

## Wide Band Power Amplifier 2GHz-6GHz



### Product Description

RFLUPA0206G20A is a wide band power amplifier with a frequency range of 2 to 6GHz.

The power output of this amplifier is 45dBm typical. The typical small signal gain is 50dB with a gain flatness of  $\pm 2.5$ dB. This power amplifier works with a +36V power supply.

The power amplifier's connectors are SMA-Female.

The operating temperature of this product is within -40 to +70°C.

### Features

- Wide band Solid State Power Amplifier
- Small Signal Gain 50dB Typical
- Output Saturation Power 45dBm Typical
- Supply Voltage +36VDC
- 50 Ohm Matched Input/Output

### 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<sub>A</sub>=+25°C)

Parameter	Min	Typ	Max	Units
Frequency Range	2		6	GHz
Gain	45	50		dB
Gain Flatness		$\pm 1.5$	$\pm 2.5$	dB
Gain Variation Over Temperature(-40°C~+70°C)		$\pm 2.0$		dB
Input Return Loss		12		dB
Output 1dB Compression Point (P1dB)		42		dBm
Saturated Output Power (Psat)	43	45		dBm
Isolation S12		-55		dB
Supply Current (Vcc=+36V)		2	5	A
Power-Added Efficiency		30		%
Turn On/Off Speed (Switch Disable)	ON	200		ns
	OFF	100		ns
Turn On/Off Speed (Drain Disable)	ON	200		us
	OFF	100		us
Turn On/Off Speed (Gate Disable)	ON	80		us
	OFF	1		ms
Weight		2.44 Max.		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	+38VDC
*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 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**

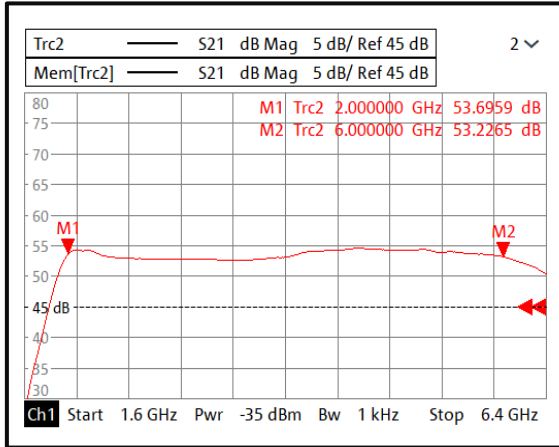
Parameter	Description
Operational Temperature	-40°C to +70°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +60°C for 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.

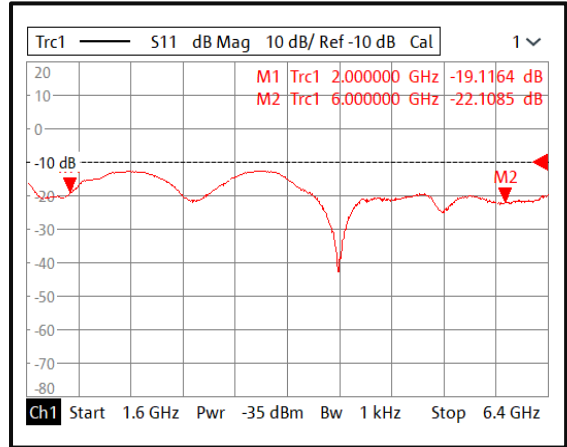
\*\*For vibration testing details please see additional information section.

**Typical Performance Plots**

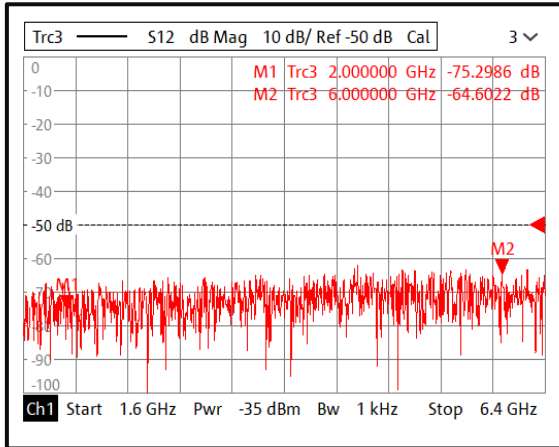
**Gain @+25°C**



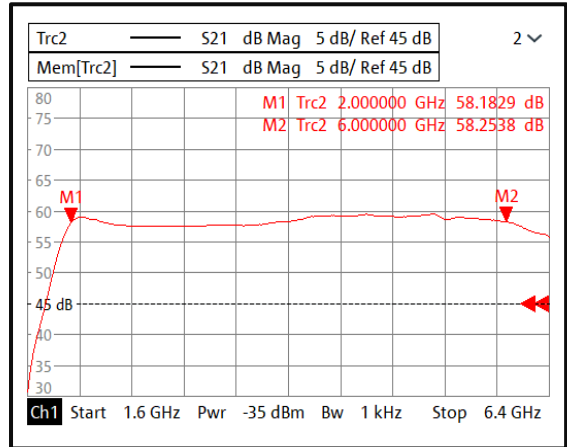
**Input Return Loss @+25°C**



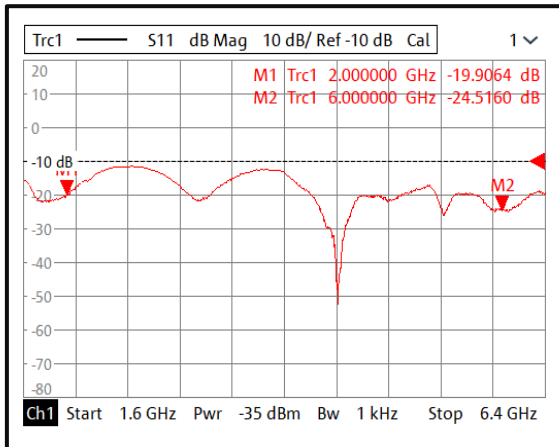
**Isolation @+25°C**



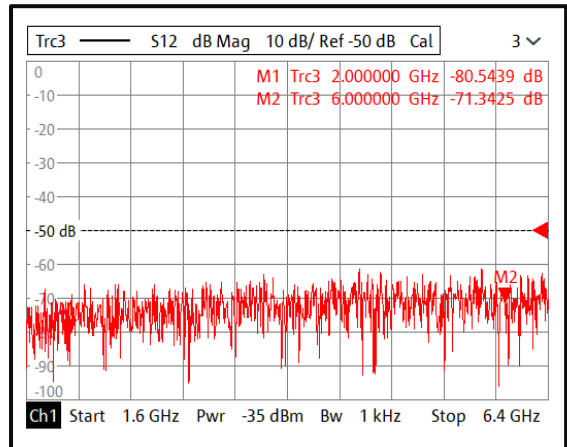
**Gain @-40°C**



**Input Return Loss @-40°C**



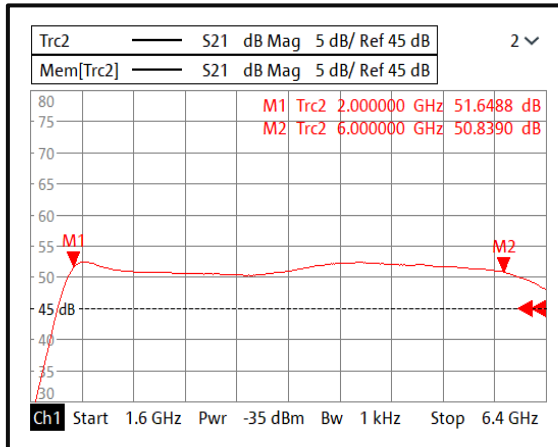
**Isolation @-40°C**



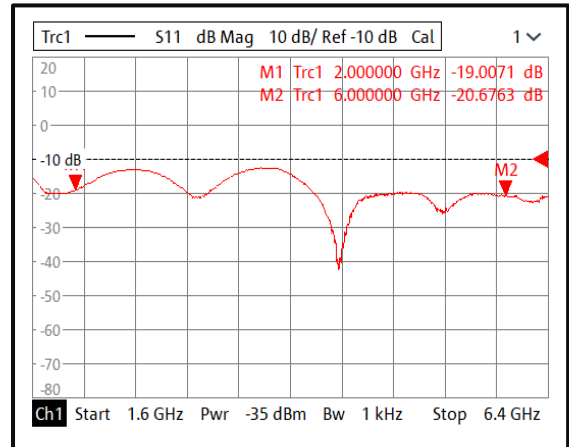
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

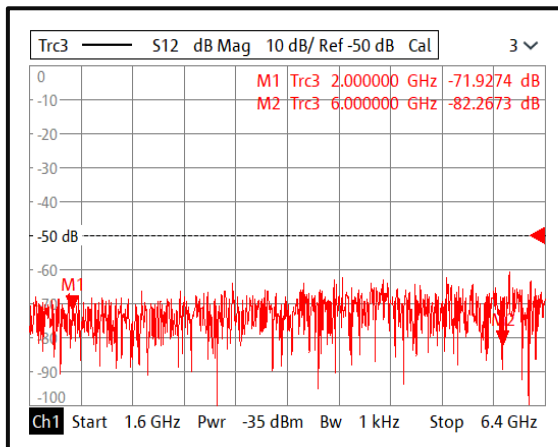
Gain@+70°C



Input Return Loss @+70°C



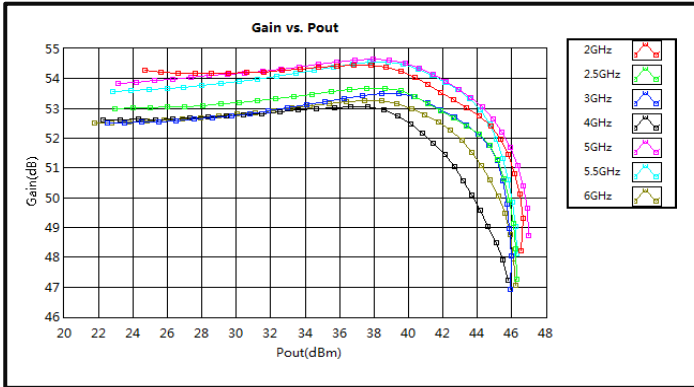
Isolation@+70°C



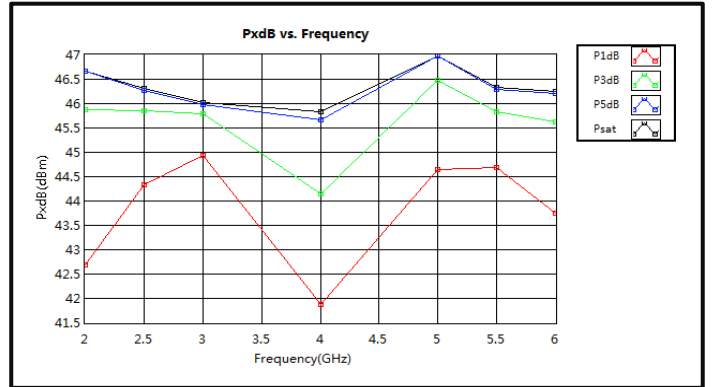
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

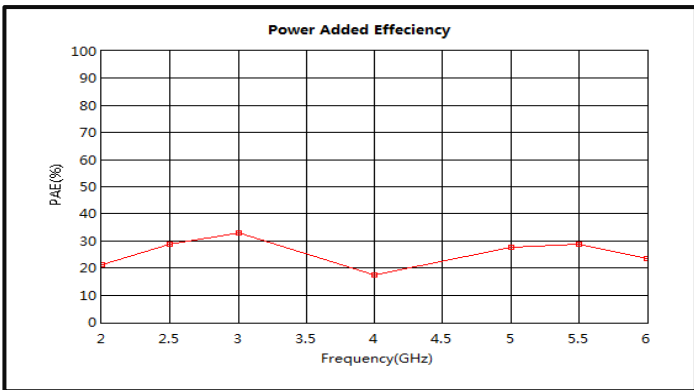
Gain vs. Output Power



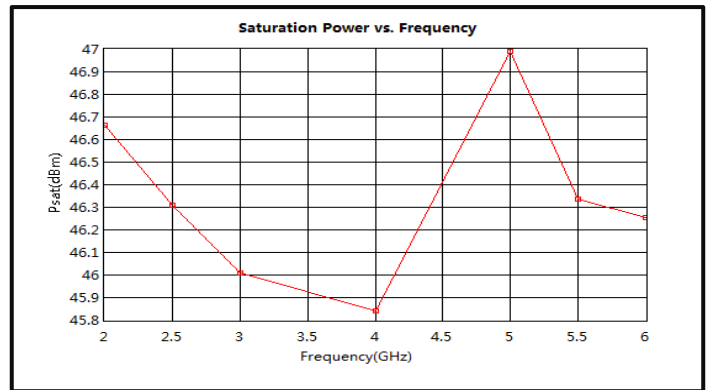
PndB vs. Frequency



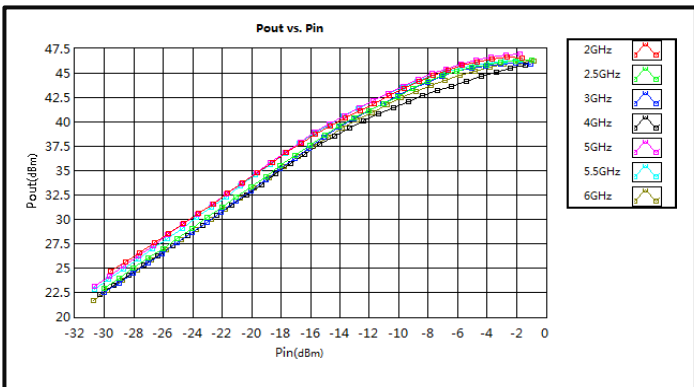
Power Added Efficiency



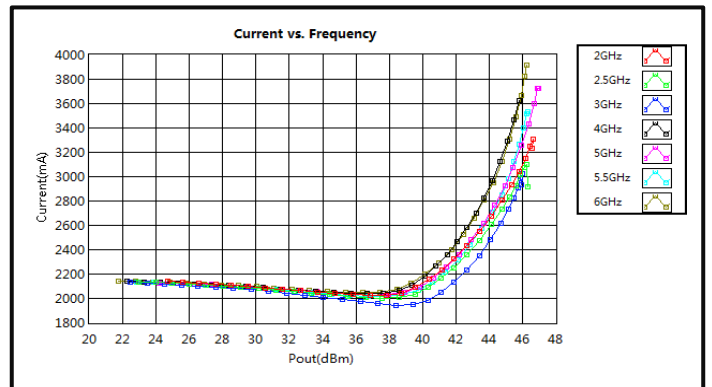
Saturation Power vs. Frequency



Pout vs. Pin

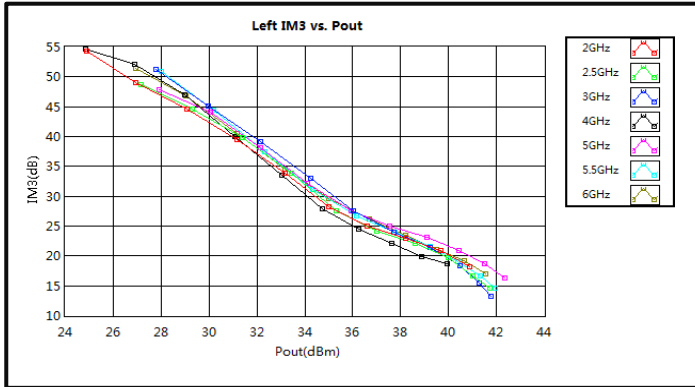


Current vs. Pout

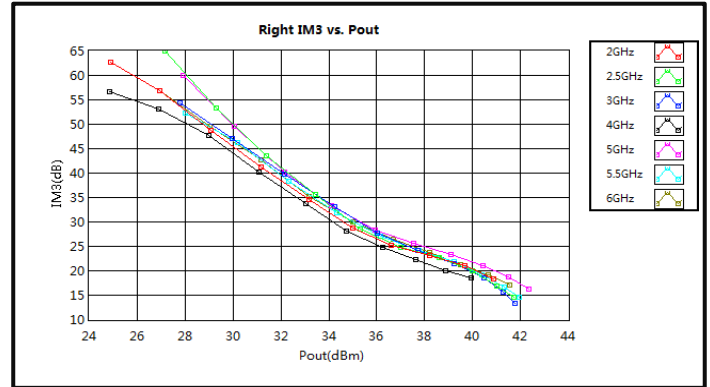


Typical Performance Plots

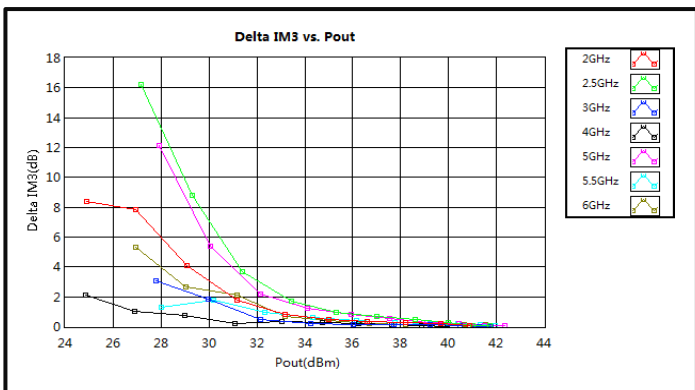
Left IM3 vs Output Power



Right IM3 vs Output Power



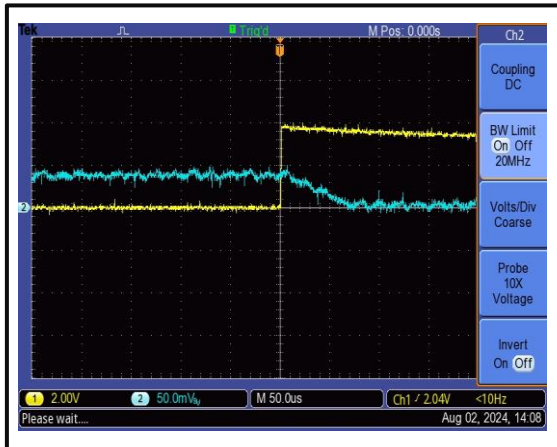
Delta IM3 vs Output Power



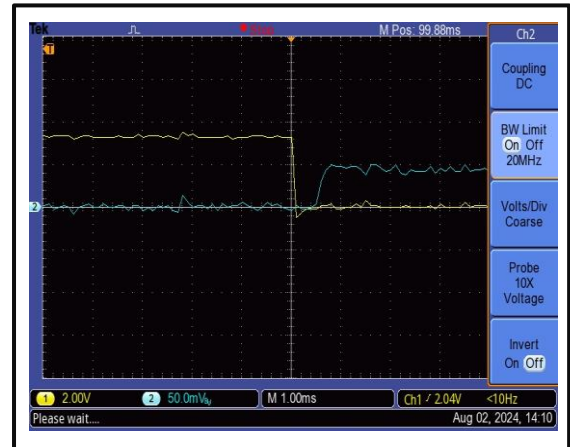
Note: IM3 test performed with 1MHz tone spacing

**Typical Performance Plots**

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

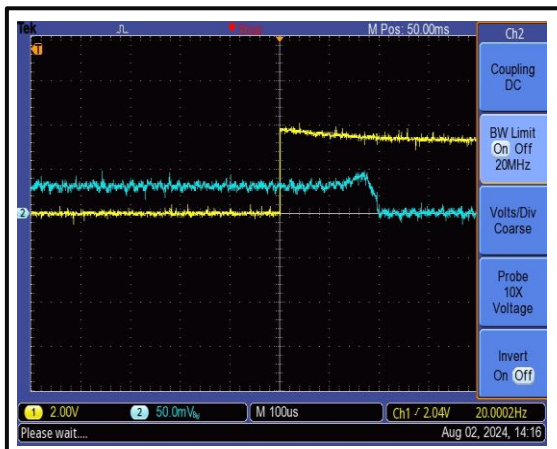


**The Gate-Enable Fall Time is 1ms @+25°C**

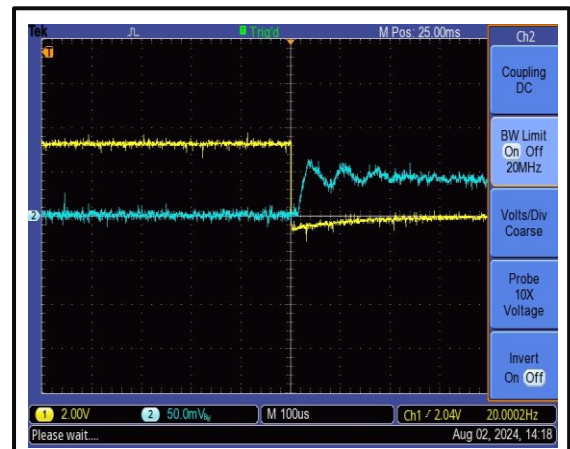


The gate control port: D-sub 15 PIN #6 (GATE\_OFF ).  
The yellow curve is the gate control signal, the blue curve is RF output envelope.

**The Drain-Enable Rise Time is 200us @+25°C**

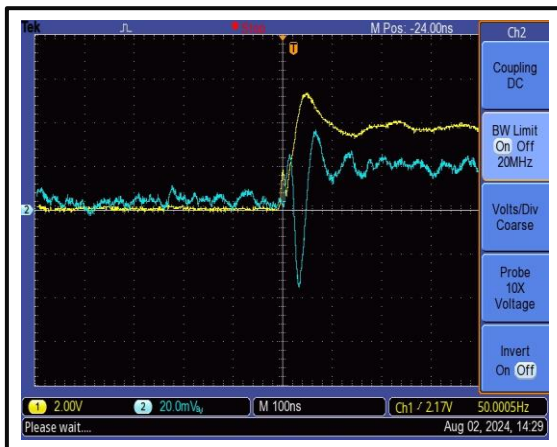


**The Drain-Disable Fall Time is 100us @+25°C**

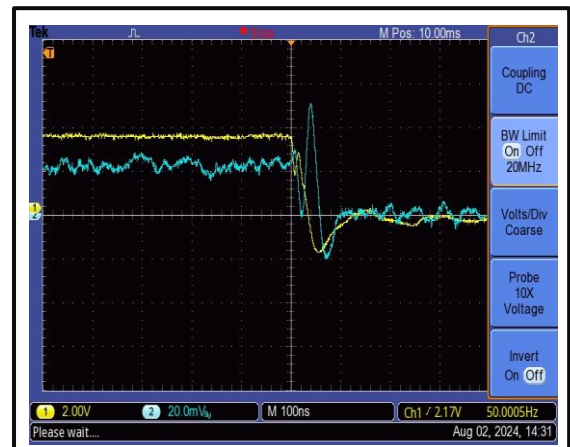


The drain control port: D-sub 15 PIN #7 (Drain\_OFF ).  
The yellow curve is the drain control signal, the blue curve is RF output envelope.

**The Switching Rise Time is 200ns @+25°C**



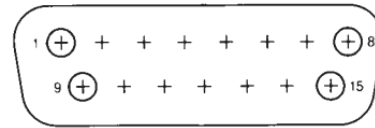
**The Switching Fall Time is 100ns @+25°C**



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

**Interface Connector**

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



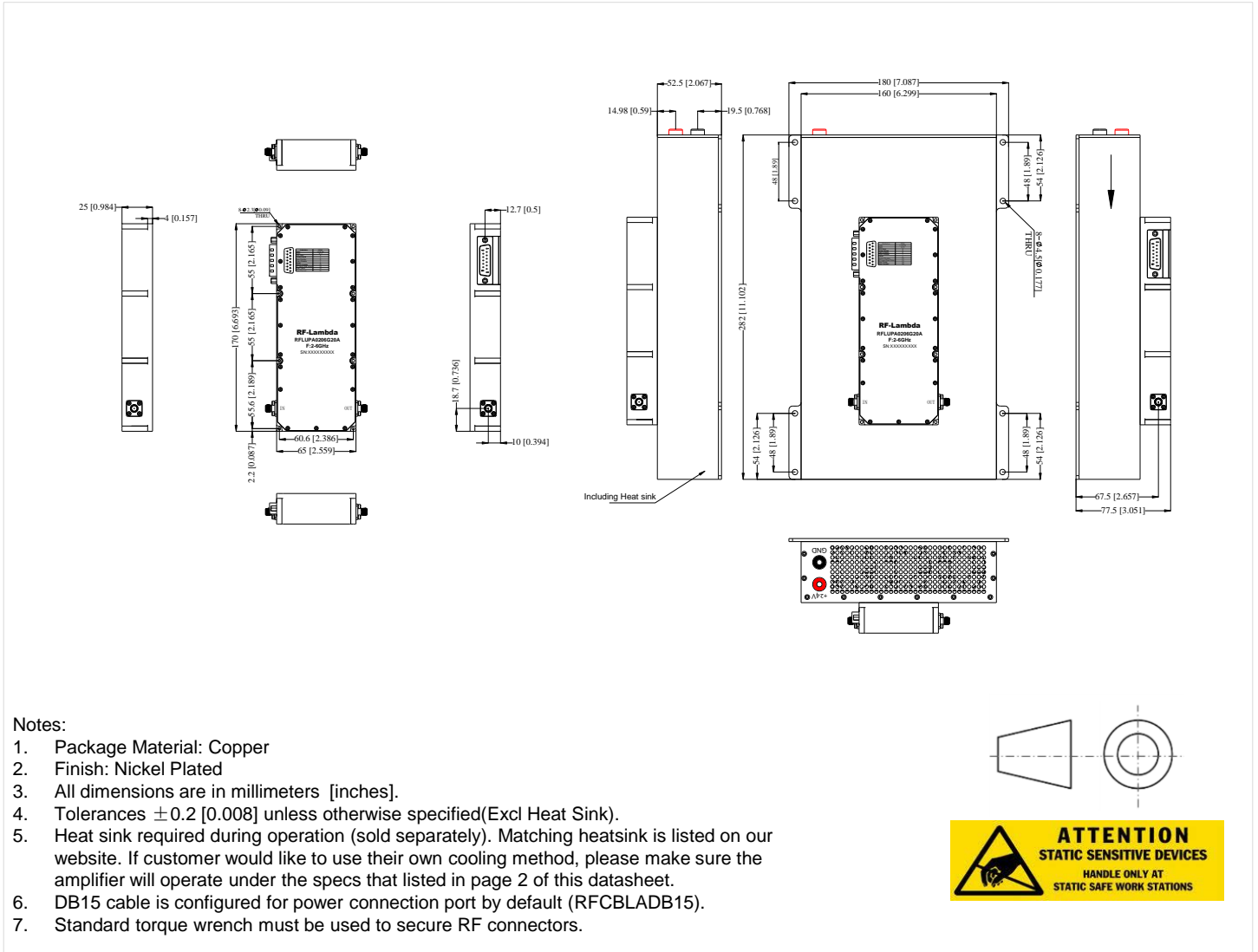
Pin #	Name	Function	Initial State	Description	Applied
1,2,9,10	VDD	Power Supply	+36V	+36V DC is supply Voltage	Yes
3,11	GND	Ground	GND	Ground	Yes
4	+5V_User	Power Supply	+5V	+5V DC is supplied for reference(200mA)	Yes
5	Temp Signal	Indicator	Voltage	Display temperature signal	Yes
6	Gate Disable	Control	LOW	Applying logic HIGH disables gates of amplifiers	Yes
7	Drain Disable	Control	LOW	Applying logic HIGH disables Positive Supply Voltage of amplifiers	Yes
8	Reset	Control	HIGH	Resets PA when logic LOW is applied and released (Internally Pulled-High +5V)	Yes
12	Switch Disable	Control	HIGH	Applying logic LOW disconnect RF signal of amplifiers	Yes
13	RF Input Over Drive	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
14	Over Temp	Indicator	LOW	Pin will be latched to logic HIGH when drive over Temperature	Yes
15	Over Current	Indicator	LOW	Pin will be latched to logic HIGH when Current Limit is reached	Yes

Notes:

- HIGH/LOW voltages are standard TTL signals 0V 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.
- 5V reference supply can source 200mA.
- Indicator output signals can source 24mA.



**Outline Drawing**



**Packing List**

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



**Fig a.**

**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
RFLUPA0206G20A	Standard	2GHz-6GHz 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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