

Ultra Broadband Low Noise Amplifier 40-80GHz



Note: The photo is for illustration purposes only.
Please refer to the outline drawing.

Product Description

R40G80GSA is a ultra broadband low noise amplifier with a frequency range of 40 to 80GHz.

The power output of this amplifier is 20dBm typical. The typical small signal gain is 17dB.

The power amplifier's input connector is 1.0mm and output connector is 1.0mm.

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

Features

- Wideband Low Noise Amplifier
- Small Signal Gain 17dB Typical
- P1dB Output Power 20dBm Typical
- Supply Voltage +5VDC
- 50 Ohm Matched Input/Output
- Low Noise Figure +7dB (typ)

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 ($T_A=+25^{\circ}\text{C}$)

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	45		75	40		80	GHz
Small Signal Gain		17			16		dB
Gain Flatness		±1.0			±2.5		dB
Gain Variation Over Temperature (-40°C~+85°C)		±1.5			±1.5		dB
Noise Figure		7.0			7.0		dB
Input Return Loss		16			16		dB
Output Return Loss		18			18		dB
*Output Power for 1 dB Compression (P1dB)		20			20		dBm
Output Third Order Intercept (OIP3)		29			29		dBm
Supply Current (Vcc=+5V)		600	900		600	900	mA
Isolation S12		-45			-45		dB
Weight			/				lbs.
Impedance			50				Ohms
Input / Output Connectors		1.0mm-Female (Input) – 1.0mm-Female(Output)					
Package Sealing	Epoxy Sealed (Standard)						
	Hermetically Sealed (Optional)						

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage	+5.5VDC
*RF Input Power (RFIN)	+10dBm

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.
4. Connect Negative supply and make sure power supply can handle max current.

Bias Down Procedure

1. Turn off power supply and remove positive supply
2. Turn off power supply and remove Negative supply
3. Disconnect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)
4. Remove ground

Environmental Specifications and Test Standards

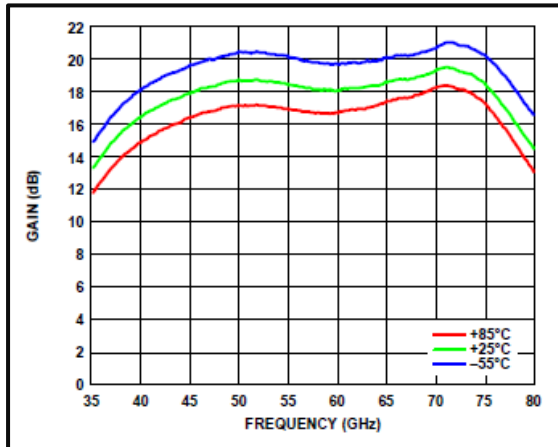
Parameter	Description
Operational Temperature	-40°C to +85°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for 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.

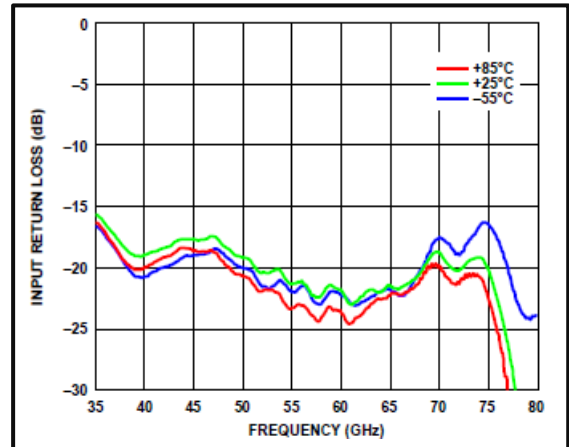
**For vibration testing details please see additional information section.

Typical Performance Plots

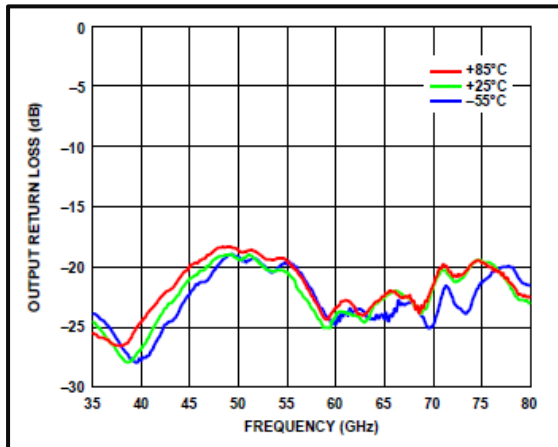
Gain vs. Output Power



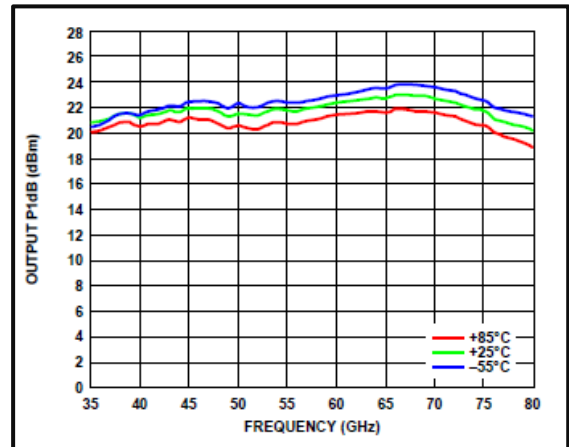
Input Return Loss



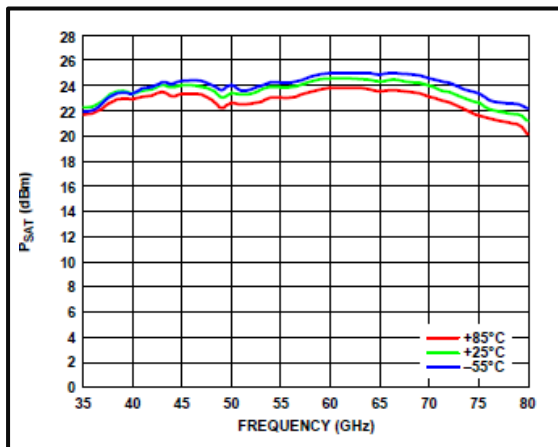
Output Return Loss



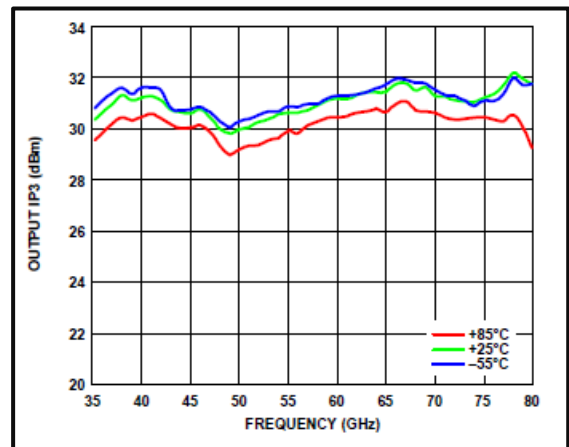
P1dB vs. Frequency



Saturation Power vs. Frequency

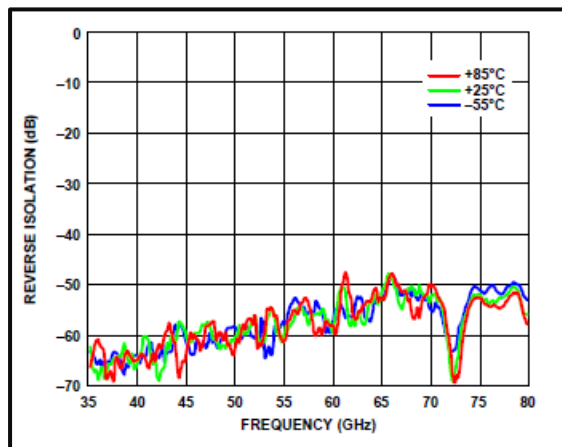


OIP3 vs. Frequency

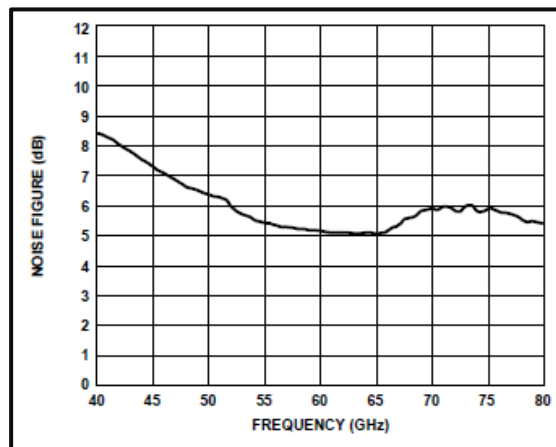


Typical Performance Plots

Reverse Isolation vs. Frequency

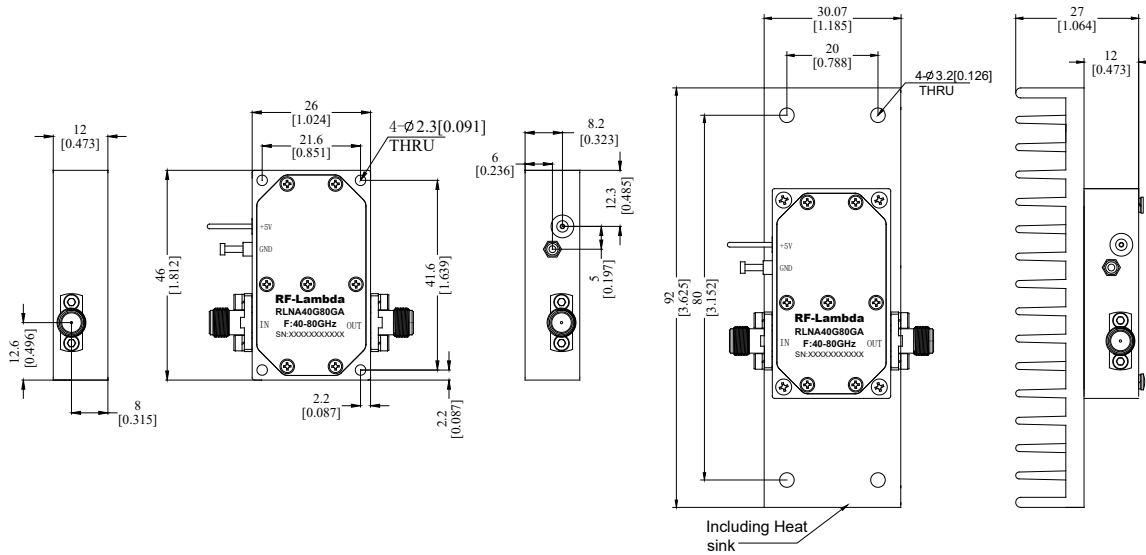


Noise Figure



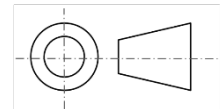
Outline Drawing

All dimensions are in millimeters [inches]



Notes:

1. Package Material: Aluminum and Copper
2. Plating: Gold/Nickel
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.1 [0.004] 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
R40G80GSA	Input connector 1.0mm and Output connector 1.0mm	40GHz-80GHz 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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