Data Sheet ： F-RFoF-6GHZ-Tx

6GHz RF over Fiber - Transmitter

Analog RFoF optical Transmitter is used to convert RF signals to optical signals that can be sent and carried over long distances of fiber optic cable.

The Optical Receiver converts them back to an RF signal. The two units are connected through 1 single mode fiber up to 40Km.

RF over Fiber modules (RFoF) are commonly used in L-band, S-band satellite, radio telescopes, RF antennas distribution, broadcasting audio, and video, timing synchronization and GPS applications and other telecommunications.

It's very easy and cost effective to extend a signal from any antenna, Modulator or RF instrument, point to point or multipoint to multipoint using fiber optic splitters.

Features:

- Supper-Mini size ：31.3mm*17mm*10mm（L*W*H）
- Un-cooled（without TEC）， low power consumption
- CWDM wavelength optional
- Wide operating frequency from 10MHz to 6GHz
- Flat frequency response
- Single +5V Power supply
- Have optical power monitoring function
- Automatic optical power control（APC）
- Broadband low noise amplifier（LNA） integrated（optional）
- Bias-T circuit integrated for power supply through the RF SMA connector（optional， see the schematic diagram below）
- RoHS compliant and CE certification
- Excellent EMI/EMC design

Applications

- WiMAX / 4G / 5G
- Satellite communications
- Mobile backhaul
- GPS signal transport
- All-Digital QAM network
- Data and video distribution
- Distributed antenna system

Specifications:

Absolute Maximum Ratings

Parameter	Symbol	Condition	Min.	Max.	Unit
Operating Case Temperature	Topr		-20	+70	°C
Storage Temperature	Tstg		-40	+85	°C
DC Operating Voltage	Vd	+5V Pin	+4.7	+5.5	V
RF Input Power	Prf	Without LNA	--	20	dBm
		With LNA	--	15	
Output Optical Power	Ps	CW	--	12	mW
Relative Humidity	Hr		--	95	%
Pressure	Pr		86	106	kPa
ESD		Human body model		Class 1A	
Note: Operation beyond these absolute maximum conditions may degrade device performance, lead to device failure, shorter lifetime, and will invalidate the device warranty.					

Typical Specification

Parameter	Test Condition		MIN.	TYP.	MAX.	Unit
Frequency Range	TSC		0.01 ~ 3			GHz
	TCC		0.01 ~ 6			
Optical Wavelength	CWDM		optional			nm
Gain (2)	TSC	Tx with LNA Rx with LNA	6	14	--	dB
		Tx with LNA Rx without LNA	-11	-3	--	
		Tx without LNA Rx with LNA	-11	-3	--	
		Tx without LNA Rx without LNA	-28	-24	--	
	TCC	Tx without LNA Rx with LNA	-11	-3	--	
		Tx without LNA Rx without LNA	-30	-26	--	
Ripple of Passband	TSC	100M~3GHz,1270nm~1370nm	--	±1.5	±2.2	dB
		100M~3GHz,1530nm and 1550nm	--	±2.5	±3.0	
	TCC	100M~6GHz,1270nm~1370nm	--	±1.5	±2.2	
		100M~6GHz,1530nm and 1550nm	--	±2.5	±3.0	
Output Optical Power	+25°C		--	9	--	dBm

RF Return loss (50 Ω)	TSC	10MHz ~ 3GHz, RF Input	--	-10	-5	dB
	TCC	10MHz ~ 6GHz, RF Input	--	-10	-5	
Input P-1db(2)	TSC	with LNA, 1.5GHz	--	0	--	dBm
		without LNA, 1.5GHz	--	17	--	
	TCC	without LNA, 3GHz		17		
SFDR(2)	TSC	1.5GHz	102	115	--	dB·Hz2/3
	TCC	3GHz	102	113	--	
Input IP3(2)	TSC	with LNA, 1.5GHz	4	9	--	dBm
		without LNA, 1.5GHz	25	33	--	
	TCC	without LNA, 3GHz	21	33	--	
		with LNA, 1.5GHz 1270nm ~1370nm	--	18	25	

Noise Figure (2)	TSC	with LNA, 1.5GHz 1530nm and 1550nm	--	20	26	dB
		without LNA, 1.5GHz 1270nm~1370nm	--	32	40	
		without LNA, 1.5GHz 1530nm and 1550nm	--	35	42	
	TCC	without LNA, 3GHz 1270nm ~1370nm	--	32	42	
		without LNA, 3GHz 1530nm and 1550nm	--	38	45	
Operating Current	with LNA, TSC		--	145	200	mA
	without LNA, TSC/TCC		--	55	100	
Operating Voltage	+5V pin		+4.8	+5	+5.2	VDC
Bias-T Voltage	Though the RF SMA connector		+4.8	+5	+5.2	VDC
Bias-T Current Supply	Though the RF SMA connector		-	--	200	mA
Note: (1) The lower start frequency such as 9kHz can be customized (without LNA only); (2) Test with optical receiver (see the picture below) and the fiber is 1-meter SMF-28 fiber.						

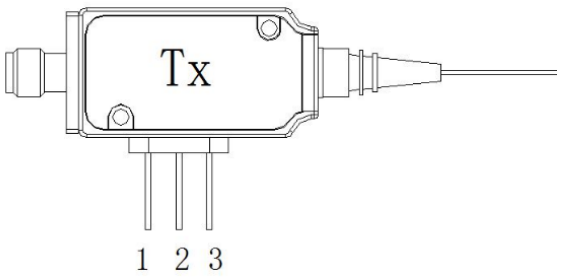
Connector

Type	**Connector**
RF	SMA (50Ω), Female
Optical	FC/APC (1)
Optical Fiber Type	SMF-28(Standard)
Power	EMI Low Pass Filter, Feed Through Capacitor

Note (1): Other type optical connector available upon request.

PIN Function

PIN	**Name**	**Direction**	**Note**
1	+5V	**I**	+5V DC Power
2	GND	**I**	RF and DC Ground
3	OP	**O**	Optical Power Monitor, Power Level is +2.2V±0.4V Indicate Transmit Optical Power Normal, Otherwise Indicate Transmit Optical Power Abnormal.



Ordering Information

Optical Transmitter

OM	-	TxC	xxx	N	x	-	O	S	x	x
OM: Optical Module		**Frequency Range(1):** **TSC:** 10M~3GHz TCC:10M~6GHz	**Wavelength (2) :**127:1270nm **129:**1290nm … **137:**1370nm **153:**1530nm **155:**1550nm		**Optical Connector and Fiber Type (3): F** FC/APC SM **L:** LC/APC SM			**Operating Temperature(4) S:** -20 to 70°C	**Bias-T: 1**:without **T:**with	**LNA(5): 0:** without **1:** with

Note: The lower start frequency such as 9kHz is available upon request (without LNA only) ;(2) Other wavelengths is available upon request; (3) Other types of optical fiber connector type is available upon request; (4) Other temperature range is available upon request, (5) LNA only supports TSC frequency band for the time being.

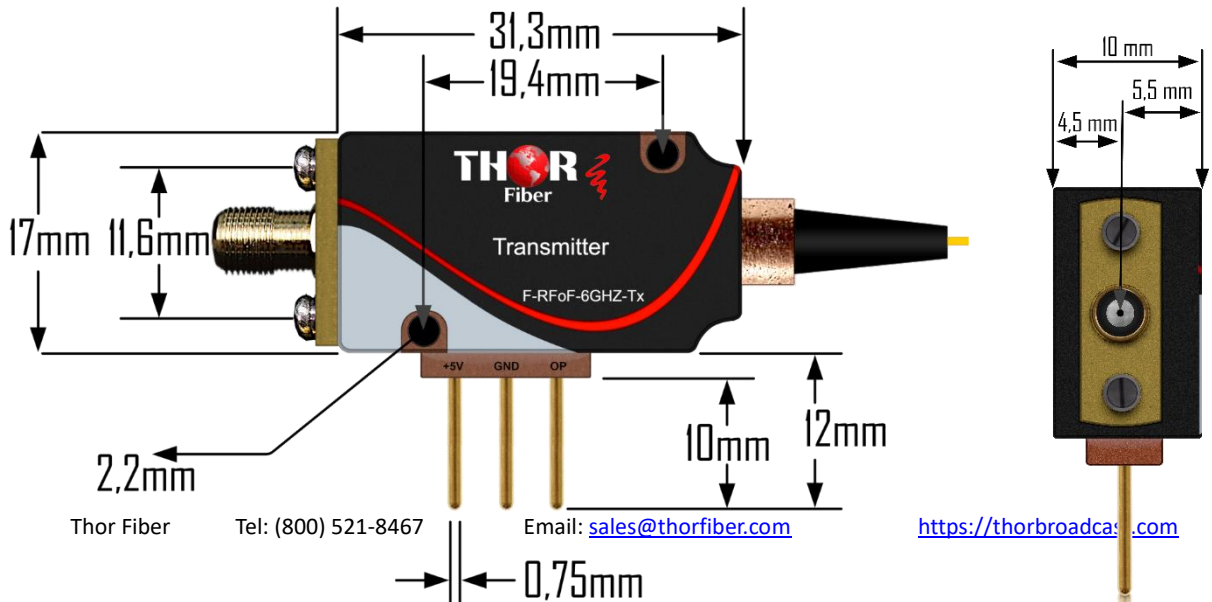
Laser Safety and ESD Protection

1,The laser safety level of F-RFoF-6GHZ-Tx modules is ClassIIIB (5mW~500mW). When using the Tx laser, the user has to avoid to exposure to the beam.
2, The F-RFoF-6GHZ-Tx modules have electrostatics sensitivity devices, so the user has to do a good job of ESD protection when using the modules.

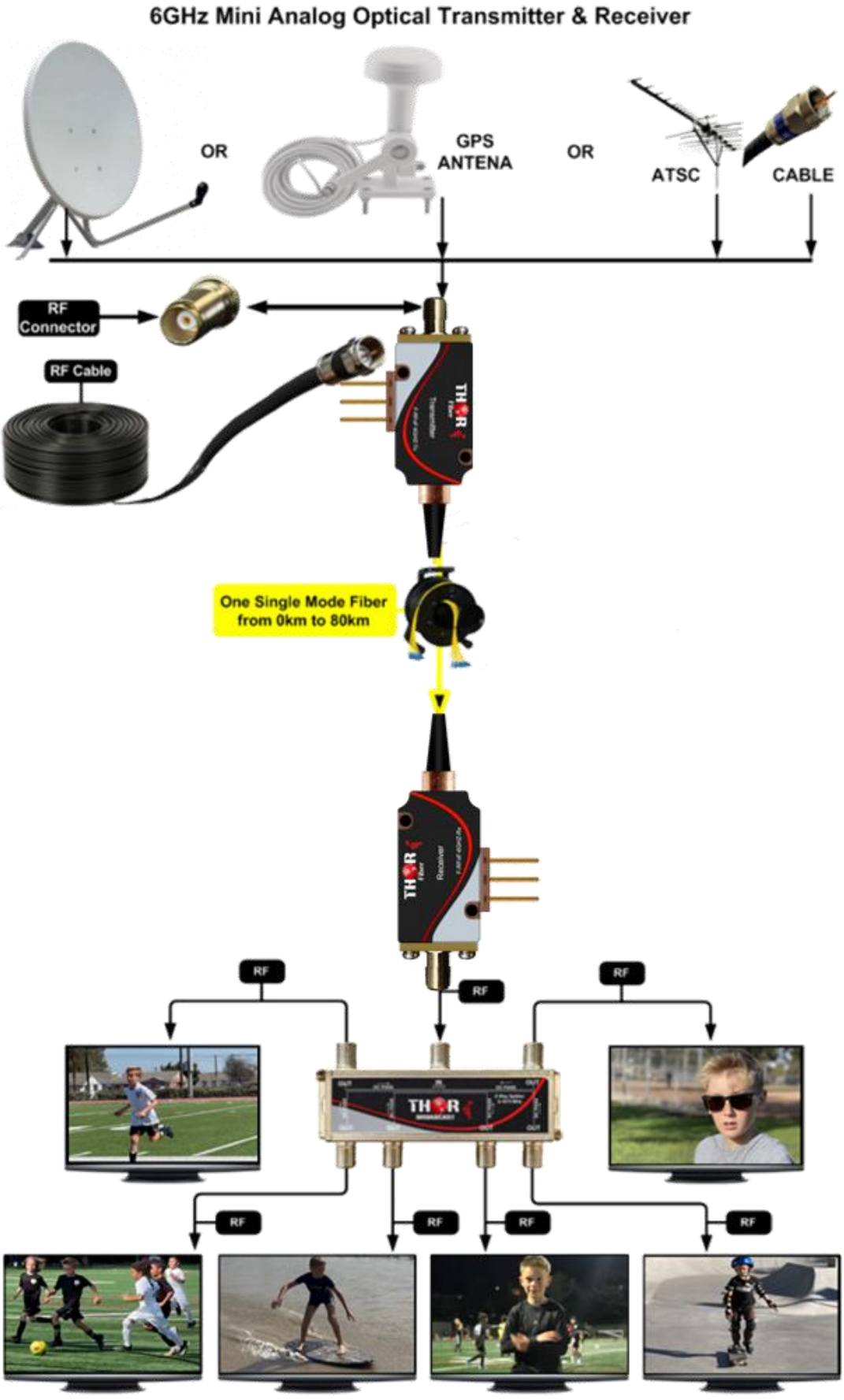
Heat Dissipation Requirements：

In order to ensure proper performance, heat sinking and heat removal must be provided by the user to limit maximum temperature of the transmitter and receiver module. The bottom of the module is the preferred heat dissipation surface.

Mechanical (unit: mm)



Drawing:


6GHz Mini Analog Optical Transmitter & Receiver
OR
GPS
ANTENA
OR
ATSC
CABLE
RF
Connector
RF Cable
One Single Mode Fiber
from 0km to 80km
RF
RF
RF
RF
RF
RF
RF

Model Selection:

F-RFoF-6GHZ-TX RFoF -RF over fiber 6Ghz optical Transmitter

F-RFoF-6GHZ-RX RFoF -RF over fiber 6Ghz optical Receiver