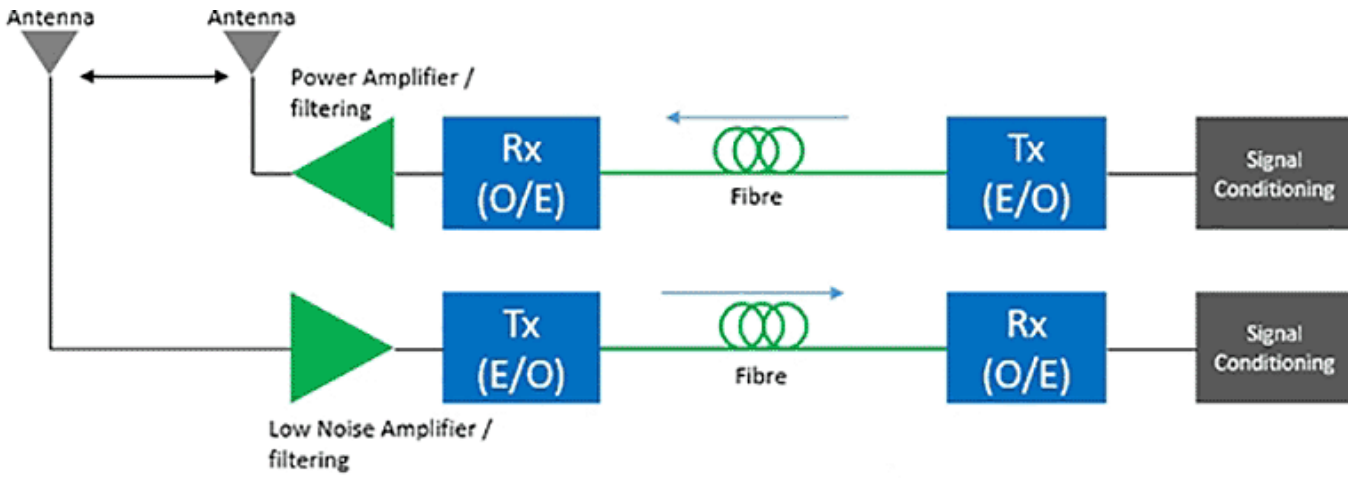
Application Example 1 – Bidirectional RF Link via a Single Fiber



Bidirectional Combining Cable is based on fiber circulator $650 ea

Application Example – Satellite RF over Fiber Link



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Operation Instructions

1. Connect the optical fiber input port on the receiver to the signal source.
2. Connect the RF output port on the receiver to the RF input port of the transmitter.
3. Connect the RF output port of the transmitter to the readout instrument.
4. Plug in the provided power supply to power the device. The LED will turn on (CW for the receiver, blinking for the transmitter).
5. The unit will operate with the performance specified in the test report.
6. If the device does not function as expected, contact us via the sales email. **Do not open the enclosure — doing so will invalidate the one-year warranty.**

Application Notes

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

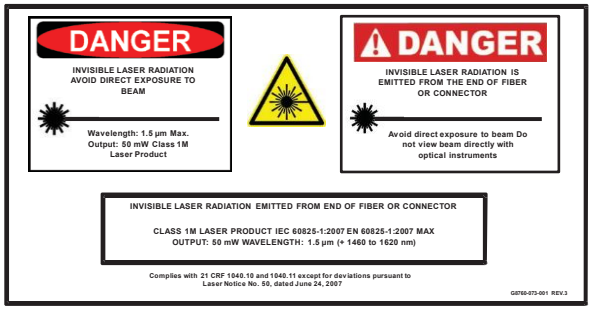
Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1M laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All versions of this laser are Class 1M laser products, tested according to IEC 60825-1:2007 / EN 60825-1:2007. An additional warning for Class 1M laser products. For diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. For collimated beams, this warning shall state that viewing the laser output with certain instruments designed for use at a distance (for example telescopes and binoculars) may pose an eye hazard.

Wavelength = 1.3/1.5 μm.

Maximum power = 30 mW.



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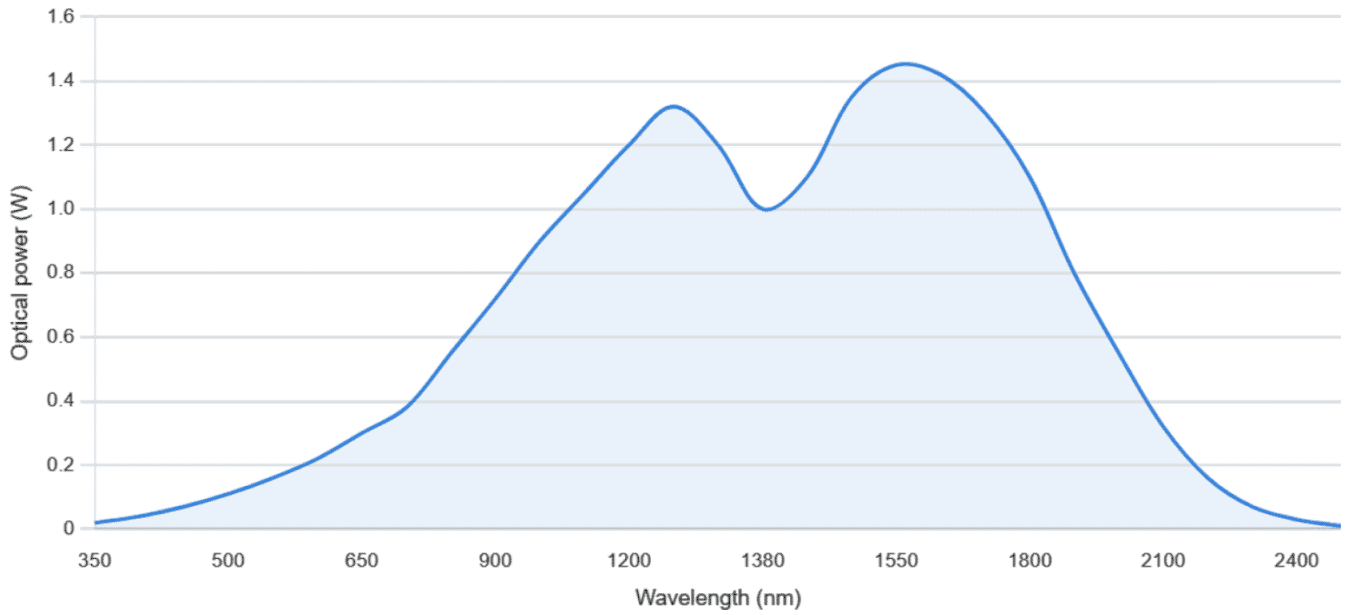
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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