Wide Band Low Noise Amplifier
5MHz-46GHz

Product Description

RLNA05M46GA is a wideband low noise amplifier with a frequency range of 5MHz to 46GHz.

The 1dB compression point of this amplifier is 18dBm typical. The typical small signal gain is 36dB with a gain flatness of ±3 dB.

The power amplifier's input connector is 2.4mm and output connector is 2.4mm.

The operating temperature of this product is within -40 to +85ºC.

Features

- Wideband Low Noise Amplifier
- Small Signal Gain 36dB Typical
- Output P1dB 18dBm Typical
- Supply Voltage +12VDC
- 50 Ohm Matched Input/Output
- Gain Flatness +/-3dB

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	Min	Typ	Max	Units
Frequency Range		0.01 to 0.9			1 to 40			40 to 46		GHz
Small Signal Gain		37			36			35		dB
Gain Flatness		+/-3			+/-3			+/-3		dB
Gain Variation Over Temperature (-40ºC to +70ºC)		+/-3			+/-3			+/-3		dB
Input Return Loss		-15			-15			-15		dB
Output Return Loss		-15			-15			-15		dB
Noise Figure		4			5			6		dB
Output 1dB Compression Point (P1dB)		23			18			13		dBm
Saturated Output Power (Psat)		25			20			15		dBm
Supply Current		370			370			370		mA
Weight					45					g
Impedance					50					Ohms
Input / Output Connectors					2.4mm (Input) – 2.4mm (Output)					
Package					Screw Sealed (Standard)					
					Hermetically Sealed (Optional)					

Absolute Maximum Ratings

Parameter	Rating
Positive Supply Voltage Range	+12VDC to +12.5VDC
*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

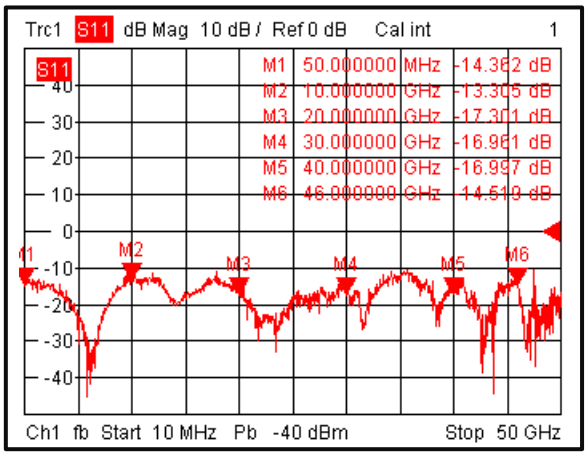
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40ºC to +85ºC (Case Temperature)
Storage Temperature	-55ºC to +125ºC
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 +85ºC 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)

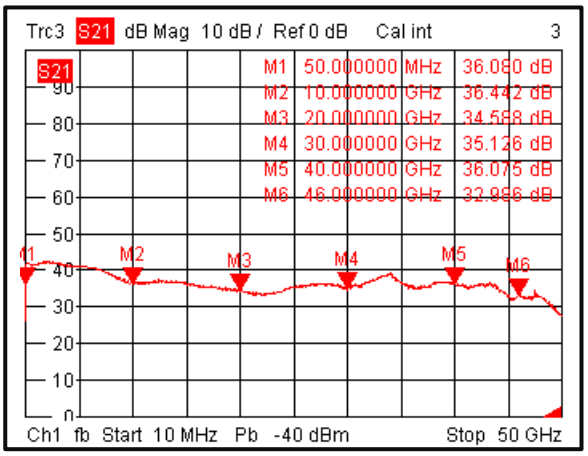
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

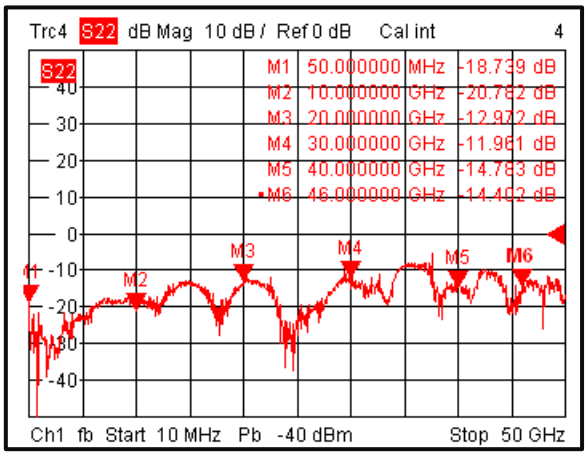
Input Return Loss vs Frequency @+25ºC



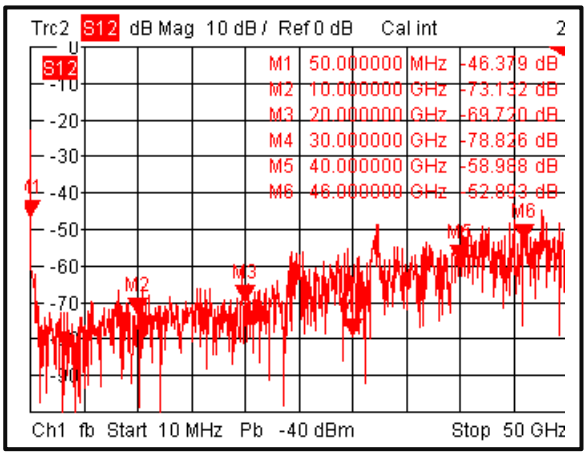
Gain vs Frequency @+25ºC



Output Return Loss vs Frequency @+25ºC



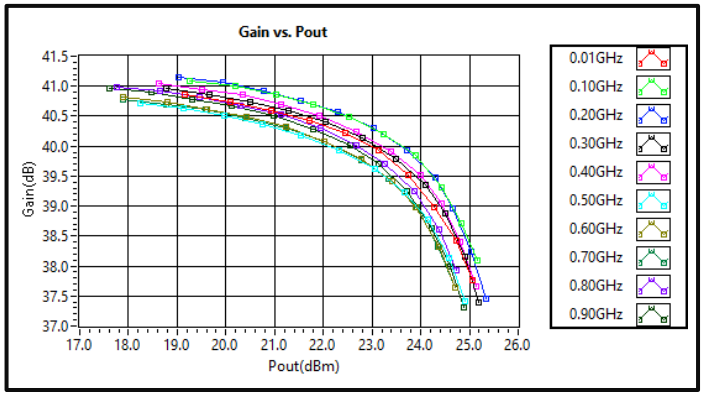
Isolation vs Frequency @+25ºC



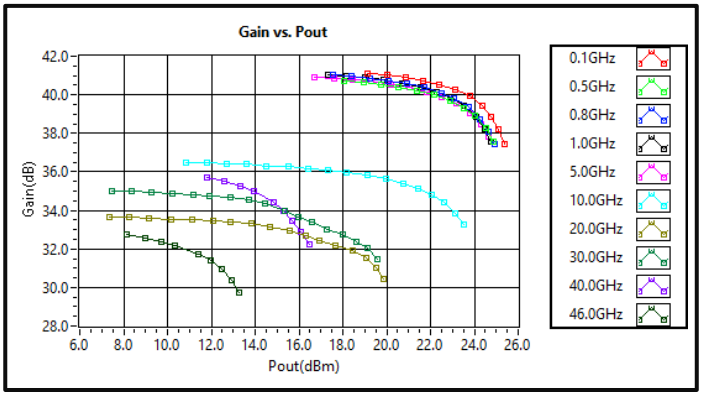
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

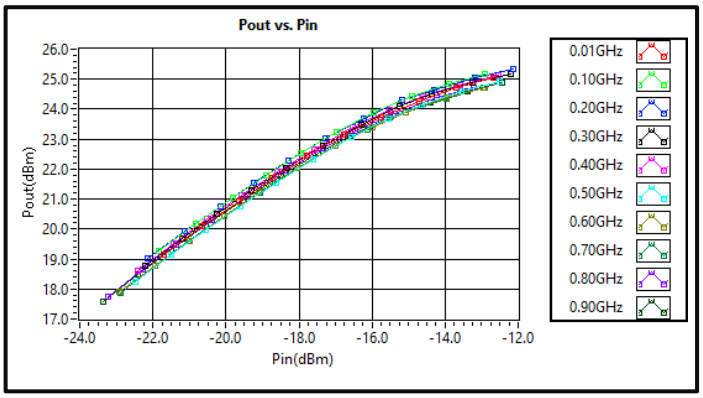
Gain vs Output Power (0.01 - 0.9 GHz)



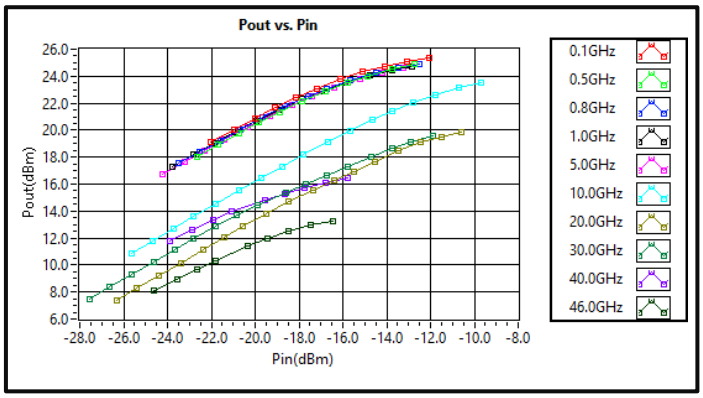
Gain vs Output Power (0.1 – 46 GHz)



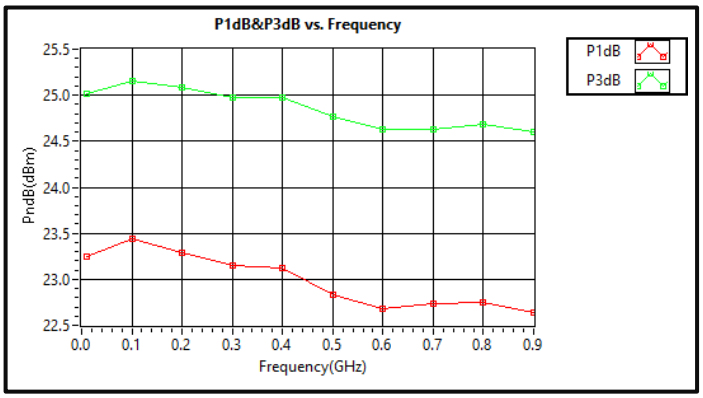
Output vs Input Power (0.01 - 0.9 GHz)



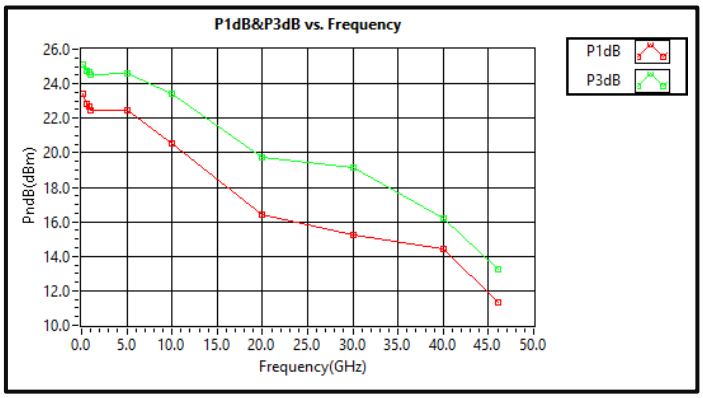
Output vs Input Power (0.1 – 46 GHz)



PxdB vs Frequency (0.01 - 0.9 GHz)

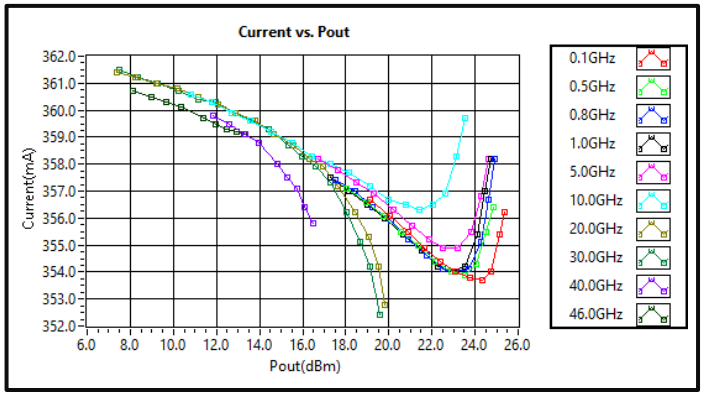


PxdB vs Frequency (0.1 – 46 GHz)

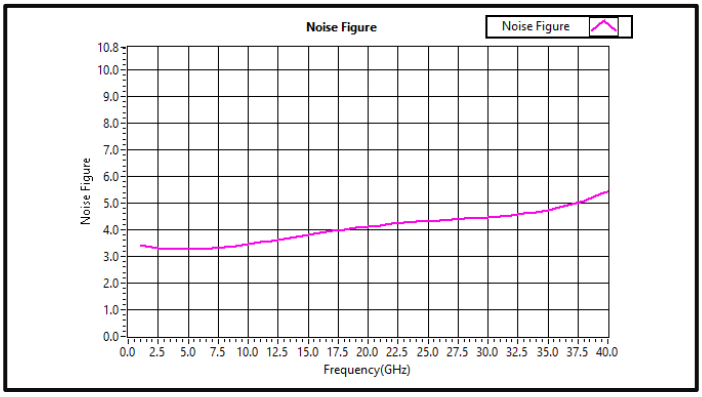


Typical Performance Plots

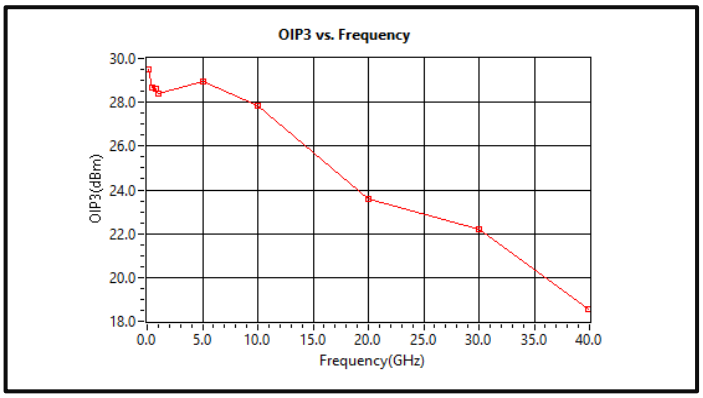
Current vs Output Power



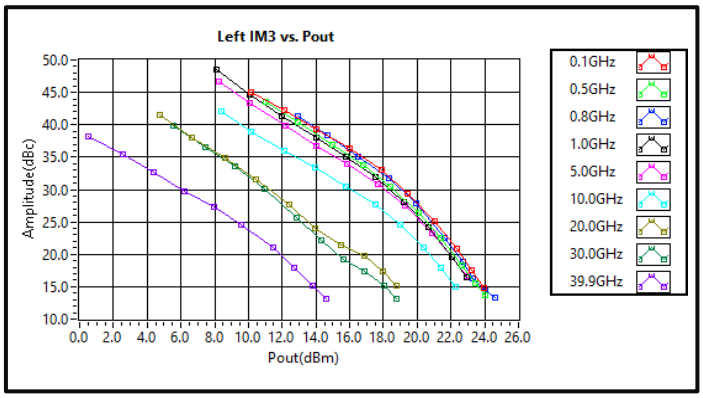
Noise Figure vs Frequency



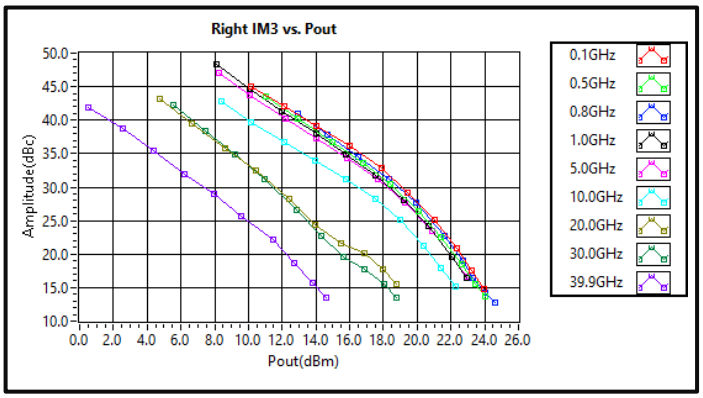
OIP3 vs Frequency



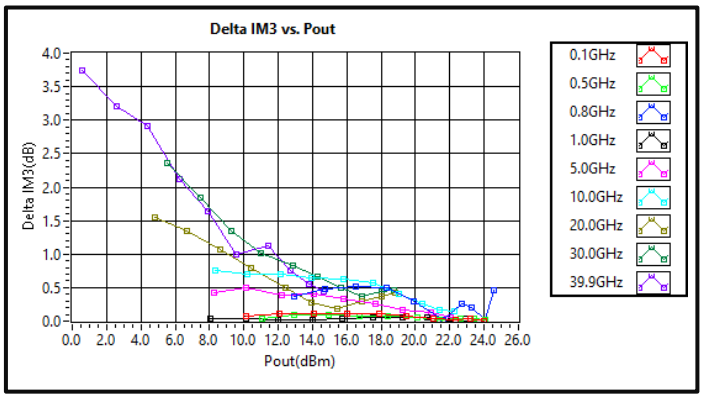
Left IM3 vs Output Power



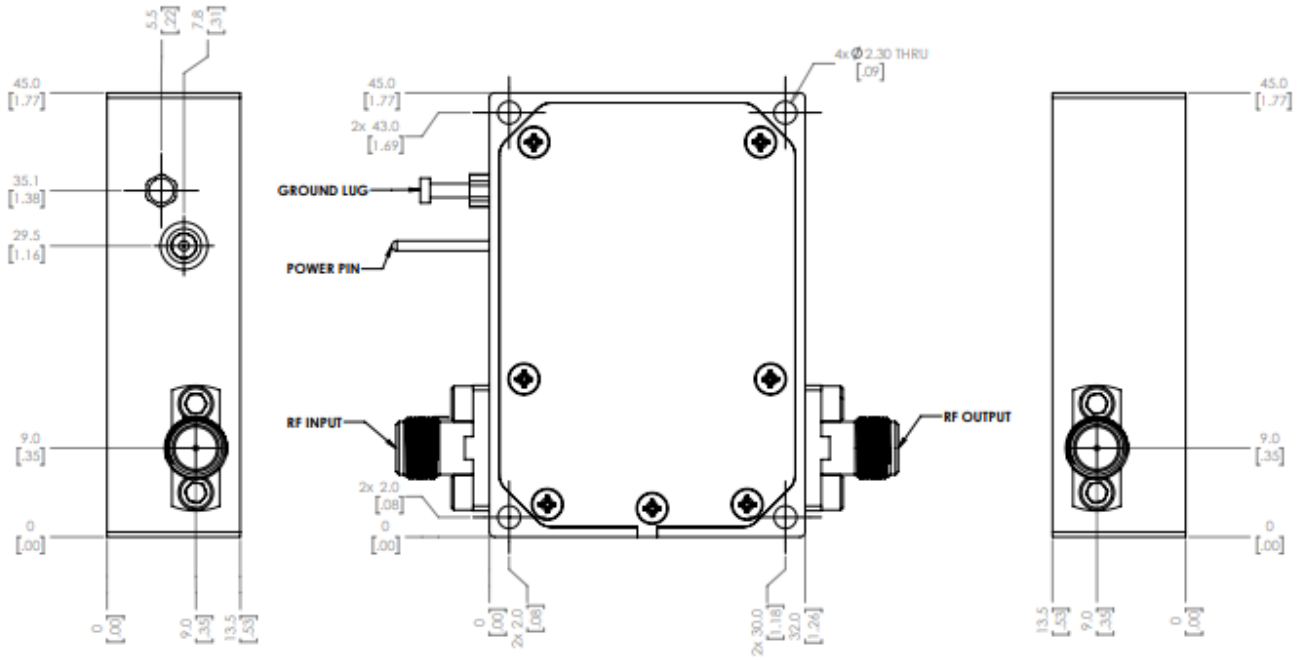
Right IM3 vs Output Power



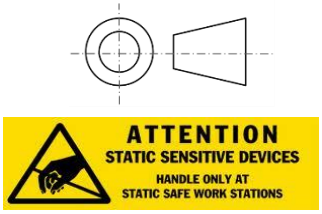
Delta IM3 vs Output Power



Outline Drawing



Notes:
1. Package Material: Aluminum and Copper
2. Plating: Gold
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
RLNA05M46GA	Input connector 2.4mm and Output connector 2.4mm	5MHz-46GHz 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 protection 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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