

## Hermetically Sealed Ultra Wideband Solid State Power Amplifier 0.02GHz-3GHz



### Product Description

RFLUPA0030G10A-H is a hermetically sealed ultra wideband solid state power amplifier with a frequency range of 0.02 to 3GHz.

The power output of this amplifier is 40dBm typical. The typical small signal gain is 43dB with a flatness of  $\pm 2.5$ dB. This power amplifier works with a +28VDC power supply.

The power amplifier is hermetically packaged to meet MIL-STD-883.

The working temperature of this product is between - 40°C and + 85°C.

### Features

- Hermetically Sealed Ultra Wideband Solid State Power Amplifier
- Small Signal Gain 43dB Typical
- Output Saturation Power 40dBm Typical
- Supply Voltage +28VDC
- 50 Ohm Matched

### 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 ( $T_A = +25^\circ\text{C}$ , $V_{CC} = +28\text{VDC}$ )

| Parameter                                        | Min  | Typ                                | Max  | Units |
|--------------------------------------------------|------|------------------------------------|------|-------|
| Frequency Range                                  | 0.02 |                                    | 3    | GHz   |
| Gain                                             | 40   | 43                                 |      | dB    |
| Gain Flatness                                    |      | $\pm 2.5$                          |      | dB    |
| Gain Variation Over Temperature (-40°C to +85°C) |      | $\pm 2.0$                          |      | dB    |
| Input VSWR                                       |      | 1.6                                |      | : 1   |
| Output 1dB Compression Point (P1dB)              | 37   | 38                                 |      | dBm   |
| Saturated Output Power (Psat)                    |      | 40                                 |      | dBm   |
| Supply Current ( $V_{CC} = +28\text{VDC}$ )      |      | 850                                | 2200 | mA    |
| Isolation S12                                    |      | -55                                |      | dB    |
| Weight                                           |      | 0.45 Max.                          |      | lbs   |
| Impedance                                        |      | 50                                 |      | Ohms  |
| Input / Output Connectors                        |      | SMA - Female                       |      |       |
| Package                                          |      | Hermetically Sealed (Laser Sealed) |      |       |

### Absolute Maximum Ratings

| Parameter              | Rating |
|------------------------|--------|
| Operating Voltage      | +28.5V |
| *RF Input Power (RFIN) | +5dBm  |

### Bias Up Procedure

- 1.Connect Ground Pin
- 2.Connect input and output
- 3.Connect +28V biasing

### Bias Down Procedure

- 1.Turn off +28V biasing
- 2.Remove RF connection
- 3.Remove Ground.

### Environmental Specifications and Test Standards

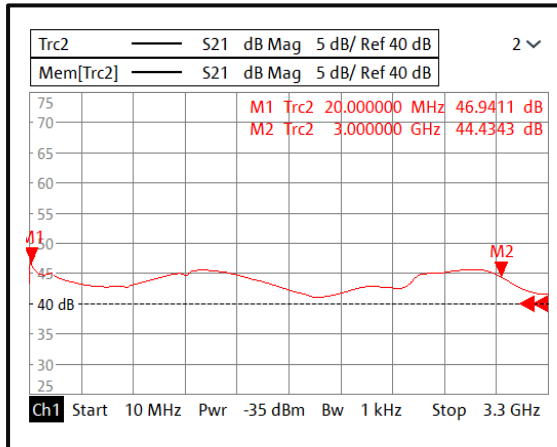
| Parameter                         | Description                                                                                                                                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operational Temperature           | -40°C to +85°C<br>(Case Temperature)                                                                                                                                                                            |
| Storage Temperature               | -50°C to +105°C                                                                                                                                                                                                 |
| Thermal Shock                     | -40°C → +85°C<br>(5 Cycles / 10 hours)                                                                                                                                                                          |
| **Random Vibration                | MIL-STD-202G<br>Table 214-I, Test Condition Letter C<br>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<br>2. Weight <=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s<br>3. Total 18 times (6 directions, 3 repetitions per direction). |
| Altitude                          | Standard: 30,000 Ft (Epoxy Sealed Controlled Environment)<br>Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)                                                                                             |
| Hermetically Sealed<br>(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.

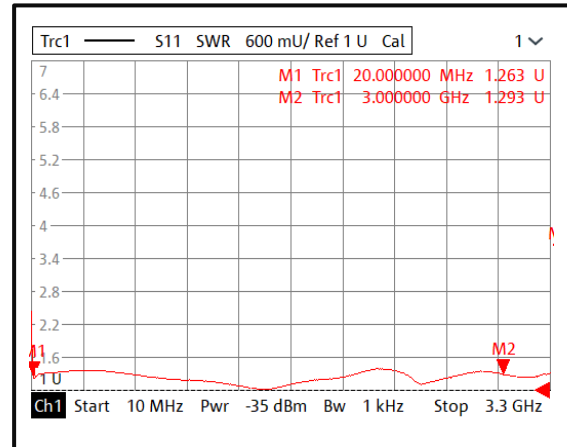
\*\*For vibration testing details please see additional information section.

Typical Performance Plots

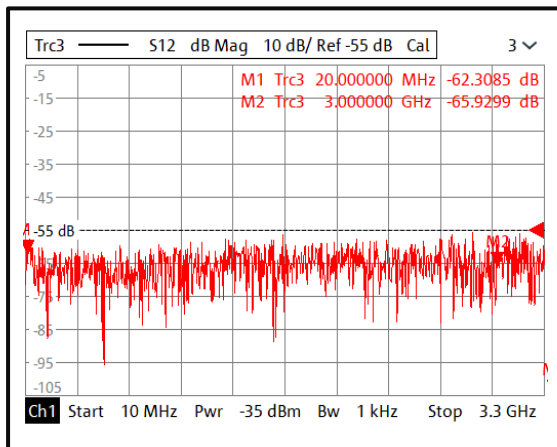
Gain@+25°C



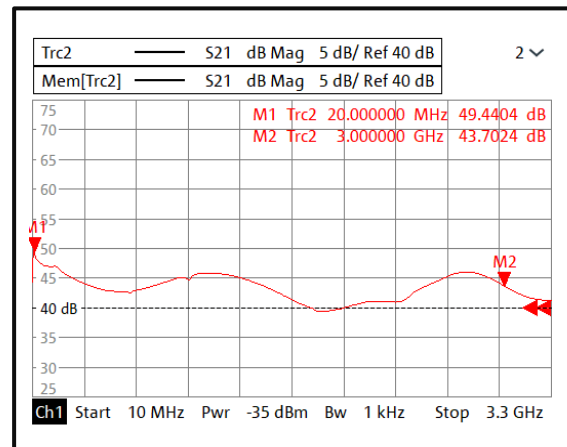
Input VSWR @+25°C



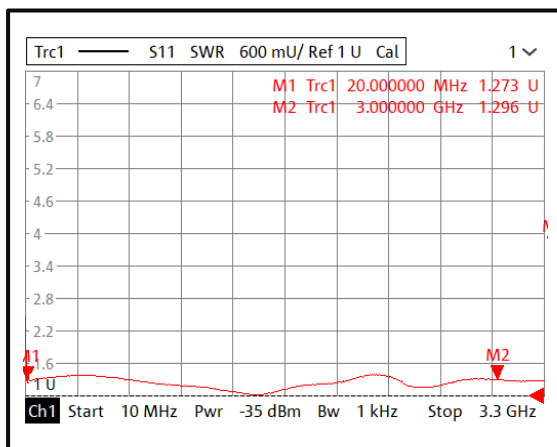
Isolation@+25°C



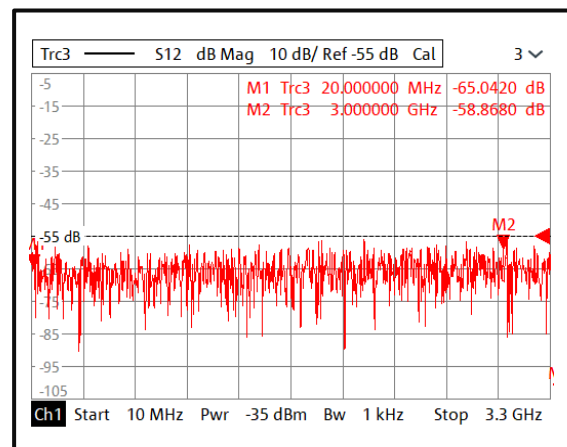
Gain@-40°C



Input VSWR @-40°C



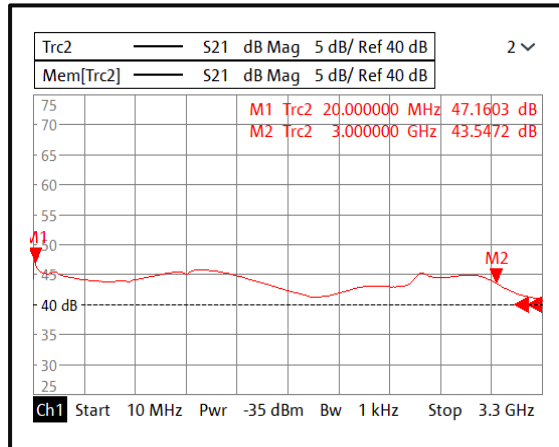
Isolation@-40°C



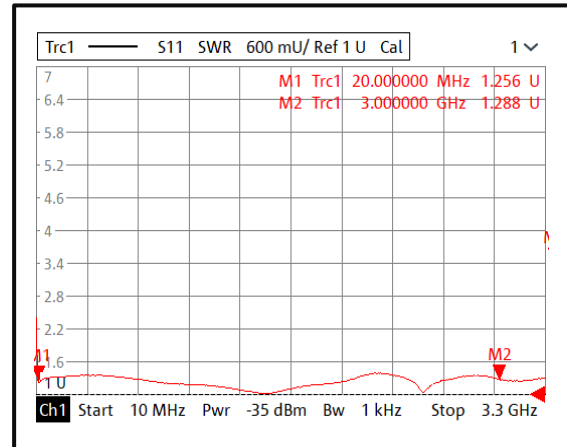
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

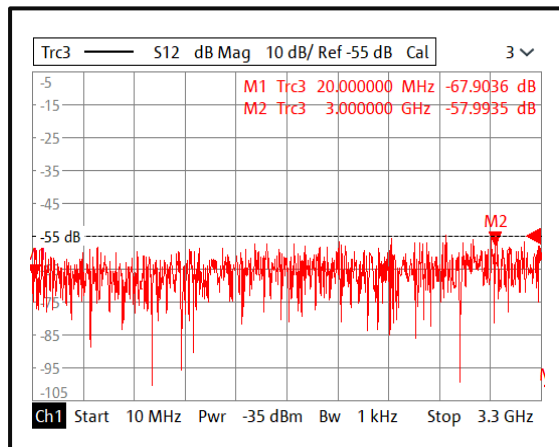
Gain@+85°C



Input VSWR @+85°C



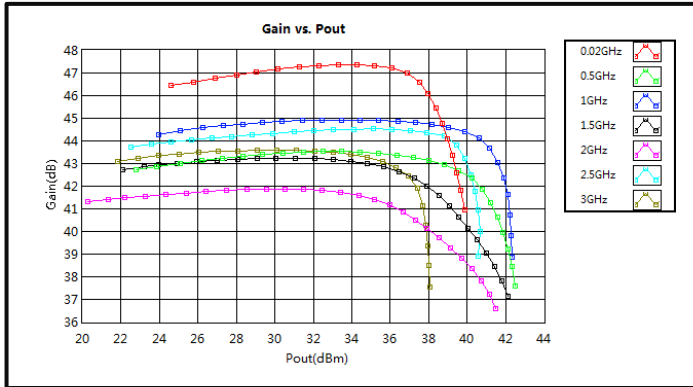
Isolation@+85°C



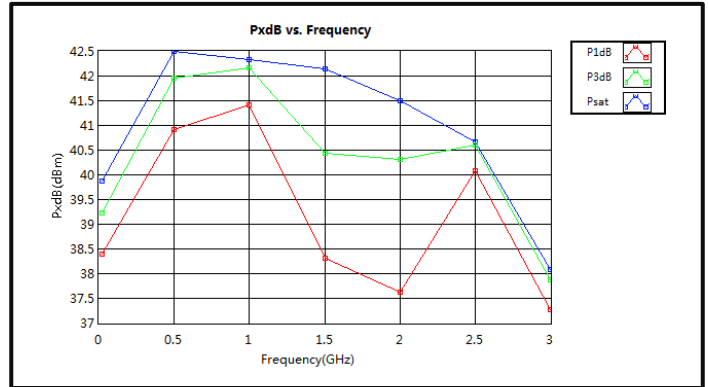
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

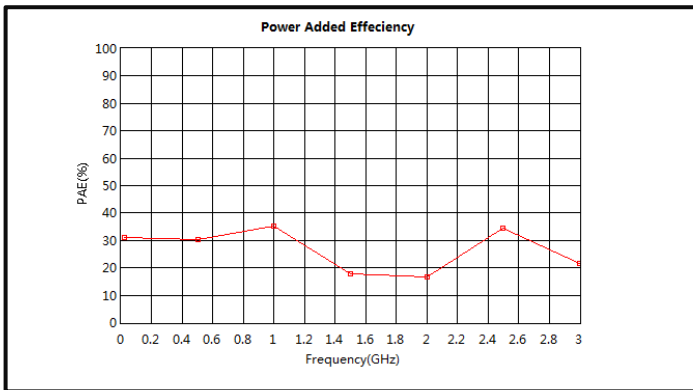
Gain vs. Output Power CW



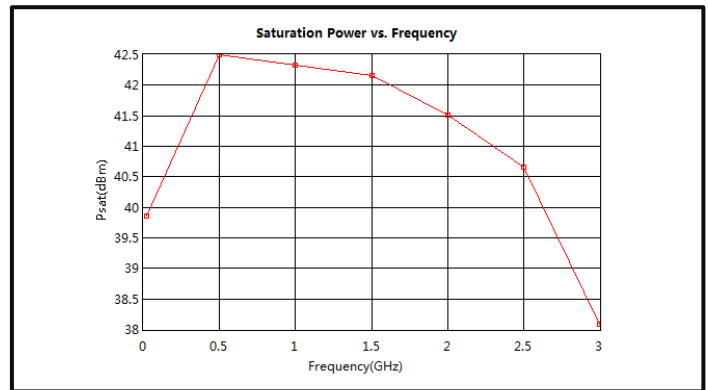
PndB vs. Frequency CW



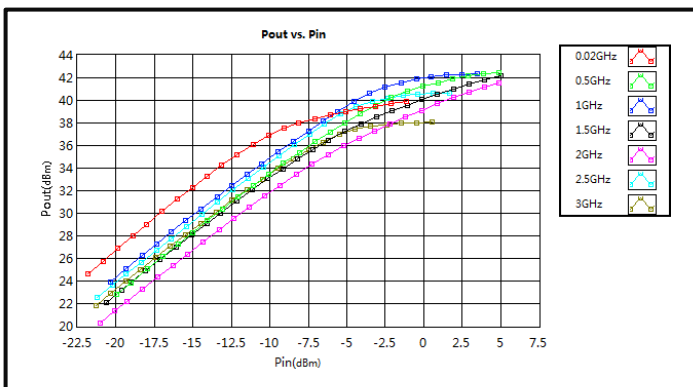
Power Added Efficiency CW



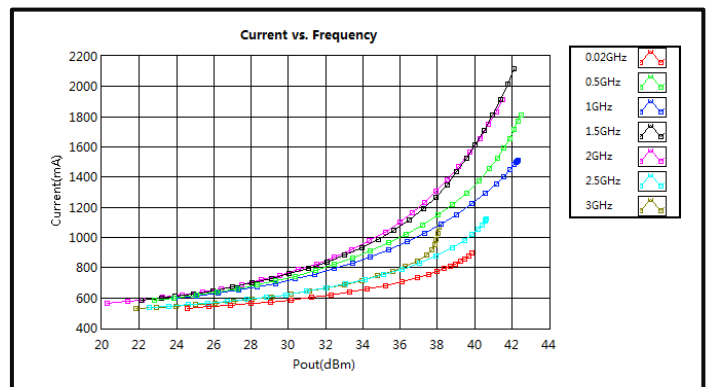
Saturation Power vs. Frequency CW



Pout vs. Pin

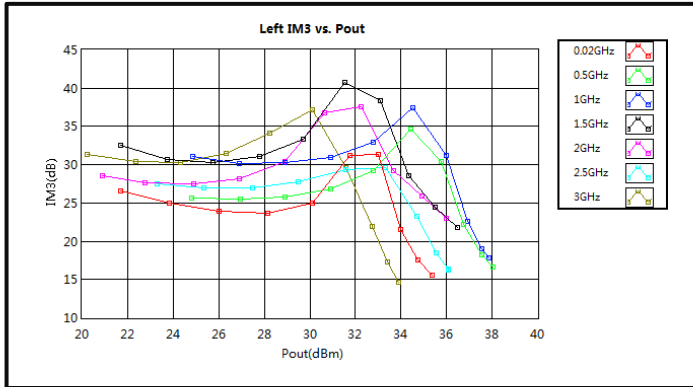


Current vs. Pout

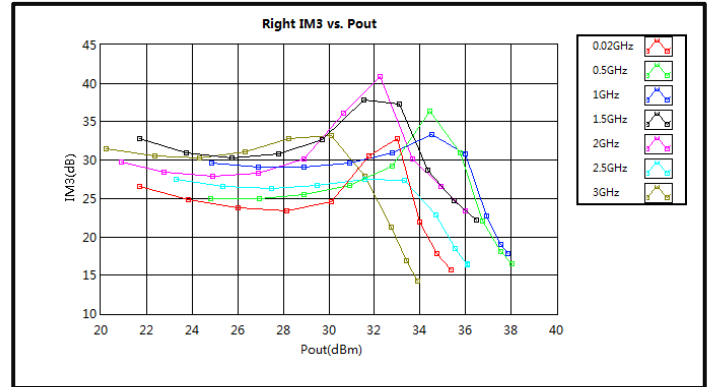


Typical Performance Plots

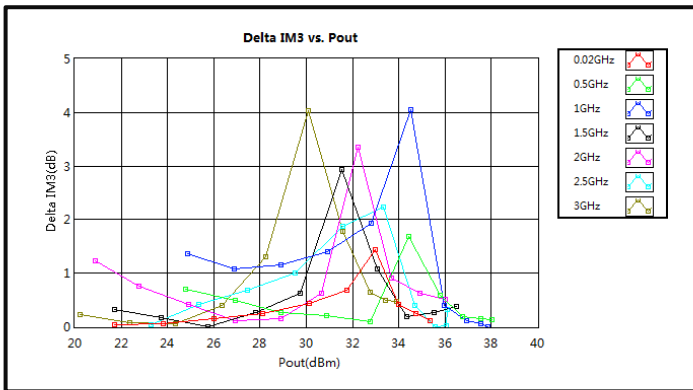
Left IM3 vs. Pout



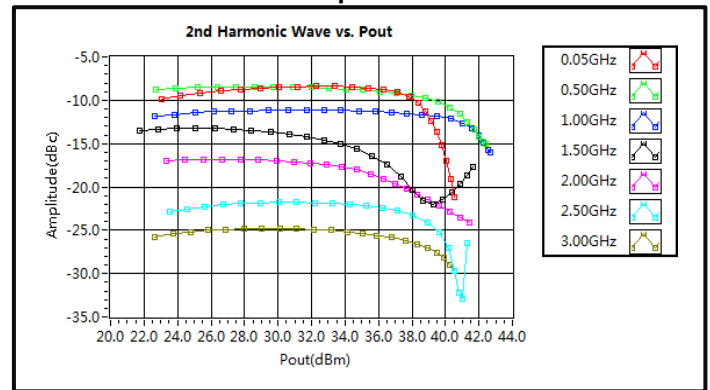
Right IM3 vs. Pout



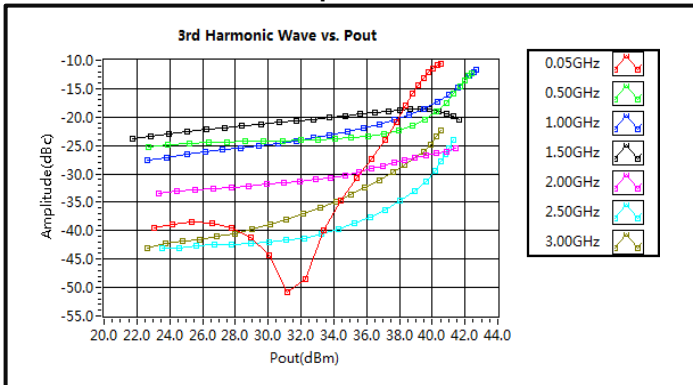
Delta IM3 vs. Pout



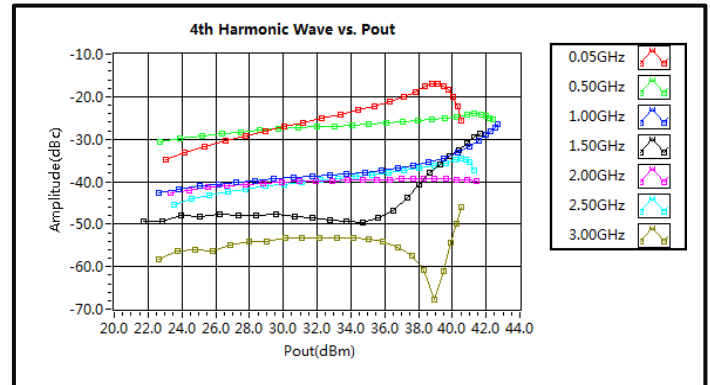
2nd Harmonic Wave Output Power



3rd Harmonic Wave Output Power

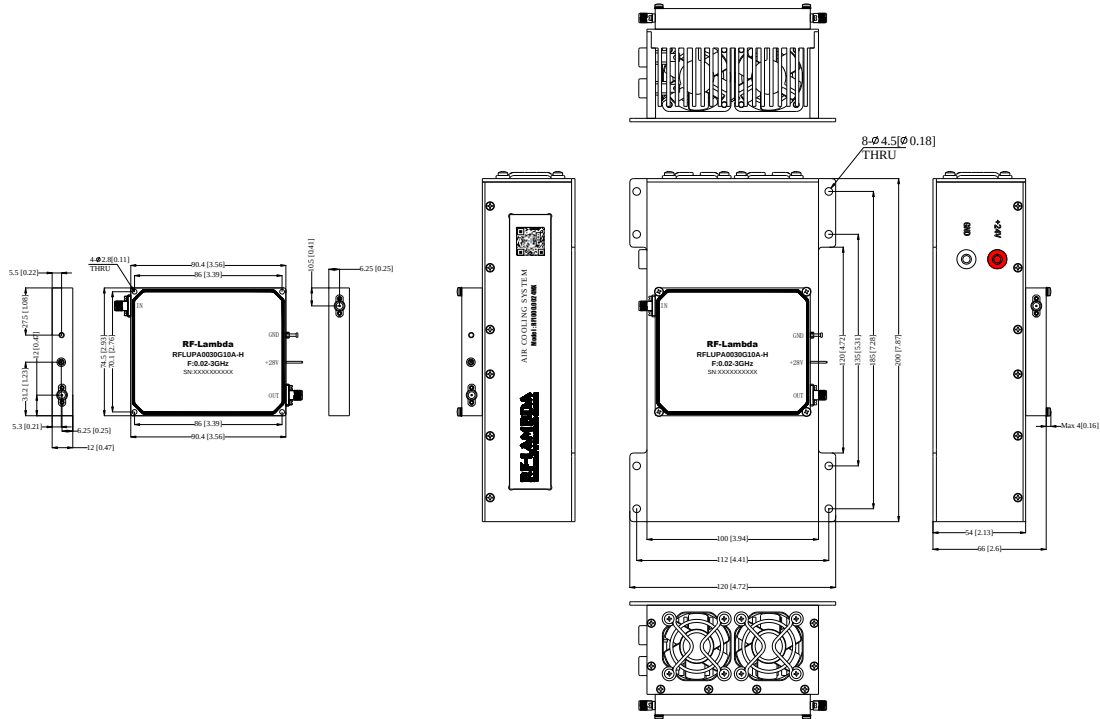


4th Harmonic Wave Output Power



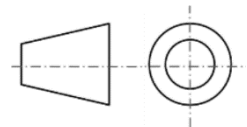
Note: IM3 test performed with 1MHz tone spacing

**Outline Drawing**



**Notes:**

1. Package Material: Aluminum
2. Finish: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Housing Tolerances  $\pm 0.2$  [0.008] 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.
6. Standard torque wrench must be used to secure RF connectors.



**Additional Information**

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

Ordering Information

| Part Number      | Modification        | Description                                                  |
|------------------|---------------------|--------------------------------------------------------------|
| RFLUPA0030G10A-H | Hermetically Sealed | 0.02GHz-3GHz Hermetically Sealed Solid State Power Amplifier |
| RFLUPA0030G10A   | Standard            | 0.02GHz-3GHz Solid State 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.