



RFoF System in Package

Description

An InGaAs Photodiode packaged directly with InP DFB Laser to offer a cohesive RFoF system in a ruggedized hermetic package. This package allows a user to connect directly to the precision SMA connector and begin transmitting and receiving over optical fiber. This unit only needs DC bias. The SMA connector is AC- coupled. The device comes with two FC/APC single mode fiber optic cables. Two fiber optic cables allows the InGaAs photodiode and InP laser to be connected at the same time to transmit or receive. This device comes with multiple build configurations for various operating frequencies.

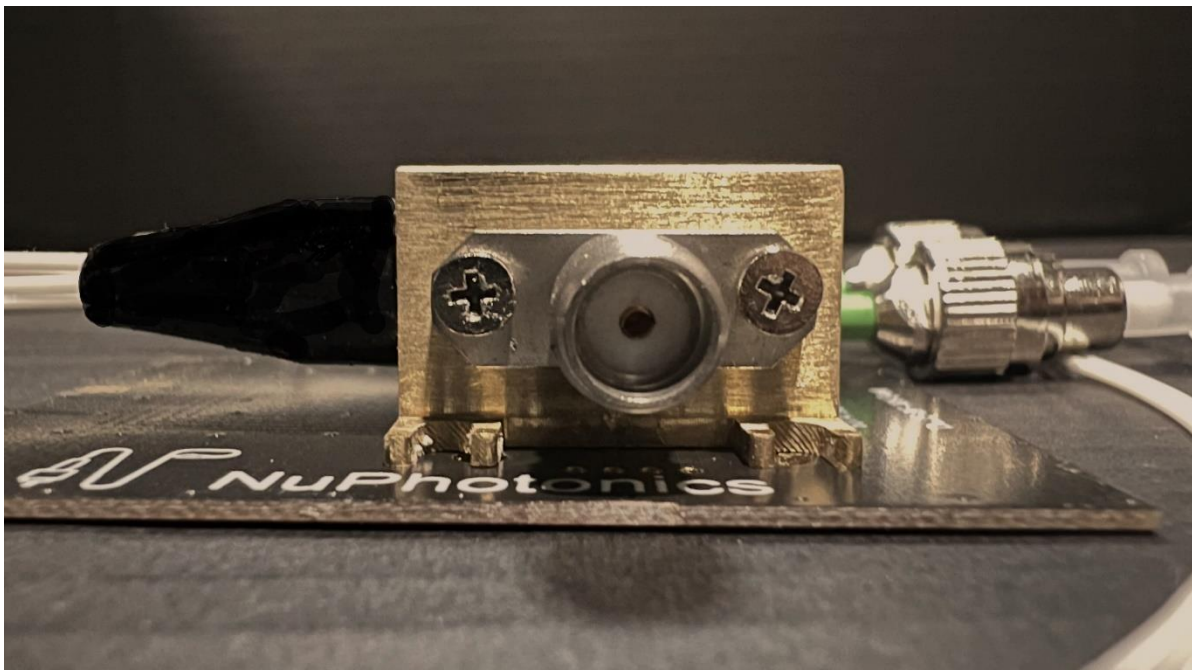
Features

- Hermetic Package
- Precision field replaceable SMA connector
- 2 Single mode Pigtail cable
 - Various optical connectors available
- Low Dark Current
- Photodiode Responsivity 0.7 A/W at 1310 nm
- High Laser optical output power
- High SFDR
- Multiple operating frequencies
- Excellent matching



Applications

- RF over Fiber (RFoF)
- 5G



Electro-Optical Characteristics ($T_{op} 23 \pm 3^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
PD Dark Current	I_d		0.05	3.0	nA	$V_r = 5.0 V$
PD Reverse Breakdown Voltage	V_{BR}	20			V	$I = 10 \mu A$
PD Responsivity	R_e	0.7 0.6			A/W	$\lambda = 1310 P_{in} 0.5 mW V = 1.0v$ $\lambda = 1550 P_{in} 0.5 mW V = 1.0v$
PD Capacitance	C_p		60	70	fF	$F = 1 MHz V = 4.0 v$
Laser Peak Wavelength	λ	1304.5	1310	1317.5	nm	
Laser Threshold Current	I_{th}		6	8	mA	$T = 25 C$
Laser Front Power	P_o	6	9		mW	$I_f = I_{th} + 20 mA$
Laser Slope Efficiency	η	0.2	0.3		W/A	$I_f = I_{th} + 20 mA$
Laser Series Resistance	R			10	Ohms	$P_o=8 mW$
Laser Forward Voltage	V_f		1.1	1.5	V	$I_f = I_{th} + 20 mA$
Laser Spectral wavelength (RMS)	$\Delta\lambda$		0.3	0.5	Nm	$P_o = 5mW$ at $-20dB$

Absolute Maximum Ratings

Parameter	Symbol	Condition	Min.	Max.	Unit
PD Reverse Voltage	V_r			10	V
PD Forward Current	I_f			10	mA
PD Reverse Current	I_R			5	mA
PD Optical Input power	P_{in}			10	mW
Storage Temperature	T_{stg}		-25	90	$^{\circ}C$
Storage Humidity	H_{stg}			85	% r.H.
Operating Temperature	T_{op}		-10	80	$^{\circ}C$
Soldering Temperature	T_{st}	60 sec		200	$^{\circ}C$
ESD Susceptibility		HBM	100		V

Operating at maximum ratings for a prolonged period will cause damage to the device.



Device Nomenclature

RS-XXXXX-XX

Product Line – RFoF System in Package

Operating Frequencies

05T80G – 5 to 8 GHz
 07T95G – 7 to 9.5 GHz
 08T12G – 8 to 12 GHz
 06T18G – 6 to 18 GHz

Optical Connector

(FA) FC/APC
 (FU) FC/UPC
 (SA) SC/APC
 (SU) SC/UPC

Device Dimensions

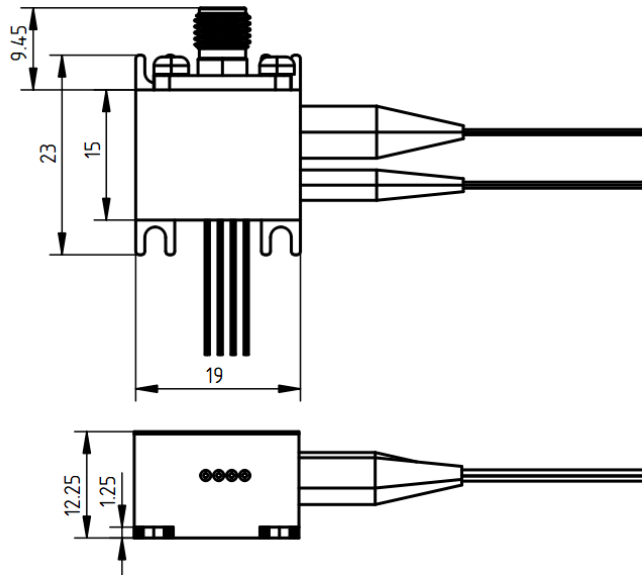
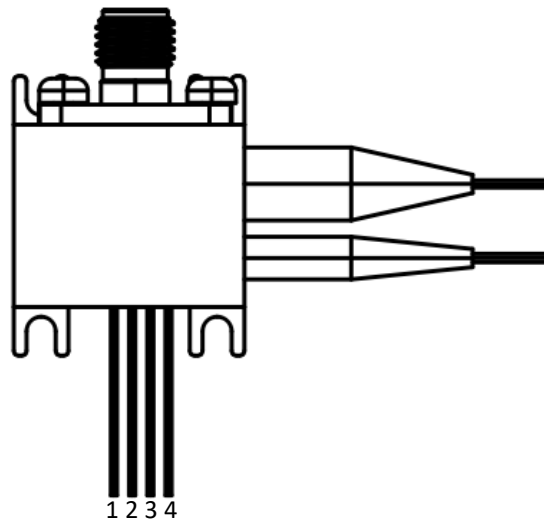


Fig 1.: Device dimensions (all units in mm). Final design may change.

Pin Configuration

Pin Number	Function
1	Ground
2	PD Bias
3	Laser Bias
4	N.C.



Power up procedure

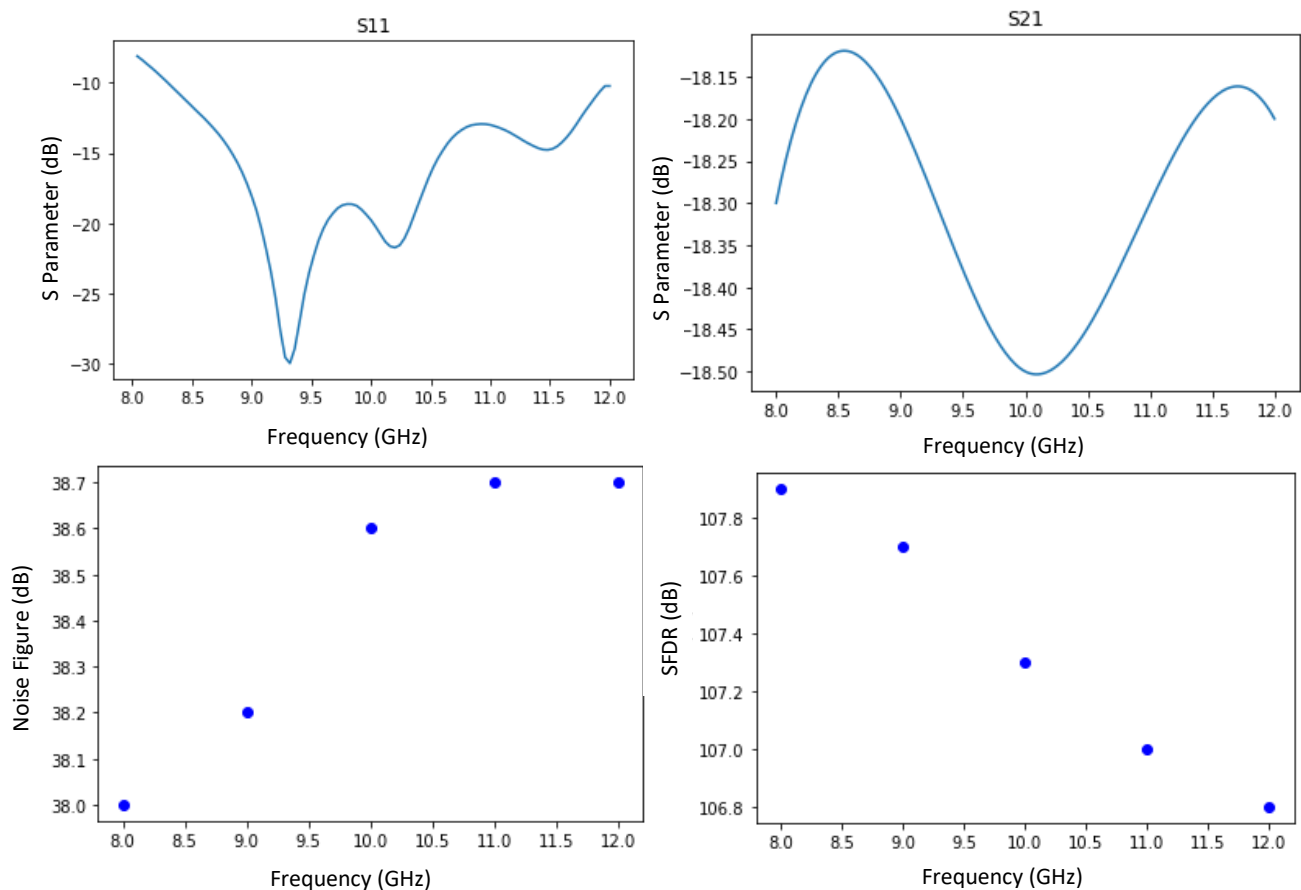
1. Apply bias to Photodiode
2. Apply bias to Laser
 - a. Adjust bias voltage to get desired current draw.
 - b. 50 mA is recommended.

Notes: When connected to another module it is recommended to have the receiving photodiode biased and powered on prior to biasing the transmitting laser diode. Adding light to an unbiased laser will cause damage.

Typical Data results: Results for 08T12G variant shown

Notes:

1. Test Condition (Laser Bias - 50 mA): 201 Points, 4 Avgs, 1% Smoothing
2. S21 measured with a reference standard RS-XXXXX module.



Early measurement data - Production ready devices data may differ.



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