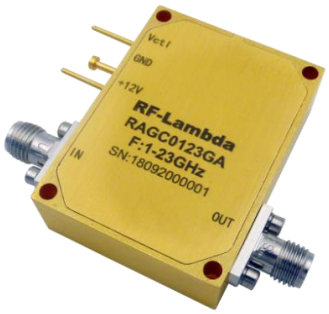
Wide Band Variable Gain Low Noise Amplifier
1GHz-23GHz



Product Description

RAGC0123GA is a wide band variable gain low noise amplifier with a frequency range of 1 to 23GHz.

The power output of this amplifier is 20dBm typical. The typical gain is 33dB with a flatness of ±2.0dB.

The working temperature of this product is between - 40℃ and + 85℃.

Features

- Wide Band Low Noise Amplifier
- Gain 33dB Typical
- P1dB Output Power 20dBm Typical
- Output Saturation Power 23dBm Typical
- Supply Voltage +12V
- 50 Ohm Matched Input/Output
- Low Noise Figure +3.0dB Typical
- Gain Flatness +/-2.0dB

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)， Vcc = +12V, Vctl= -1 to +2V

Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	1		2	2		20	20		23	GHz
Gain	32	37		28	35		26	33		dB
Gain Adjustable Range		30			30			30		dB
Gain Flatness		±2.0			±2.0	±3.0		±1.0	±2.0	dB
Gain Variation Over Temperature (-40℃ ~ +85℃)		±0.5			±1.0			±2.0		dB
Noise Figure		3.5	5.0		2.5	4.5		5.0		dB
Input VSWR		3.0			2.0	3.2		2.0	3.0	: 1
Output VSWR		2.5			1.8	2.8		2.0	2.5	: 1
Output 1dB Compression Point (P1dB)	19	21		17	20		15	17		dBm
Saturated Output Power (Psat)		23			22			19		dBm
Output Third Order Intercept (OIP3)		30			28			26		dBm
Isolation S12		-75			-65			-60		dB
Supply Current (Vcc=+12V, Vctl=-1 to +2V)		180	350		180	350		180	350	mA
Weight — Net	1.2 Max									Ounce
Weight — Including Heat Sink	3.1 Max									Ounce
Impedance	50									Ohms
Input / Output Connectors	SMA-Female (Input) – SMA-Female (Output)									
Package	Epoxy Sealed (Standard)									
	Hermetically Sealed (Optional)									

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Absolute Maximum Ratings

Parameter	Rating
Operating Voltage	+15V
Vg Control Voltage	-2V to +3V
*RF Input Power (RFIN)	+40dBm

Bias Up Procedure

1.Connect Ground Pin
2.Connect input and output
3.Connect +12V biasing
4.Connect Vctl Control

Bias Down Procedure

1.Turn off Vctl Control
2.Turn off +12V biasing
3.Remove RF connection
4.Remove Ground.

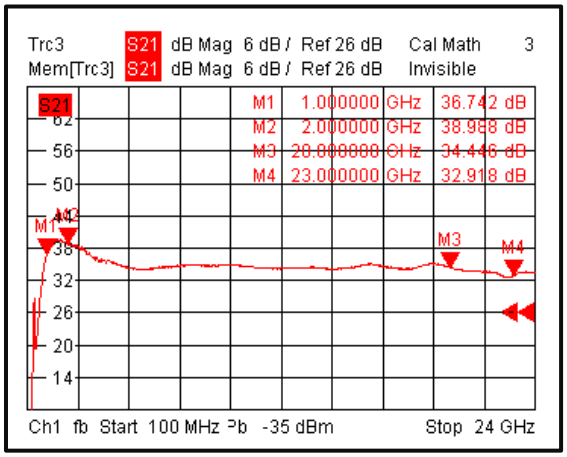
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40ºC to +85ºC (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 +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)

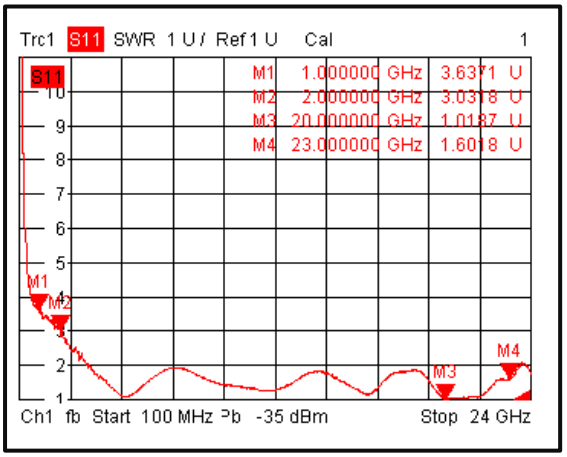
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

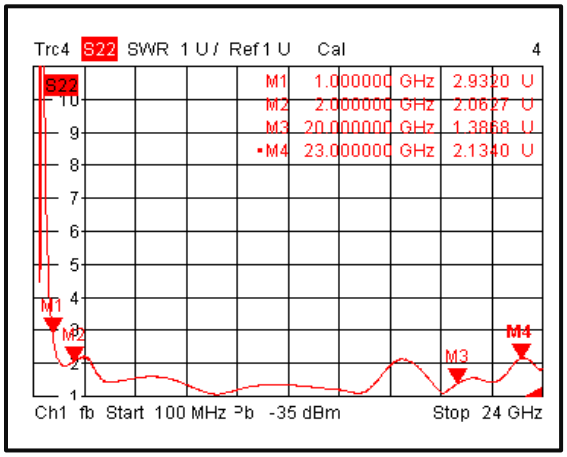
Gain@+25℃



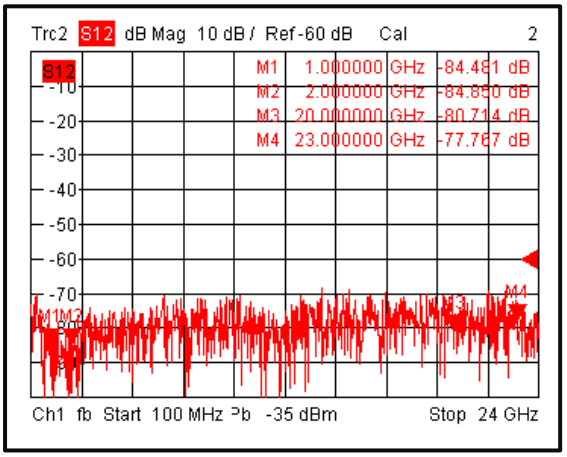
Input VSWR@+25℃



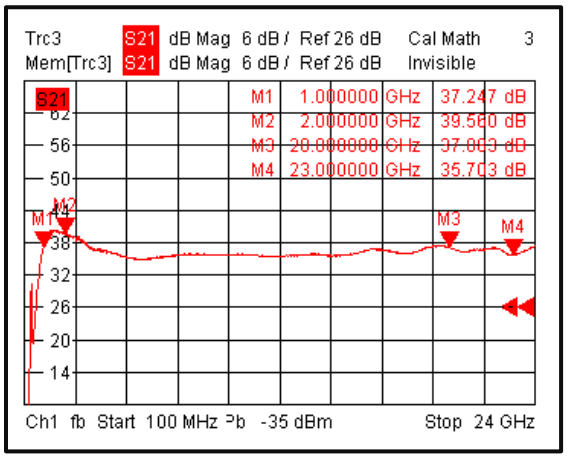
Output VSWR@+25℃



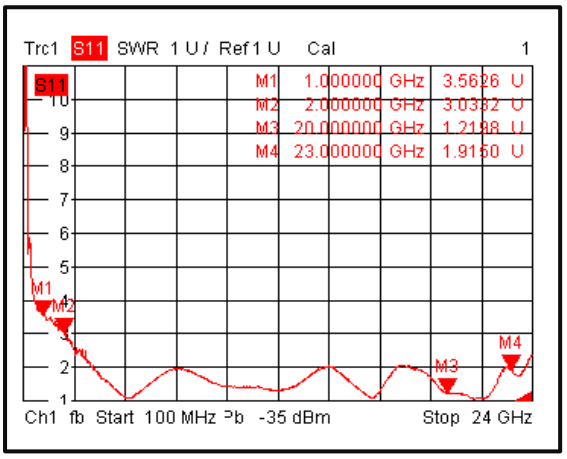
Isolation@+25℃



Gain@-40℃

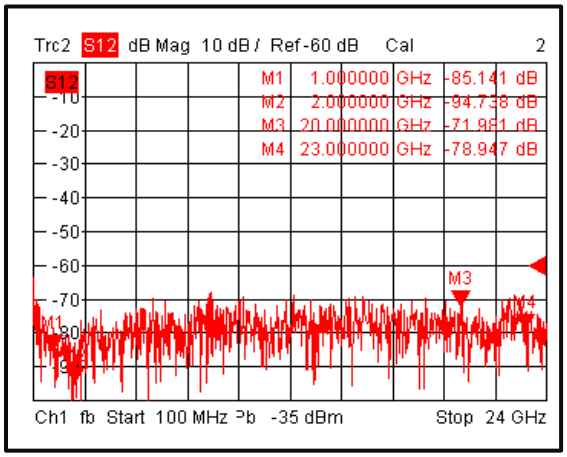


Input VSWR@-40℃

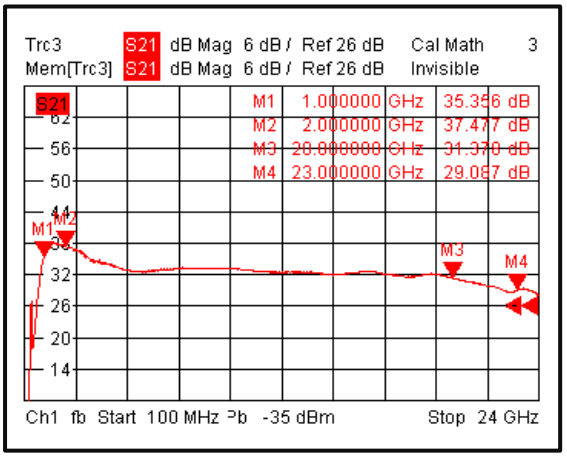


Typical Performance Plots

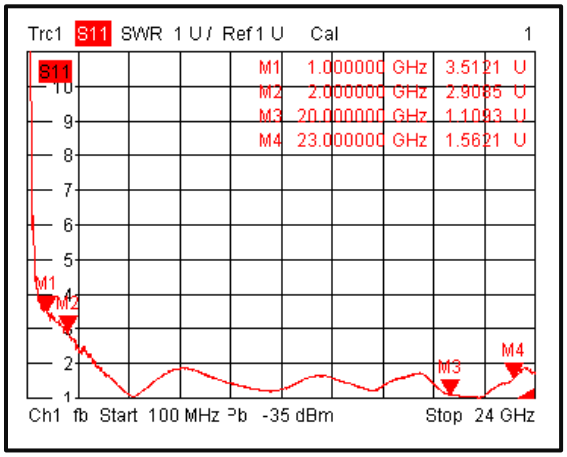
Isolation@-40℃



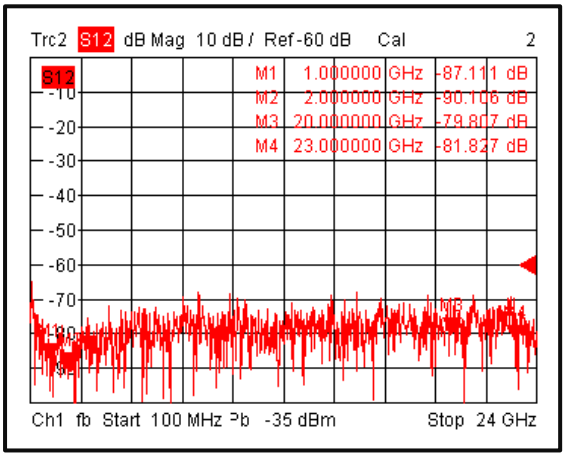
Gain@+85℃



Input VSWR@+85℃

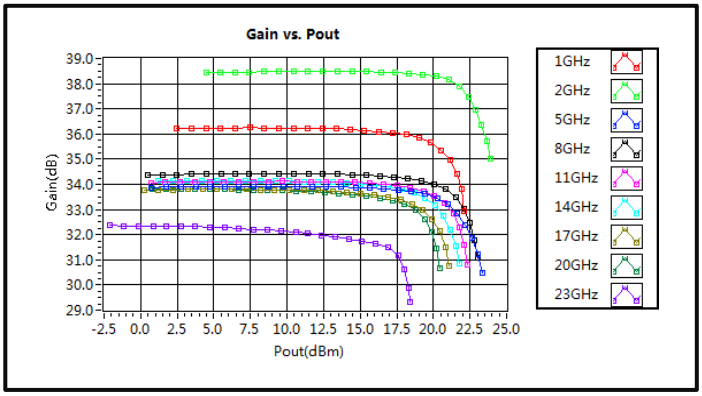


Isolation@+85℃

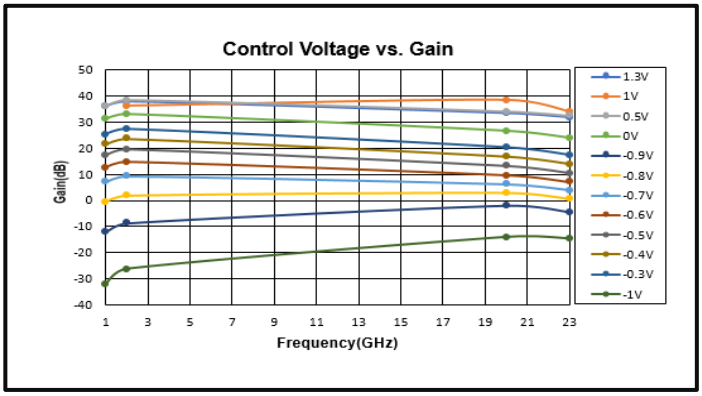


Typical Performance Plots

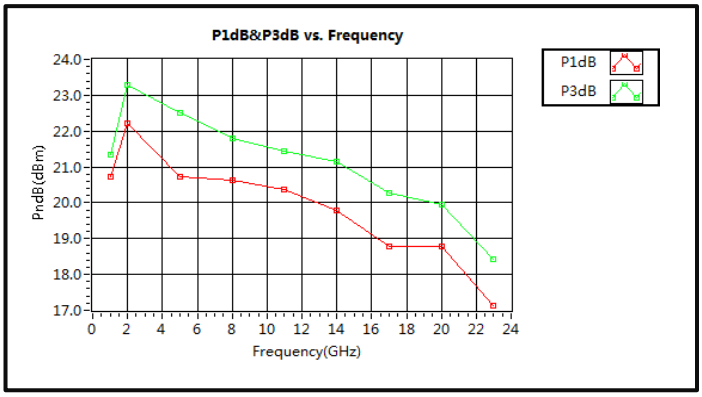
Gain vs. Output Power



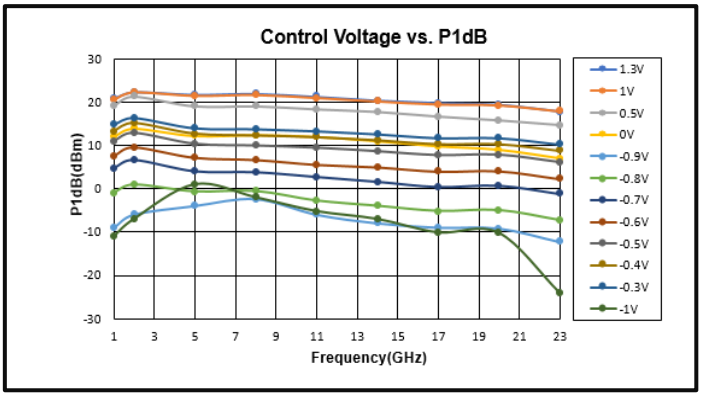
Control Voltage vs. Gain



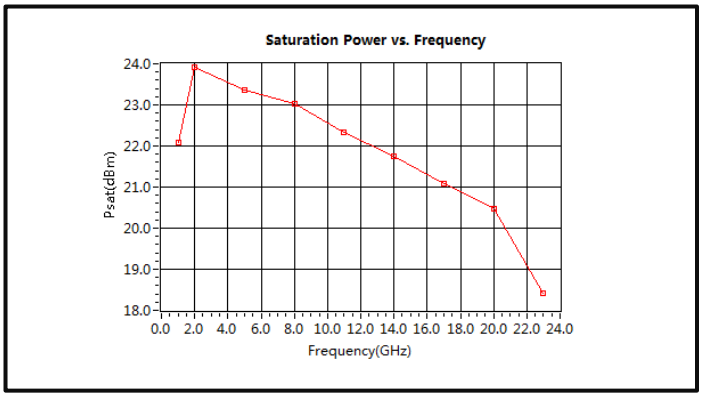
P1dB & P3dB vs. Frequency



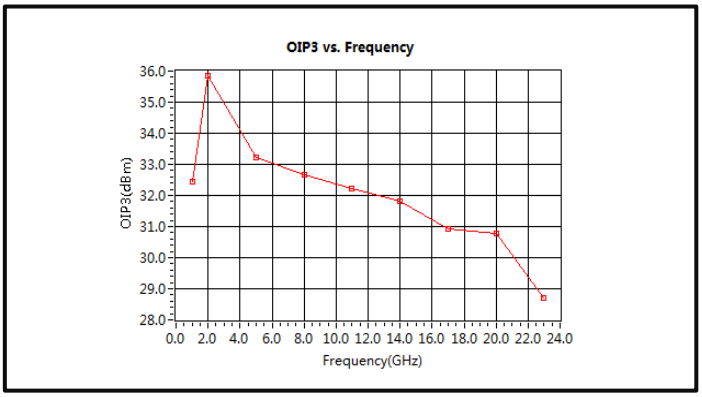
Control Voltage vs. P1dB



Saturation Power vs. Frequency

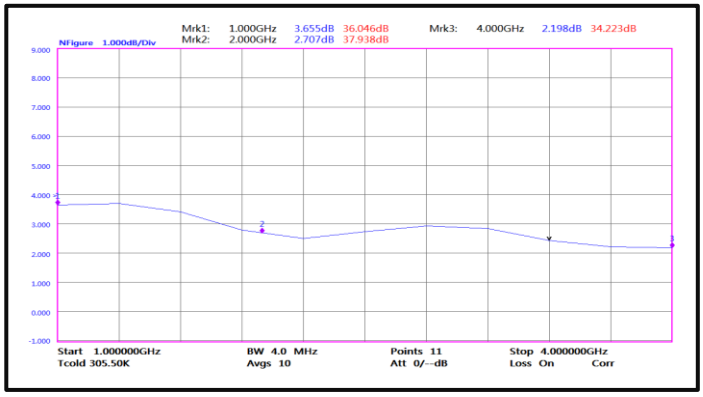


Output Third Order Intercept (OIP3)

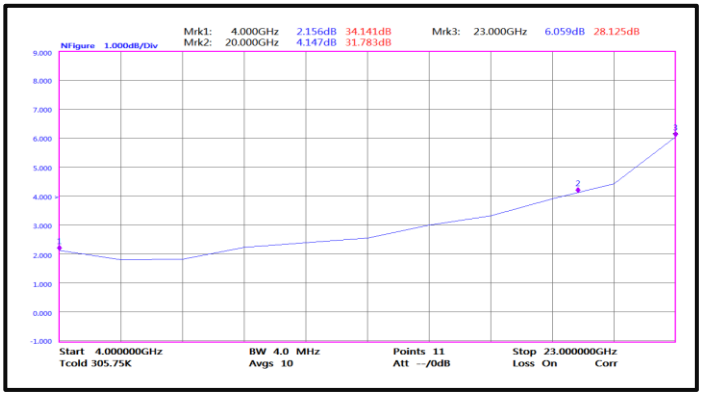


Typical Performance Plots

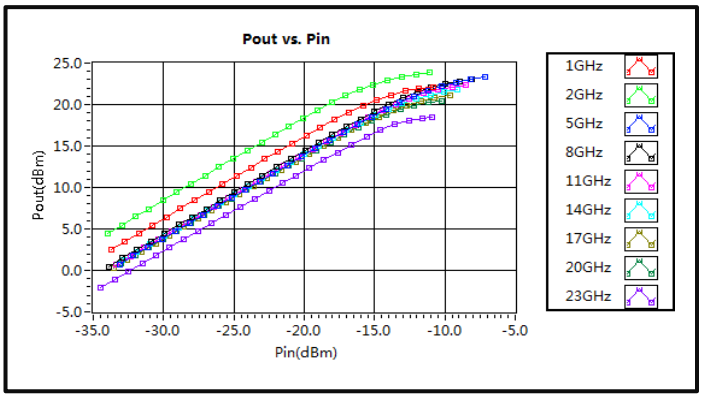
Noise Figure(1GHz-4GHz)



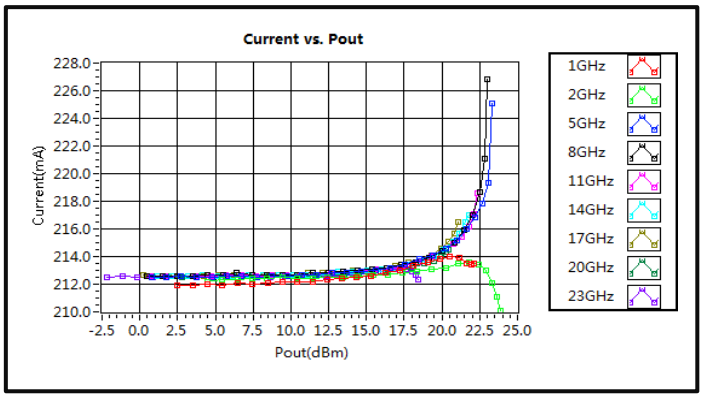
Noise Figure(4GHz-23GHz)



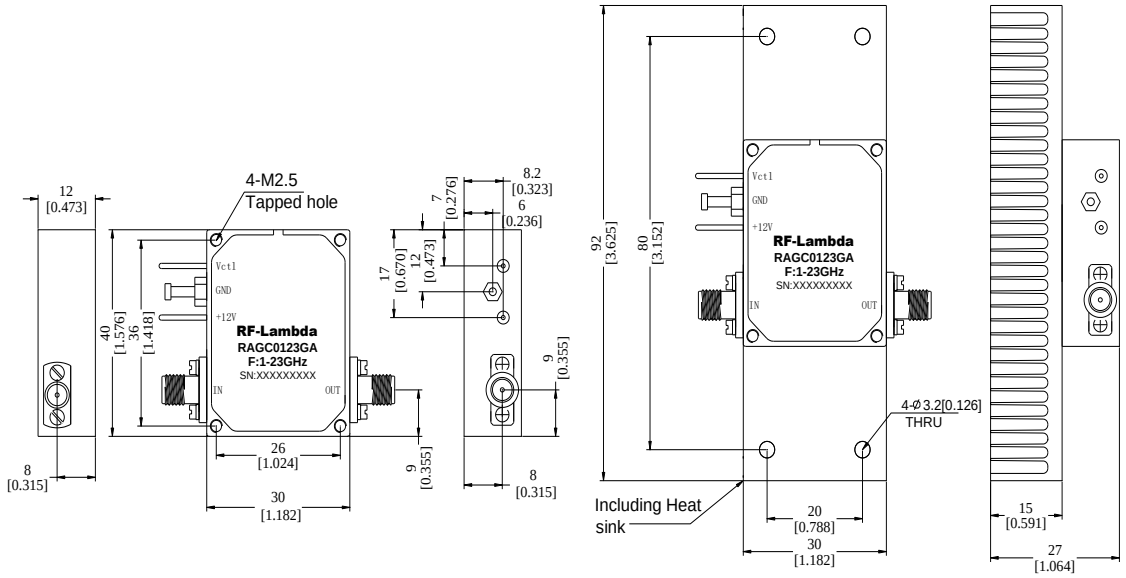
Pout vs. Pin



Current vs. Pout

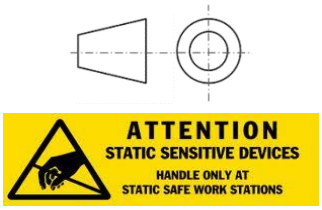


Outline Drawing



Notes:

1. Package Material: Aluminum
2. Finish: Gold Plated
3. All dimensions are in millimeters [inches].
4. Housing 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. 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
RAGC0123GA	Standard	1GHz-23GHz Low Noise 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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