

Wideband 1.5-Watt Power Amplifier 39GHz-48GHz



Product Description

RP39G48GSPA is a wideband power amplifier with a frequency range of 39 to 48GHz.

The power output of this amplifier is 1.4 Watts typical. The typical small signal gain is 15dB with a variance of ± 3 dB. This performance is achieved through the use of GaN devices.

The power amplifier's input and output connectors are 2.4mm.

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

Features

- Wideband Solid State Power Amplifier
- Small Signal Gain 15 dB Typical
- Output Saturation Power 31.8dBm Typical
- Supply Voltage +6VDC
- 50 Ohm Matched Input/Output
- Drain Overvoltage Protection
- Drain 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 ($T_A = +25^\circ\text{C}$)

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range		39 – 43			43 – 48		GHz
Small Signal Gain		12			15		dB
Gain Variance		+/-3			+/-3		dB
Gain Variation Over Temperature (-40°C to +85°C)		+/-4			+/-4		dB
Input Return Loss		-8			-14		dB
*Saturated Output Power (Psat)		31.8			30.46		dBm
		1.5			1.1		Watts
Supply Current ($V_{CC} = +6\text{VDC}$)		2	4.5		2	4.5	A
Weight			0.12				lbs.
Impedance			50				Ohms
Input / Output Connectors					2.4mm-Female		
Package					Epoxy Sealed (Standard)		
					Hermetically Sealed (Optional)		

Note: Special screening is available with extra cost. Please inquire with sales.

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	+6.5VDC
*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 negative supply
4. Connect positive supply and make sure power supply can handle max current.

Bias Down Procedure

1. Turn off positive power supply
2. Remove positive supply Connection
3. Turn off negative power supply
4. Remove negative supply Connection
5. Remove RF Connection
6. Remove ground

Environmental Specifications and Test Standards

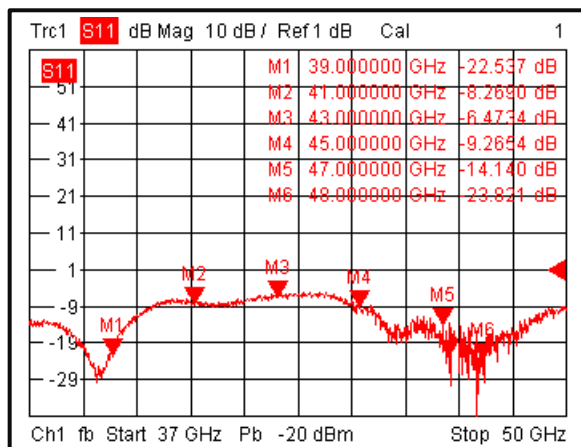
Parameter	Description
Operational Temperature	-40°C to +85°C (Case Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for 72 Hours
Shock	MIL-STD-202G Table 213-I, Test Condition Letter K 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)

Notes:

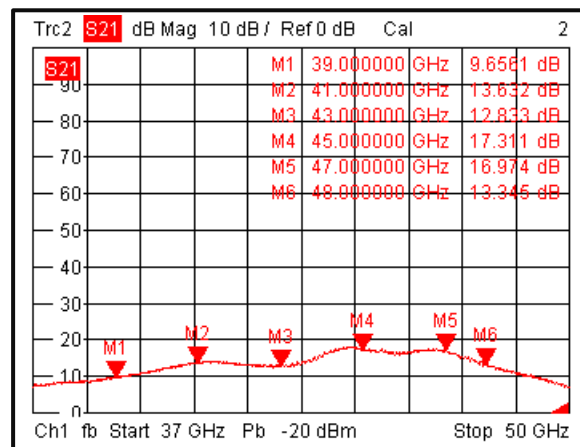
- Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
- For vibration testing details please see additional information section

Typical Performance Plots

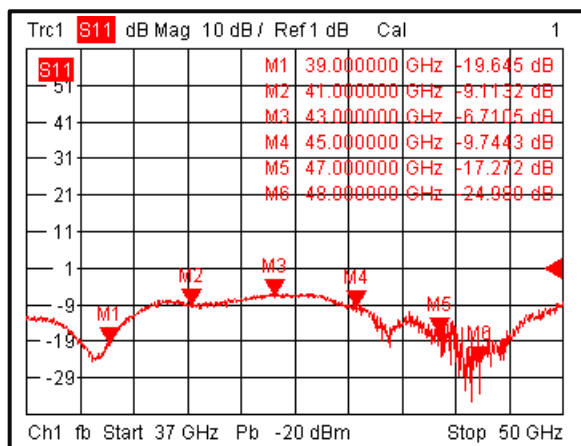
Input Return Loss @+25°C



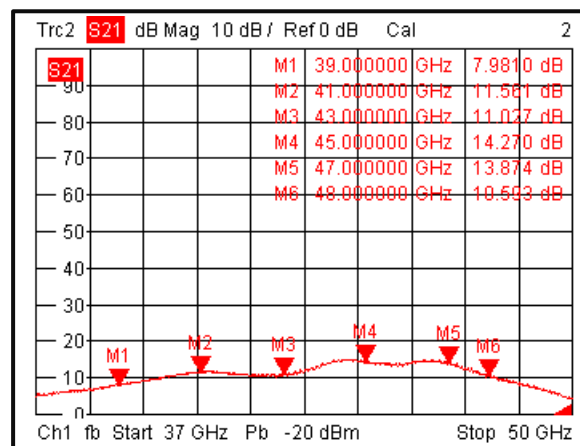
Gain vs. Frequency @+25°C



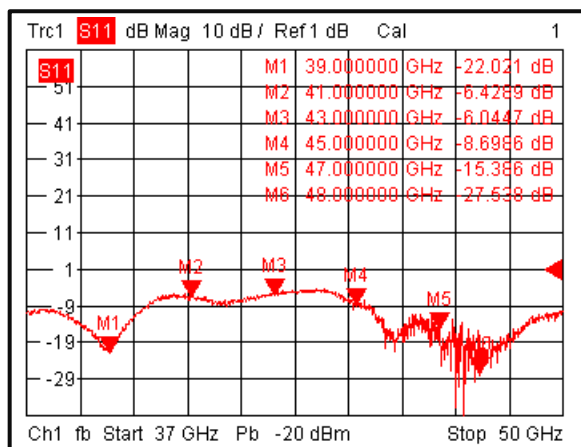
Input Return Loss @+85°C



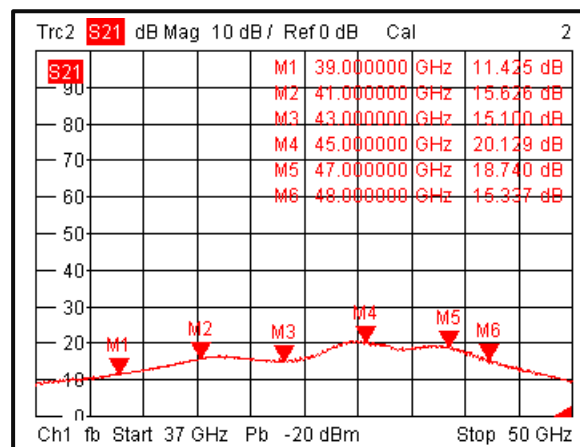
Gain vs. Frequency @+85°C



Input Return Loss @-40°C



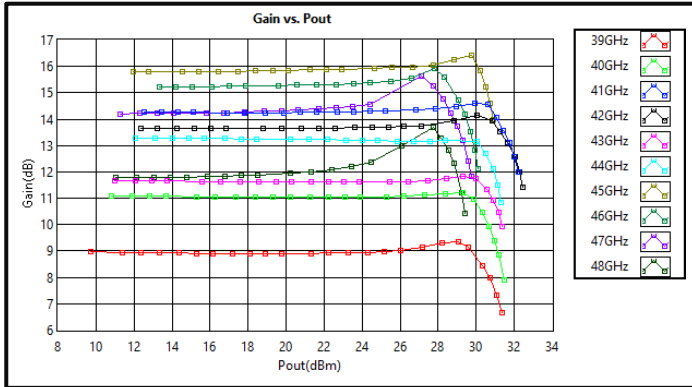
Gain vs. Frequency @-40°C



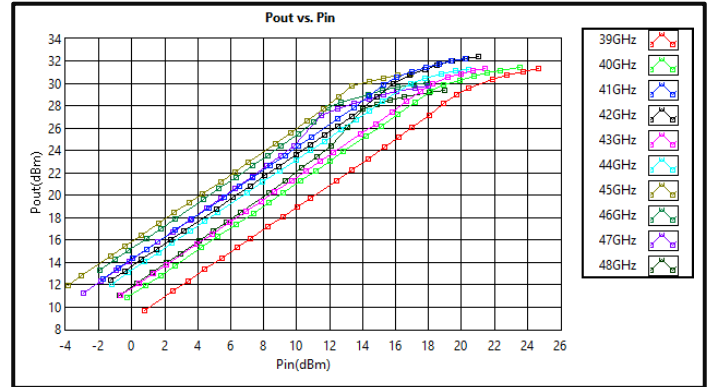
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

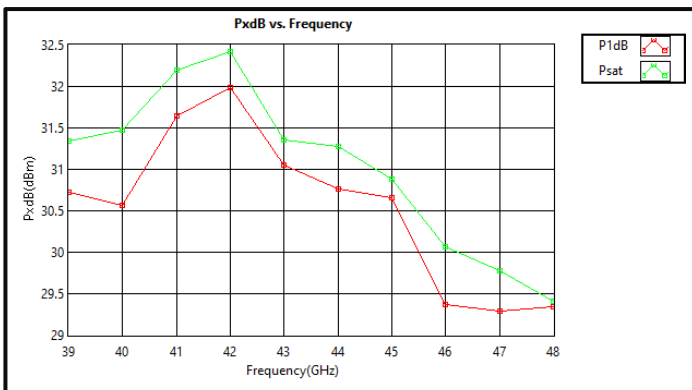
Gain vs Output Power CW



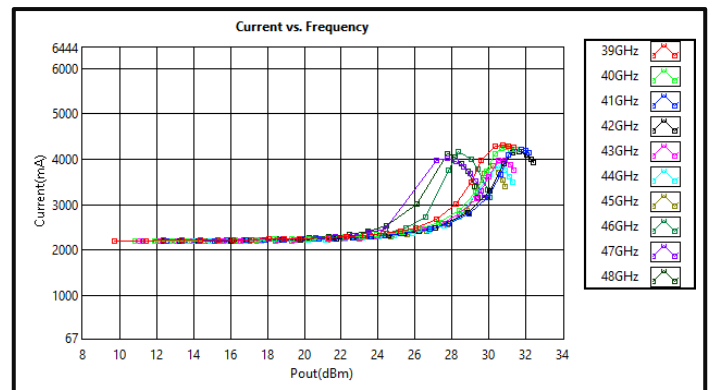
Output vs Input Power CW



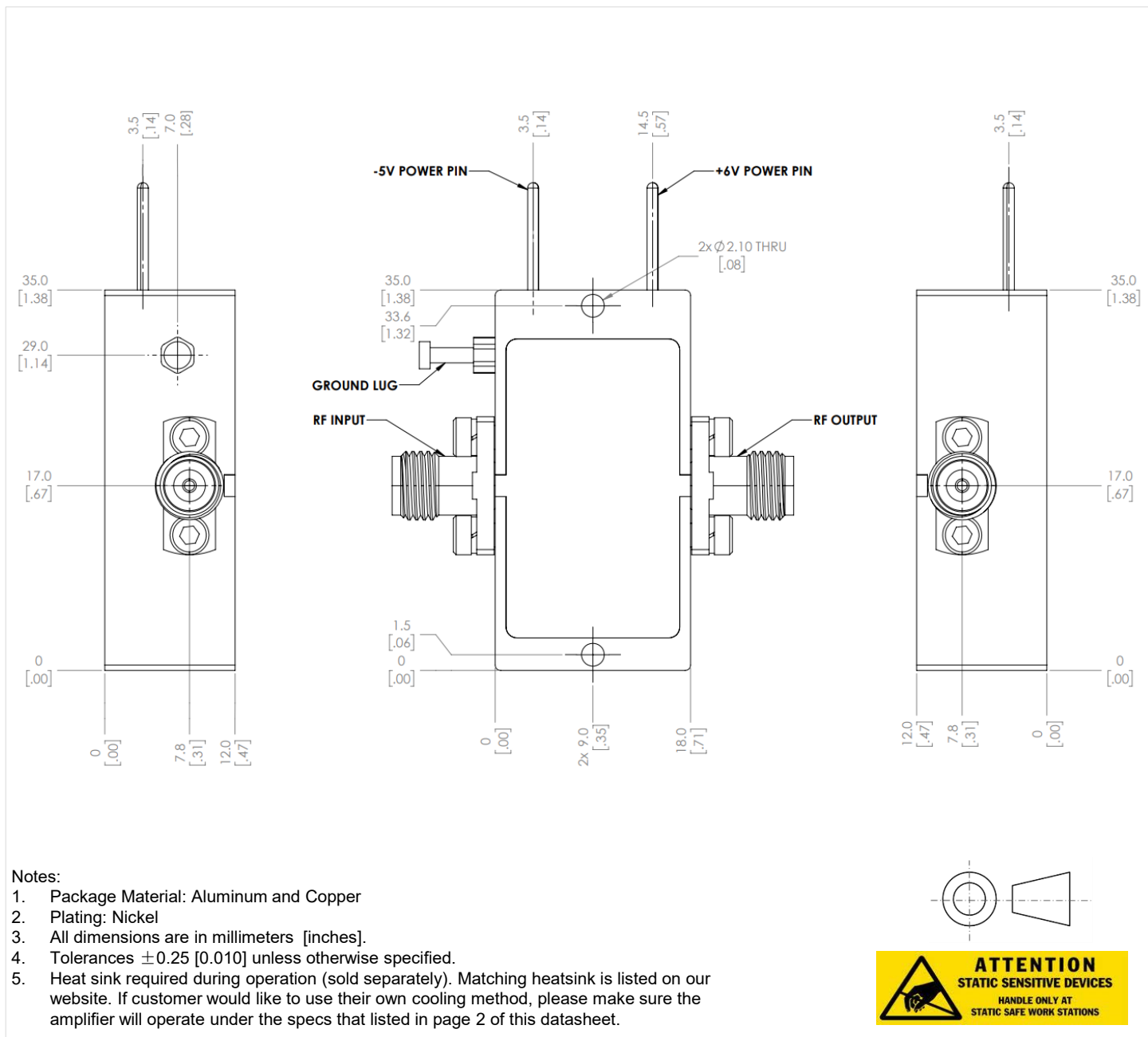
PxdB vs Frequency CW



Current vs Output Power (+6VDC)



Outline Drawing



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
RP39G48GSPA	Input connector 2.4mm and Output connector 2.4mm	39GHz-48GHz 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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