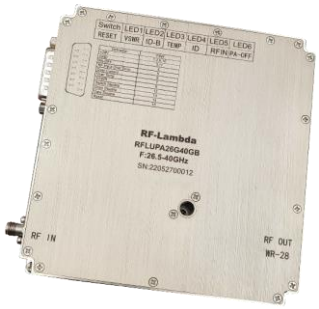
Wide Band Solid State Power Amplifier
26.5GHz-40GHz



Product Description

RFLUPA26G40GB is a wide band power amplifier with a frequency range of 26.5 to 40GHz.

The power output of this amplifier is 42dBm typical. The typical small signal gain is 47dB with a gain flatness of ±6dB. This performance is achieved through the use of GaN devices.

This power amplifier works with a +28 VDC power supply.

The power amplifier input connector is 2.92mm-female and output connector is WR-28.

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

Features

- Solid State Power Amplifier
- Small Signal Gain 47dB Typical
- Output Saturation Power 42dBm Typical
- Supply Voltage +28 VDC
- 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		26.5		40	GHz
Small Signal Gain		40	47		dB
Gain Flatness			±6.0		dB
Gain Variation Over Temperature (-40ºC to +70ºC)			±5.0		dB
Input Return Loss			15		dB
Output 1dB Compression Point (P1dB)			41		dBm
Saturated Output Power (Psat)		39.5	42		dBm
RF ON/OFF Speed (IDQ on)			200		ns
Isolation S12			-50		dB
Supply Current (Vcc=+28V)			6	8	A
Power Added Efficiency (PAE)			10		%
Time Division Duplexing (TDD) Blanking	ON		300		us
	OFF		150		us
Weight	Net		3.9 Max		lbs.
	Including Heat Sink		9.6 Max		
Impedance			50		Ohms
Input / Output Connectors			2.92mm-Female(Input) – WR28(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	+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

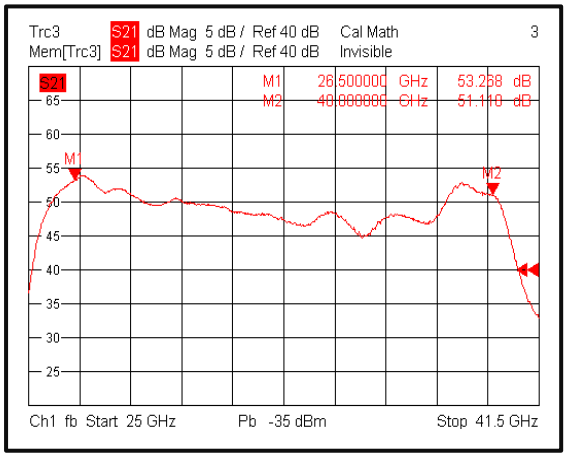
Environmental Specifications and Test Standards

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)

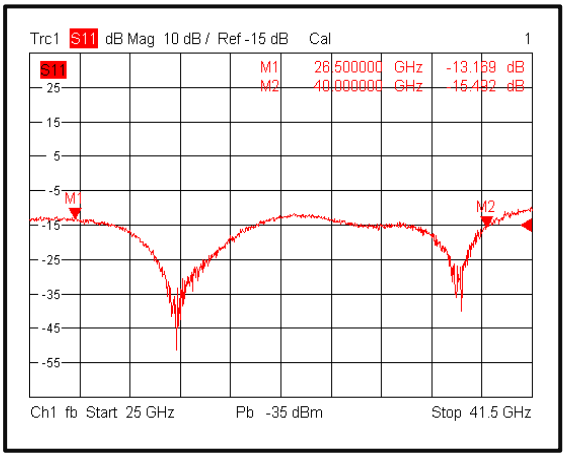
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

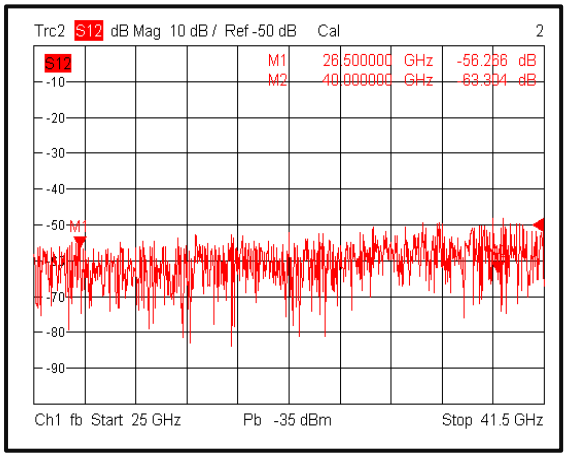
Gain @ +25℃



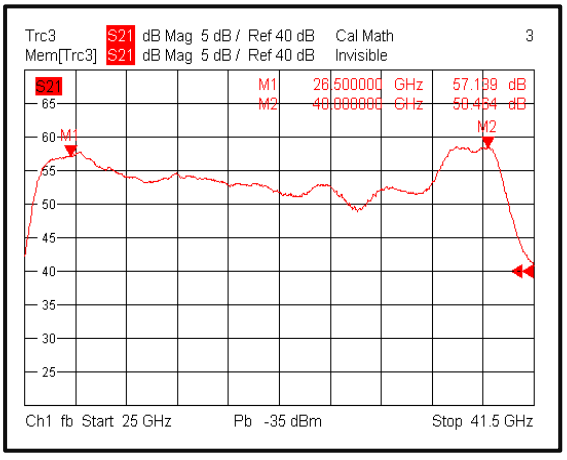
Input Return Loss@+25℃



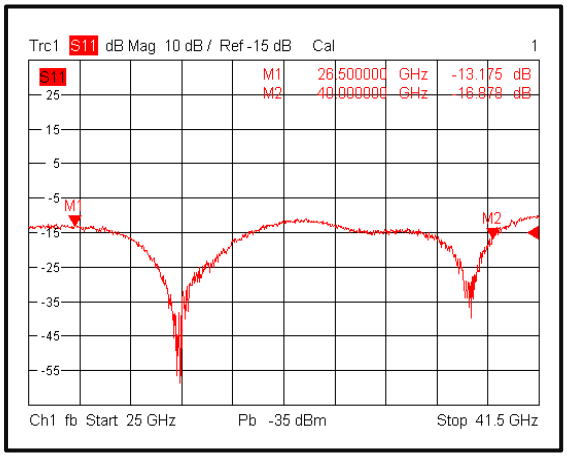
Isolation @ +25℃



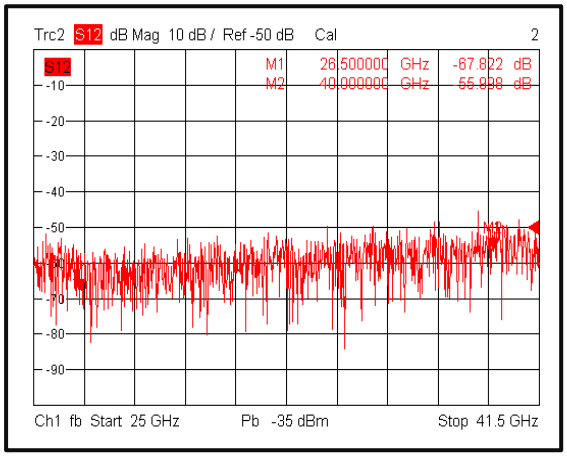
Gain @ -40℃



Input Return Loss@ -40℃



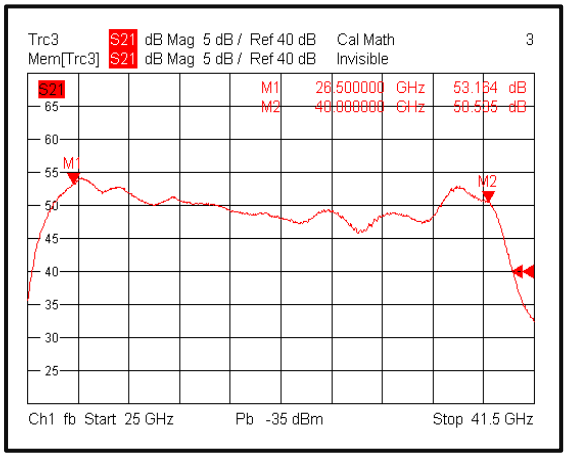
Isolation @ -40℃



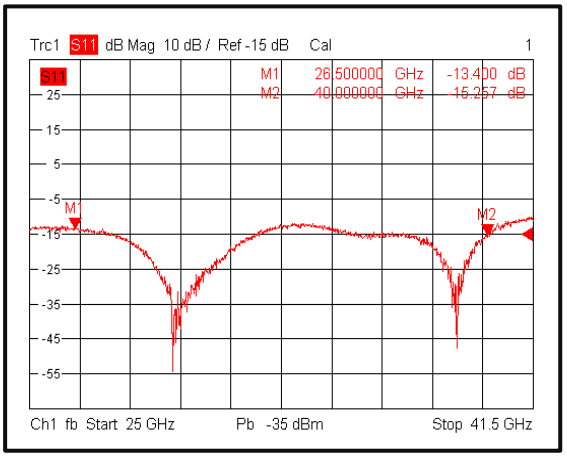
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

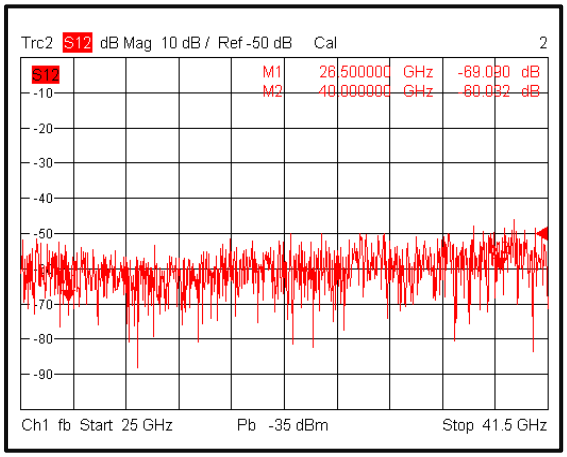
Gain @ +70℃



Input Return Loss@ +70℃



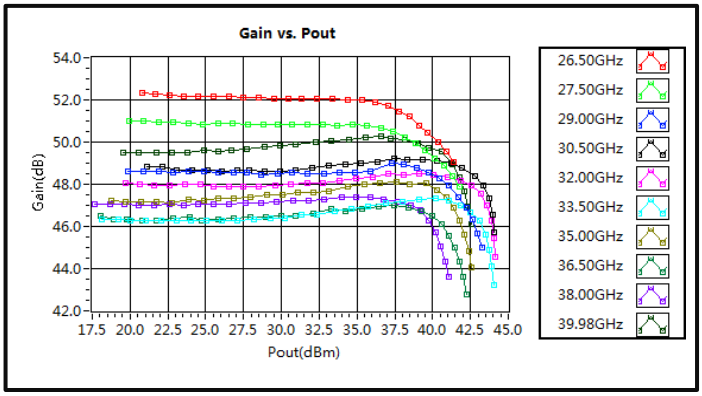
Isolation @ +70℃



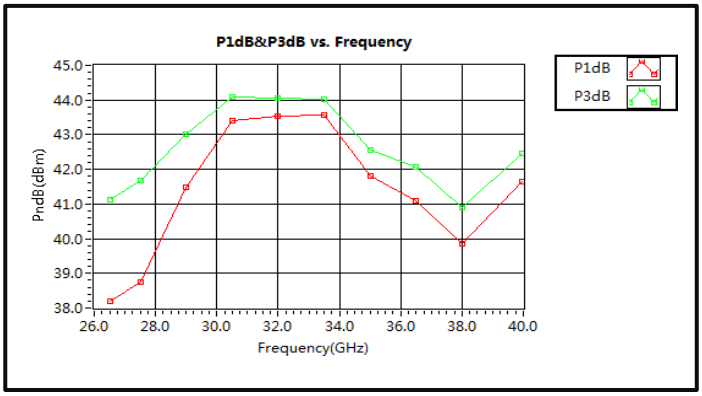
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

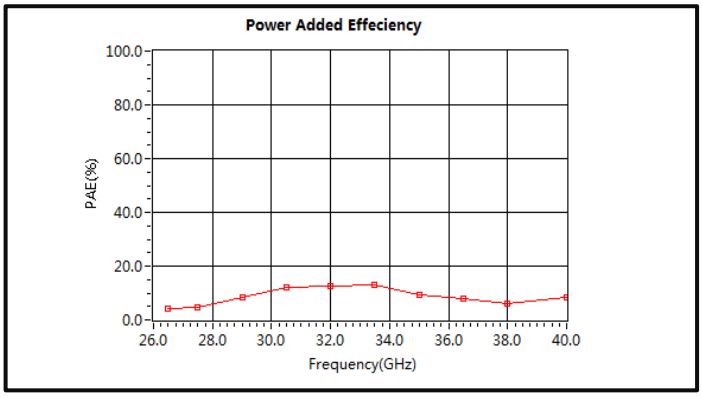
Gain vs. Output Power CW



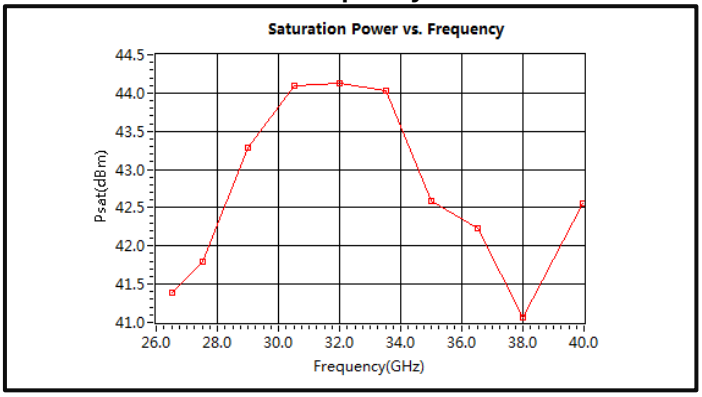
PndB vs. Frequency CW



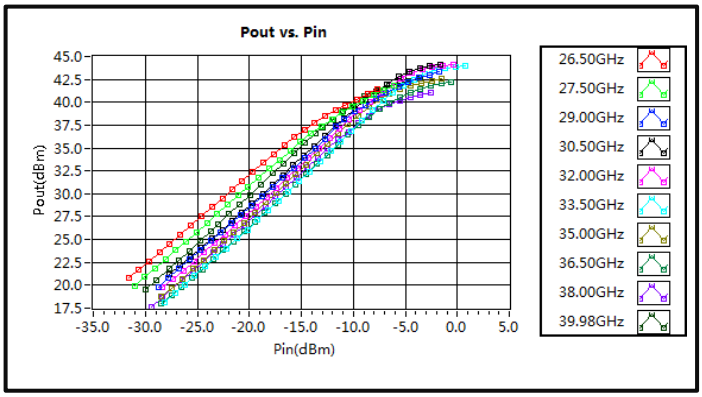
Power Added Efficiency CW



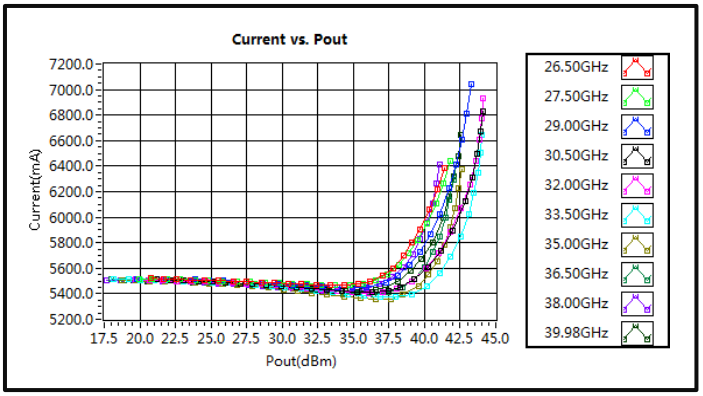
Saturation Power vs. Frequency CW



Pout vs. Pin

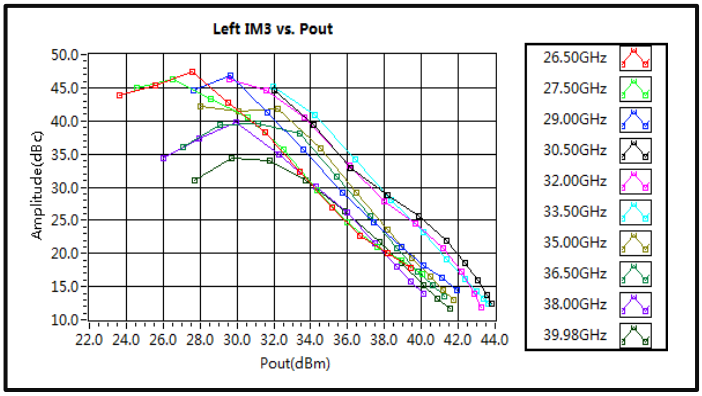


Current vs. Pout

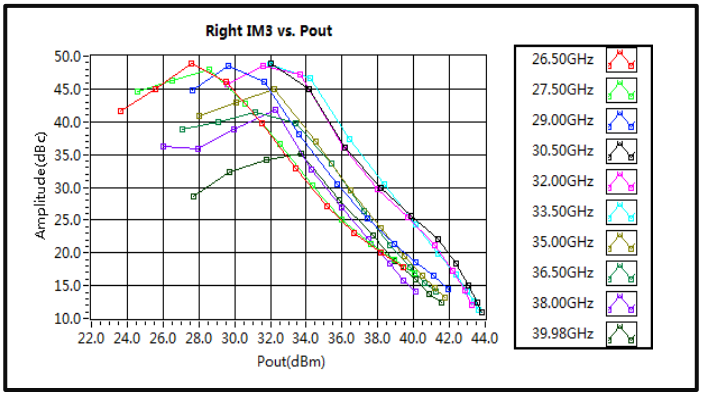


Typical Performance Plots

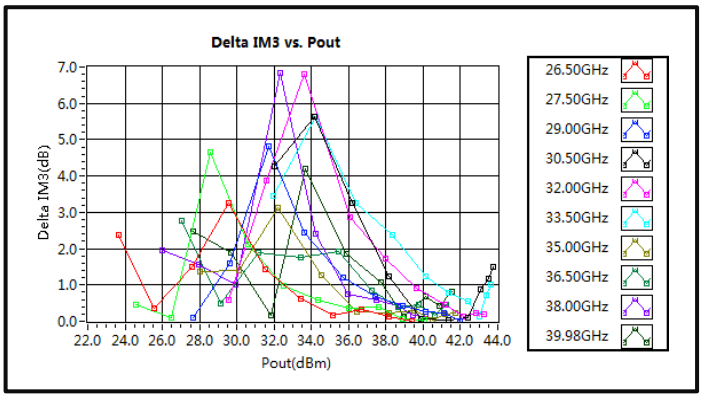
Left IM3 vs. Pout



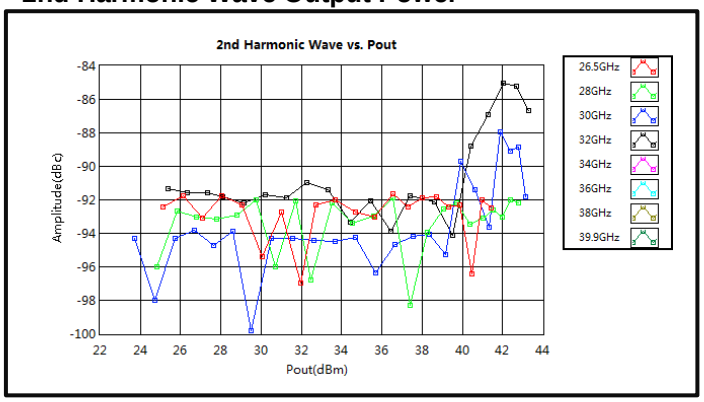
Right IM3 vs. Pout



Delta IM3 vs. Pout



2nd Harmonic Wave Output Power



Note: IM3 test performed with 1MHz tone spacing

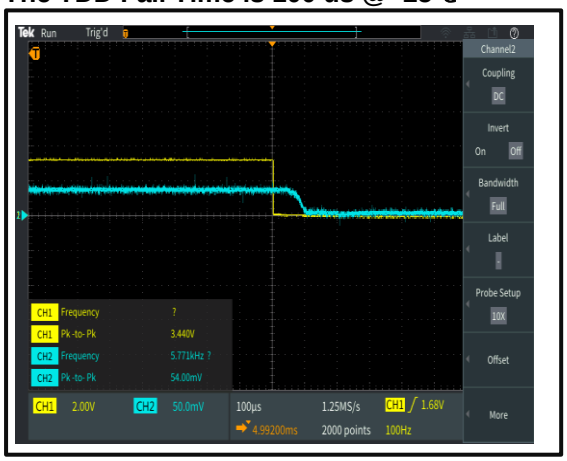
Typical Performance Plots

The Switching Rise Time is 200 ns @+25℃

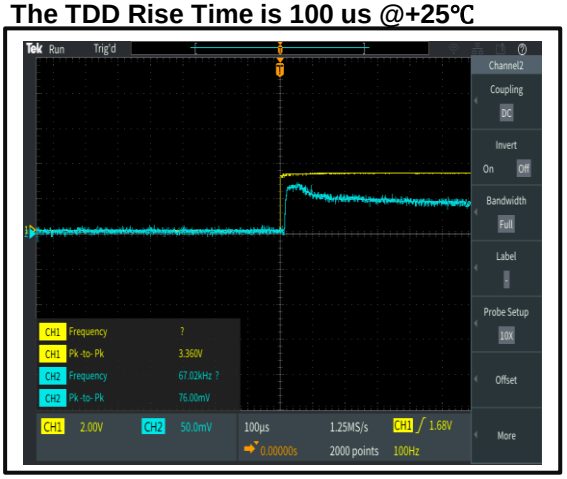
The Switching Fall Time is 200 ns @+25℃

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

The TDD Fall Time is 100 us @+25℃

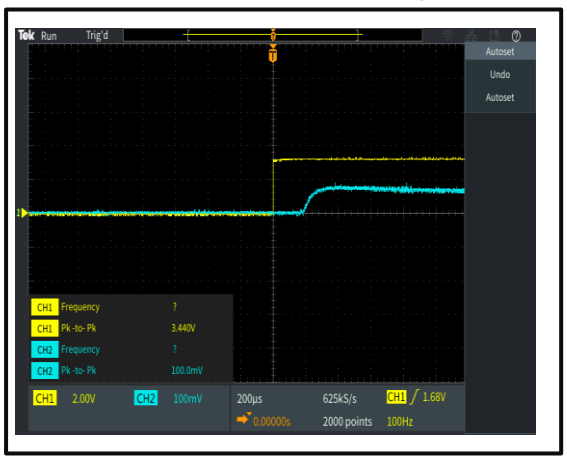


The TDD Rise Time is 100 us @+25℃



Note: the TDD control port：D-sub 15 PIN #13 (Drain _OFF).
The blue curve is the TDD control signal, the yellow curve is RF output envelope.

The TDD Enable Time is 300us @+25℃

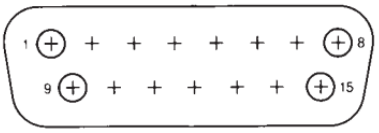


The TDD Disable Time is 150 us @+25℃

Note: the TDD control port：D-sub 15 PIN #14 (GATE_OFF).
The blue curve is the TDD control signal, the yellow curve is RF output envelope.

Protection Connector Table

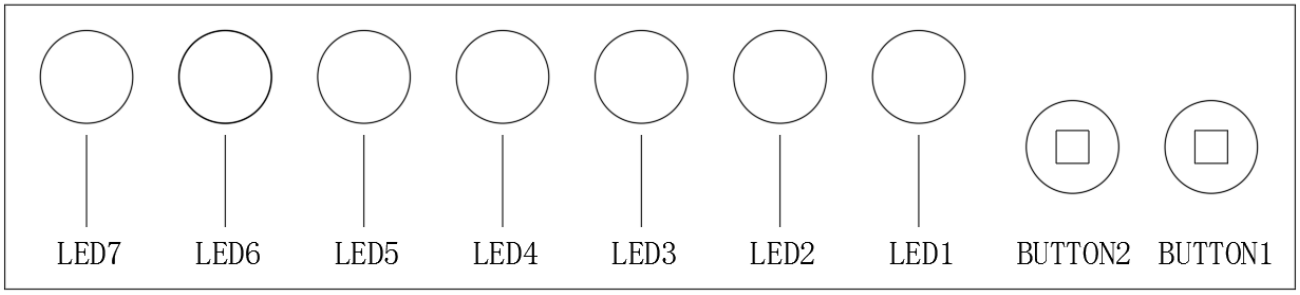
Male D-Sub is on the housing
The mating Female part number: 172-E15-203R001



Pin #	Name	Function	Initial State	Description	Applied
1,2, 9,10	VDD	Power Supply	+28V	+28V DC Supply Voltage	Yes
3,11	GND	Ground	GND	Ground	Yes
4	PA_OFF	Indicator	LOW	Amplifier working state, high level is off	Yes
5	RF Input Over Drive	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
6	Over Current	Indicator	LOW	Pin will be latched to logic HIGH when drain current limit is reached or current imbalance	Yes
7	Over Temp	Indicator	LOW	Pin will be latched to logic HIGH when amplifier is driven over temperature	Yes
8	VSWR	Indicator	LOW	Pin will be latched to logic HIGH when output reflection is over limit	No
12	Switch Disable	Control	LOW	Applying logic HIGH disconnect RF signal of amplifiers	Yes
13	Drain Disable	Control	LOW	Applying logic HIGH disable drains of amplifiers	Yes
14	Gate Disable	Control	LOW	Applying logic HIGH disable gates of amplifiers	Yes
15	Reset	Control	HIGH	Resets PA when logic LOW is applied and released	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.
- Indicator output signals can source 24mA.

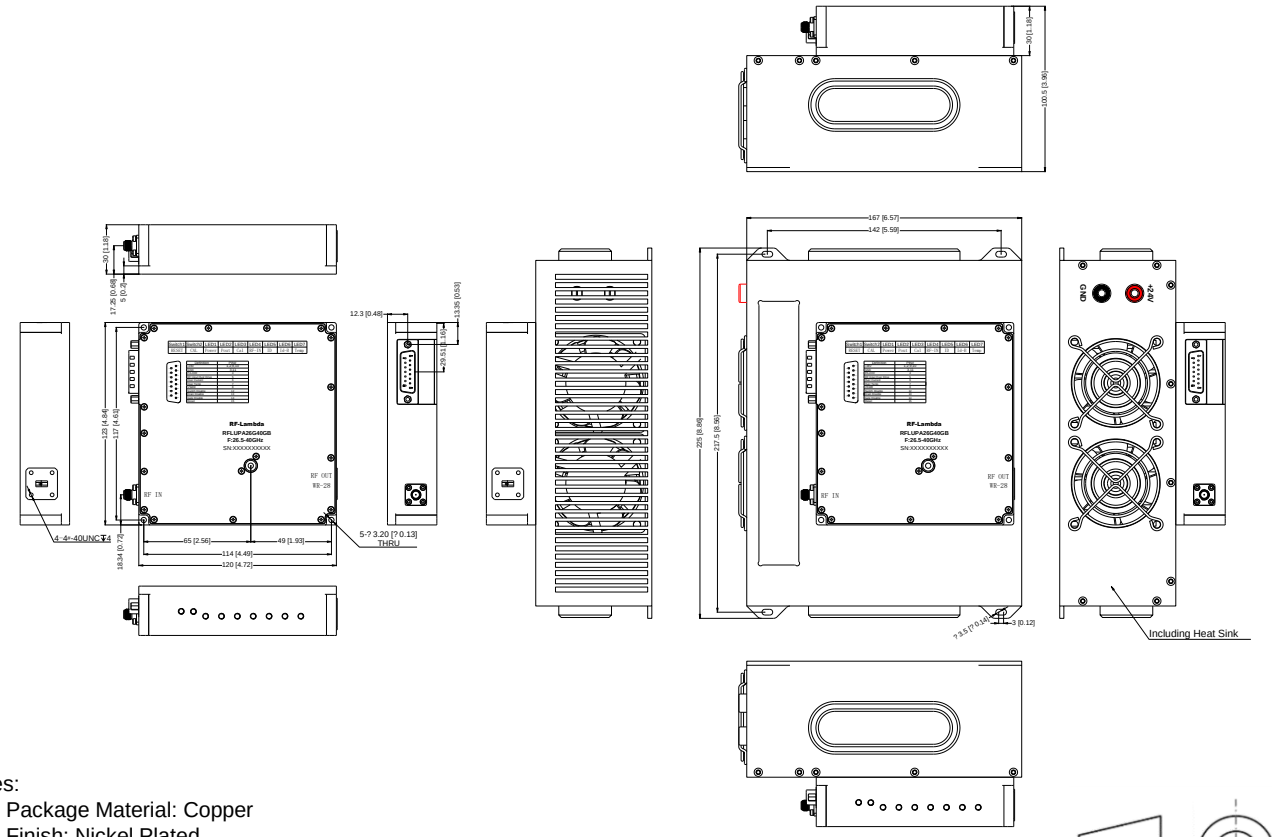
Alarm Status Panel



	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	Over Current	Indicator	GREEN Color	PA will shut down and latch this LED to a RED color when current limit is reached *	Yes
LED 6	ID-Balance	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	Over Temp	Indicator	GREEN Color	PA will shut down and latch this LED to a RED color when driven over temperature *	Yes

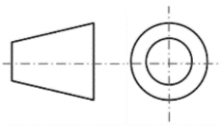
*LED needs to be manually reset to initial state by pressing RESET button

Outline Drawing



Notes:

1. Package Material: Copper
2. Finish: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Tolerances ±0.1 [0.004] 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. Heat Sink required during operation (Sold Separately)
8. Standard torque wrench must be used to secure RF connectors



Packing List

ID	Description	QTY
1	Fig a. DB15 cable (RFCBLADB15)	1
2	Fig b. Waveguide to coaxial adapter (RFWA28E0COAL) (Consult sales)	0

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
RFLUPA26G40GB	Input Connector 2.92mm-Female and Output Connector WR-28	26.5GHz-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

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