Wide Band Solid State Power Amplifier
1GHz-18GHz

Note: Photo is for illustration purposes only.
Please refer to outline drawing.

Product Description

RFLUPA01G18GC is a wide band power amplifier with a frequency range of 1 to 18GHz.

The power output of this amplifier is 45.5dBm typical. The typical gain is 50dB with a gain flatness of ±3.0dB. This power amplifier works with a +28VDC power supply.

The power amplifier connectors are SMA-Female.

The operating temperature of this product is -40 ºC to +70 ºC.

Features

- Solid State Power Amplifier
- Gain 50dB Typical
- Output Saturation Power 45.5dBm Typical
- Supply Voltage +28VDC
- 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_A=+25ºC)

Parameter		Min	Typ	Max	Units
Frequency Range		1		18	GHz
Gain		45	50		dB
Gain Flatness			±3.0		dB
Gain Variation Over Temperature (-40℃~+70℃)			±3.0		dB
Input VSWR			1.5	2.0	: 1
Output 1dB Compression Point (P1dB)			42		dBm
Saturated Output Power (Psat)		44	45.5		dBm
Supply Current (Vcc=+28V)			7.5	10	A
Power Added Efficiency (PAE)			10		%
Turn On/Off Speed (Switch Disable)	ON		100		ns
	OFF		100		ns
Turn On/Off Speed (Drain Disable)	ON		500		us
	OFF		800		us
Turn On/Off Speed (Gate Disable)	ON		300		us
	OFF		500		us
Weight	Net		2.47 Max.		lbs.
	Including Heat sink		9.16 Max.		lbs.
Impedance			50		Ohms
Input / Output Connectors			SMA-Female (Input) / SMA-Female (Output)		
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	+30V
*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

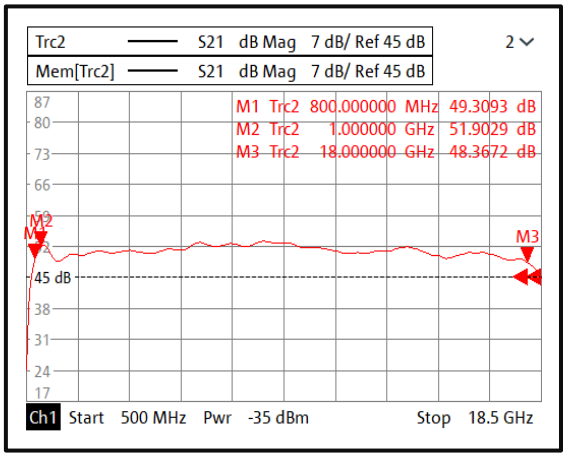
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40ºC to +70ºC (Case Temperature)
Storage Temperature	-50ºC to +105ºC
Thermal Shock	-40ºC → +70ºC (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)

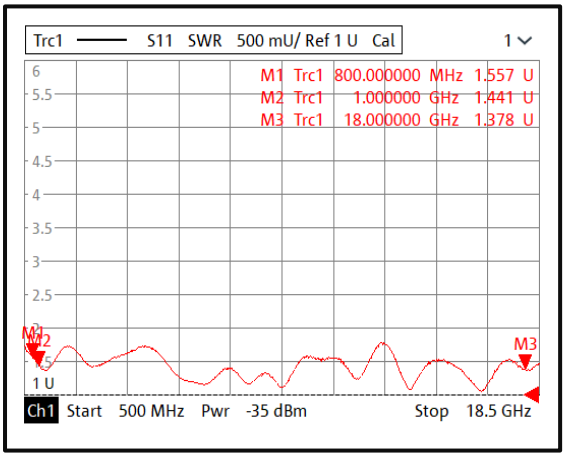
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

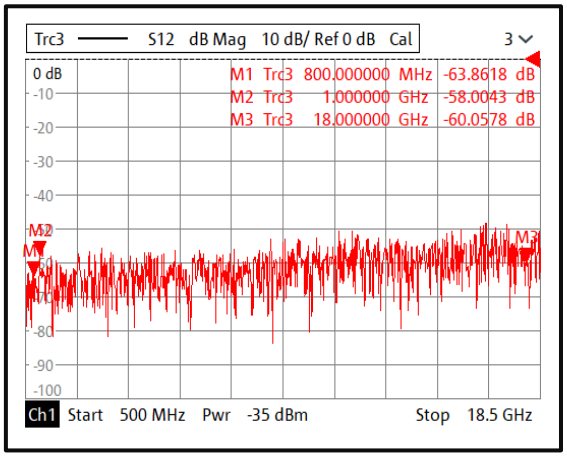
Gain@+25℃



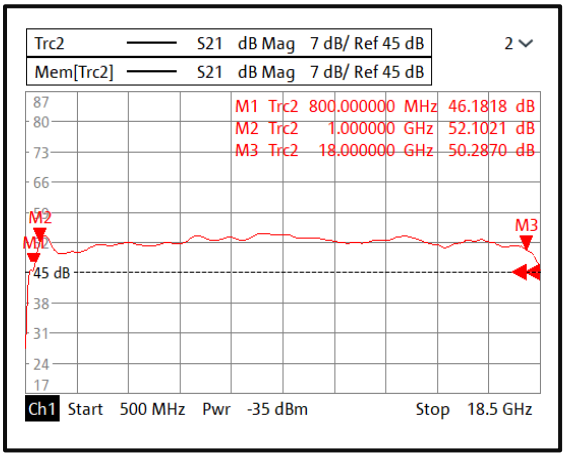
Input VSWR @+25℃



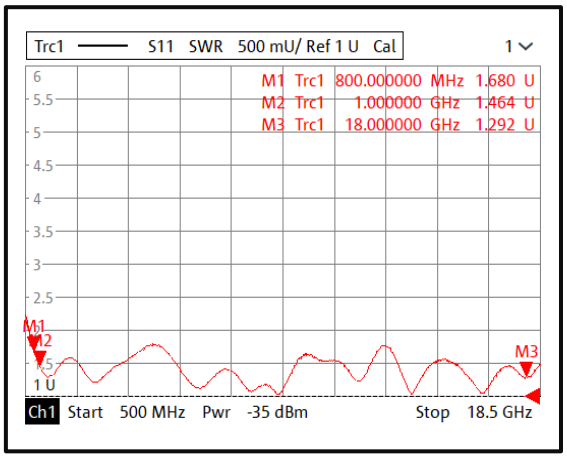
Isolation@+25℃



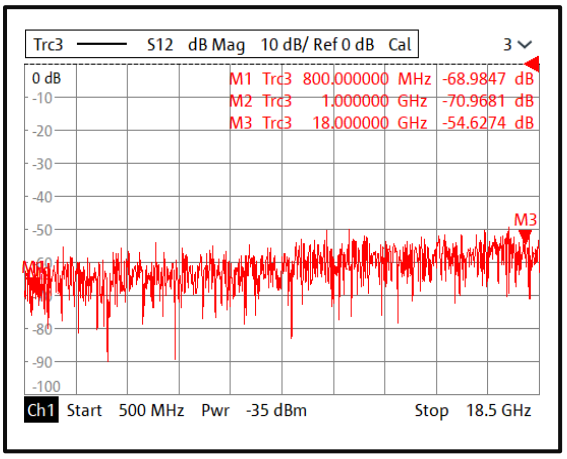
Gain @-40℃



Input VSWR @-40℃

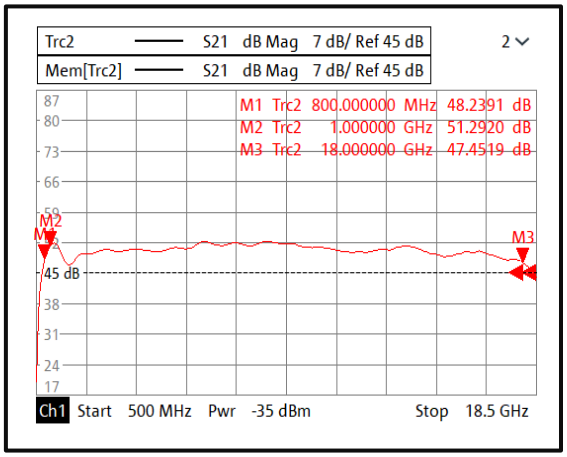


Isolation @-40℃

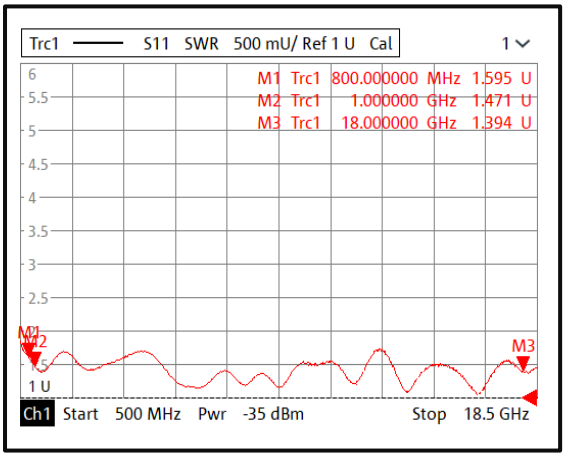


Typical Performance Plots

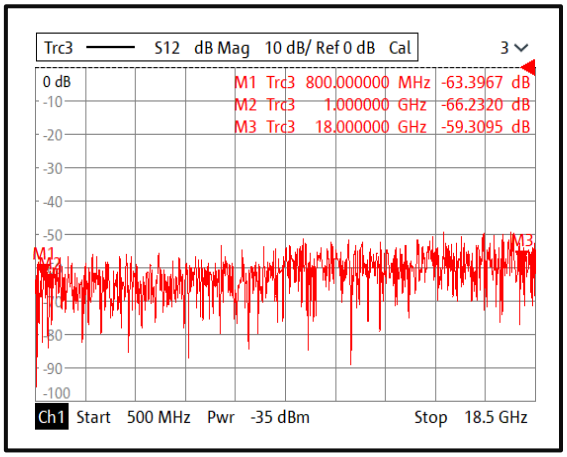
Gain@+70℃



Input VSWR @+70℃

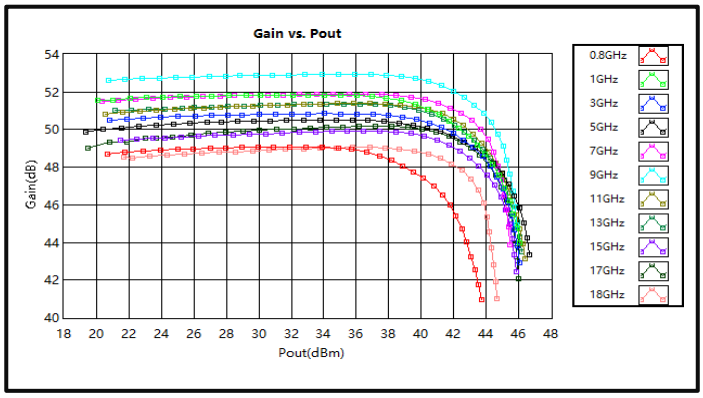


Isolation@+70℃

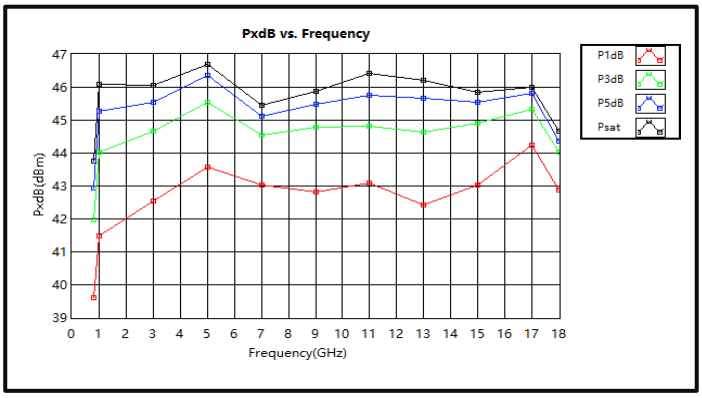


Typical Performance Plots

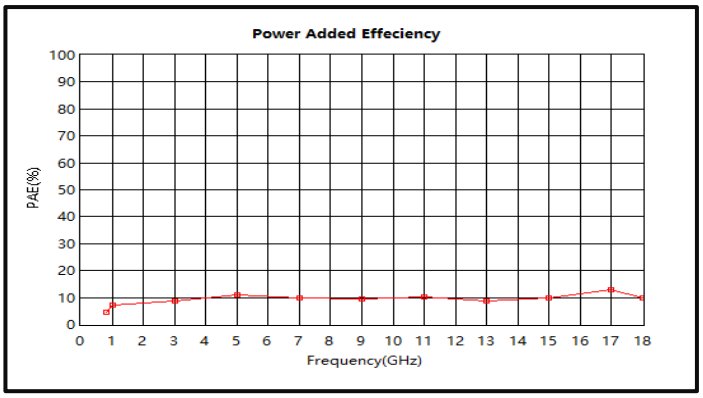
Gain vs. Output Power



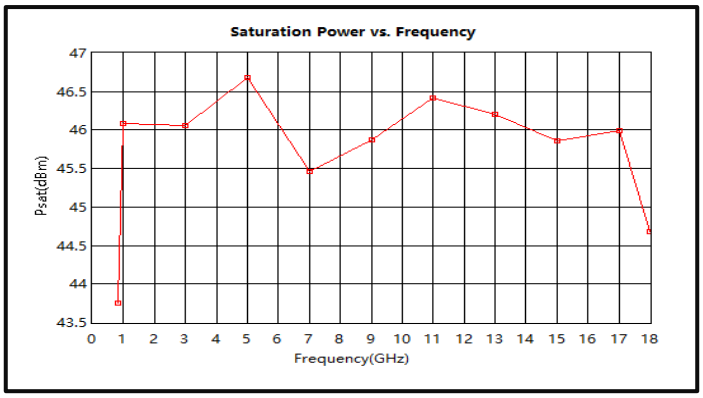
PxdB vs. Frequency



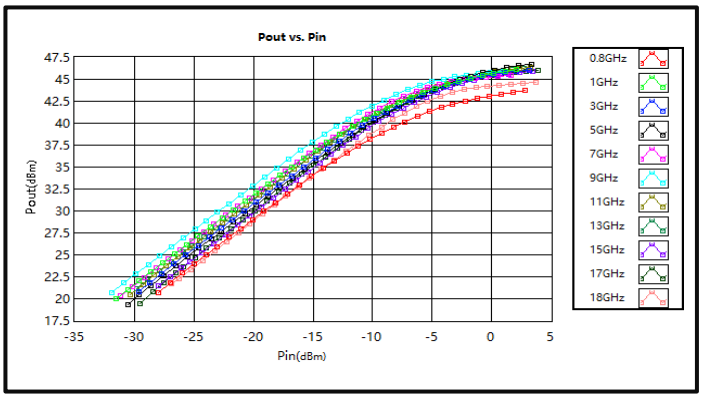
Power Added Efficiency



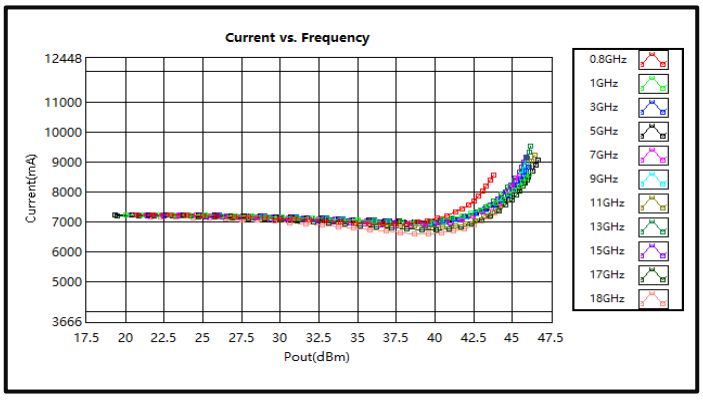
Saturation Power vs. Frequency



Pout vs. Pin

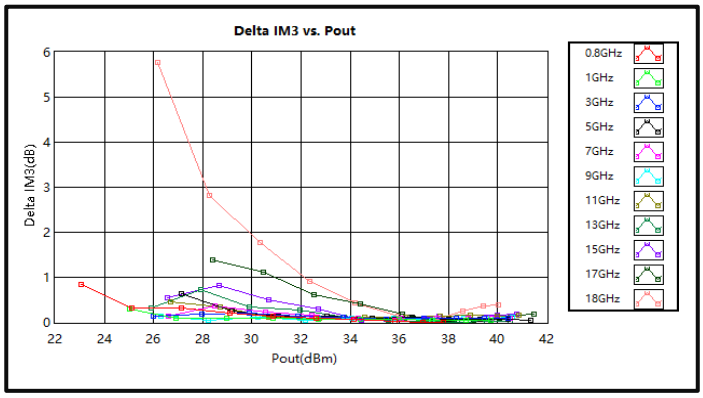


Current vs. Pout

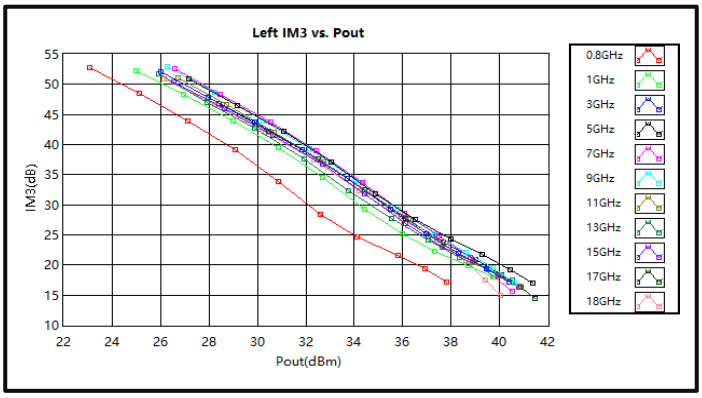


Typical Performance Plots

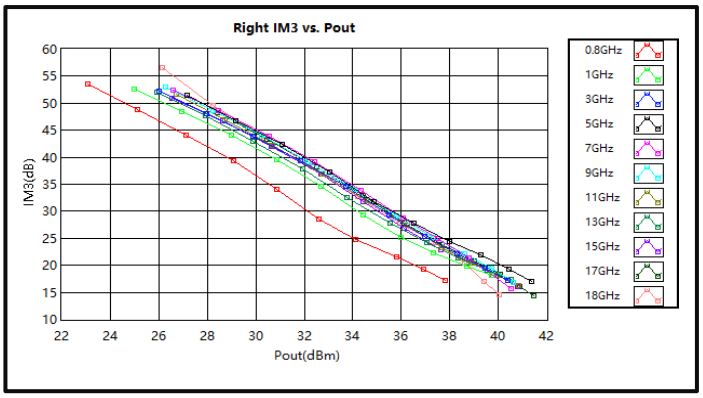
Delta IM3 vs Output Power



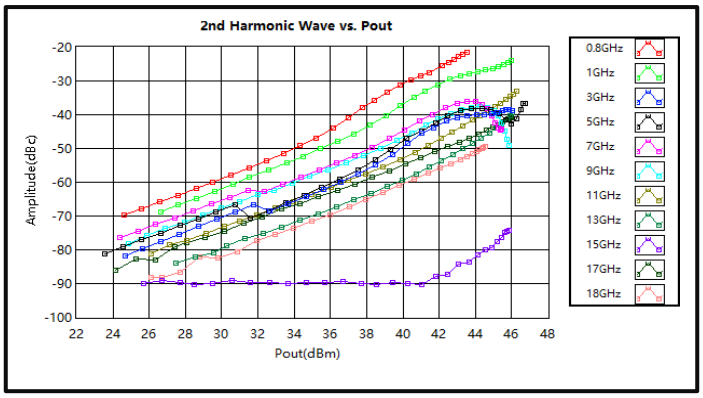
Left IM3 vs Output Power



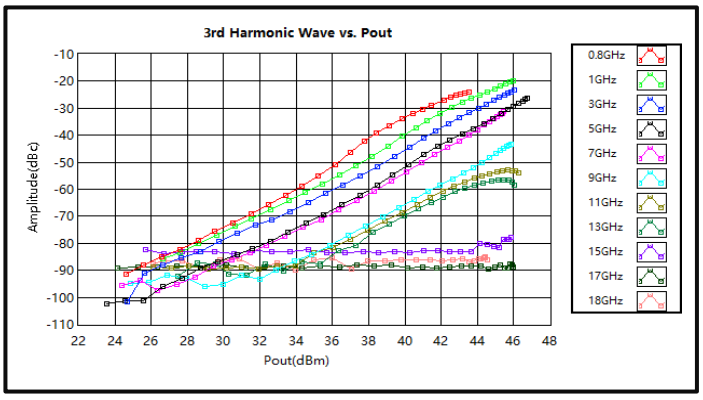
Right IM3 vs Output Power



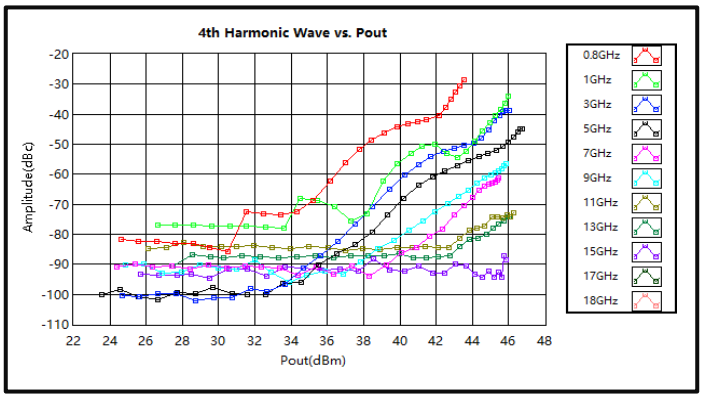
2nd Harmonic Wave Output Power



3rd Harmonic Wave Output Power



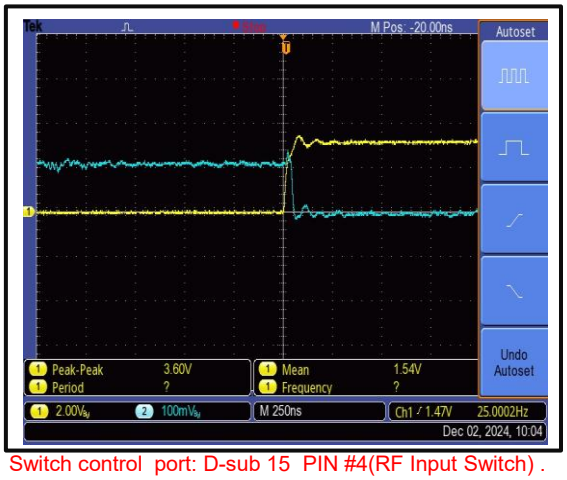
4th Harmonic Wave Output Power



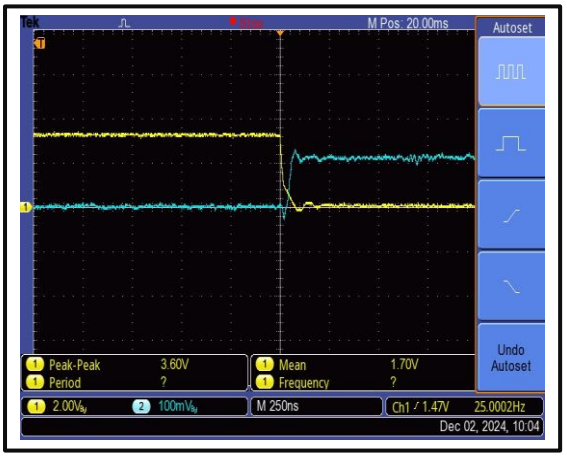
Note: IM3 test performed with 1MHz tone spacing

Typical Performance Plots

The Switching Rise Time is 100 ns @+25℃

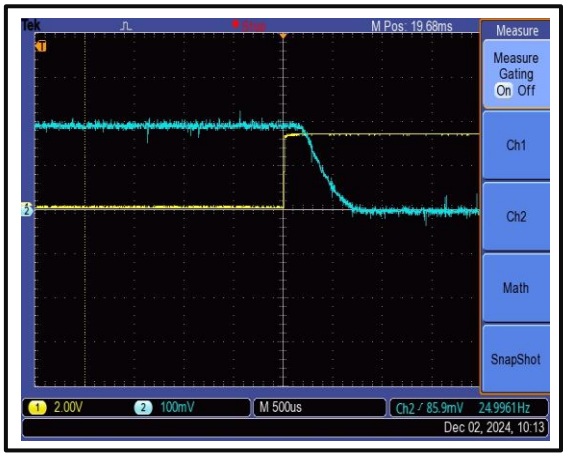


The Switching Fall Time is 100 ns @+25℃

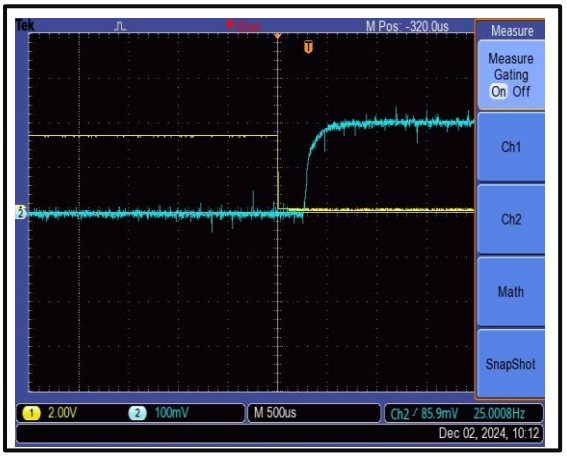


Switch control port: D-sub 15 PIN #4(RF Input Switch) .
The yellow curve is the switch control signal, the blue curve is RF output envelope.

The Drains-Enable Rise Time is 800 us @+25℃



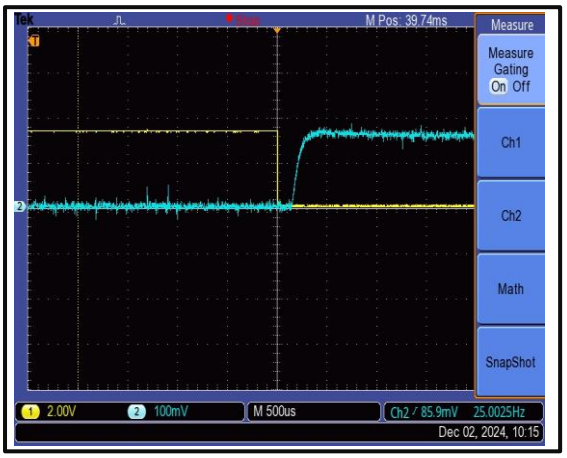
The Drains-Disable Fall Time is 500 us @+25℃



The drain control port：D-sub 15 PIN #3 (Drain Disable).
The yellow curve is the drain control signal, the blue curve is RF output envelope.

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

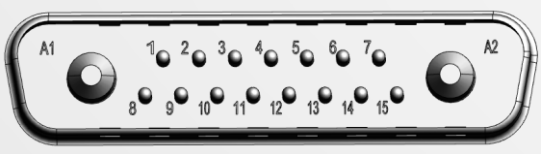
The Gate-Enable Fall Time is 300 us @+25℃



The gate control port：D-sub 15 PIN #2 (Gate Disable).
The yellow curve is the gate control signal, the blue curve is RF output envelope.

Protection Connector Table

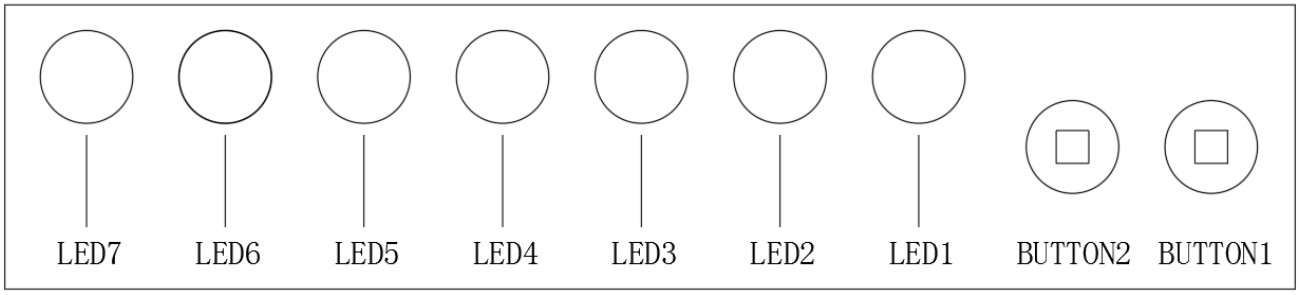
Male D-Sub is on the housing
The mating female part number: 3600000141



Pin #	Name	Function	Initial State	Description	Applied
A1	VDD	Power Supply	+28V	+28V DC is supply Voltage	Yes
A2	GND	Ground	GND	Ground	Yes
1	Reset	Control	HIGH	Resets PA when logic LOW is applied for five more seconds and released	Yes
2	Gate Disable	Control	LOW	Appling logic HIGH disables gate of amplifiers	Yes
3	Drain Disable	Control	LOW	Applying logic HIGH disables drain of amplifiers	Yes
4	RF Input Switch	Control	LOW	Applying logic HIGH turns off RF front-end switch to terminator	Yes
5	PA Off Alarm	Indicator	LOW	Pin will be latched to logic HIGH when any of the protection limit is reached	Yes
6	RF Input Over	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
7	Temp Over	Indicator	LOW	Pin will be latched to logic HIGH when amplifier is driven over temperature	Yes
8	Current Over	Indicator	LOW	Pin will be latched to logic HIGH when drain current limit is reached	Yes
10	ID Imbalance	Indicator	LOW	Pin will be latched to logic HIGH when an imbalance in the drain current of the combining branches occurs	Yes
9,11,12,13	NC	NC	NC	NC	No
14	+5V	Power Supply	+5V	+5V DC is provided for reference *	Yes
15	GND	GND	GND	GND	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.

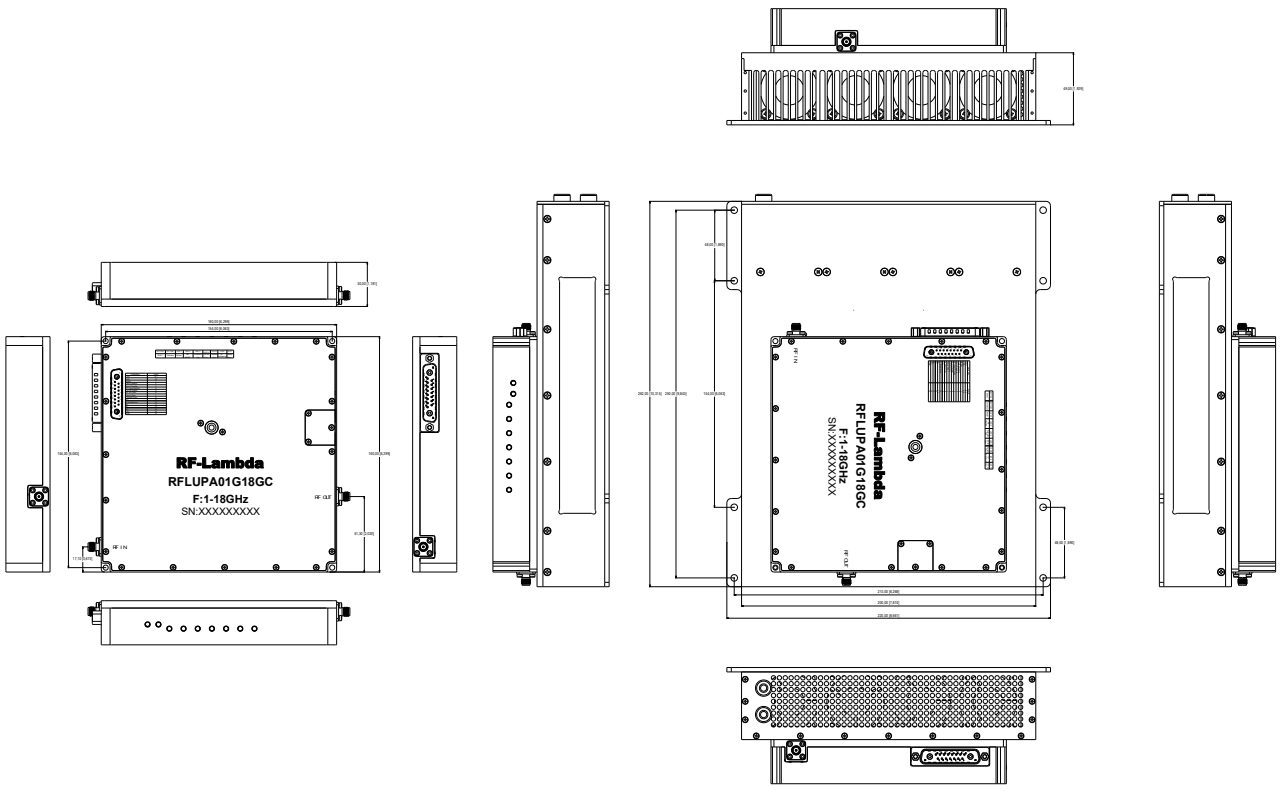
Alarm Status Panel



	Name	Function	Initial State	Description	Applied
BUTTON1	Reset	Control		Manual reset button to reset PA	Yes
BUTTON2	Calibration	Control		Manual calibration button to correct PA	Yes
LED 1	Power	Indicator	GREEN Color	Power supply normal indicator*	Yes
LED 2	RF ON/OFF	Indicator	GREEN Color	RF output status indicator. PA will shut down and latch this LED to a RED color when any protection is triggered*	Yes
LED 3	Calibration State	Indicator	GREEN Color	Calibration status indicator. The red light indicates that calibration is required. The indicator will flash during calibration*	Yes
LED 4	RF Input Over Drive	Indicator	GREEN Color	PA will shut down and latch this LED to a RED color when input signal is over limit *	Yes
LED 5	Current Over	Indicator	GREEN Color	PA will shut down and latch this LED to a RED color when current limit is reached *	Yes
LED 6	ID Imbalance	Indicator	GREEN Color	PA will shut down and latch this LED to a RED color when an imbalance in the drain current of the combining branches occurs *	Yes
LED 7	Temp Over	Indicator	GREEN Color	PA will shut down and latch this LED to a RED color when driven over temperature *	Yes

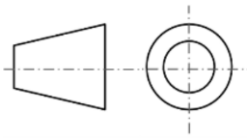
*LED needs to be manually reset to initial state by pressing RESET button.

Outline Drawing



Notes:

1. Package Material: Copper
2. Finish: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Tolerances ±0.2 [0.08] unless otherwise specified (Excl 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.
6. DB17 cable is configured for power connection port by default (RFCBLADB17)
7. Standard torque wrench must be used to secure RF connectors



Packing List

ID	Description	QTY
1	Fig a. DB17 cable (RFCBLADB17)	1
2	Fig c. Screws（#4-40*5+6）	2

Fig a.

Fig c.

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
RFLUPA01G18GC	Standard	1GHz-18GHz 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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