

Benchtop RF System Amplifier 28GHz-42GHz



Product Description

RAMP28G42GA is a benchtop RF system amplifier with a frequency range of 28 to 42GHz.

The power output of this amplifier is 34dBm typical. The typical small signal gain is 34 dB with a gain flatness of ± 8 dB.

The AC power amplifier uses a standard convenient 110V/220 VAC power supply. The fan and heatsink are all completely integrated inside the unit.

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

The operating temperature of this product is within -30 to +70°C.

Features

- Wideband AC-Power Amplifier
- Small Signal Gain 34dB Typical
- Output Saturation Power 34dBm Typical
- Supply Voltage 110/220 VAC
- 50 Ohm Matched Input/Output
- 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°C)

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range		28 – 35			35 – 42		GHz
Small Signal Gain		33			32		dB
Noise Figure		8			7		dB
Gain Flatness		±7			±8		dB
Gain Variation Over Temperature (-30°C ~ +70°C)		±3			±3		dB
Input Return Loss		14			9		dB
Output Return Loss		7			8		dB
*Saturated Output Power (Psat)		34.5			34.5		dBm
Isolation S12	60	70		60	70		dB
Input Max Power(no damage)		Psat –Gain			Psat – Gain		dBm
Weight			16.53				lbs.
Impedance			50				Ohms
Input /Output Connectors		2.92 mm-Female(Input)--2.92 mm-Female(Output)					
Package Sealing	Epoxy and Screw Tight Sealed (Standard)						
	Hermetically Sealed (Optional with extra charge)						

* P1dB, P3dB and Psat power test signal: 200 μ s pulse width with 10% duty cycle.

* For average CW power testing or increased duty cycle, a 3dBm back off from Psat is required.

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	110VAC to 220VAC
*RF Input Power (RFIN)	Psat – Large Signal Gain

Bias Up Procedure

1. Connect input and output with 50 Ohm source/load.
(In band VSWR < 1.9:1 or >10dB return loss.)

2. Connect Power Cable

3. Turn On Back Panel AC Power Supply Switch

4. Press Front Panel Power Switch to Power Display

Bias Down Procedure

1. Press Front Panel Power Switch to Power Off Display

2. Turn Off Back Panel AC Power Supply Switch

3. Remove Power Cable (If Moving Equipment)

4. Disconnect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)

Environmental Specifications and Test Standards

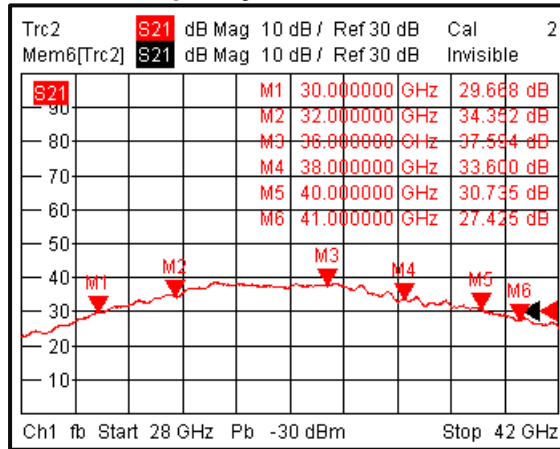
Parameter	Description
Operational Temperature	-30°C to +70°C (Ambient Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +70°C for 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.

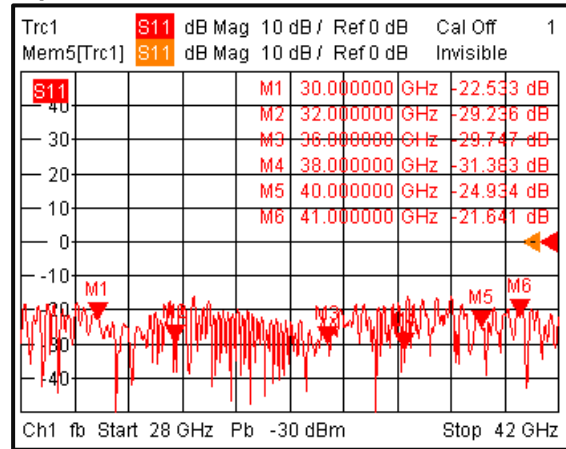
**For vibration testing details please see additional information section.

Typical Performance Plots

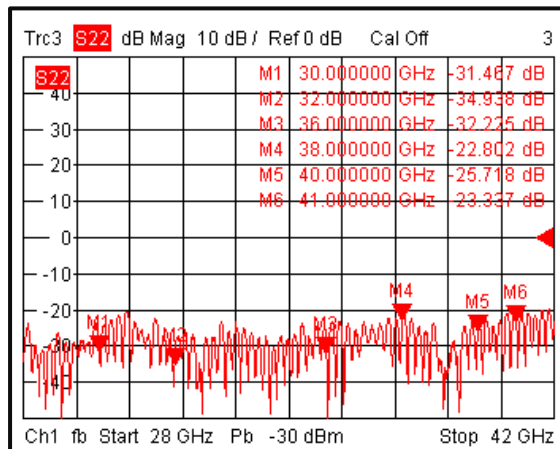
Gain vs. Frequency



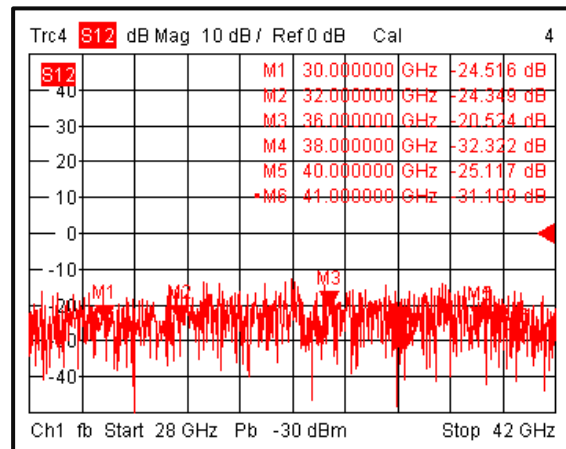
Input Return Loss



Output Return Loss



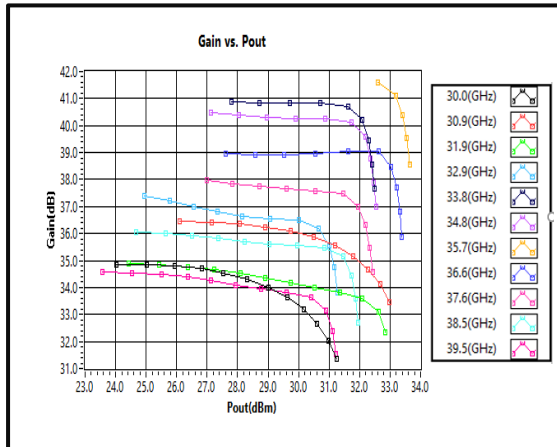
Isolation S12



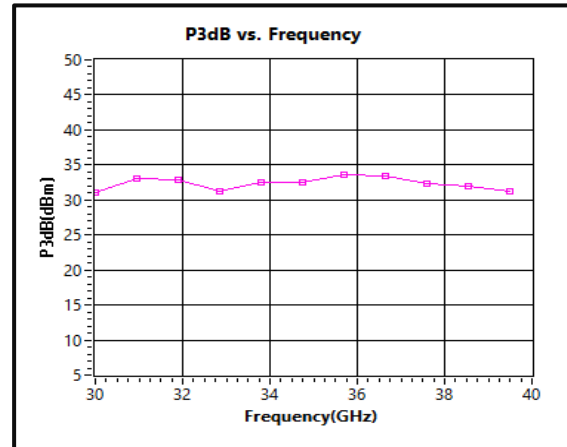
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

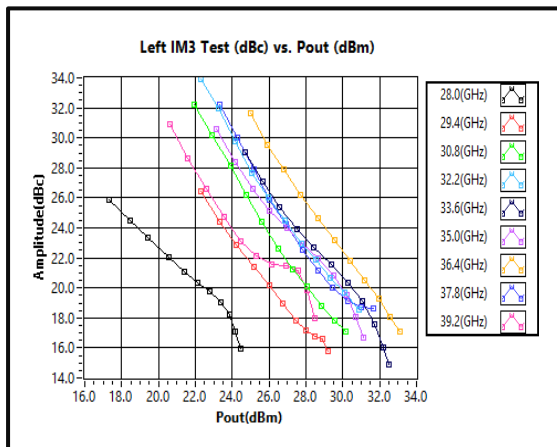
Gain vs. Output Power 30GHz-40GHz



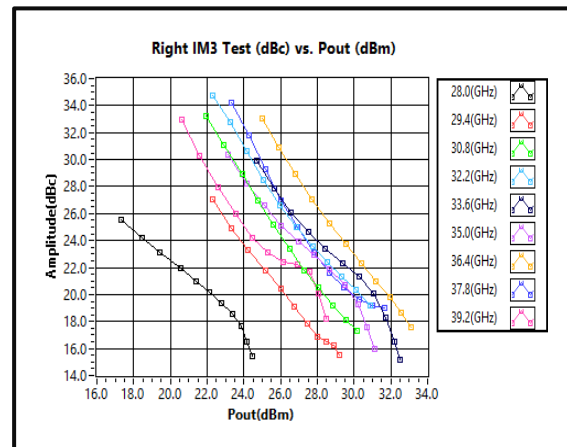
P3dB vs. Frequency 30GHz-40GHz



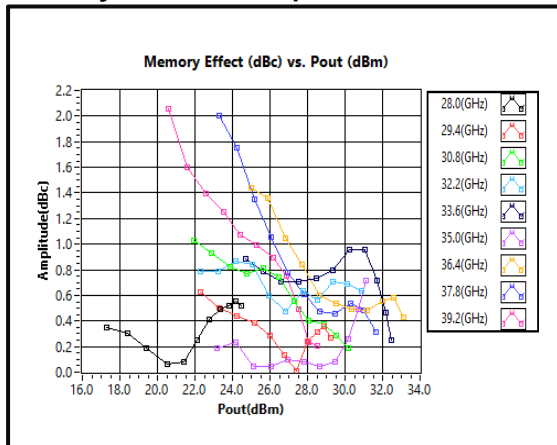
Left IM3 vs. Output Power 28GHz-40GHz



Right IM3 vs. Output Power 28GHz-40GHz

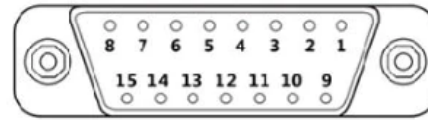


Memory Effect vs. Output Power 28GHz-40GHz



Protection Connector Table

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

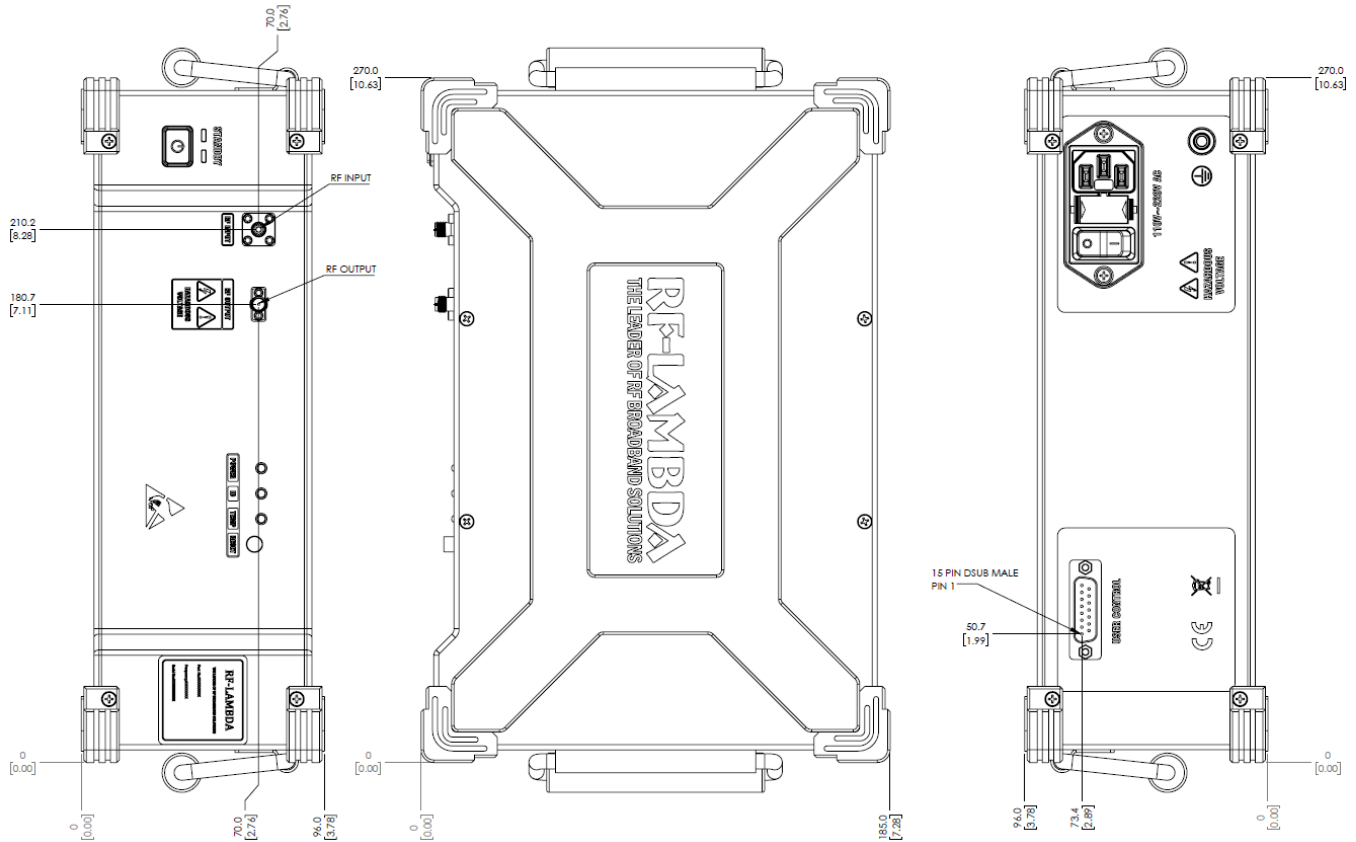

DB15 Female

Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Drain Disable	Control	LOW	Applying logic <u>HIGH</u> disables drains of amplifiers	Yes
3	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of amplifiers	Yes
4	RF IN Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when input signal is over limit	No
5	Temp Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when amplifier is driven over temperature	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when drain current limit is reached	Yes
7	ID Imbalance	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when an imbalance in the drain current of the combining branches occurs	No
8	GND	Ground	GND	Ground	Yes
9	VDC	VDC	NA	Power Supply for Amplifier	Yes
10	VDC	VDC	NA	Power Supply for Amplifier	Yes
11	VDC	VDC	NA	Power Supply for Amplifier	Yes
12	Temp Signal	Indicator	NA	PA carrier case temperature is represented by voltage	Yes
13	+5V	Power Supply	+5V	+5V DC is supplied for reference	Yes
14	GND	Ground	GND	Ground	Yes
15	GND	Ground	GND	Ground	Yes

Notes:

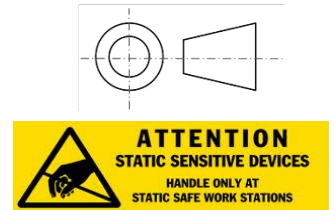
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source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

Outline Drawing



Notes:

1. Package Material: Aluminum and Copper
2. Finish: Black
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.25 [0.010] unless otherwise specified.
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.



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
RAMP28G42GA	Input connector 2.92mm-Female and Output connector 2.92mm-Female	28GHz-42GHz Wide Band AC-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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