

## Wide Band Power Amplifier 10GHz-12GHz



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

### Product Description

RP10G12GSPB is a wideband power amplifier with a frequency range of 10 to 12GHz.

The power output of this amplifier is 51dBm typical. The typical small signal gain is 26dB with a gain flatness of  $\pm 3$ dB. This power amplifier works with a +48 VDC power supply.

The power amplifier's input and output connectors are SMA-female.

The operating temperature of this product is -45 to +55°C.

### Features

- Wide Band Power Amplifier
- Small Signal Gain 26dB Typical
- Output Saturation Power 51dBm Typical
- Supply Voltage +48VDC
- 50 Ohm Matched Input/Output
- Overcurrent Protection

### Typical Applications

- Wireless Infrastructure
- Military and Aerospace Applications
- Test Instrumentation
- Radar Systems
- Microwave Radio Systems
- TR Modules
- Research and Development

### Electrical Specifications (T<sub>A</sub>=+25°C)

Parameter	Min	Typ	Max	Units
Frequency Range		10-12		GHz
Gain		26		dB
Gain Flatness		$\pm 3$		dB
Gain Variation Over Temperature		$\pm 3$		dB
Input Return Loss		-21		dB
Output Return Loss		-30		dB
Output 1dB Compression Point (P1dB)		49		dBm
Saturated Power (Psat)		51		dBm
Output Third Order Intercept (IP3)		59		dBm
Supply Current (Vdd=+48V)		1.3	19	A
Power Supply		48	54	V
Isolation S12		25		dB
Weight		3.3		lbs.
Impedance		50		Ohms
Input / Output Connectors	SMA-Female			
Package	Epoxy Sealed (Standard)			
	Hermetically Sealed (Optional)			

\* P1dB, P3dB and Psat power testing signal: 200 $\mu$ s pulse width with 10% duty cycle.

\* For average CW power testing or increased duty cycle, a 5dB back off from Psat is required unless water/oil cooling system is applied.

**Absolute Maximum Ratings**

Parameter	Rating
Supply Voltage Range	+36 to +54VDC
*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**

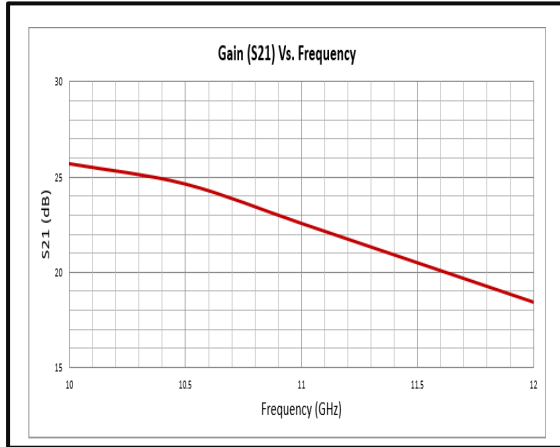
Parameter	Description
Operational Temperature	-45°C to +55°C (Case Temperature less than +85°C)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +55°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.

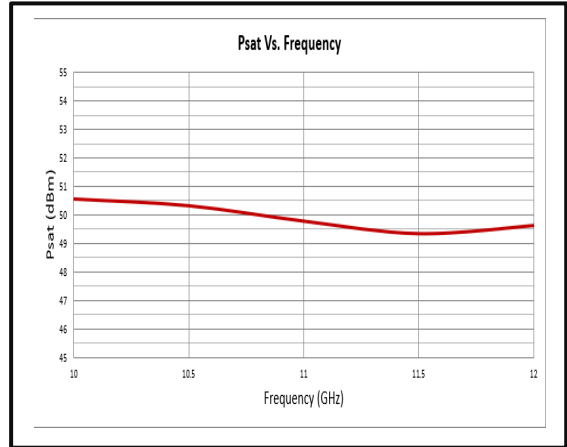
\*\*For vibration testing details please see additional information section.

**Typical Performance Plots**

**Gain**

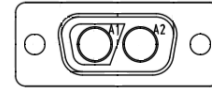


**Saturation Power vs. Frequency**



**Power Supply Connector Table**

Male D-Sub is on the housing, part number:09691100022  
The mating female part number: 09691000022



Pin #	Gender on the Housing	Function	Initial State	Description	Applied
A1	Female	VDC	VDC	Supply Voltage (this pin is up to 20A)	Yes
A2	Male	GND	GND	GND (this pin is up to 20A)	Yes

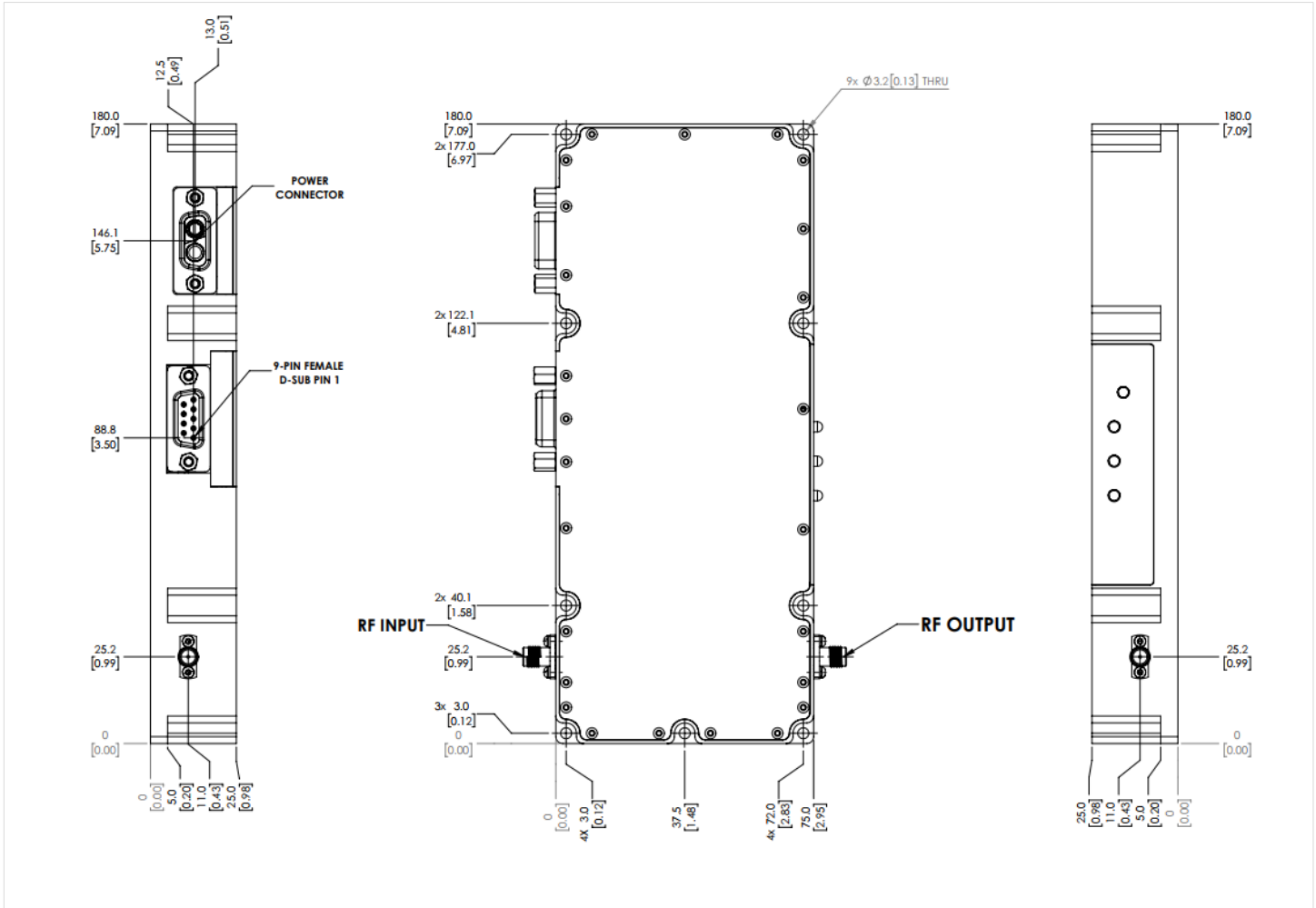
Notes:

- Matching connector and cable will be shipped with the product.
- If customer would like to use their own wires, 12 AWG wire is required for high current applications.

Female D-Sub is on the housing .

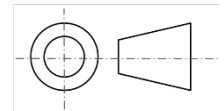
Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Current Over	Indicator	LOW	Pin will be latched to logic HIGH when drain current limit is reached	Yes
3	ID Signal	Indicator	---	Analog voltage that represents the current being drawn from the last stage of the amplifier	Yes
4	+5V	Power Supply	+5V	+5V DC is supplied for reference	Yes
5	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of amplifiers	Yes
6	Drain Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of amplifiers	Yes
7	TEMP Signal	Indicator	---	Analog voltage that represents the case temperature of the amplifier	Yes
8	TEMP over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when amplifier is driven over temperature	Yes
9	GND	---	---	GND (must be able to support 5A) Both GND pins must be tied together	Yes

**Outline Drawing**



**Notes:**

1. Package Material: Aluminum / Copper
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Tolerances  $\pm 0.25$  [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.
6. Standard torque wrench must be used to secure RF connectors
7. Final dimensions subject to change.



**Additional Information**

Documentation	Webpage
ESD Policy	<a href="https://rflambda.com/pdf/rflambda_esd_control.pdf">https://rflambda.com/pdf/rflambda_esd_control.pdf</a>
Heatsink Lookup Specifications	<a href="https://rflambda.com/search_heatsink.jsp">https://rflambda.com/search_heatsink.jsp</a>
Connector Torque Specifications	<a href="https://www.rflambda.com/pdf/Torque_Specifications.pdf">https://www.rflambda.com/pdf/Torque_Specifications.pdf</a>
Random Vibration Test Standard	<a href="https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf">https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf</a>

**Ordering Information**

Part Number	Modification	Description
RP10G12GSPB	Standard	10GHz-12GHz 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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