

Solid State Power Amplifier 8GHz-11GHz



Product Description

The RFLUPA08G11GA is a solid state power amplifier with a frequency range of 8 to 11GHz.

The power output of this amplifier is 48dBm typical. The typical small signal gain is 49dB. This power amplifier works with a +36V DC power supply.

The power amplifier's input and output connectors are SMA. The working temperature of this product is between - 40 °C and + 70 °C

Features

- Solid State Power Amplifier
- Gain:49dB Typical
- Output Saturation Power 48dBm Typical
- Supply Voltage: +36V
- 50 Ohm Matched Input/Output
- Overvoltage Protection
- Overcurrent Protection
- Auto Calibration

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°C, V_{cc} = +36V

Parameter	Min	Typ	Max	Units
Frequency Range		8 - 11		GHz
Gain		49		dB
Gain Variation Over Temperature		6		dB
Input Return Loss		-15		dB
Saturated Power (P _{sat})		48		dBm
Output Third Order Intercept (OIP3)		47		dBm
Supply Current		550	7000	mA
Power Supply		36		V
Isolation S12		-45		dB
Input Max		8		dBm
Weight		2.64		lbs.
Impedance		50		Ohms
Input / Output Connectors		SMA-Female		

* P1dB, P3dB and P_{sat} power testing signal: 200µs pulse width with 10% duty cycle.

* For average CW power testing or increased duty cycle, a 5dB back off from P_{sat} is required unless water/oil cooling system is applied.

Absolute Maximum Ratings

Parameter	Rating
Operating Voltage	+40V
RF Input Power	8dBm

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 Ground Pin

3. Connect +36V biasing

Bias Down Procedure

1. Turn off +36V biasing

2. Remove RF connection

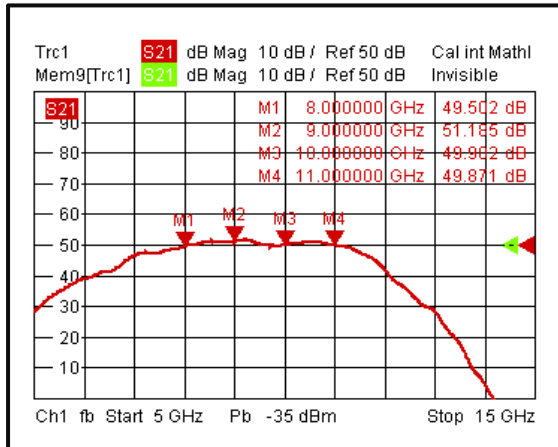
3. Remove Ground.

Environmental Specifications and Test Standards

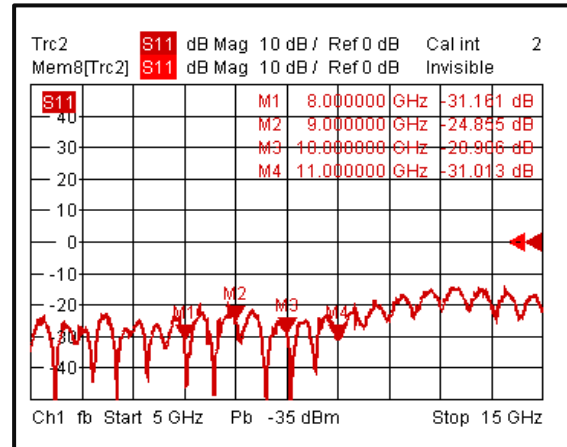
Parameter	Description
Operational Temperature	-40°C to +70°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +70°C for 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)

Typical Performance Plots

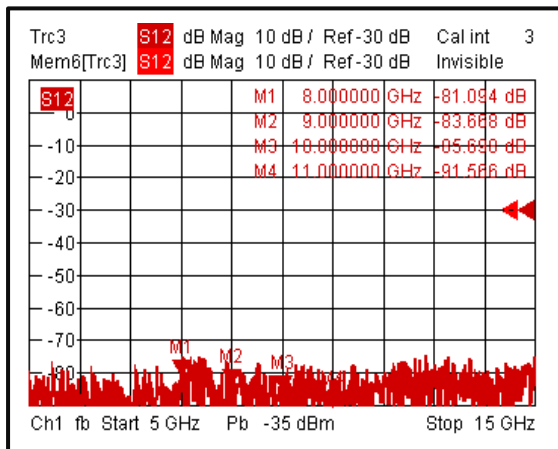
Gain



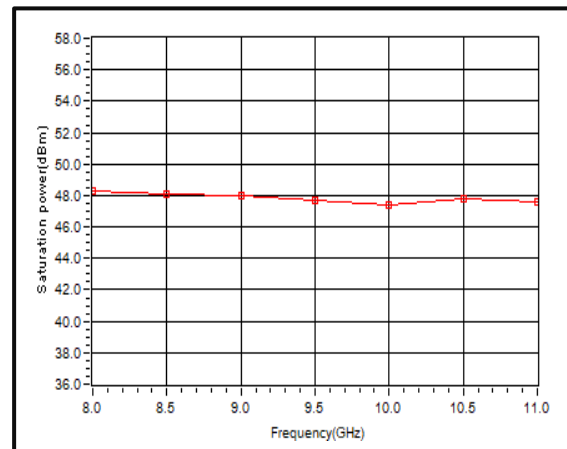
Input Return Loss



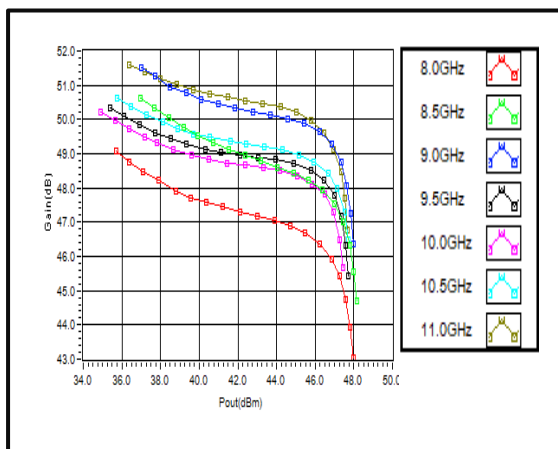
Isolation



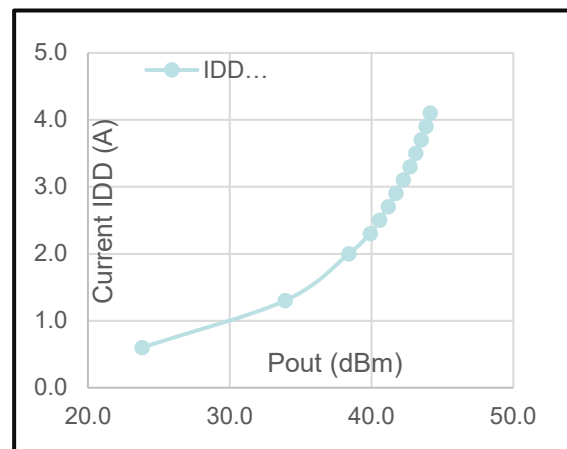
P7dB vs. Frequency



Gain vs. Output Power

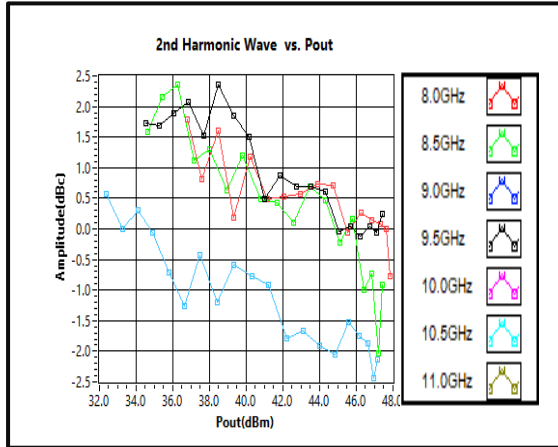


IDD Current with Average Power at 10GHz

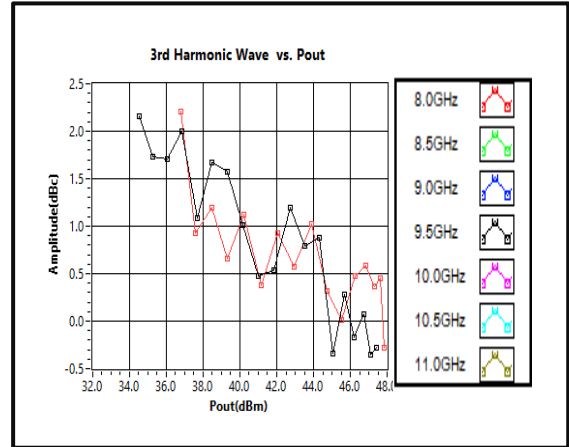


Note: Small signal VNA measurements include attenuators to protect equipment

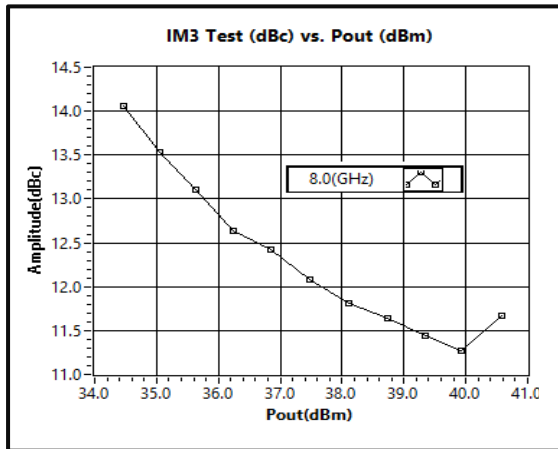
2nd Harmonic Wave vs Output Power



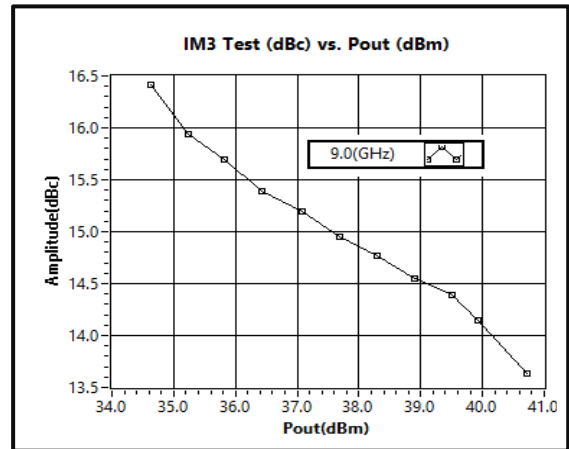
3rd Harmonic Wave Output Power



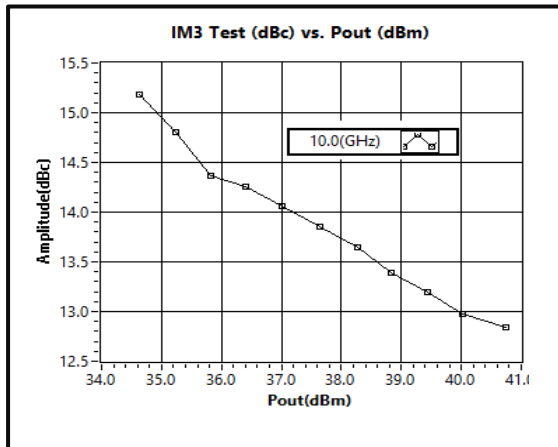
IM3 Test vs. Pout @8GHz



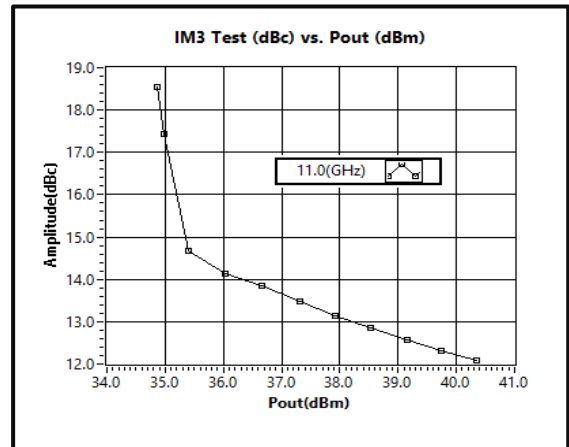
IM3 Test vs. Pout @9GHz



IM3 Test vs. Pout @10GHz

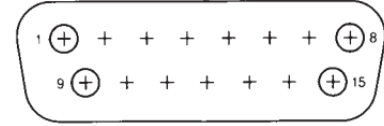


IM3 Test vs. Pout @11GHz



Protection Connector Table

Male D-Sub is on the housing
The mating male part number: 172-E15-203R001

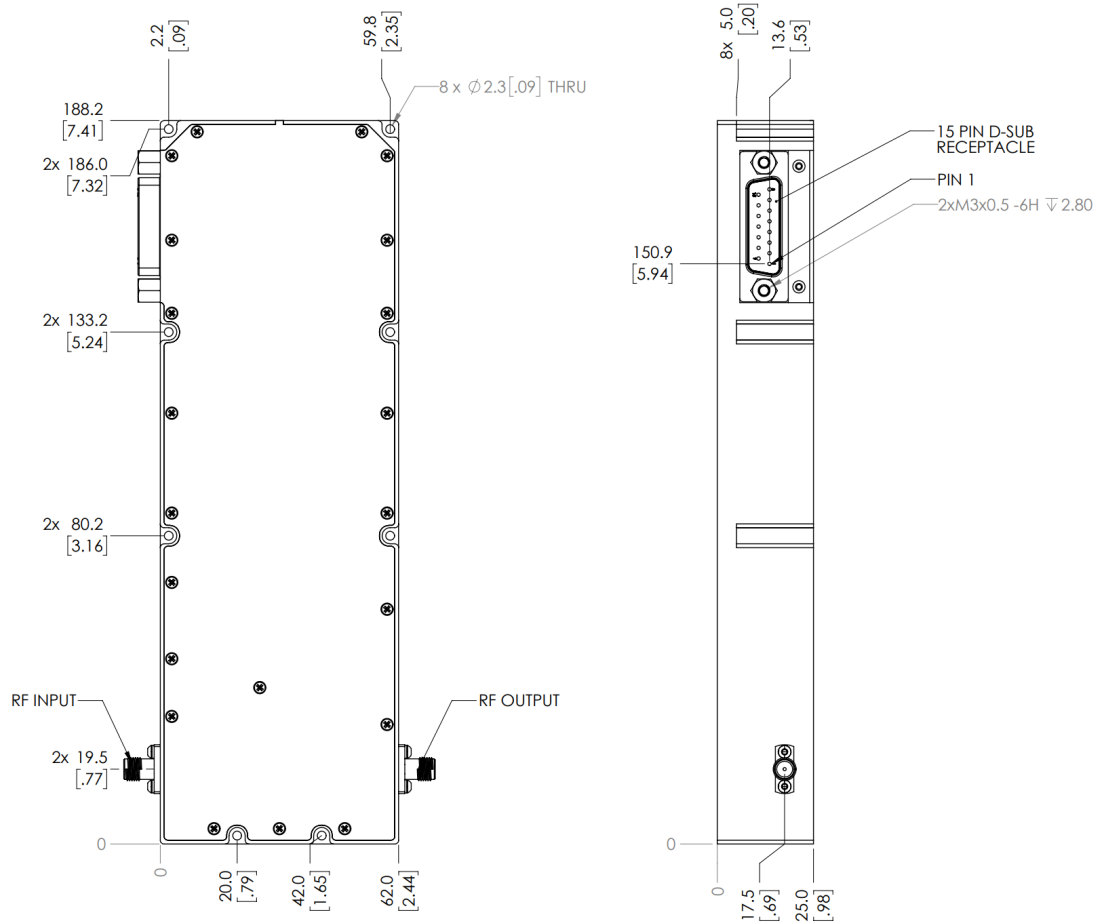


Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Drain Disable	Control	LOW	Applying logic <u>HIGH</u> disables drains of amplifiers	Yes
3	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of amplifiers	Yes
4	RF IN Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when input signal is over limit	No
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	NC	NC		NC	No
8	GND	Ground	GND	Ground	Yes
9	VDC	Power Supply	VDC	Apply +36VDC and make sure this pin is tied with other VDC pins	Yes
10	VDC	Power Supply	VDC	Apply +36VDC and make sure this pin is tied with other VDC pins	Yes
11	VDC	Power Supply	VDC	Apply +36VDC and make sure this pin is tied with other VDC pins	Yes
12	Temp Signal	Indicator		PA carrier case temperature is represented by voltage	Yes
13	+5V	Power Supply	+5V	+5V DC is supplied for reference, this is connected to an output of an LDO internally (It can supply current up to 600mA)	Yes
14	GND	Ground	GND	Ground	Yes
15	GND	Ground	GND	Ground	No

Notes:

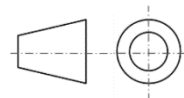
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 700mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Aluminum/Copper
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Tolerances ± 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	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
RFLUPA08G11GA	Standard	8GHz-11GHz 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

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