10W Ultra Wide Band Power Amplifier 18GHz-40GHz

Product Description

RFLUPA18G40GA2 is an ultra wide band power amplifier with a frequency range of 18 to 40GHz.

The power output of this amplifier is 39 dBm typical. The typical small signal gain is 45 dB with a gain flatness of ±6.0dB.

The power amplifier's connectors are 2.92mm-Female.

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

Features

- Ultra Wide band Solid State Power Amplifier
- Small Signal Gain 45dB Typical
- Output Saturation Power 39 dBm 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	Min	Typ	Max	Units
Frequency Range		18		26	26		40	GHz
Gain		40	45		40	45		dB
Gain Flatness			±6.0			±6.0		dB
Gain Variation Over Temperature (-40℃~+70℃)			±4.0			±4.0		dB
Input Return Loss			10			10		dB
*Saturated Output Power (Psat)		37	39		36	39		dBm
Isolation S12			-50			-50		dB
Supply Current (Vcc=+28V)			3	5		3	5	A
Power-Added Efficiency			10			10		%
Weight	Net			2.6 Max.				lbs.
	Including Heat sink			6.1 Max.				
Impedance				50				Ohms
Input / Output Connectors				2.92mm-Female(Input) – 2.92mm-Female(Output)				
Package				Epoxy Sealed (Standard)				
				Hermetically Sealed (Optional)				

* P1dB, P3dB and Psat power test signal: 200μs pulse width with 10% duty cycle.
* For average CW power testing or increased duty cycle, a 3dBm back off from Psat is required.

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

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	+30VDC
*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

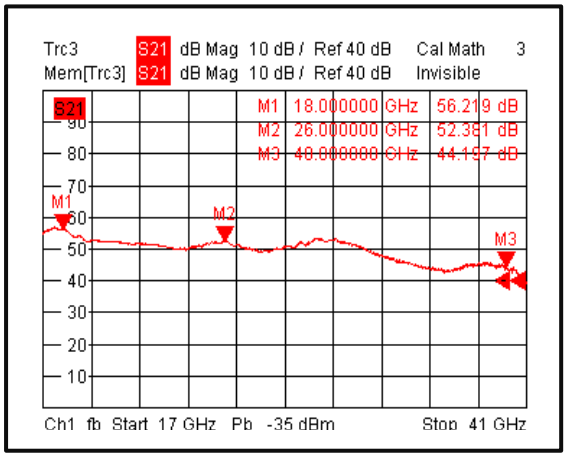
Environmental Specifications and Test Standards

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

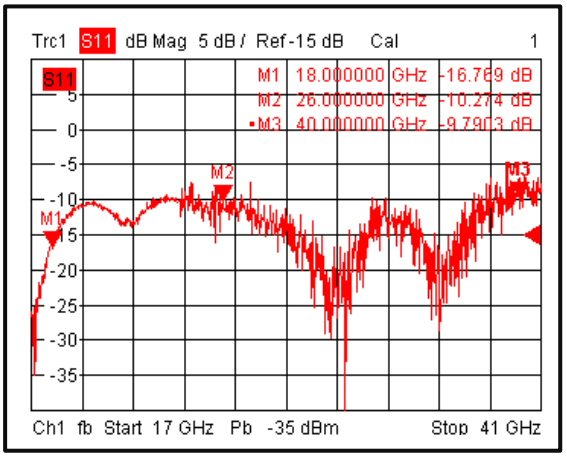
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

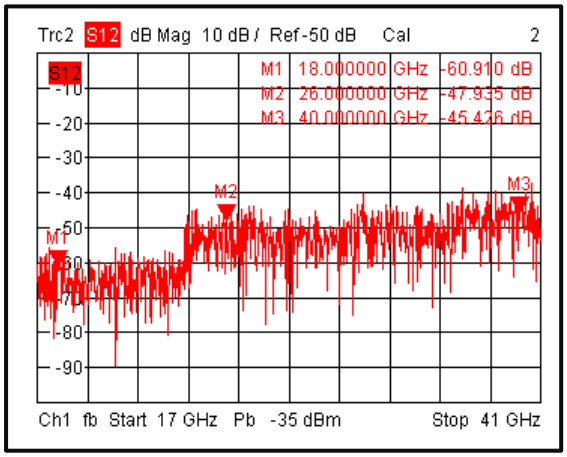
Gain @ +25℃



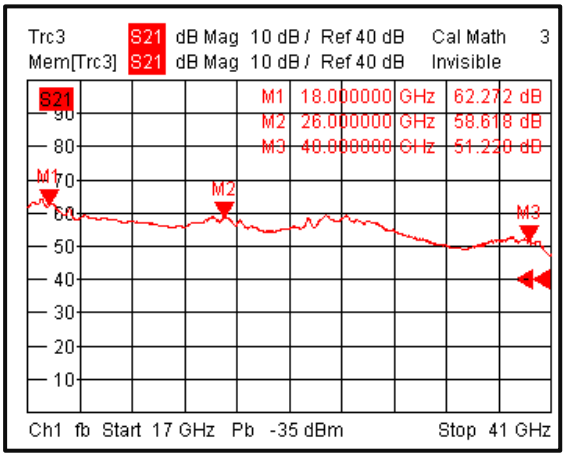
Input Return Loss @+25℃



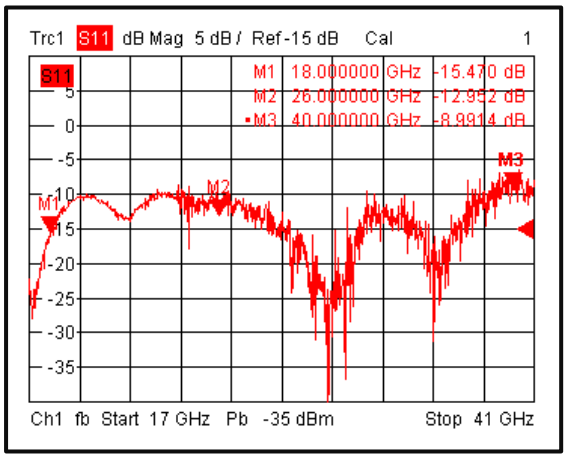
Isolation @ +25℃



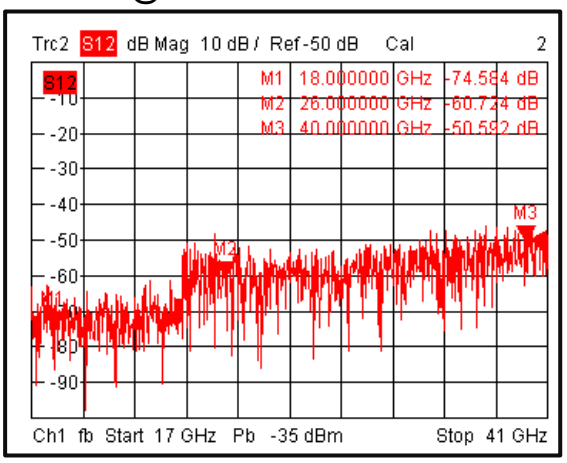
Gain @ -40℃



Input Return Loss @ -40℃



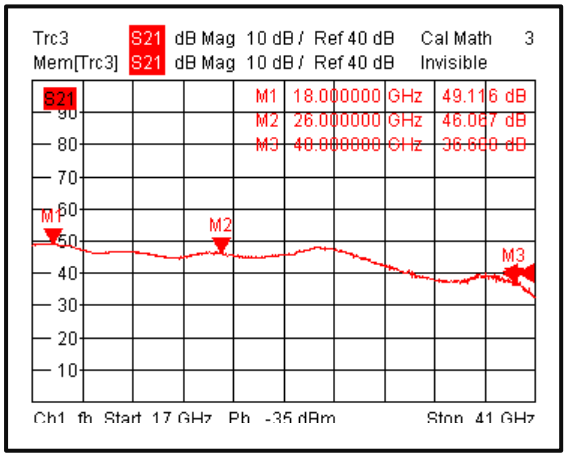
Isolation @ -40℃



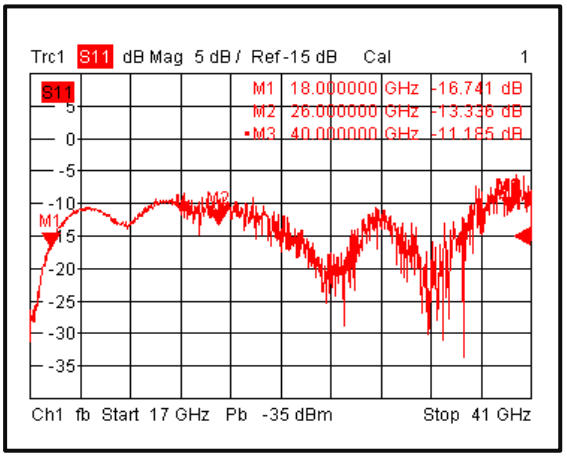
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

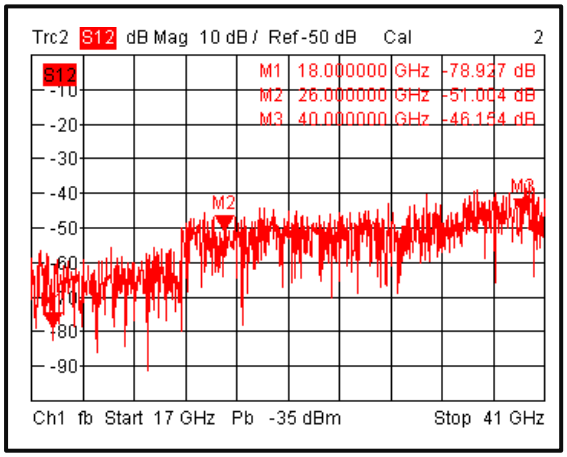
Gain @ +70℃



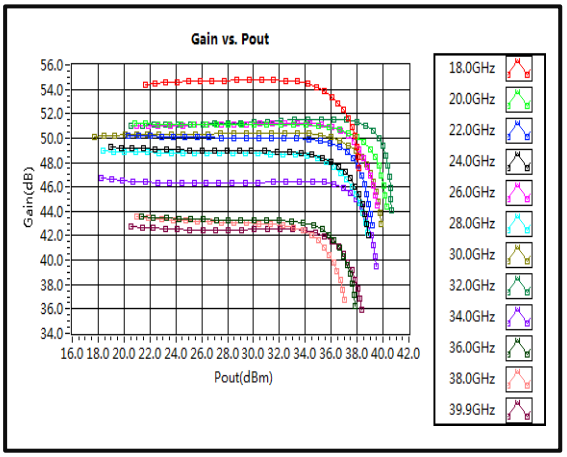
Input Return Loss @ +70℃



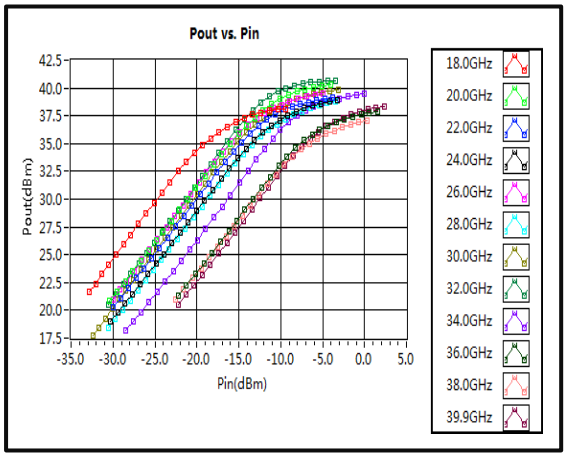
Isolation @ +70℃



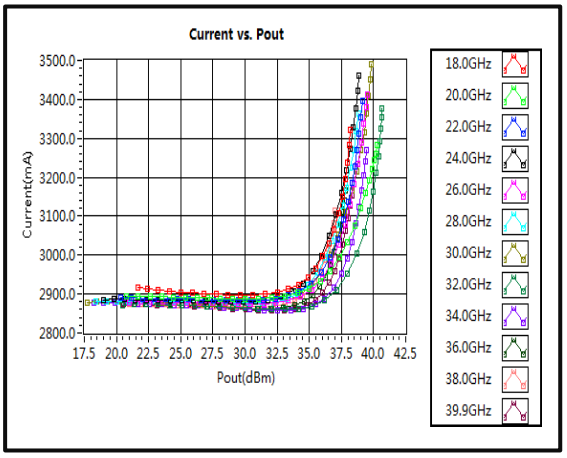
Gain vs. Output Power



Pout vs. Pin



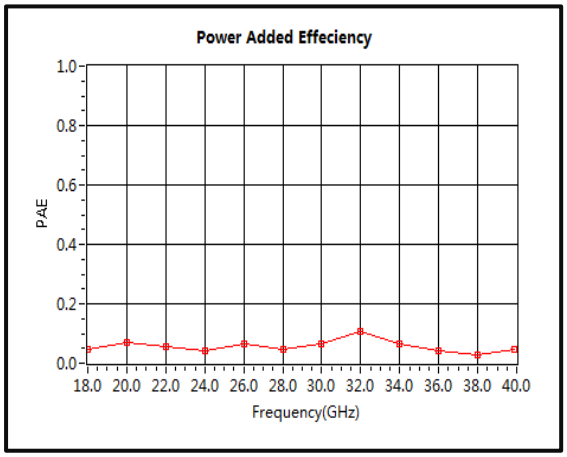
Current vs. Pout



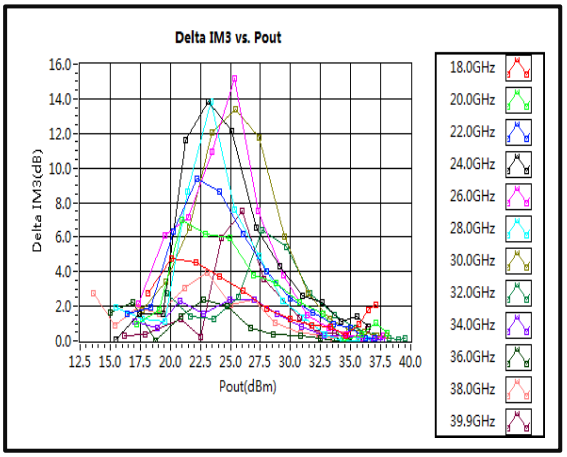
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

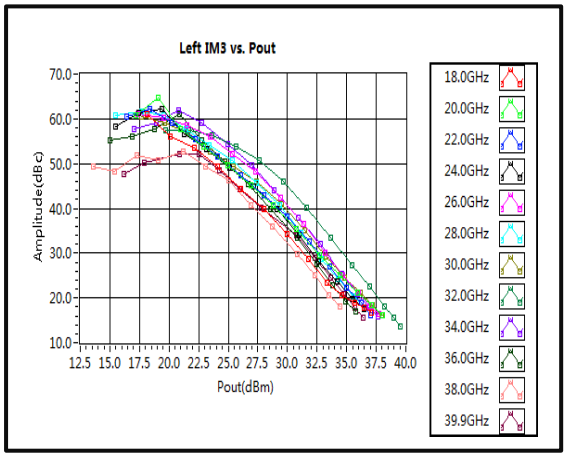
Power Added Efficiency



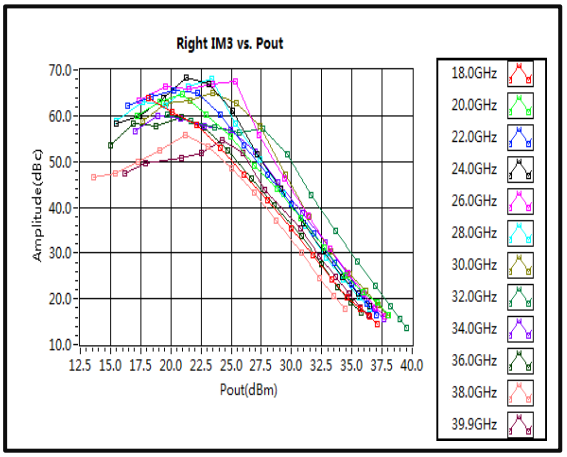
Delta IM3 vs. Pout



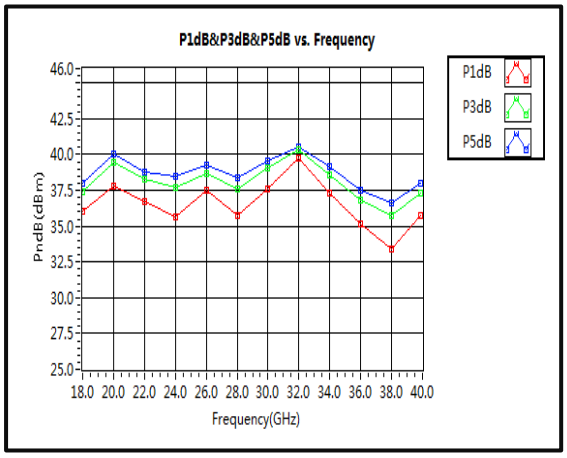
Left IM3 vs. Pout



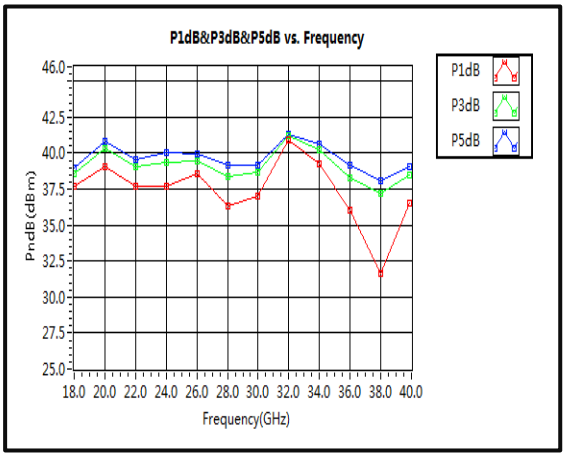
Right IM3 vs. Pout



P1dB – P5dB vs. Frequency @+25℃



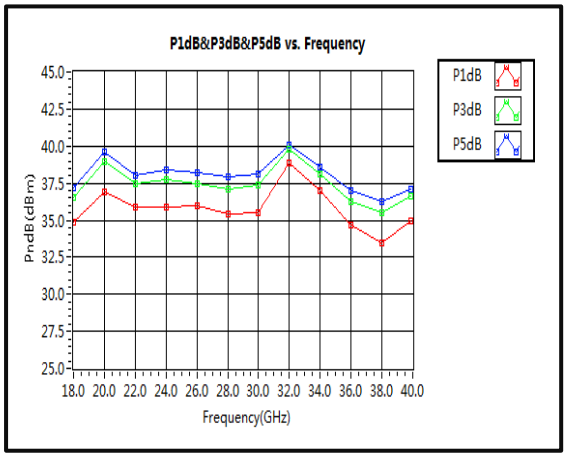
P1dB – P5dB vs. Frequency @-40℃



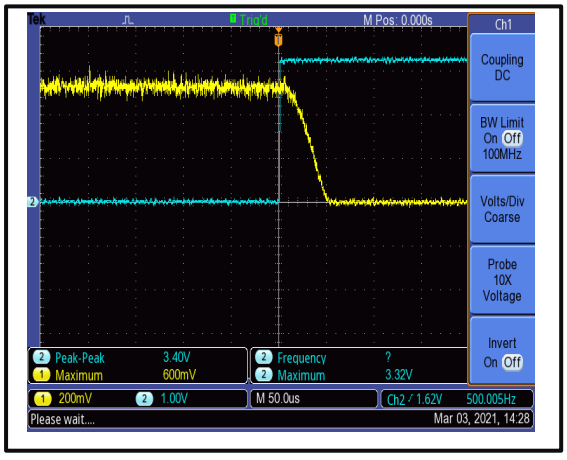
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

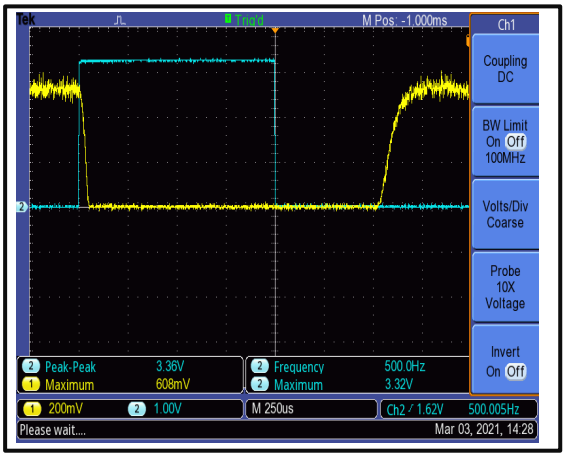
P1dB – P5dB vs. Frequency @+70℃



The TDD Enable Time is 50 us @+25℃

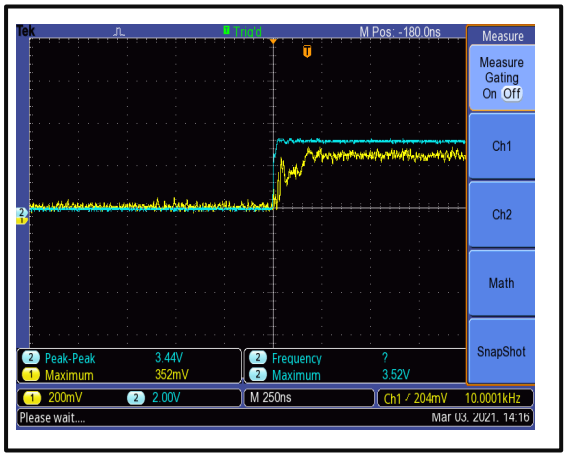


The TDD Disable Time is 600 us @+25℃

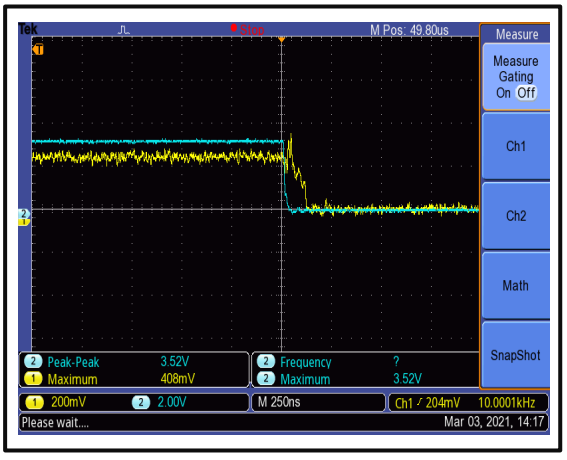


TDD control port：D-sub 15 PIN #6 (GATE_OFF).
The blue curve is the TDD control signal, the yellow curve is RF output envelope.

The Switching Rise Time is 200 ns @+25℃



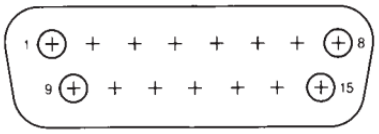
The Switching Fall Time is 200 ns @+25℃



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

Interface Connector

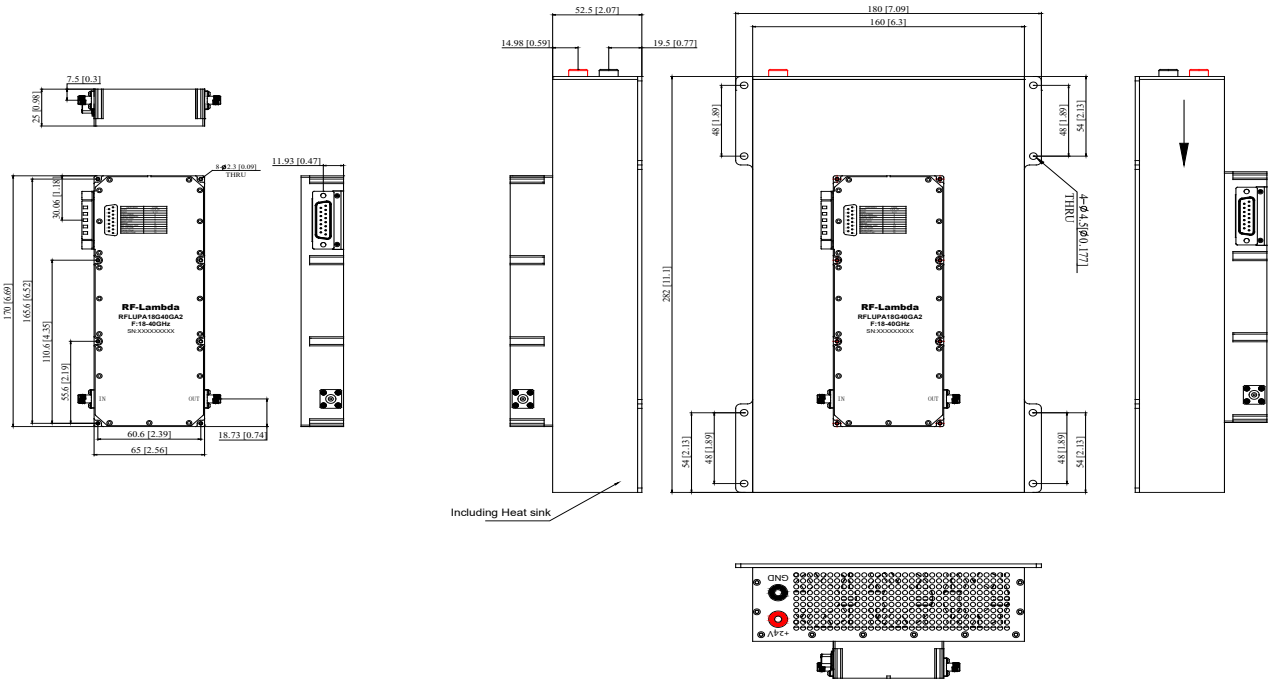
Male D-Sub is on the housing
The mating female part number: 172-E15-203R001



Pin #	Name	Function	Initial State	Description	Applied
1,2,9,10	VDD	Power Supply	+28V	+28V 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_OFF	Control	LOW	Applying logic HIGH disables gates of amplifiers	Yes
7	AMP_OFF	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	RF_Switch _OFF	Control	HIGH	Applying logic LOW disconnect RF signal of amplifiers	Yes
13	RF IN Over	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
14	Temp Over	Indicator	LOW	Pin will be latched to logic HIGH when drive over Temperature	Yes
15	Current Over	Indicator	LOW	Pin will be latched to logic HIGH when Current Limit is reached	Yes

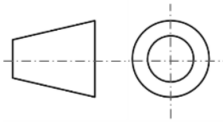
Notes:
- HIGH/LOW voltages are standard TTL signals 0V to 0.8V = LOW. 2.8V to 5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 200mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Copper
2. Plating: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Tolerances ±0.2 [0.008] 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. DB15 cable is configured for power connection port by default (RFCBLADB15).
7. Standard torque wrench must be used to secure RF connectors.



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
RFLUPA18G40GA2	Input connector 2.92mm-Female and Output connector 2.92mm-Female	18GHz-40GHz 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

The information contained herein is believed to be reliable. RF-Lambda makes no warranties regarding the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for any of the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for RF-Lambda products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.
RF-Lambda products are not warranted or authorized for use as critical components in medical, life-saving, or life sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.