

Wideband Solid State Power Amplifier 6-18GHz



*Please refer outline page for detail dimension

Typical Applications

- Wireless Infrastructure
- Military and Aerospace Applications
- Test Instrumentation
- Radar Systems
- 5G Wireless Communications
- Microwave Radio Systems
- TR Modules
- Research and Development
- Cellular Base Stations

Product Description

RFLUPA0618GF is a wideband power amplifier with frequency range of 6 to 18GHz, with VDC power supply. High efficiency cooling system is designed within amplifier.

Features

1. Small Signal Gain 75dB Typical.
2. 10dB Adjustable Digital Control Attenuator
3. Psat 52dBm Typical
4. Power supply: +48 VDC
5. 50 Ohm Matched Input/Output
6. Protection Functions:
 - Over temperature
 - Over current
 - Current imbalance
 - RF input over drive protection
 - VSWR protection
7. Amplifier Automatic Calibration Function
8. RF Output Power Indication
9. RF Output Enable Function
10. High Maximum RF Input Power Handling, 10W max
11. Ethernet Remote Control
12. USB Remote Control

Electrical Specifications (T_A=+25°C)

Parameter	Min	Typ	Max	Units
Frequency Range		6 – 18		GHz
Small Signal Gain		75		dB
Gain Flatness		+/-10		dB
Gain Variation Over Temperature (-30°C to +50°C)		+/-5		dB
Input Return Loss		-18		dB
Output 1dB Compression Point (P1dB)		48		dBm
Saturated Output Power (Psat)		52.5		dBm
Supply Current (+48 VDC)		17	53	A
IM3		-30		dBc
RF ON and OFF Speed		80/2500		us
Power Added Efficiency (PAE)		20		%
Weight		40		Lbs
Impedance		50		Ohms
Input / Output Connectors		N-Type Female		
Package		Please see the mechanical drawing		

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	19 ~ 72 VDC
*RF Input Power (RFIN)	Psat – Large Signal Gain

Bias Up Procedure

1. Connect input and output with 50 Ohm source/load.
(In band VSWR < 1.9:1 or >10dB return loss.)
2. Connect Power Cable
3. Turn On Back Panel Power Supply Air Breaker
4. Press Front Panel Power Switch to Power Display

Bias Down Procedure

1. Press Front Panel Power Switch to Power Off Display
2. Turn Off Back Panel Power Supply Breaker
3. Remove Power Cable (If Moving Equipment)
4. Disconnect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)

Environmental Specifications and Test Standards

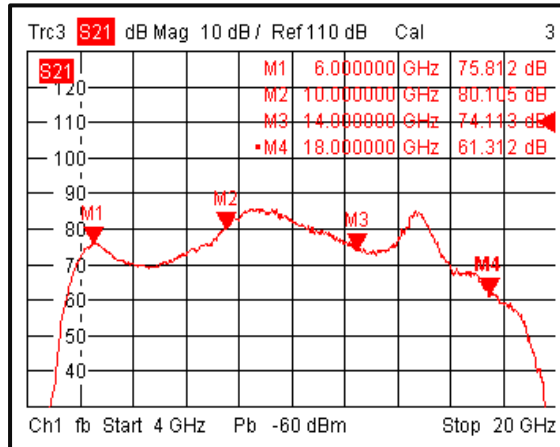
Parameter	Description
Operational Temperature	-30°C to +50°C (Case Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for 72 Hours
Shock	1. Weight >20g, 50g half sine wave for 11ms, Speed variation 3.44m/s 2. Weight <=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s 3. Total 18 times (6 directions, 3 repetitions per direction).
Altitude	Standard: 30,000 Ft (Epoxy Sealed Controlled Environment) Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)
Hermetically Sealed (Optional)	MIL-STD-883 (For Hermetically Sealed Units)

*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.

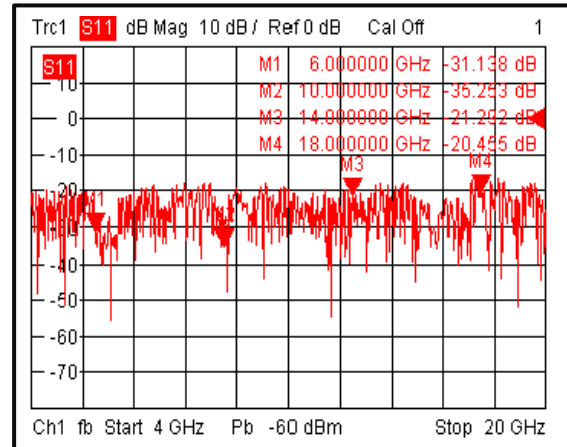
**For vibration testing details please see additional information section.

Typical Performance Plots

Gain vs. Frequency, 0dB Attenuation, +25°C

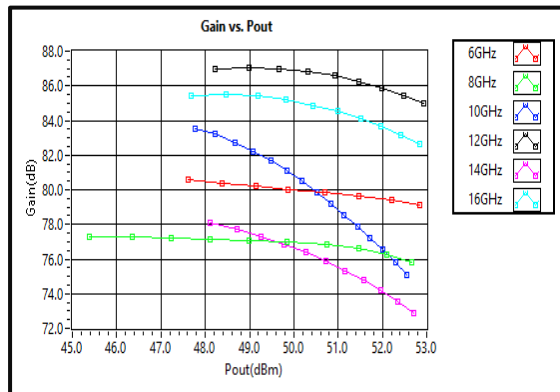


Input Return Loss @+25°C

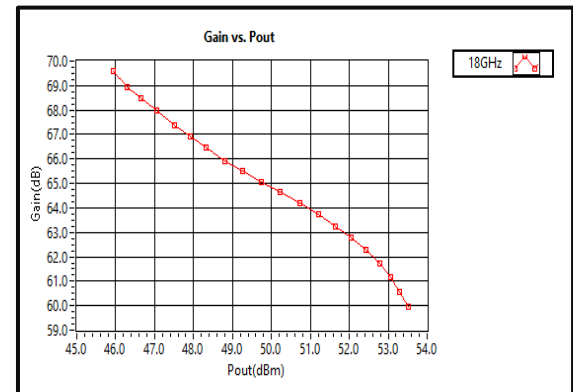


**This product is equipped with 10dB adjustable digital control attenuator*

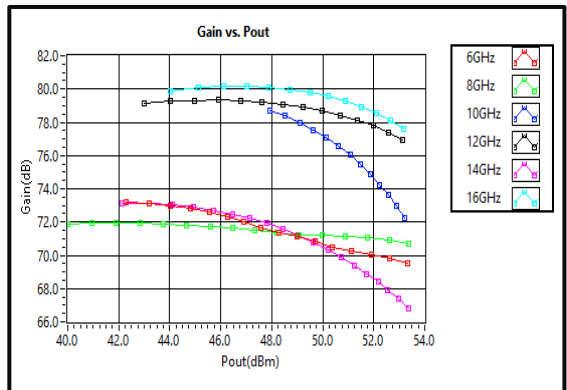
Gain vs. Output Power, CW signal
0dB Attenuation, +25°C



Gain vs. Output Power, CW signal
0dB Attenuation, +25°C



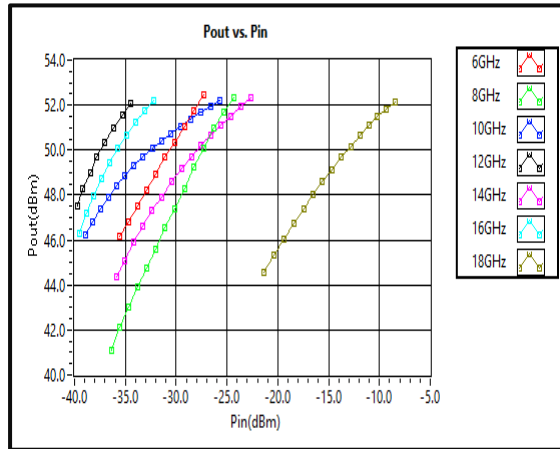
Gain vs. Output Power, CW signal
5dB Attenuation, +25°C



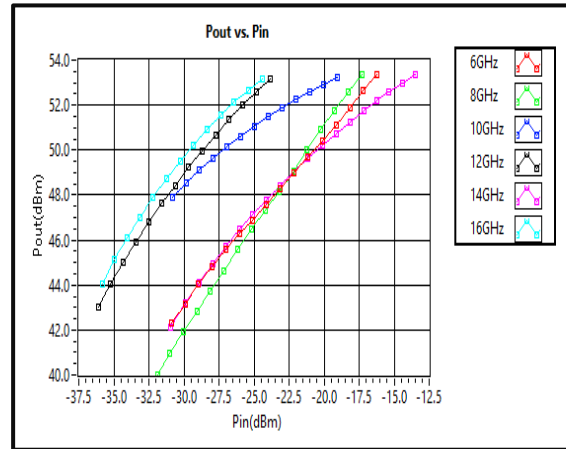
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

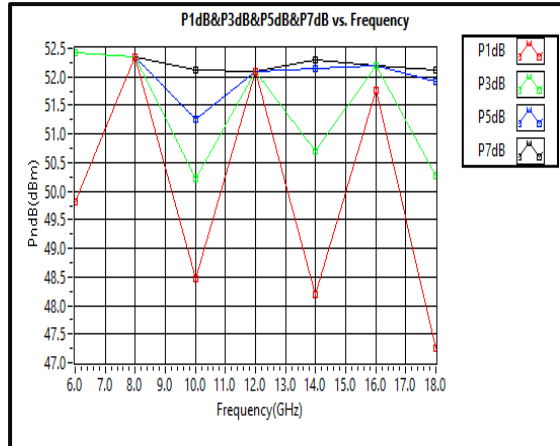
Output Power vs. input Power, 0dB Attenuation, +25°C



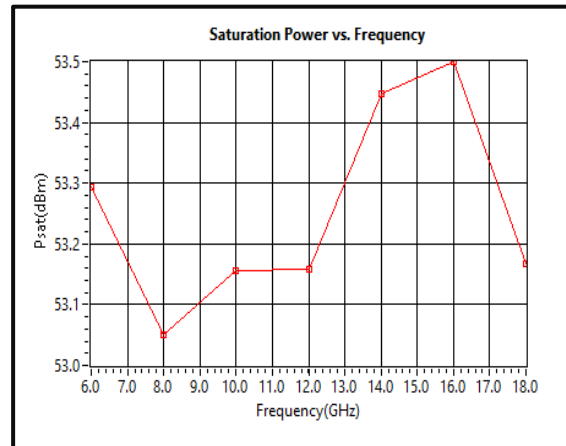
Output Power vs. input Power, 5dB Attenuation, +25°C



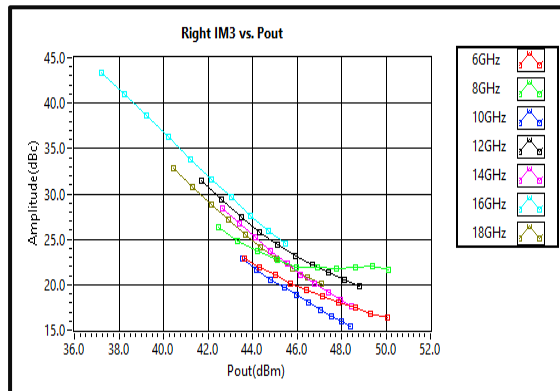
PndB vs. Frequency, 0dB Attenuation, +25°C



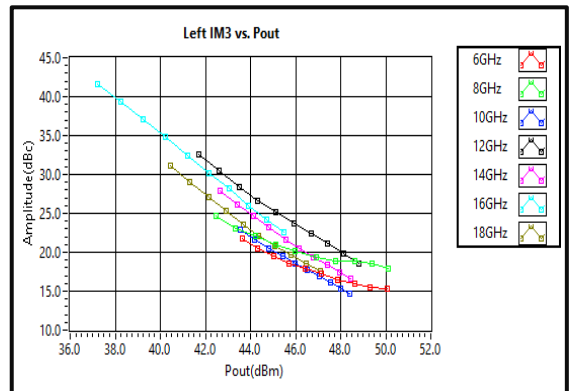
Psat vs. Frequency @ +25°C



Right IM3 @+25°C



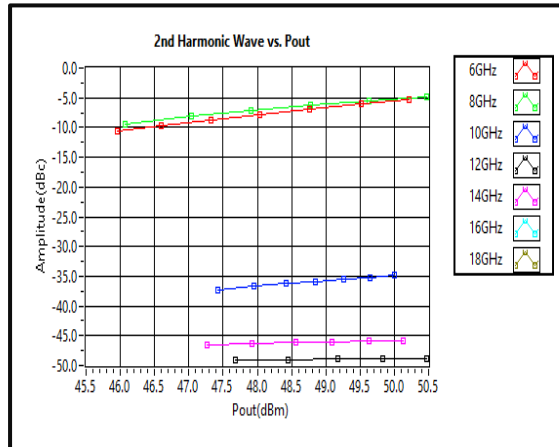
Left IM3 @+25°C



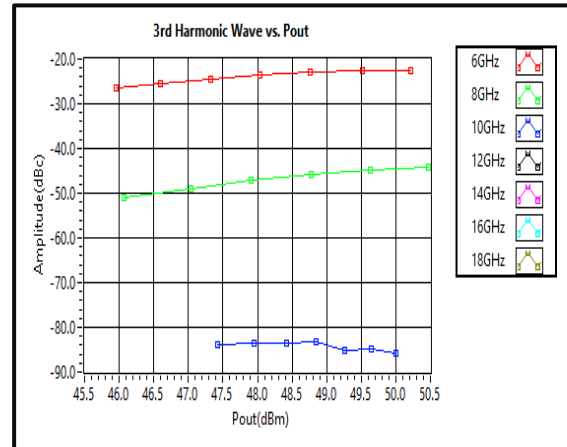
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

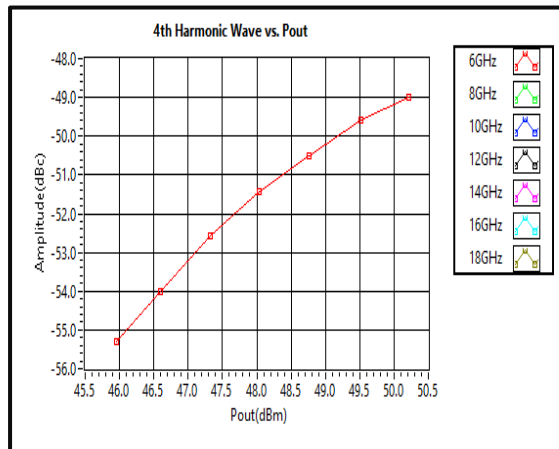
2nd Harmonics, +25°C



3rd Harmonics, +25°C



4th Harmonics, +25°C



Note: Small signal VNA measurements include attenuators to protect equipment

Protection Connector Table

Female D-Sub is on the chassis: 173-E15-213R001

The mating male part is provided within shipment. PN: 172-E15-203R001

Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gate of amplifiers	Yes
3	Drian Disable	Control	LOW	Applying logic <u>HIGH</u> disables drian of amplifiers	Yes
4	RF IN Over	Indicator	HIGH	Pin will be latched to logic <u>HIGH</u> when input signal is over limit	Yes
5	Temp Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when amplifier is driven over temperature	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when drain current limit is reached	Yes
7	ID Imbalance	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when an imbalance in the drain current of the combining branches occurs	Yes
8	PA Off Alarm	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when any of the protection limit is reached	NO
9	Fan Alarm	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when Fan limit is reached	Yes
10	RF Switch OFF	Control	LOW	Applying logic <u>HIGH</u> turns RF switch to load path	Yes
11	VSWR	Indicator	HIGH	Pin will be latched to logic <u>HIGH</u> when output reflection is over limit	Yes
12	5dB Attenuation	Control	LOW	Applying logic <u>HIGH</u> enables 5dB attenuation	Yes
13	10dB Attenuation	Control	LOW	Applying logic <u>HIGH</u> enables 10dB attenuation	Yes
14	+5V	Power Supply	+5V	+5V DC is available for reference 400mA current ability	Yes
15	GND	Ground	GND	Ground	Yes

Notes:

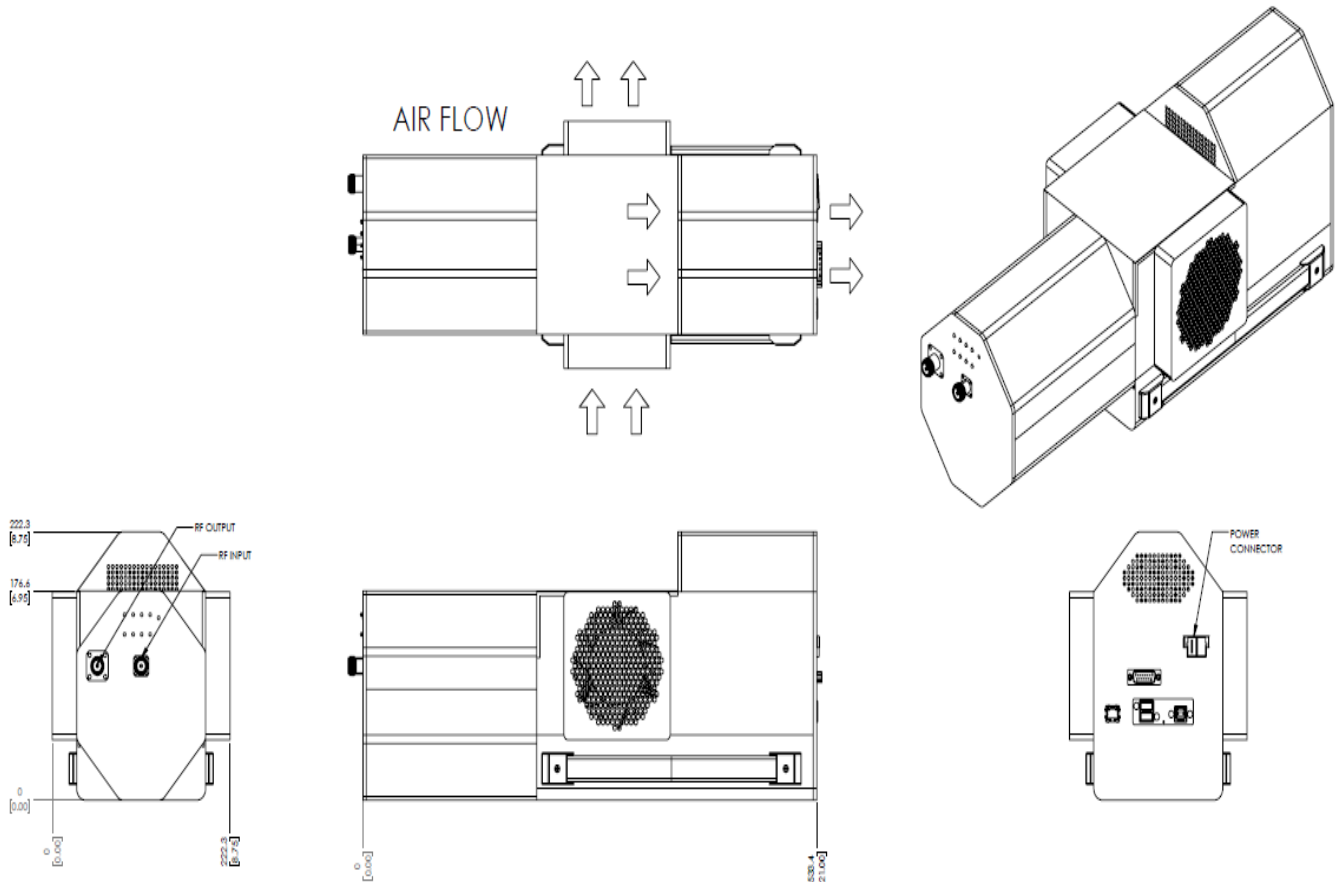
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- Indicator output signals can source 24mA.

Outline Drawing

Power connector on chassis: 1510350002

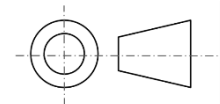
Mating connector: 1510340012

*The mating male part is provided within shipment.



Notes:

1. Package Material: Aluminum and Copper
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.25 [0.010] unless otherwise specified.
5. Heat sink required during operation (sold separately). Matching heatsink is listed on our website. If customer would like to use their own cooling method, please make sure the amplifier will operate under the specs that listed in page 2 of this datasheet.



Additional Information

Documentation	Webpage
ESD Policy	https://rflambda.com/pdf/rflambda_esd_control.pdf
Heatsink Lookup Specifications	https://rflambda.com/search_heatsink.jsp
Connector Torque Specifications	https://www.rflambda.com/pdf/Torque_Specifications.pdf
Random Vibration Test Standard	https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf

Ordering Information

Part Number	Modification	Description
RFLUPA0618GF	Input connector N-Type and Output connector N-Type	6GHz-18GHz Benchtop Power Amplifier

Amplifier Use

Ensure that the amplifier input and output ports are safely terminated into a proper 50 ohm load before turning on the power. Never operate the amplifier without a load. A proper 50 ohm load is defined as a load with impedance less than 1.9:1 or return loss larger than 10dB relative to 50 Ohm within the specified operating band width.

Power Supply Requirements

Power supply must be able to provide adequate current for the amplifier. Power supply should be able to provide 1.5 times the typical current or 1.2 times the maximum current (whichever is greater).

In most cases, RF - Lambda amplifiers will withstand severe mismatches without damage. However, operation with poor loads is discouraged. If prolonged operation with poor or unknown loads is expected, an external device such as an isolator or circulator should be used to protect the amplifier.

Ensure that the power is off when connecting or disconnecting the input or output of the amp.

Prevent overdriving the amplifier. Do not exceed the recommended input power level.

Adequate heat-sinking required for RF amplifier modules. Please inquire.

Amplifiers do not contain Thermal protection, Reverse DC polarity or Over voltage protection with the exception of a few models. Please inquire.

Proper electrostatic discharge (ESD) precautions are recommended to avoid performance degradation or loss of functionality.

What is not covered with warranty?

Each RF - Lambda amplifier will go through power and temperature stress testing.

Since the die, ICs or MMICs are fragile, these are not covered by warranty. Any damage to these will NOT be free to repair.

Important Notice

The information contained herein is believed to be reliable. RF-Lambda makes no warranties regarding the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for any of the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for RF-Lambda products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

RF-Lambda products are not warranted or authorized for use as critical components in medical, life-saving, or life sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.