Ultra Wide Band Power Amplifier
0.2GHz-2.5GHz

Product Description

RFLUPA0225G100A is a wideband power amplifier with a frequency range of 0.2 to 2.5GHz.

The power output of this amplifier is 48dBm typical. The typical small signal gain is 55dB with a gain flatness of ±3.5dB. This power amplifier works with a +36VDC power supply.

The power amplifier's input and output connectors are SMA-Female.

The operating temperature of this product is -40 to +60ºC.

Features

- Ultra Wide band Power Amplifier
- Small Signal Gain 55dB Typical
- Output Saturation Power 48dBm Typical
- Supply Voltage +36 VDC
- 50 Ohm Matched Input/Output
- Overvoltage Protection
- Overcurrent Protection

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	Units
Frequency Range			0.2 – 2.5		GHz
Small Signal Gain			55		dB
Gain Flatness			±3.5		dB
Gain Variation Over Temperature (-40ºC to +60ºC)			±3.5		dB
Input Return Loss			-10		dB
Output 1dB Compression Point (P1dB)		44	45		dBm
Saturated Output Power (Psat)		46	48		dBm
Supply Current (VDC=+36V) (Output Power @ Psat)			8		A
IM3			-28		dBc
Power Added Efficiency (PAE)			30		%
Turn On/Off Speed (Switch Disable)	ON		160		ns
	OFF		120		ns
Turn On/Off Speed (Drain Disable)	ON		50		us
	OFF		500		us
Turn On/Off Speed (Gate Disable)	ON		800		us
	OFF		100		us
Weight	Net		3.97 Max.		lbs.
	Including Heat sink		10.7 Max.		lbs.
Impedance			50		Ohms
Input / Output Connectors			SMA-Female		
Package			Epoxy Sealed (Standard)		
			Hermetically Sealed (Optional)		

RF-LAMBDA USA LLC: www.rflambda.com
Sales: sales@rflambda.com Technical: support@rflambda.com

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	+34 VDC to +38 VDC
*RF Input Power (RFIN)	Psat – Large Signal Gain

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 +36 VDC and make sure power supply can handle max current.

Bias Down Procedure

1. Turn off +36 VDC
2. Remove +36 VDC Connection
3. Remove RF Connection
4. Remove ground

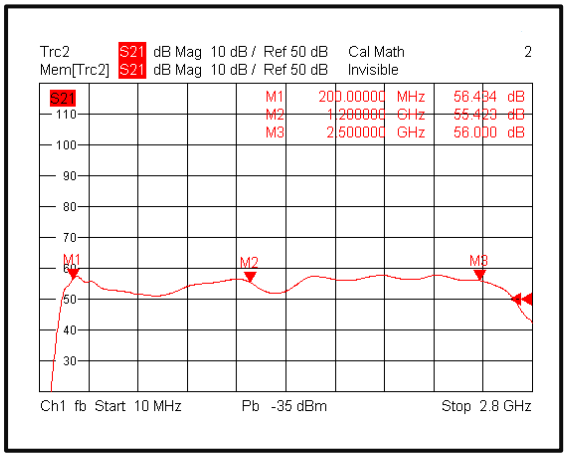
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40ºC to +60ºC (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 +60ºC 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)

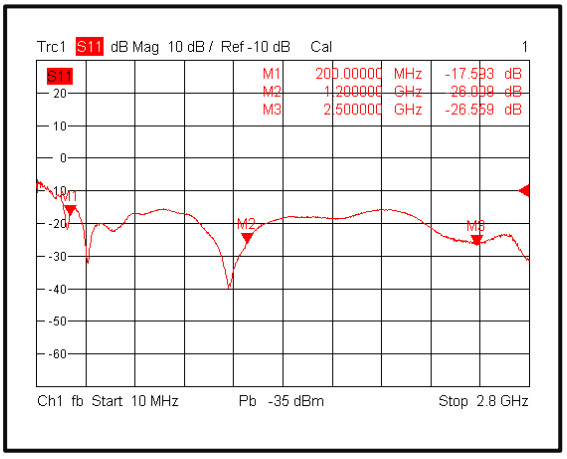
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

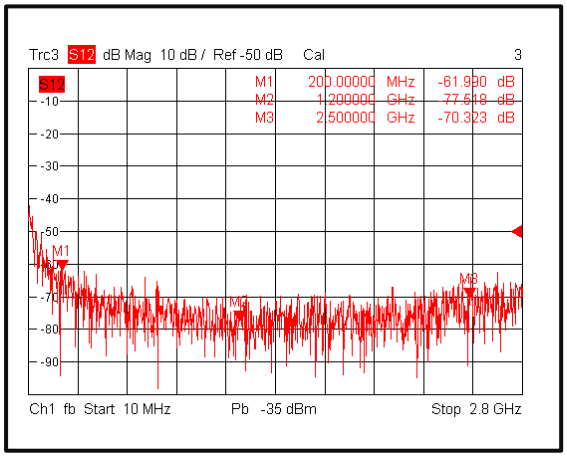
Gain @ +25℃



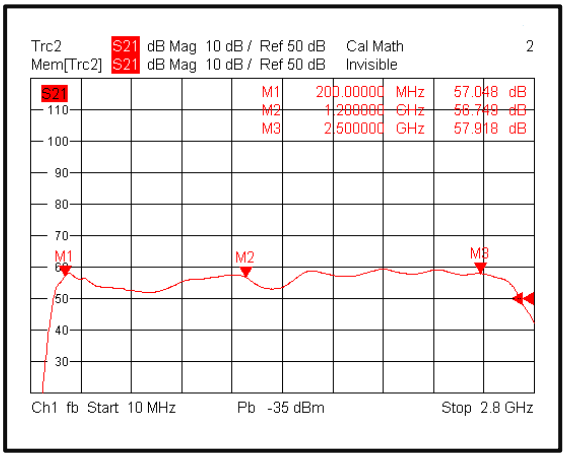
Input Return Loss@+25℃



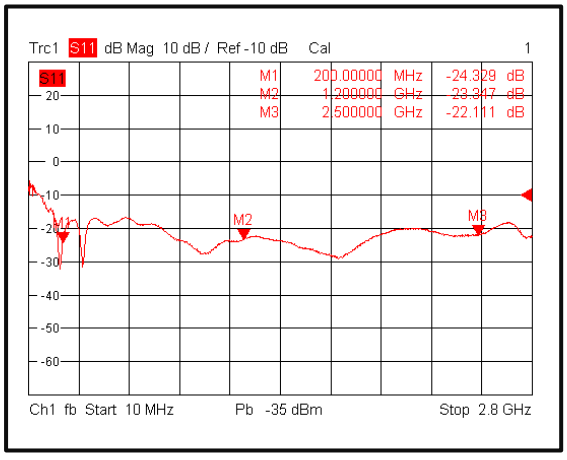
Isolation @ +25℃



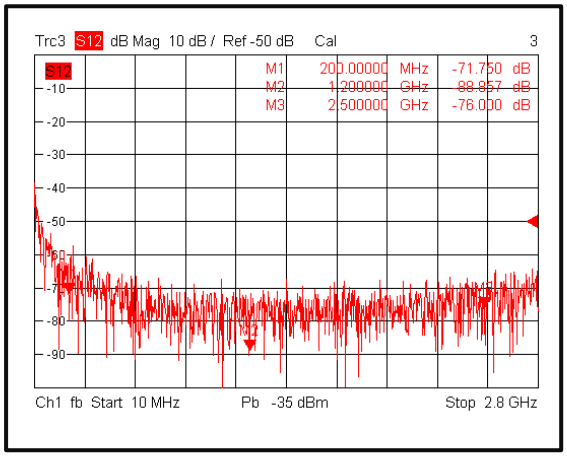
Gain @ -40℃



Input Return Loss@ -40℃



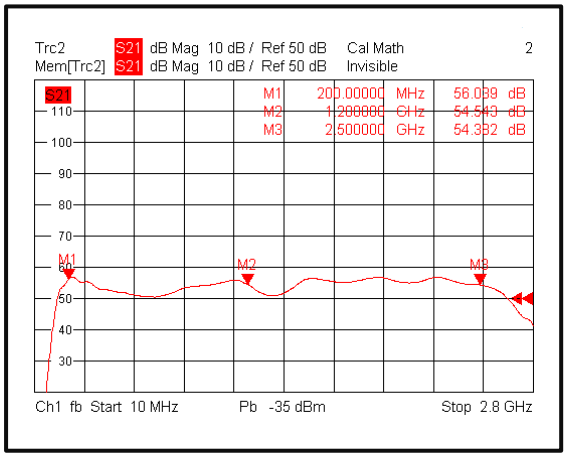
Isolation @ -40℃



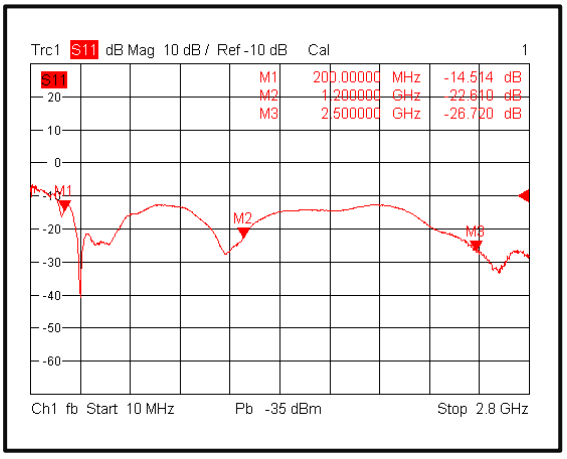
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

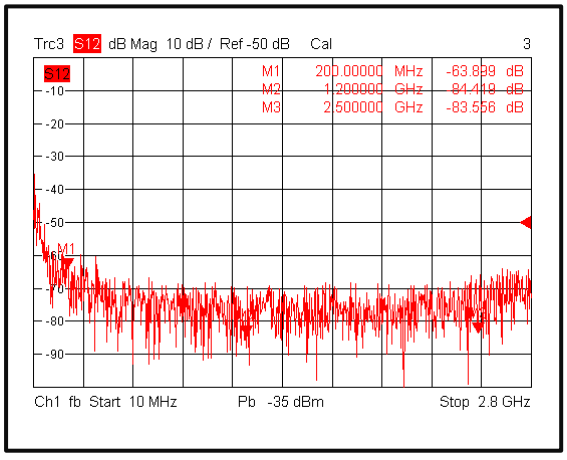
Gain @ +60℃



Input Return Loss@ +60℃



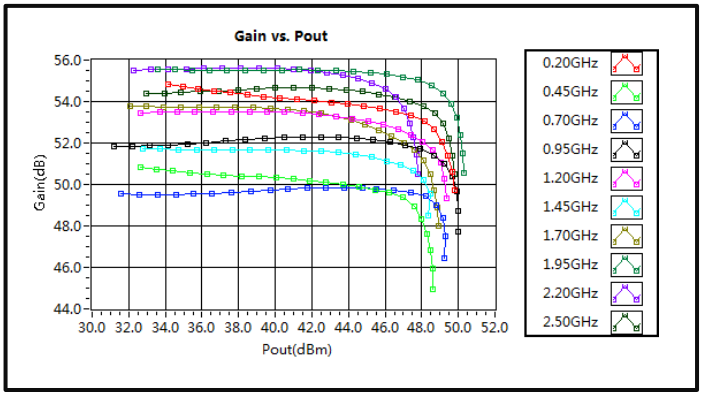
Isolation @ +60℃



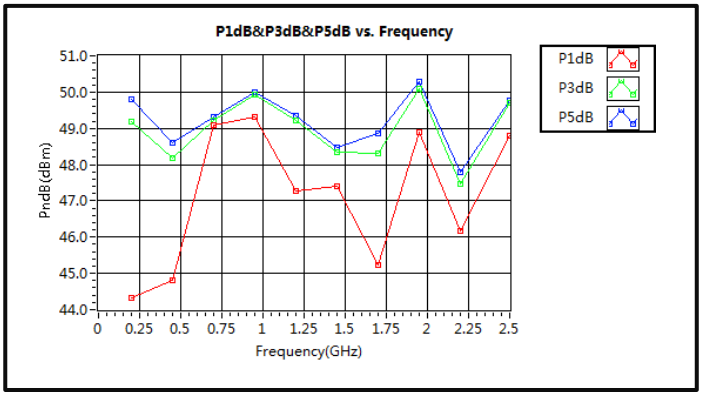
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

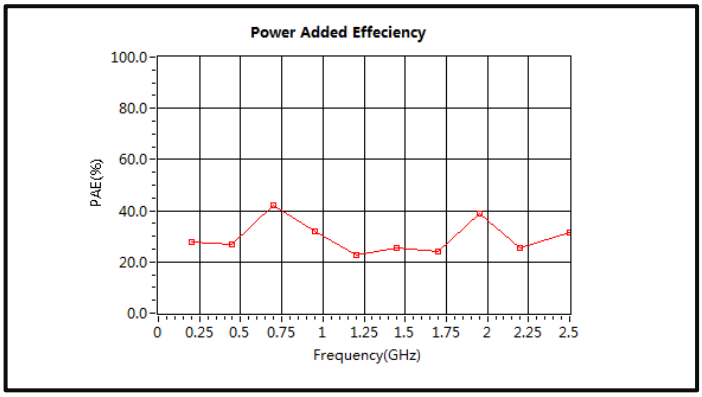
Gain vs. Output Power CW



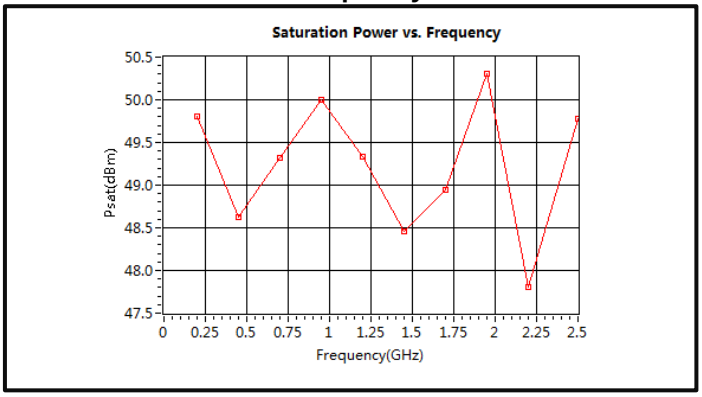
PndB vs. Frequency CW



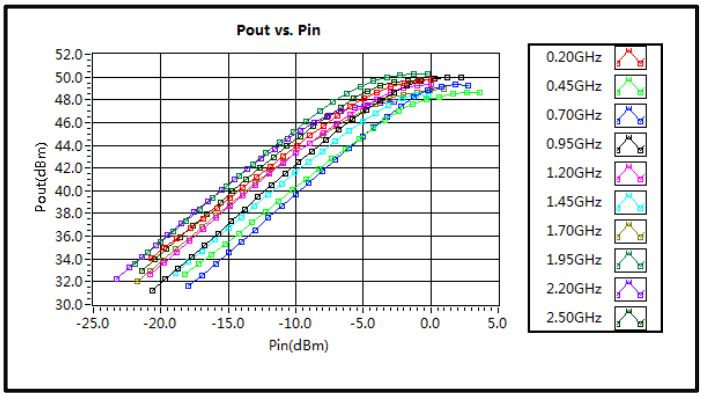
Power Added Efficiency CW



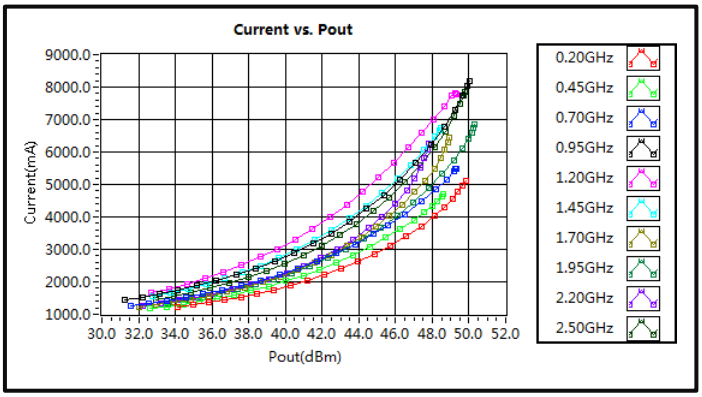
Saturation Power vs. Frequency CW



Pout vs. Pin

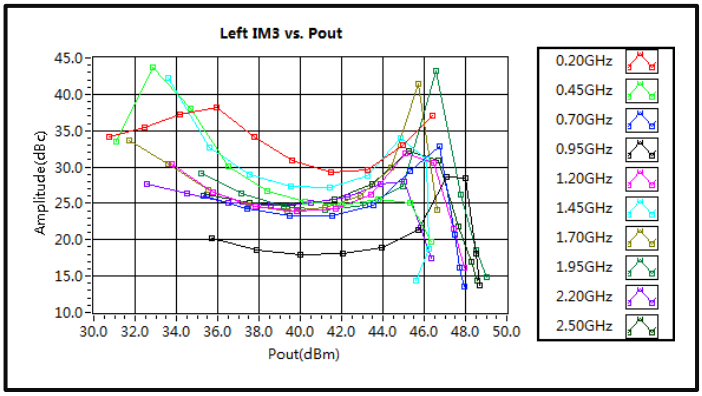


Current vs. Pout

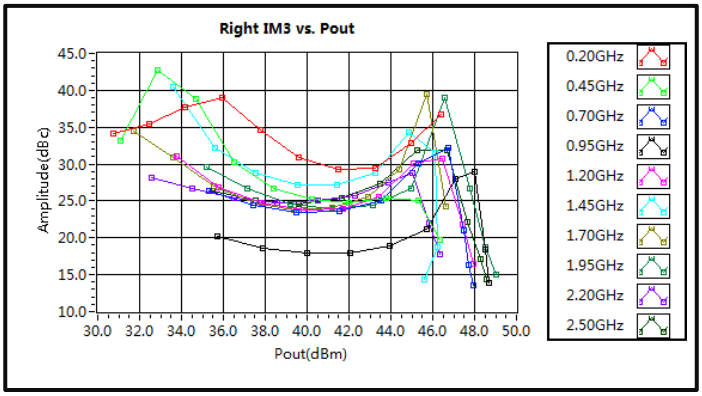


Typical Performance Plots

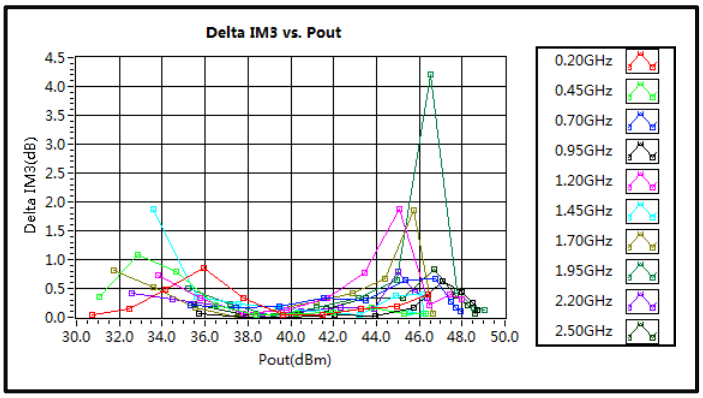
Left IM3 vs. Pout



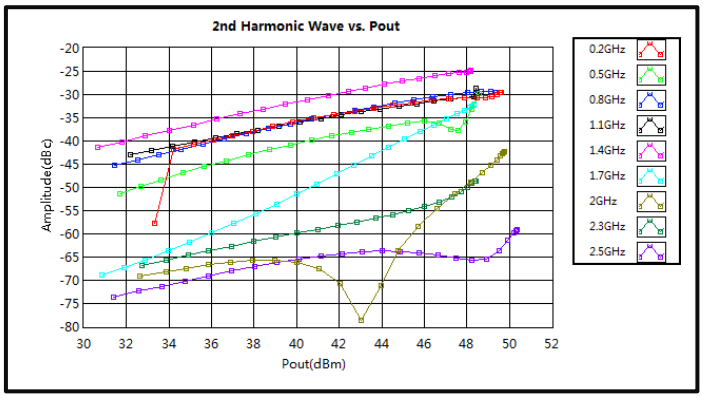
Right IM3 vs. Pout



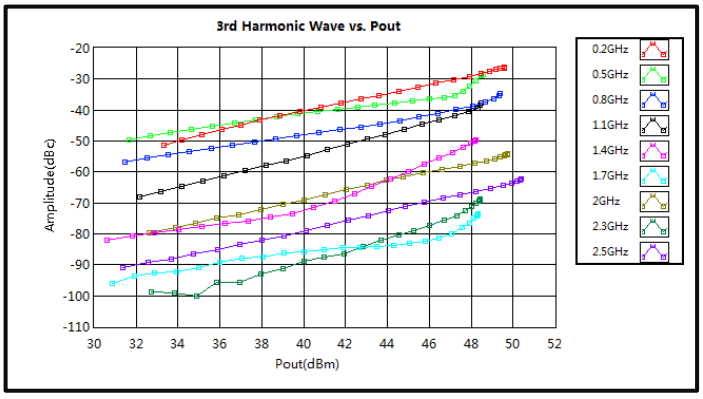
Delta IM3 vs. Pout



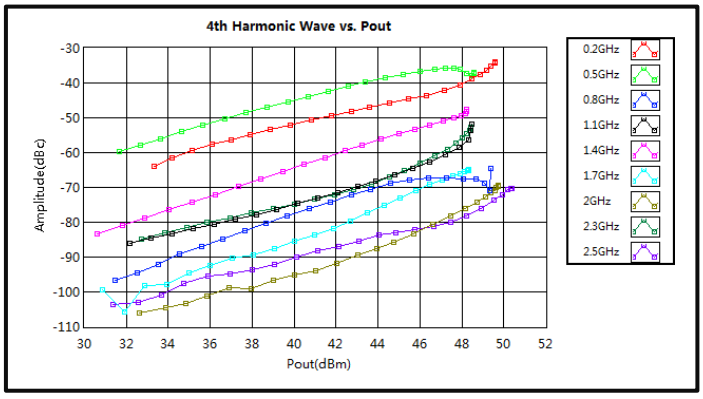
2nd Harmonic Wave Output Power



3rd Harmonic Wave Output Power



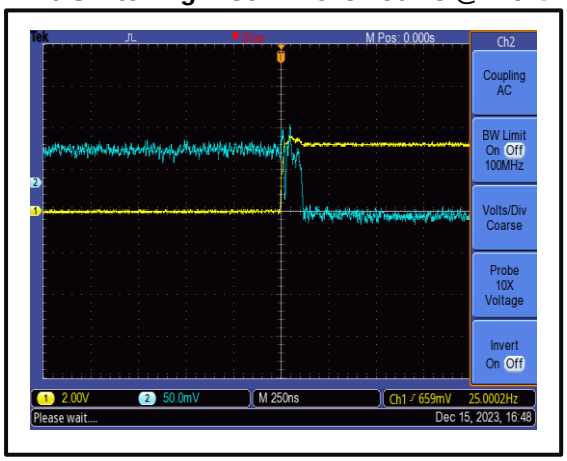
4th Harmonic Wave Output Power



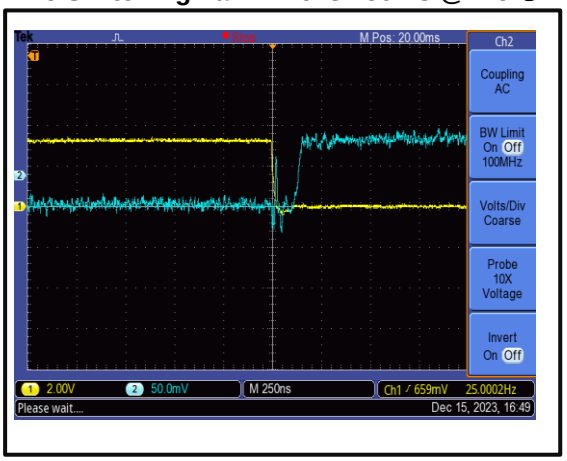
Note: IM3 test performed with 1MHz tone spacing

Typical Performance Plots

The Switching Rise Time is 250 ns @+25℃

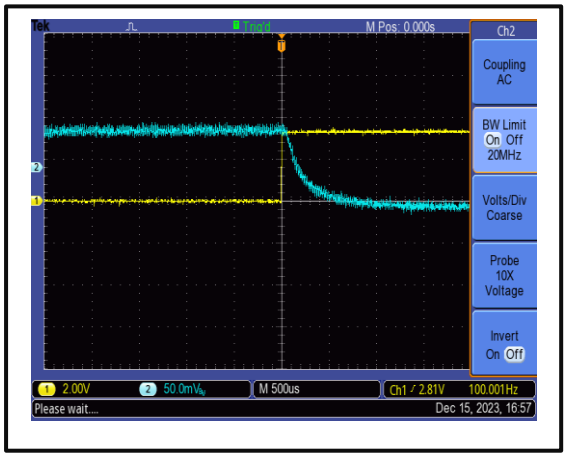


The Switching Fall Time is 250 ns @+25℃

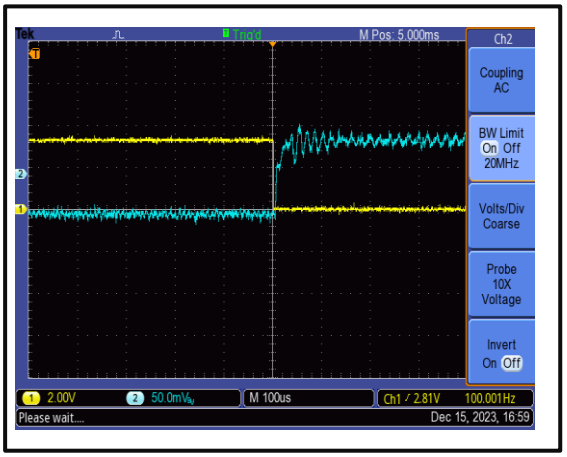


Switch control port: D-sub 15 PIN #12(Switch Disable) .
The yellow curve is the switch control signal, the blue curve is RF output envelope.

The Drain-Enable Rise Time is 500 us @+25℃

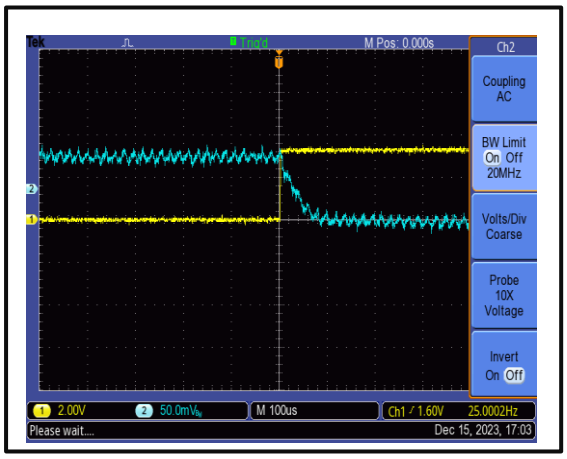


The Drain-Disable Fall Time is 100 us @+25℃

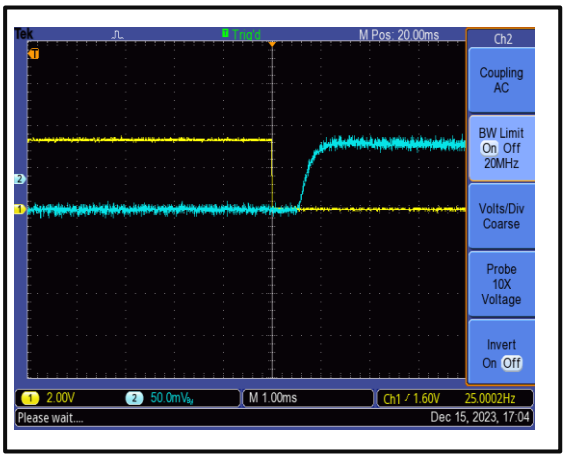


The drain control port：D-sub 15 PIN #13 (Drain Disable).
The yellow curve is the drain control signal, the blue curve is RF output envelope.

The Gate-Enable Rise Time is 100 us @+25℃



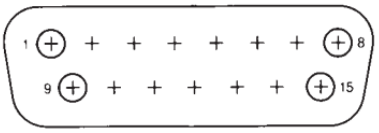
The Gate-Disable Fall Time is 1000 us @+25℃



The gate control port：D-sub 15 PIN #14 (Gate Disable).
The yellow curve is the gate control signal, the blue curve is RF output envelope.

Protection Connector Table

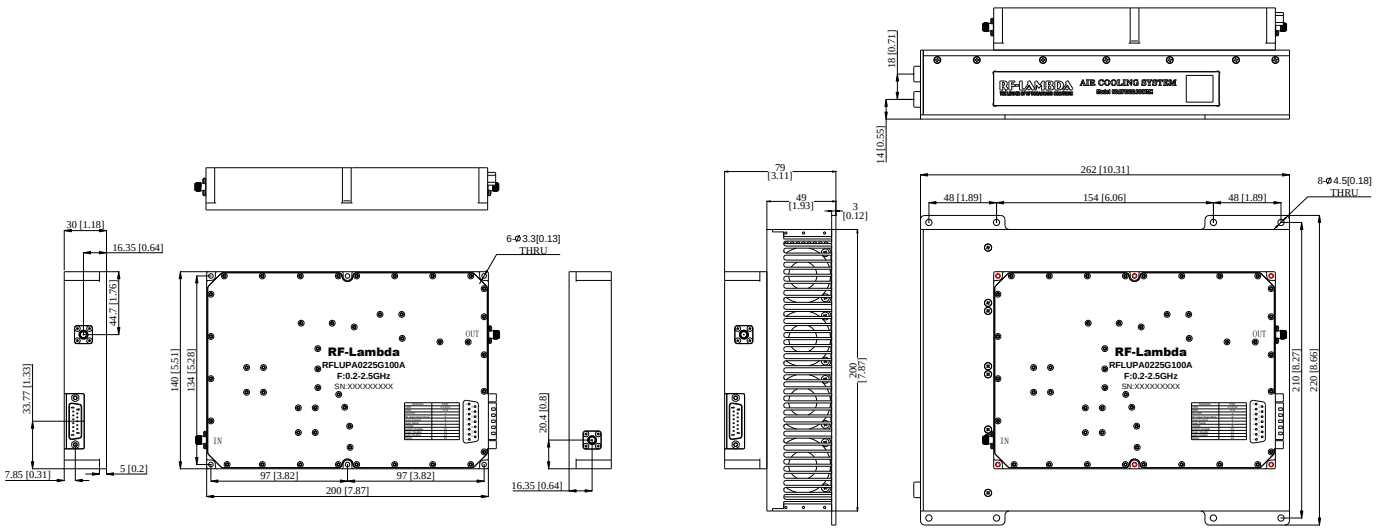
Male D-Sub is on the housing
The mating female part number: 172-E15-203R001

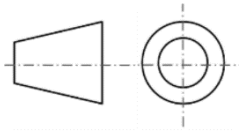


Pin #	Name	Function	Initial State	Description	Applied
1,2,9,10	VDD	Power Supply	+36V	+36 VDC is supply Voltage	Yes
3,11	GND	Ground	GND	Ground	Yes
4	PA_OFF	Indicator	LOW	Amplifier working state, high level is off	Yes
5	RF Input Over Drive	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
6	Over Current	Indicator	LOW	Pin will be latched to logic HIGH when Current Limit is reached	Yes
7	Over Temp	Indicator	LOW	Pin will be latched to logic HIGH when drive over Temperature	Yes
8	VSWR	Indicator	LOW	Pin will be latched to logic HIGH when output reflection is over limit	Yes
12	Switch Disable	Control	LOW	Applying logic HIGH disconnect RF signal of amplifiers	Yes
13	Drain Disable	Control	LOW	Applying logic HIGH disables Positive Supply Voltage of amplifiers	Yes
14	Gate Disable	Control	LOW	Applying logic HIGH disables gates of amplifiers	Yes
15	Reset	Control	HIGH	Resets PA when logic LOW is applied and released (Internally Pulled-High +3.3V)	Yes

Notes:
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2.8V-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





Notes:

1. Package Material: Aluminum and Copper
2. Finish: Nickel Plated
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.

Packing List

ID	Description	QTY
1	Fig a. DB15 cable (RFCBLADB15)	1

Fig a.

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
RFLUPA0225G100A	Standard	0.2GHz-2.5GHz 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

RF-LAMBDA USA LLC: www.rflambda.com
Sales: sales@rflambda.com Technical: support@rflambda.com