# Wide Band Power Amplifier
# 18GHz-28GHz

## Product Description

RFLUPA18G28GA is a wideband power amplifier with a frequency range of 18 to 28GHz.

The power output of this amplifier is 33dBm typical. The typical small signal gain is 40dB with a gain flatness of ±1.5dB. This power amplifier works with a +24VDC power supply.

The working temperature of this product is between – 40℃ and + 85℃.

## Features

- Wide band Power Amplifier
- Small Signal Gain 40dB Typical
- Output Saturation Power 33dBm Typical
- High P1dB +31dBm Typical
- Supply Voltage +24VDC
- 50 Ohm Matched Input / Output

## 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

## Electrical Specifications ($T_A$=+25ºC)

| Parameter | | Min | Typ | Max | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|---|
| Frequency Range | | 18 | | 26 | 26 | | 28 | GHz |
| Gain | | 35 | 40 | | 33 | 36 | | dB |
| Gain Flatness | | | ±1.5 | | | ±2.5 | | dB |
| Gain Variation Over Temperature (-40℃~+85℃) | | | ±2.0 | | | ±2.0 | | dB |
| Input VSWR | | | 1.5 | 1.8 | | 1.5 | 1.8 | :1 |
| Output 1dB Compression Point (P1dB) | | 30 | 32 | | 29 | 31 | | dBm |
| *Saturated Output Power (Psat) | | | 33 | | | 32 | | dBm |
| 3rd Order Intermodulation Product(IM3) @P1dB | | | 15 | | | 15 | | dBc |
| Supply Current (Vcc=+24V) | | | 560 | 1500 | | 560 | 1500 | mA |
| Efficiency at Psat (RF Output Power / DC Power Consumption) | | | 12 | | | 12 | | % |
| Weight | Net | 0.6 Max. | | | | | | lbs. |
| | Including Heat Sink | 3.62 Max. | | | | | | |
| Impedance | | 50 | | | | | | Ohms |
| Input / Output Connectors | | 2.92mm- Female(Input) – 2.92mm- Female(Output) | | | | | | |
| Package | | Epoxy Sealed (Standard) | | | | | | |
| | | Hermetically Sealed (Optional) | | | | | | |



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## Absolute Maximum Ratings

| Parameter | Rating |
|---|---|
| Operating Voltage | +28VDC |
| *RF Input Power (RFIN) | +2dBm |

## Bias Up Procedure

1. Connect ground
2. Connect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)
3. Connect positive supply and make sure power supply can handle max current.

## Bias Down Procedure

1. Turn off power supply
2. Remove positive supply Connection
3. Remove RF Connection
4. Remove ground

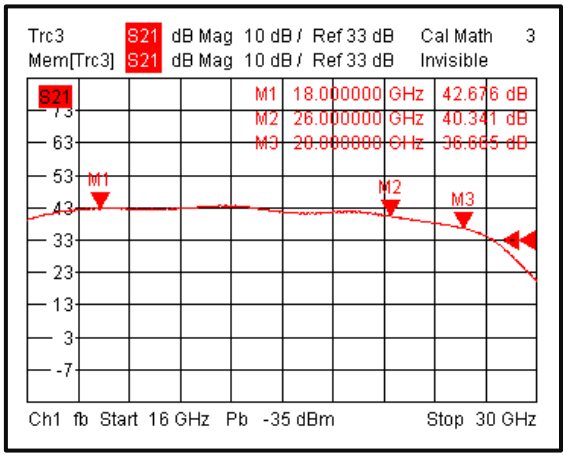
## Environmental Specifications and Test Standards

| Parameter | Description |
|---|---|
| Operational Temperature | -40ºC to +85ºC (Case Temperature) |
| Storage Temperature | -50ºC to +105ºC |
| Thermal Shock | -40ºC → +85ºC (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 +85ºC 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) |

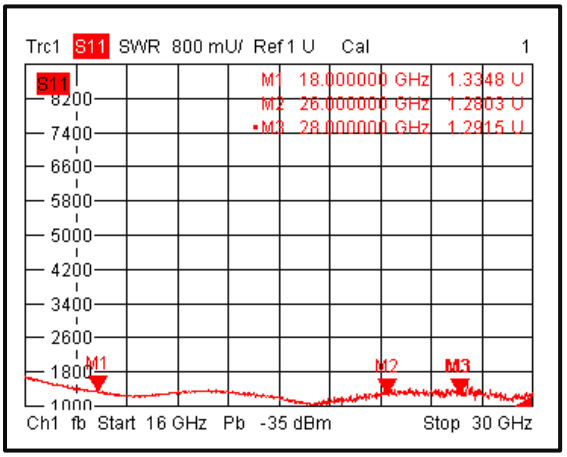
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

## Typical Performance Plots

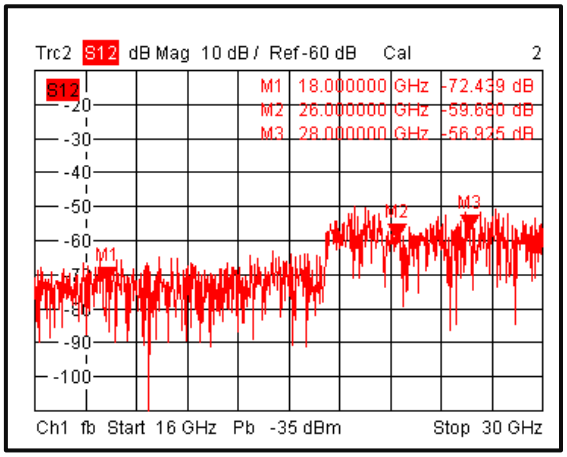
### Gain@+25℃



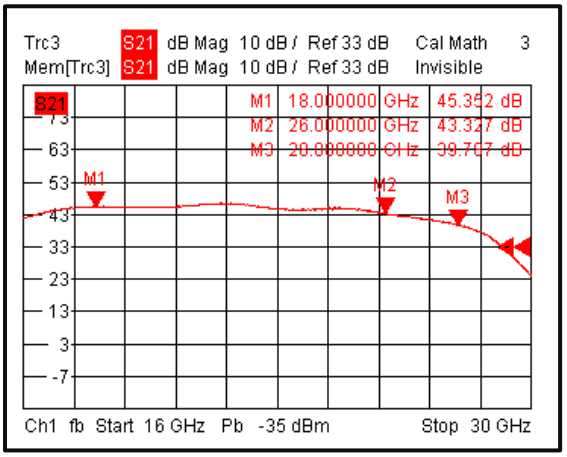

### Input VSWR @+25℃



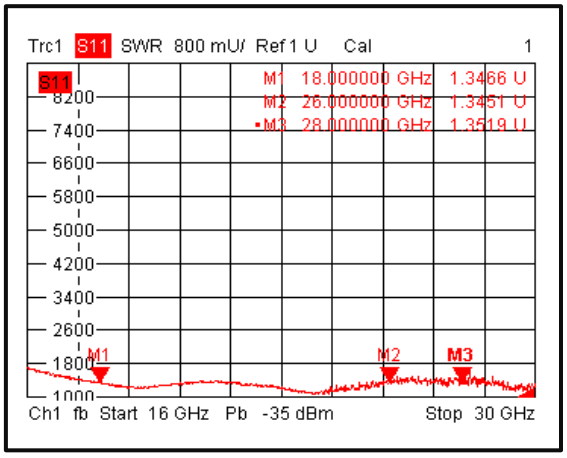

### Isolation@+25℃



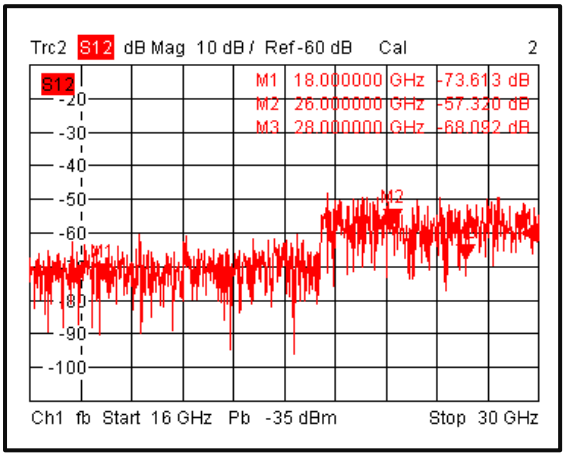

### Gain@-40℃




### Input VSWR @-40℃



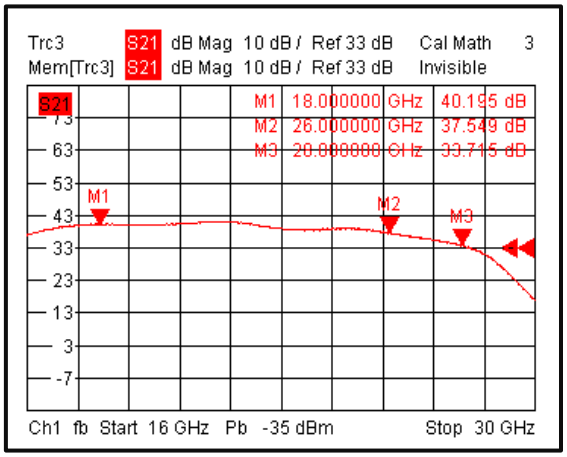

### Isolation@-40℃



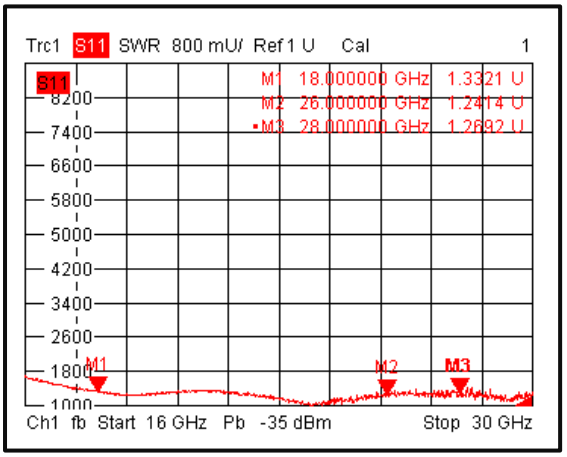

Note: Small signal VNA measurements include attenuators to protect equipment

## Typical Performance Plots

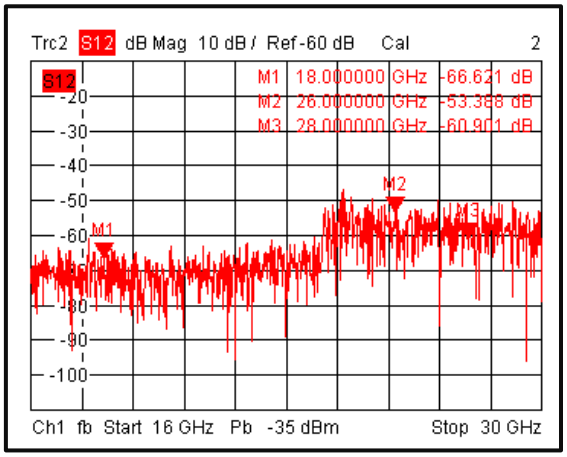
### Gain@+85℃




### Input VSWR @+85℃



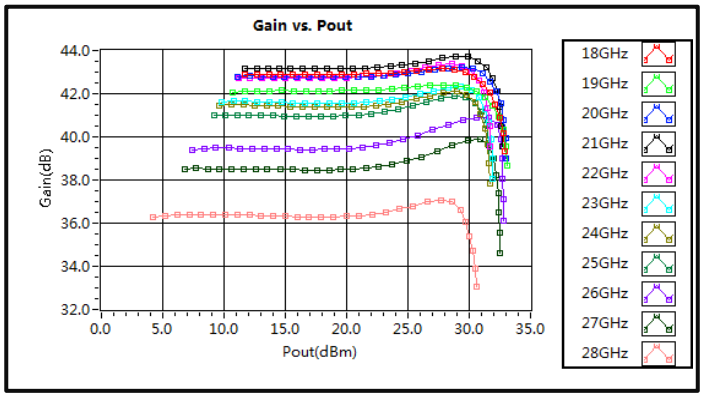

### Isolation@+85℃



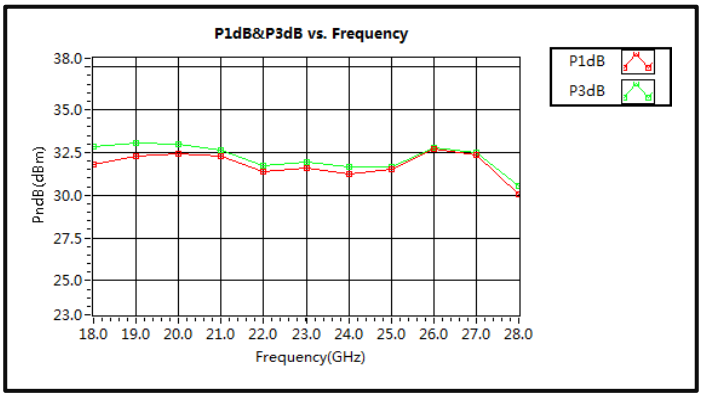

Note: Small signal VNA measurements include attenuators to protect equipment

## Typical Performance Plots

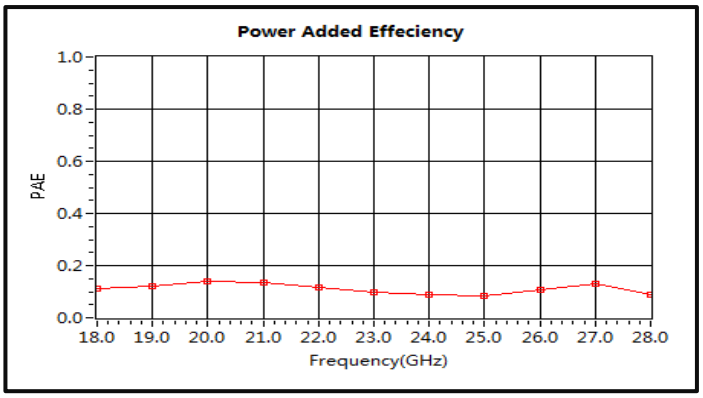
### Gain vs. Output Power (CW Power)



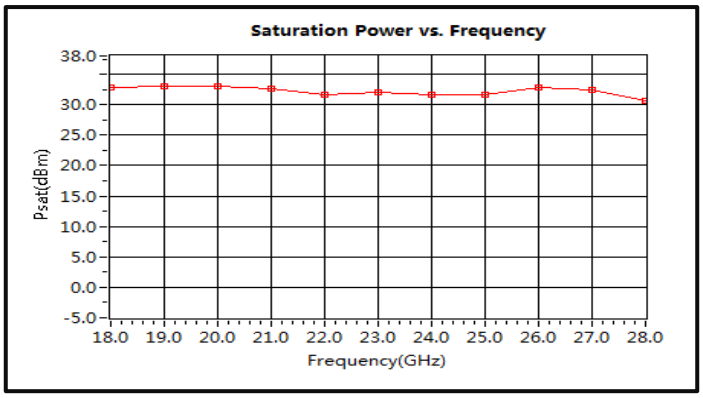

### PndB vs. Frequency (CW Power)



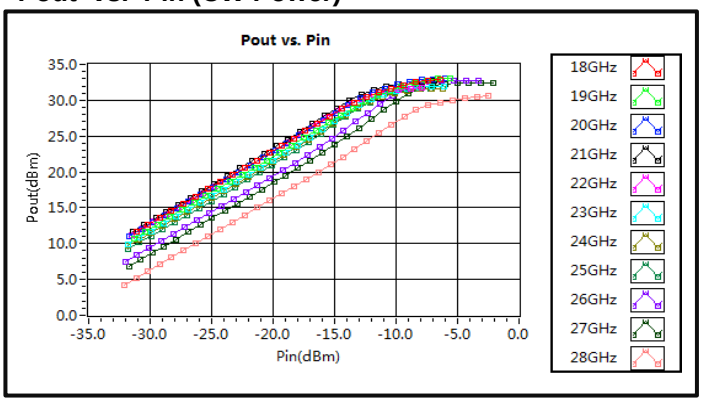

### Power Added Efficiency (CW Power)



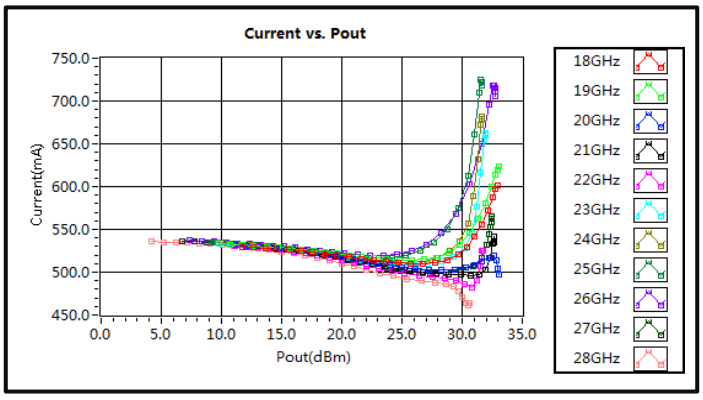

### Saturation Power vs. Frequency (CW Power)




### Pout vs. Pin (CW Power)

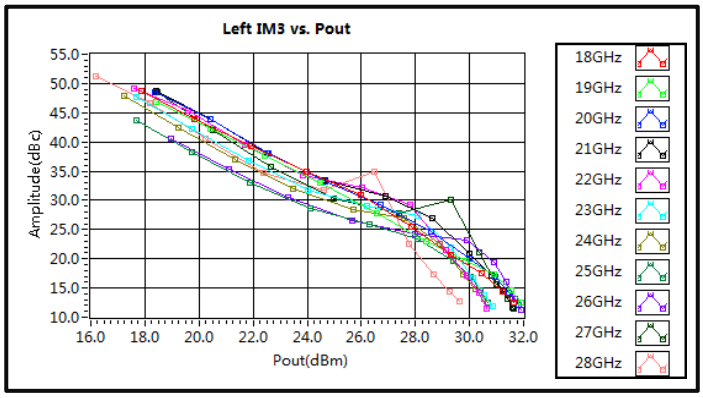



### Current vs. Pout (CW Power)

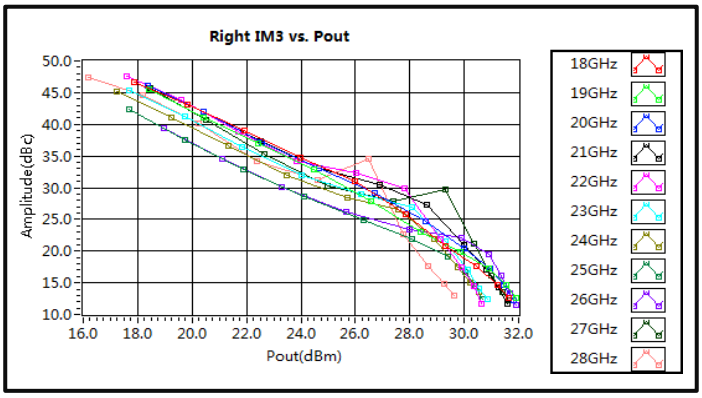


## Typical Performance Plots

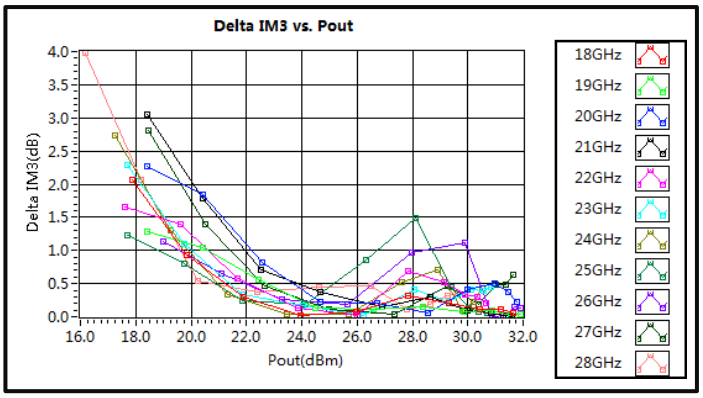
### Left IM3 vs. Pout



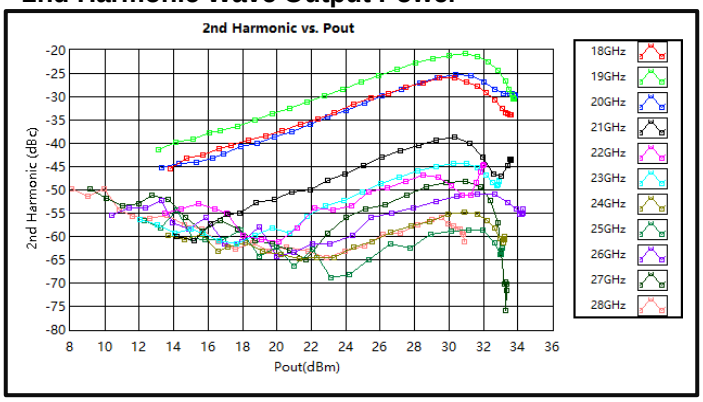

### Right IM3 vs. Pout



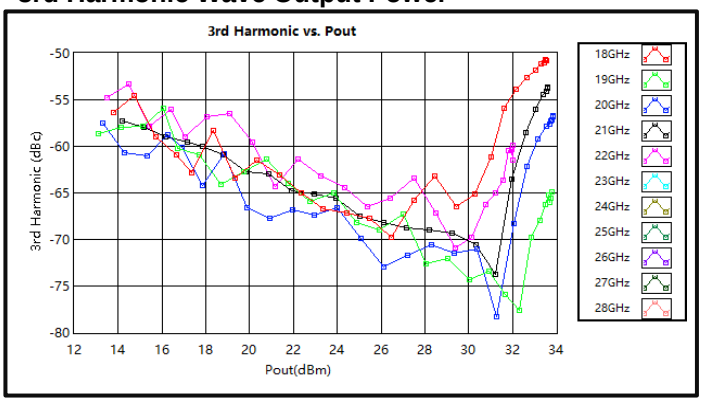

### Delta IM3 vs. Pout




### 2nd Harmonic Wave Output Power

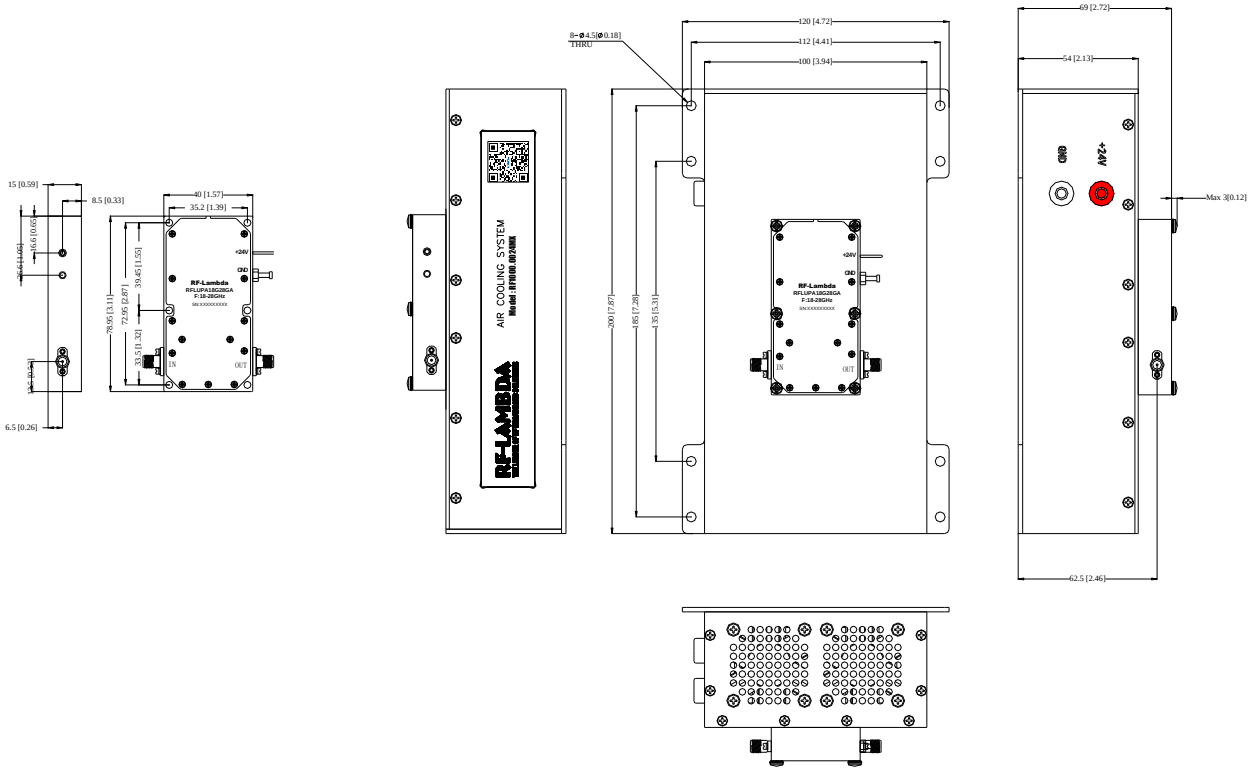



### 3rd Harmonic Wave Output Power

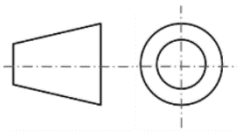



Note: IM3 test performed with 1MHz tone spacing

## Outline Drawing




Notes:
1. Package Material: Copper
2. Finish: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Housing Tolerances ±0.2 [0.008] unless otherwise specified(Excl Heat Sink).
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.
6. Standard torque wrench must be used to secure RF connectors.




## 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 |
|---|---|---|
| RFLUPA18G28GA | Input Connector 2.92mm-Female<br>and Output Connector 2.92mm-Female | 18GHz-28GHz 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.
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