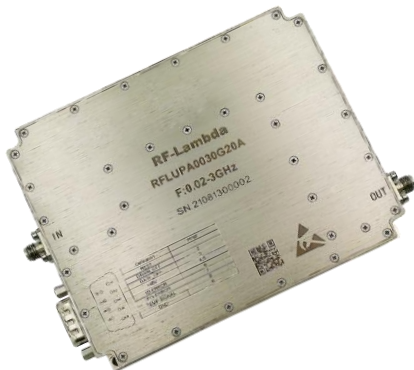


Ultra Wideband Solid State Power Amplifier 0.02GHz-3GHz



Product Description

RFLUPA0030G20A is an ultra wideband solid state power amplifier with a frequency range of 0.02 to 3GHz.

The power output of this amplifier is 43.5dBm typical. The typical small signal gain is 47dB with a flatness of ± 3 dB. This power amplifier works with a +48 VDC power supply.

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

Features

- Wideband Solid State Power Amplifier
- Gain: 47dB typical
- Output power +43.5dBm typical
- Supply Voltage: +48V
- 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, TA = +25°C

Parameter	Min.	Typ.	Max.	Units
Frequency Range	0.02		3	GHz
Gain	40	47		dB
Gain Flatness		± 3.0		dB
Gain Variation Over Temperature (-40°C~+70°C)		± 3.0		dB
Input VSWR		1.6		: 1
Output 1dB Compression Point (P1dB)		40		dBm
Saturated Output Power (Psat)	42.5	43.5		dBm
RF ON/OFF Speed (IDQ on)		2		ms
Isolation S12		-55		dB
Supply Current (Vcc=+48V)		0.6	2.5	A
Power-Added Efficiency		30		%
TDD-Time-Division Duplexing PA Blanking	ON	10		ms
	OFF	150		us
Turn On/Off Speed (Drain Disable)	ON	1.2		ms
	OFF	3		ms
Turn On/Off Speed (Gate Disable)	ON	900		us
	OFF	80		us
Weight	Net	1.16 Max.		lbs
	Including Heat sink	4.1 Max.		
Impedance		50		Ohms
Input / Output Connectors		SMA-Female(Input) – SMA-Female(Output)		
Finish		Nickel Plated		
Package Sealing		Epoxy Sealed (Standard)		
		Hermetically Sealed (Optional)		

Absolute Maximum Ratings

Parameter	Rating
Operating Voltage	+50V
*RF Input Power	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 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

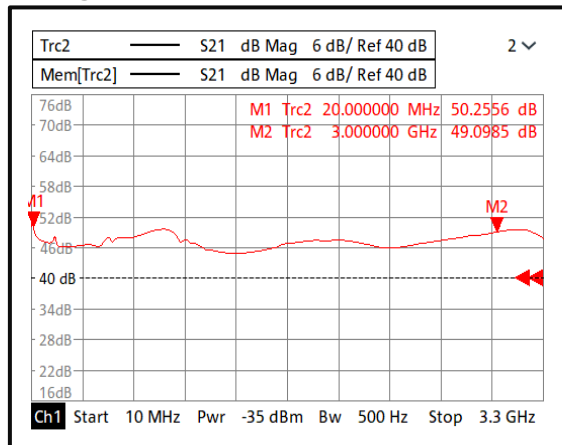
Parameter	Description
Operational Temperature	-40°C to +70°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +70°C for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

*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.

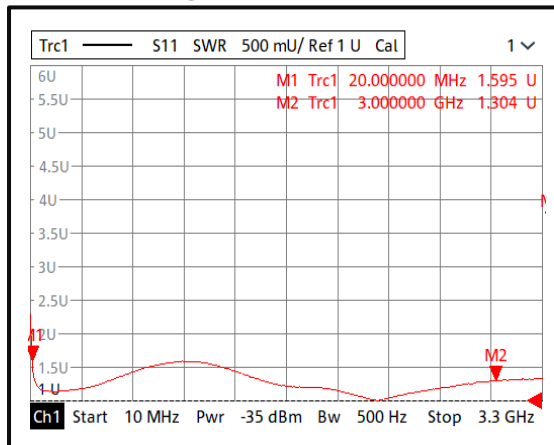
**For vibration testing details please see additional information section.

Typical Performance Plots

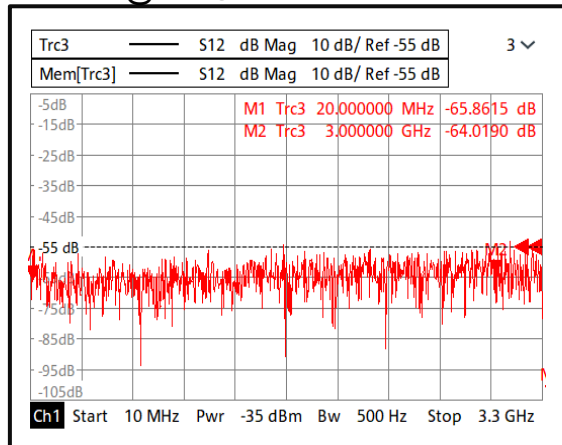
Gain @ +25°C



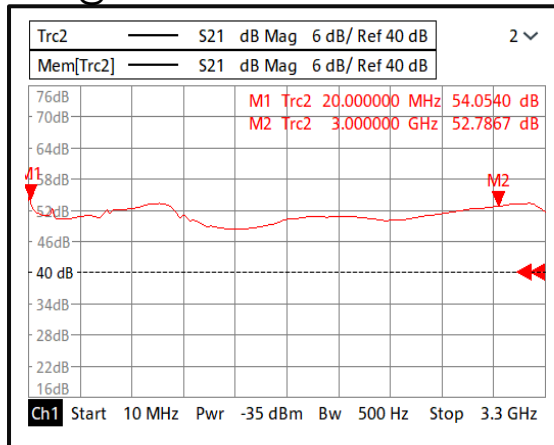
Input VSWR @+25°C



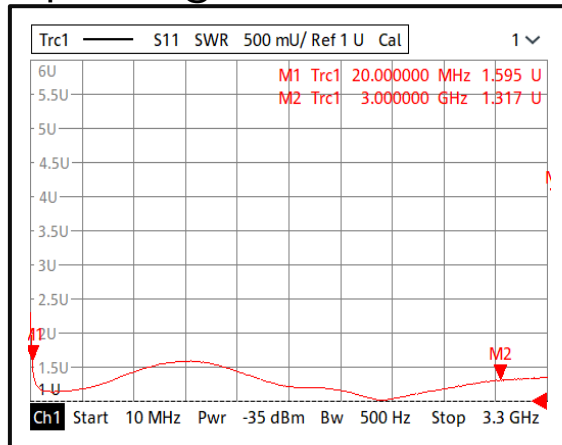
Isolation @ +25°C



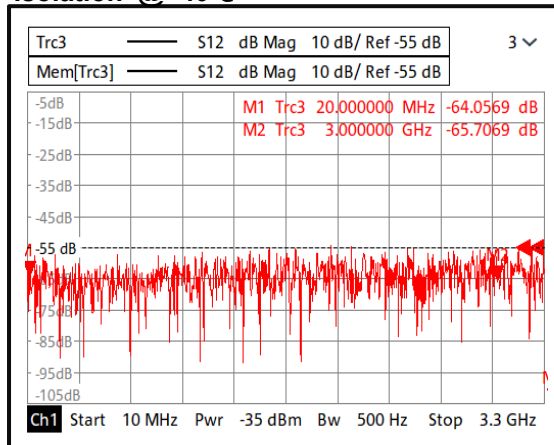
Gain @ -40°C



Input VSWR @ -40°C



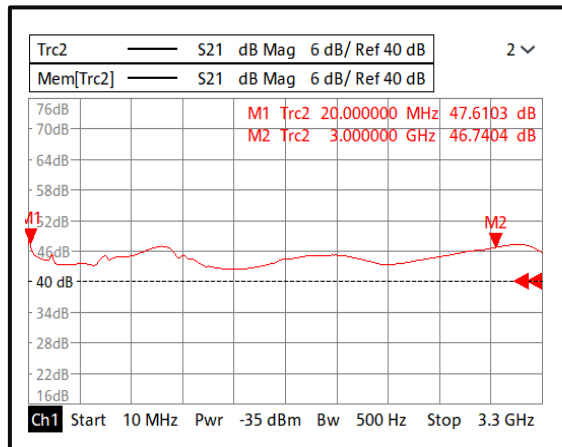
Isolation @ -40°C



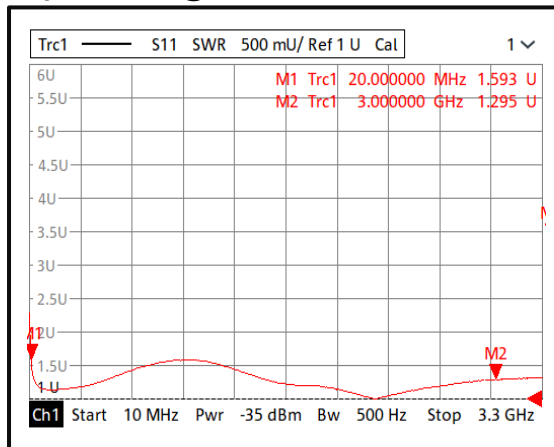
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

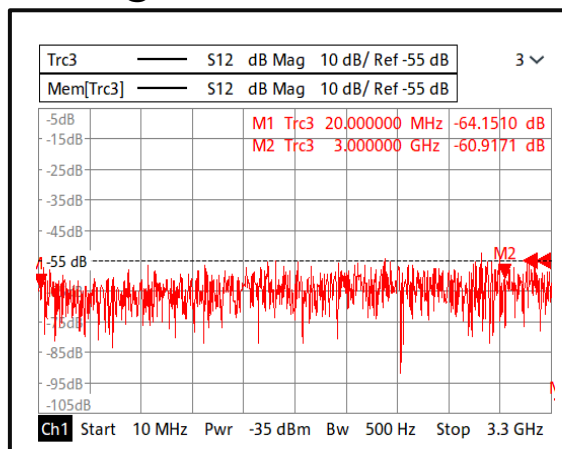
Gain @ +70°C



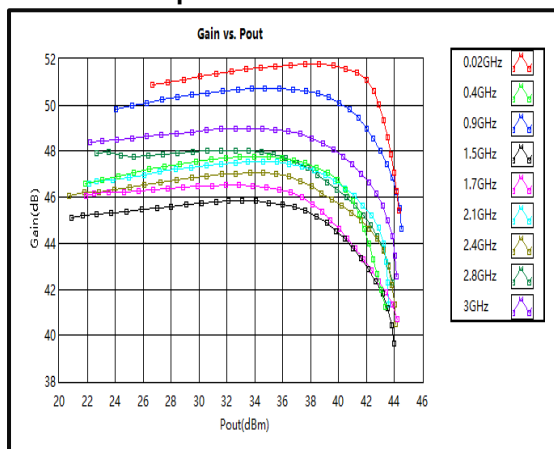
Input VSWR @ +70°C



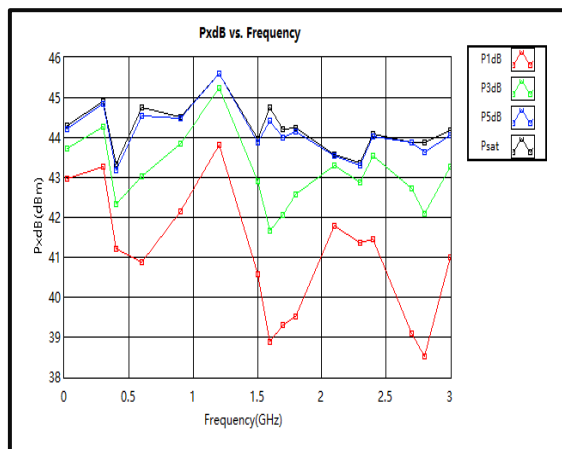
Isolation @ +70°C



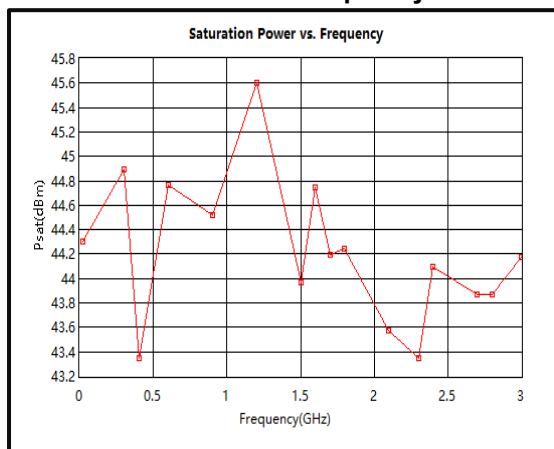
Gain vs. Output Power CW



PndB vs. Frequency CW



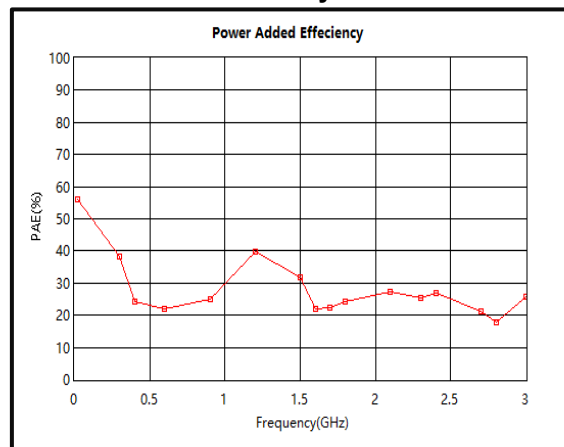
Saturation Power vs. Frequency CW



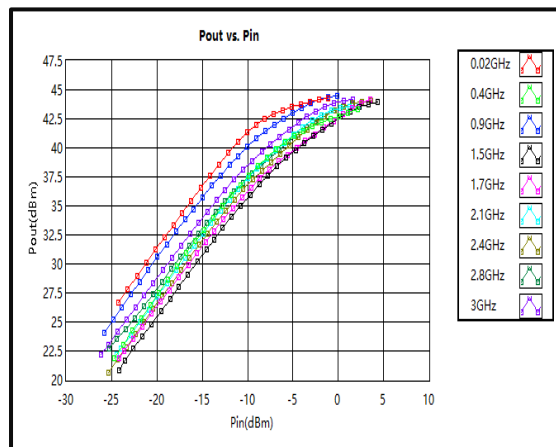
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

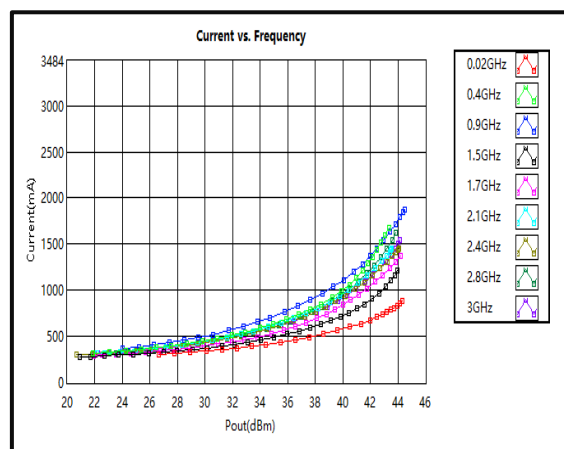
Power Added Efficiency CW



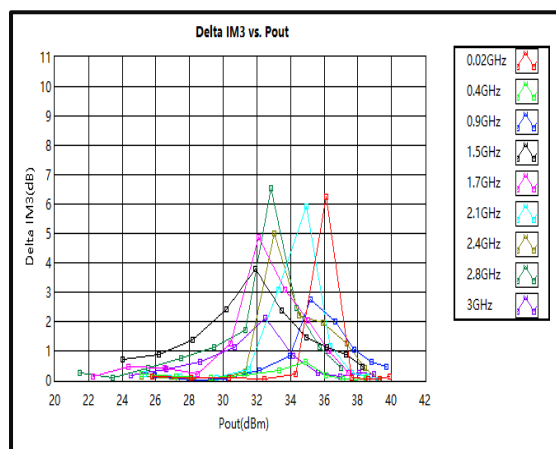
Pout vs. Pin CW



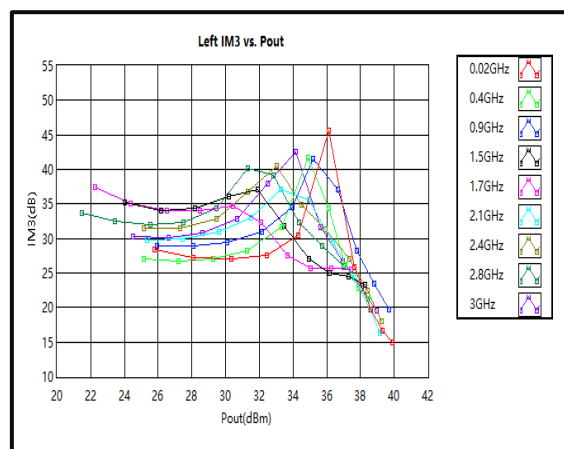
Current vs. Pout CW



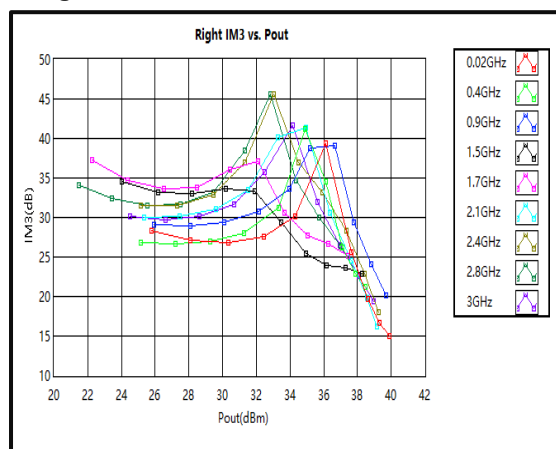
Delta IM3 vs. Pout CW



Left IM3 vs. Pout CW



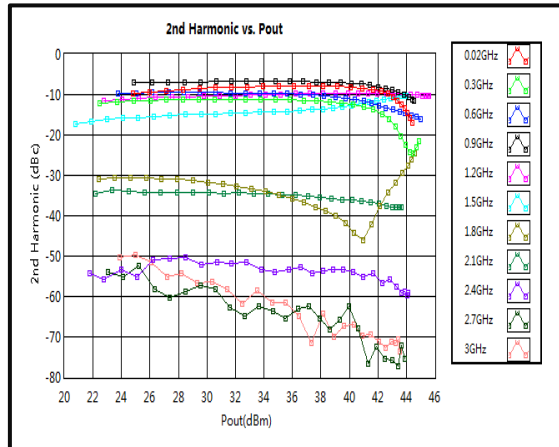
Right IM3 vs. Pout CW



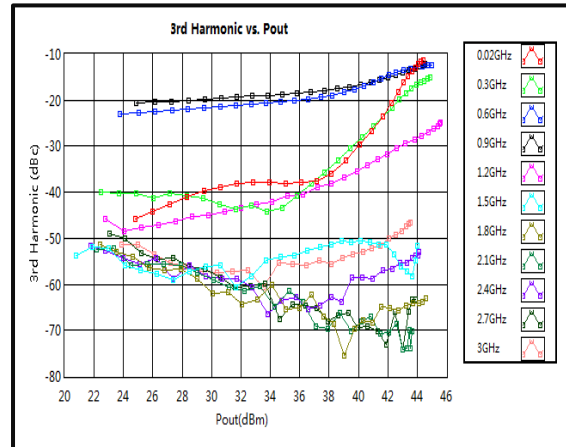
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

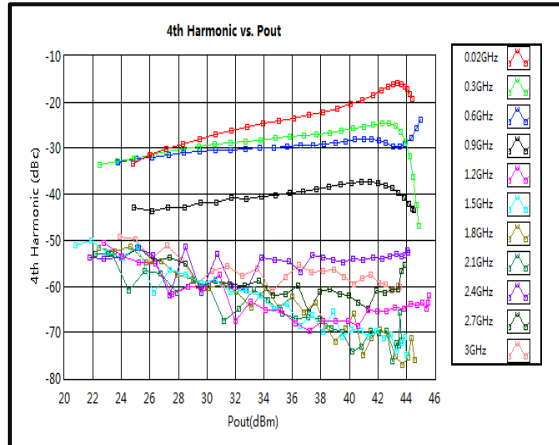
2nd Harmonic Wave Output Power



3rd Harmonic Wave Output Power

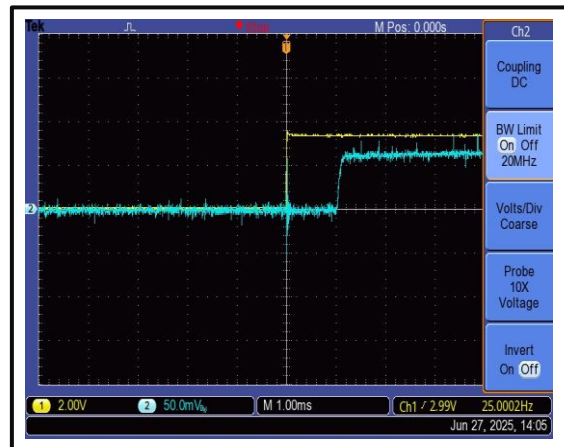


4th Harmonic Wave Output Power

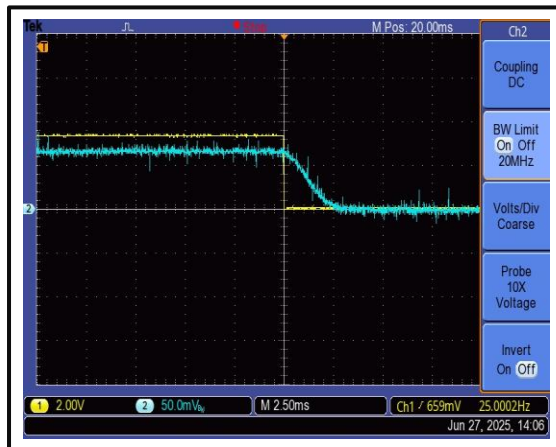


Typical Performance Plots

The Drain-Enable Rise Time is 1.2ms @+25°C

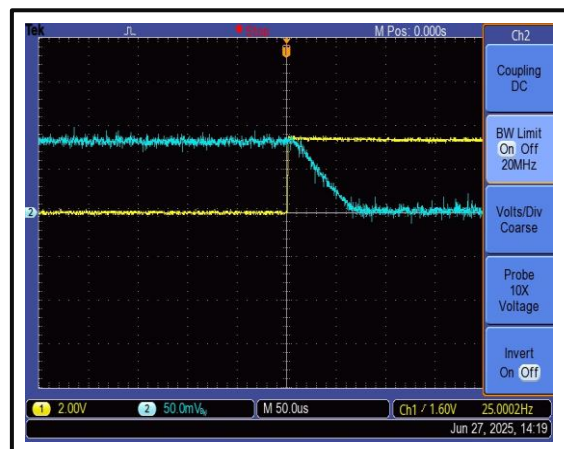


The Drain-Disable Fall Time is 3ms @+25°C

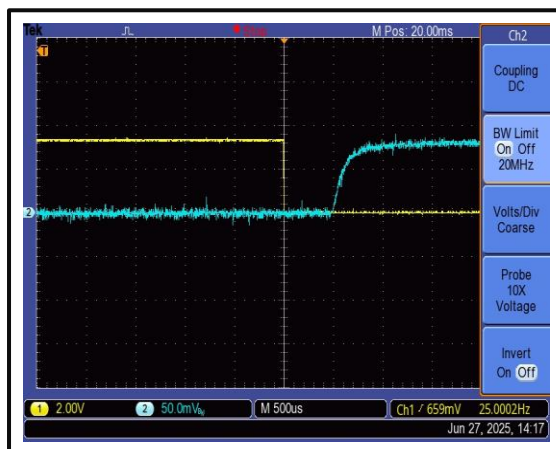


The drain control port: D-sub 9 PIN #2 (Drain_OFF).
The yellow curve is the drain control signal, the blue curve is RF output envelope.

The Gate-Enable Rise Time is 80us @+25°C



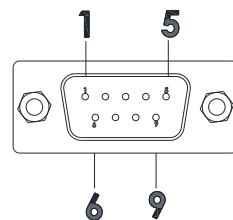
The Gate-Enable Fall Time is 900us @+25°C



The gate control port: D-sub 9 PIN #3 (GATE_OFF).
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: 171-009-203L001

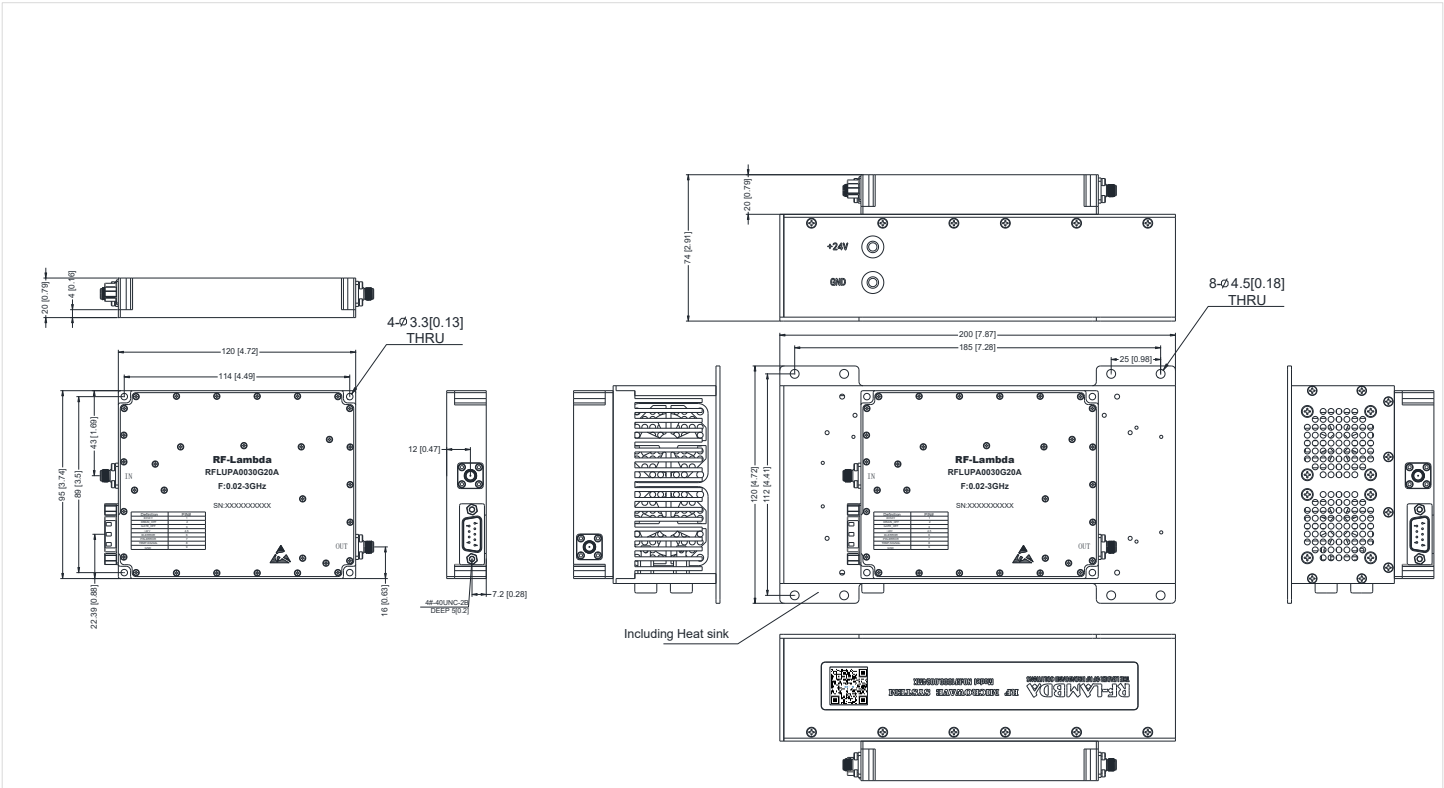


Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	HIGH	Reset is effective when PA is protected	Yes
2	DRAIN_OFF	Control	HIGH	Applying logic LOW disables drain of amplifiers	Yes
3	GATE_OFF	Control	LOW	Applying logic HIGH disables gates of amplifiers	Yes
4,5	+48V	Power Supply	+48V	+48V DC is supply Voltage	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when drain current limit is reached	Yes
7	RF IN Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when input signal is over limit	Yes
8	Temp Signal	Indicator	2.5V(+25°C)	Analog voltage relative to Module's Temperature	Yes
9	GND	Ground	GND	Ground	Yes

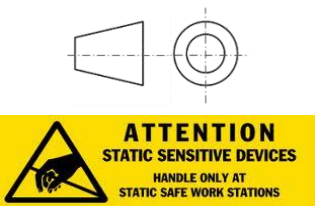
Notes:

- HIGH/LOW voltages are standard TTL signals 0 to 0.8V = LOW. 2.8V to 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
 - 2. Finish: Nickel Plated
 - 3. All dimensions are in millimeters [inches].
 - 4. Tolerances ± 0.5 [0.02] unless otherwise specified (Excl Heat Sink).
 - 5. DB9 cable is configured for power connection port by default(RFCBLADB9)
 - 6. 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.
 - 7. Standard torque wrench must be used to secure RF connectors.



Packing List

ID	Description	QTY
1	Fig a. DB9 cable (RFCBLADB9)	1
2	Fig b. Screws (#4-40*5+6)	2



Fig a.



Fig b.

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
RFLUPA0030G20A	Standard	0.02-3GHz 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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