

200W Wide Band Power Amplifier 20MHz-520MHz



Product Description

RFLUPA0052G200A is a wideband power amplifier with a frequency range of 20 to 520MHz.

The power output of this amplifier is 53dBm typical. The typical small signal gain is 55dB with a gain 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 +60°C.

Features

- Wide band Power Amplifier
- Small Signal Gain 55dB Typical
- Output Saturation Power 53dBm Typical
- Supply Voltage +48 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 ($T_A = +25^\circ\text{C}$)

Parameter		Min	Typ	Max	Units
Frequency Range			20 - 520		MHz
Small Signal Gain		50	55		dB
Gain Flatness			± 3		dB
Gain Variation Over Temperature (-40°C to +60°C)			± 3		dB
Input Return Loss			-15		dB
Output 1dB Compression Point (P1dB)			50		dBm
Saturated Output Power (Psat)			53		dBm
Supply Current ($V_{CC} = +48\text{VDC}$)			2	13	A
IM3			-28		dBc
Power Added Efficiency (PAE)			40		%
Weight	Net		2.88 Typ.		lbs.
	Including Heat sink		8.6 Typ.		lbs.
Impedance			50		Ohms
Input / Output Connectors		SMA-Female(Input) – SMA-Female(Output)			
Package		Epoxy Sealed (Standard)			
		Hermetically Sealed (Optional)			

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	+45VDC to +49.5VDC
*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 +48VDC and make sure power supply can handle max current.

Bias Down Procedure

1. Turn off +48VDC
2. Remove +48VDC Connection
3. Remove RF Connection
4. Remove ground

Environmental Specifications and Test Standards

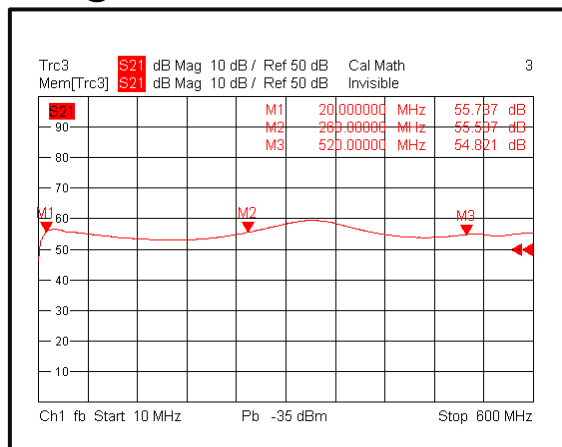
Parameter	Description
Operational Temperature	-40°C to +60°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +60°C for 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.

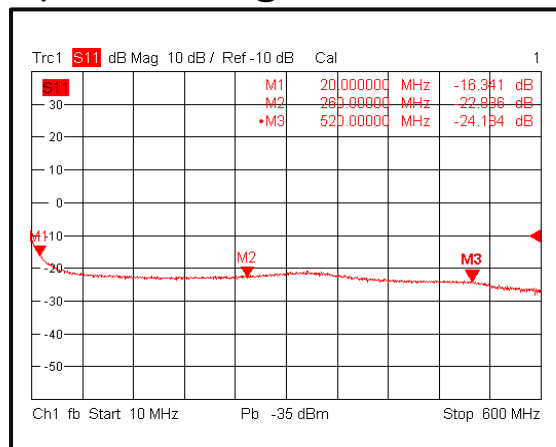
**For vibration testing details please see additional information section.

Typical Performance Plots

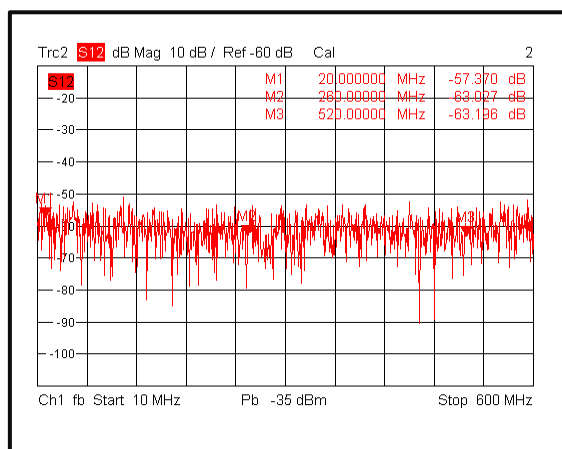
Gain @ +25°C



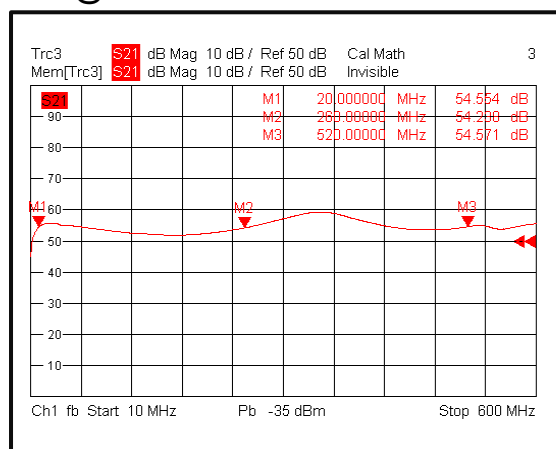
Input Return Loss @ +25°C



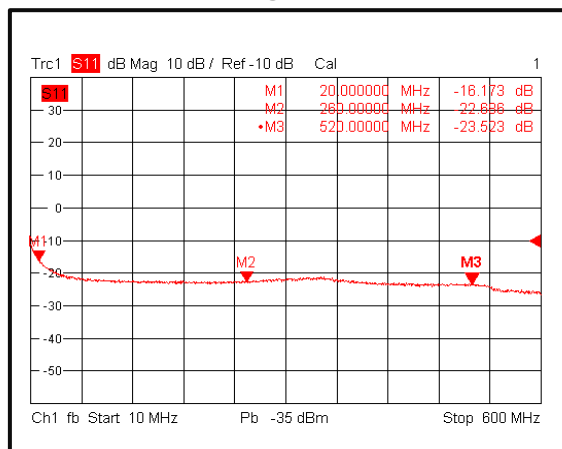
Isolation @ +25°C



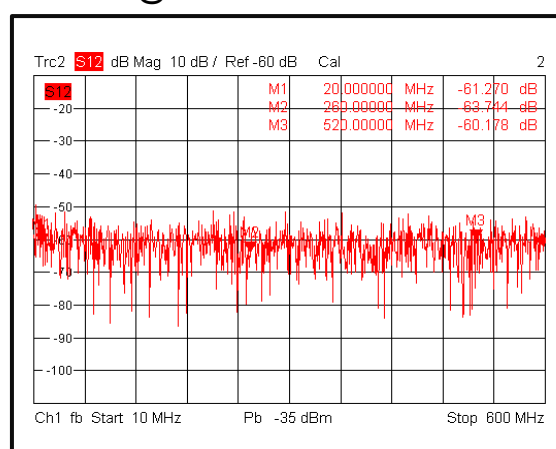
Gain @ -40°C



Input Return Loss @ -40°C



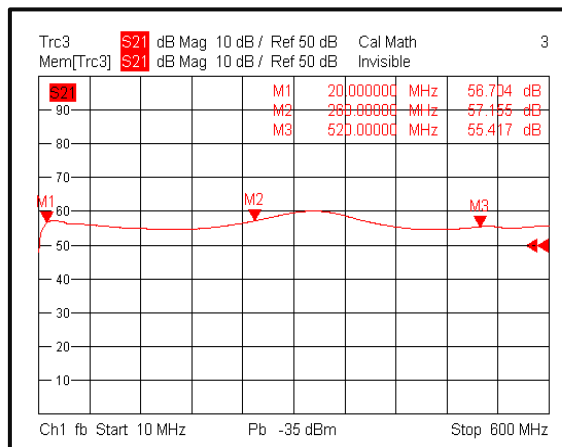
Isolation @ -40°C



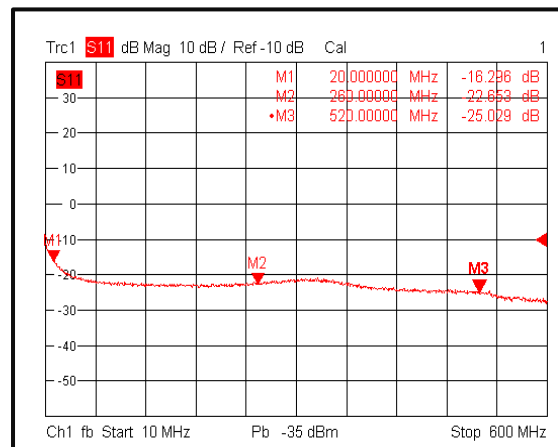
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

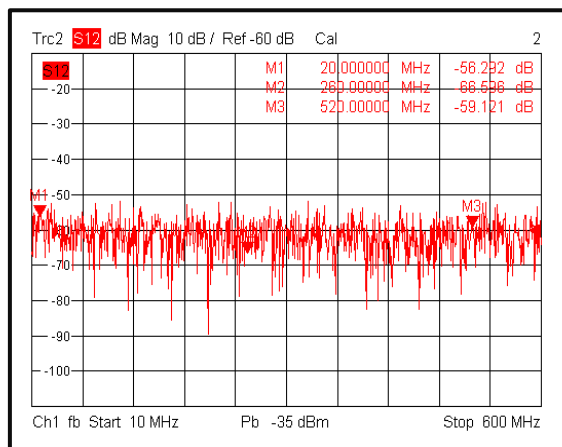
Gain @ +60°C



Input Return Loss @ +60°C



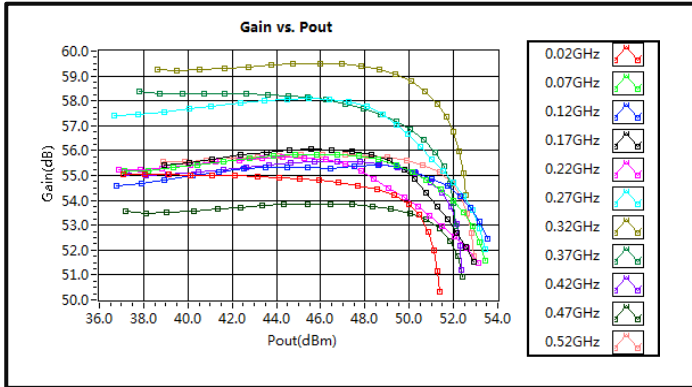
Isolation @ +60°C



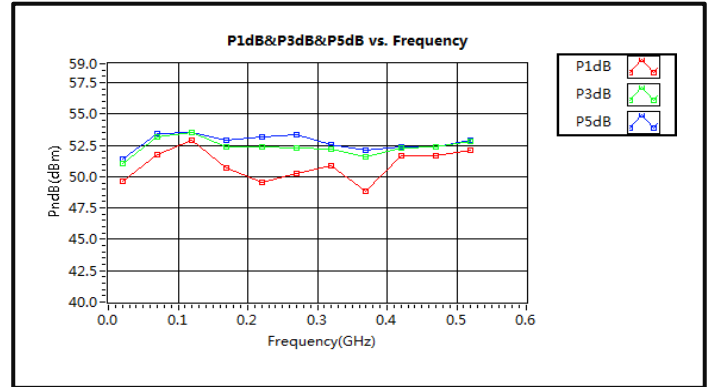
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

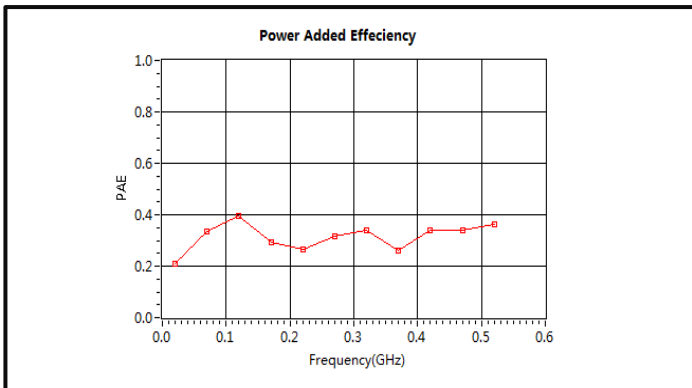
Gain vs. Output Power CW



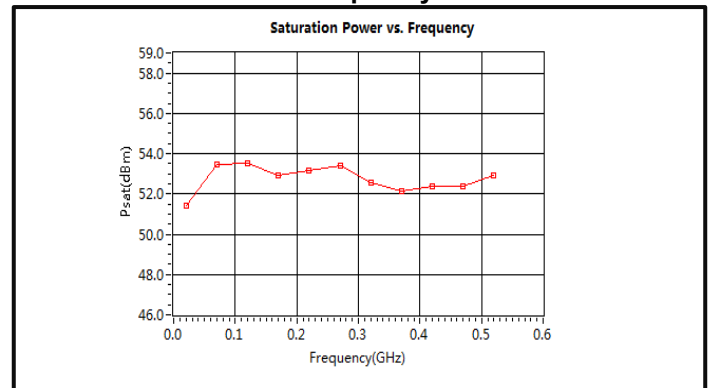
PndB vs. Frequency CW



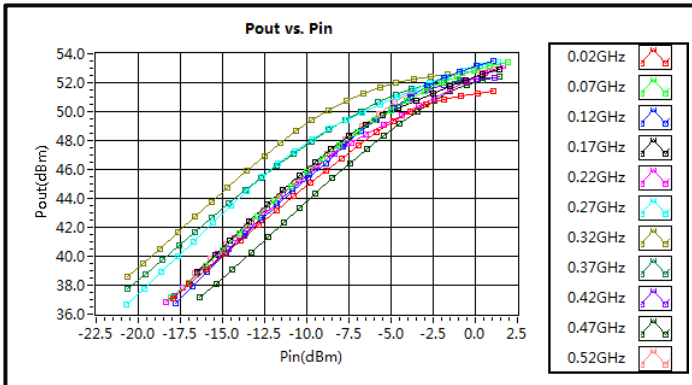
Power Added Efficiency CW



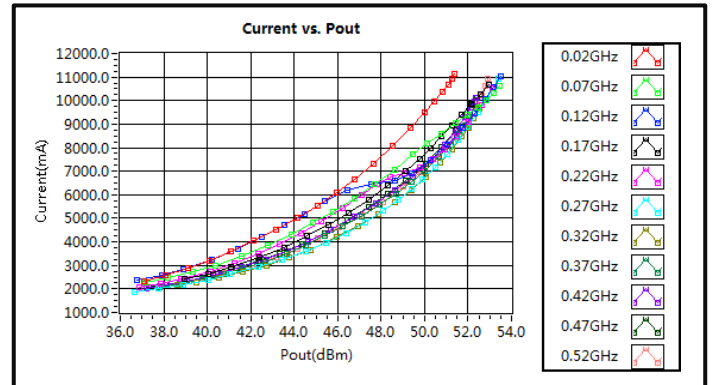
Saturation Power vs. Frequency CW



Pout vs. Pin

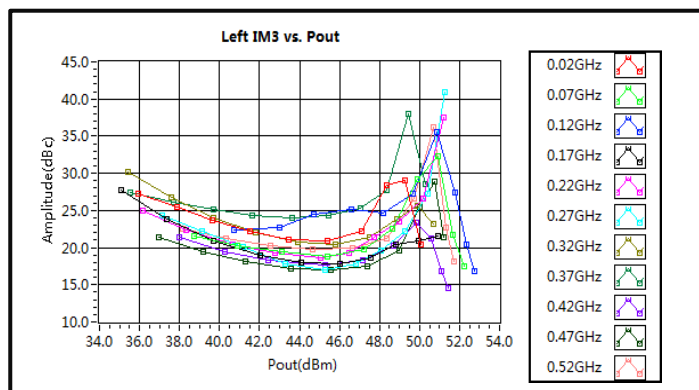


Current vs. Pout

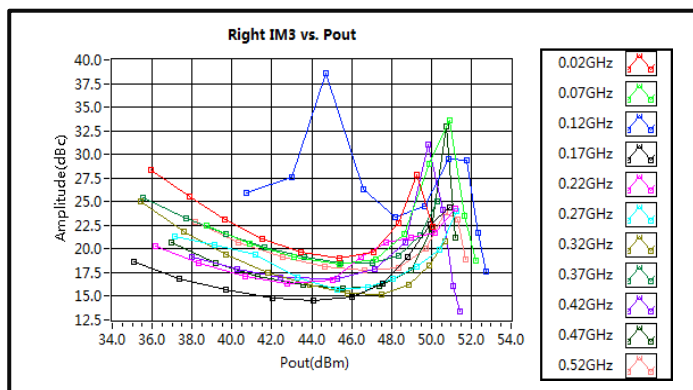


Typical Performance Plots

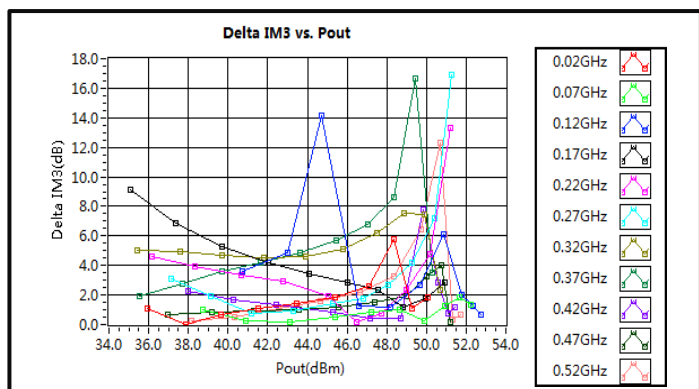
Left IM3 vs. Pout



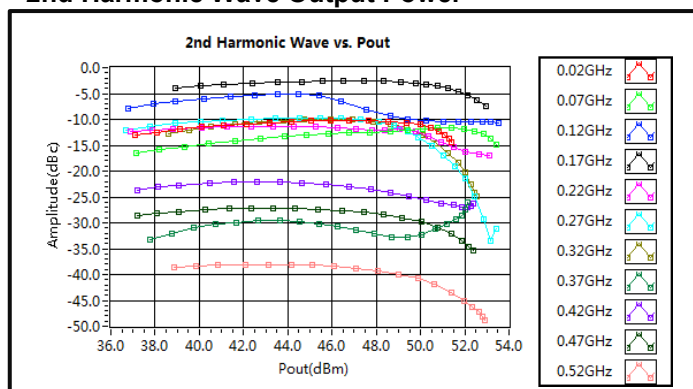
Right IM3 vs. Pout



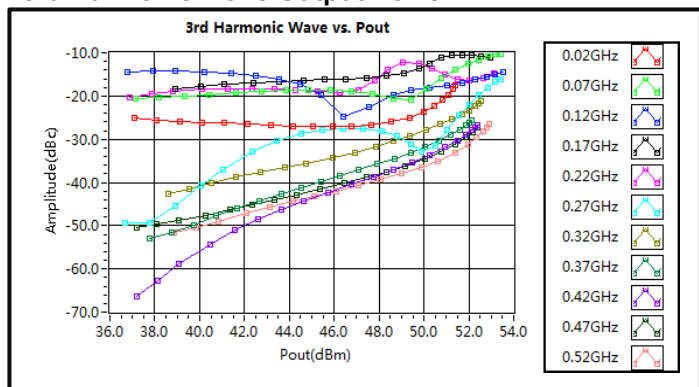
Delta IM3 vs. Pout



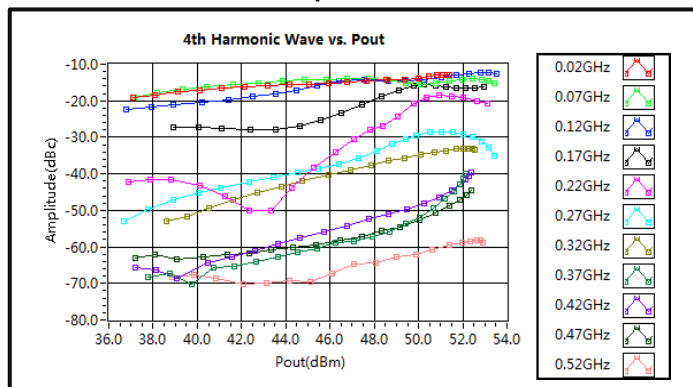
2nd Harmonic Wave Output Power



3rd Harmonic Wave Output Power



4th Harmonic Wave Output Power

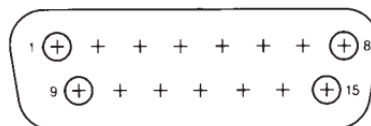


Note: IM3 test performed with 1MHz tone spacing

Protection Connector Table

Male D-Sub is on the housing

The mating female part number: 172-E15-203R001

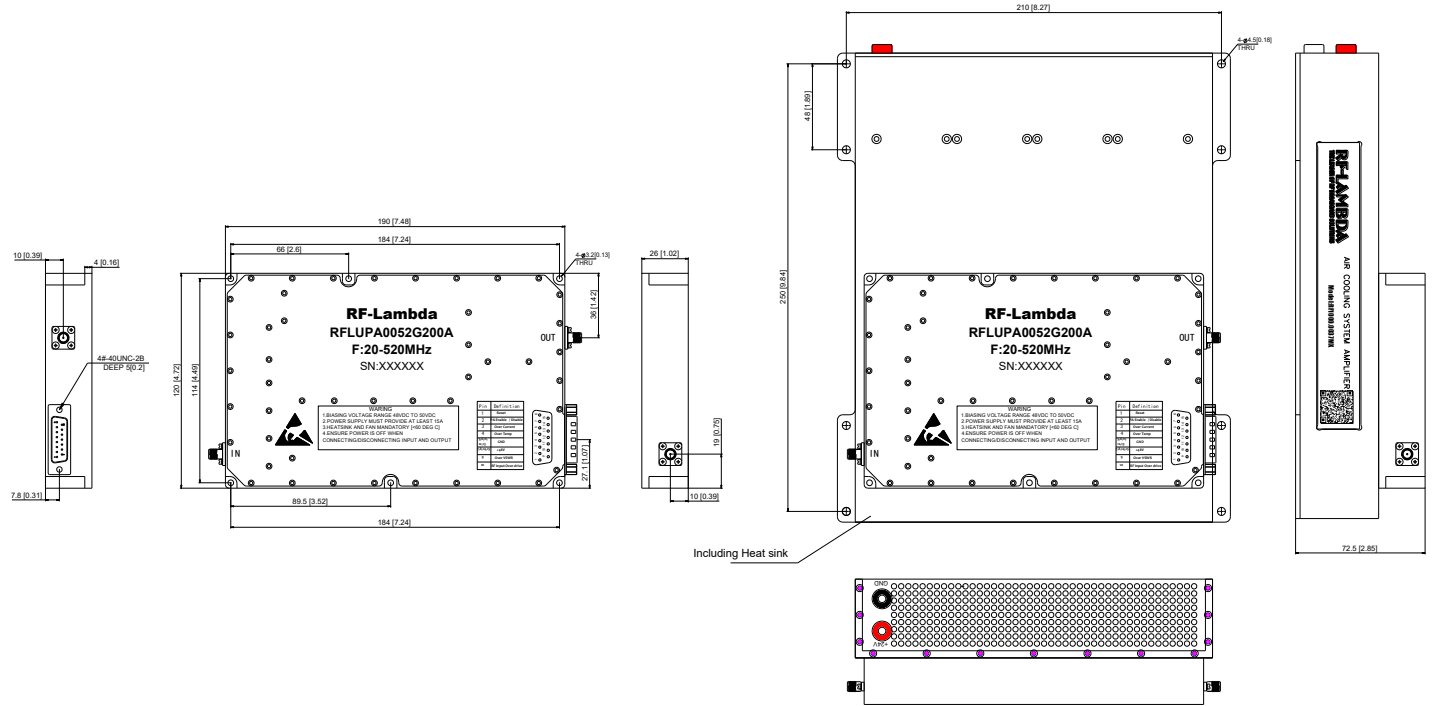


Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	High	Reset is effective when PA is in a protected state	Yes
2	PA Enable / Disable	Control	High	Amplifier Disable , TTL Logic Low	Yes
3	Over Current	Indicator	Low	Pin will be latched to logic HIGH when drain current limit is reached	Yes
4	Over Temp	Indicator	Low	Pin will be latched to logic HIGH when Temperature limit is reached	Yes
5,6,11,12,13	GND	Ground	GND	Ground	Yes
7,8,14,15	+48V	Power Supply	+48V	+48V DC is supply Voltage	Yes
9	Over VSWR	Indicator	Low	Pin will be latched to logic HIGH when output reflection is over limit	Yes
10	RF Input Over drive	Indicator	Low	Pin will be latched to logic HIGH when input signal is over limit	Yes

Notes:

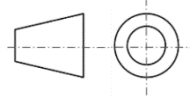
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source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

Outline Drawing



Notes:

1. Package Material: Aluminum and Copper
2. Finish: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.5 [0.02] unless otherwise specified (Excluding 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.



Packing List

ID	Description	QTY
1	Fig a. DB15 cable (51321000015)	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
RFLUPA0052G200A	Standard	20MHz-520MHz 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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