

140W Broadband High Power Amplifier 20MHz-520MHz



Product Description

RFLUPA0052G100A-B is a broadband high power with a frequency range of 20 to 520MHz.

The power output of this amplifier is 51.5dBm typical. The typical small signal gain is 50dB with a gain flatness of ± 1.0 dB. This power amplifier works with a +28VDC power supply.

The working temperature of this product is between -40°C and +70°C.

Features

- Broadband High Power Amplifier
- Small Signal Gain 50dB Typical
- RF Output Power 51.5dBm Typical
- Supply Voltage +28VDC
- 50 Ohm Matched Input / Output

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	20		70	70		520	MHz
Small Signal Gain	49	50		49	50		dB
Gain Flatness		± 1.0			± 1.0		dB
Gain Variation Over Temperature (-40°C~+70°C)		± 3.0			± 3.0		dB
Input VSWR		1.3	1.5		1.3	1.5	: 1
Output 1dB Compression Point (P1dB)		49			49		
Saturated Output Power (Psat)	48.5	50		50	51.5		dBm
IM3		15			15		dBc
Isolation S12		-50			-50		dB
Supply Current (Vcc=+28V)			2.5 Typ. 13.5 Max.				A
Efficiency @ P1dB			40				%
Turn On/Off Speed (Switch Disable)	ON		200				ns
	OFF		200				ns
Weight			1.77 Max.				lbs.
Impedance			50				Ohms
Input / Output Connectors			SMA - Female(Input) – SMA - Female(Output)				
DC Interface Connector			D-Sub9-Pin (Male)				
Package			Epoxy Sealed (Standard)				
			Hermetically Sealed (Optional)				

Absolute Maximum Ratings

Parameter	Rating
Operating Voltage	+32V
RF Input Power	Psat – Large Signal Gain
Load VSWR @ POUT =50W	∞ @ all load phase & amplitude for duration of 1 minute ; 3:1 @ all load phase & amplitude continuous

Bias Up Procedure

- 1.Connect Ground Pin
- 2.Connect input and output
- 3.Connect +28V biasing

Bias Down Procedure

- 1.Turn off +28V biasing
- 2.Remove RF connection
- 3.Remove Ground.

Environmental Specifications and Test Standards

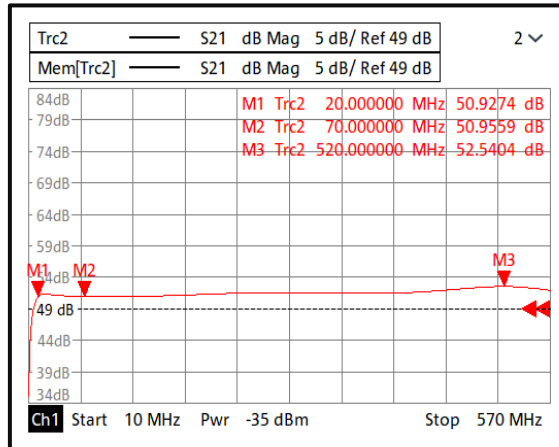
Parameter	Description
Operational Temperature	-40°C to +70°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +70°C for 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.

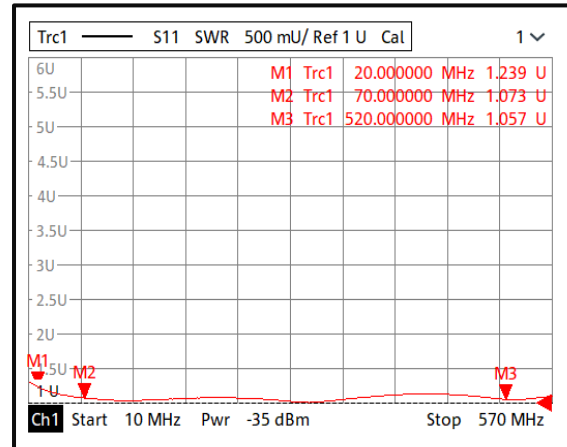
**For vibration testing details please see additional information section.

Typical Performance Plots

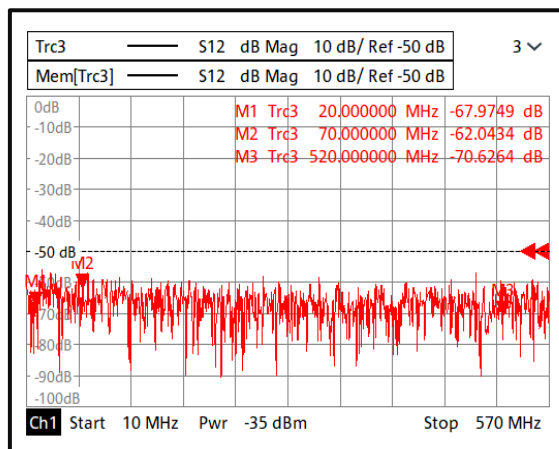
Gain @+25°C



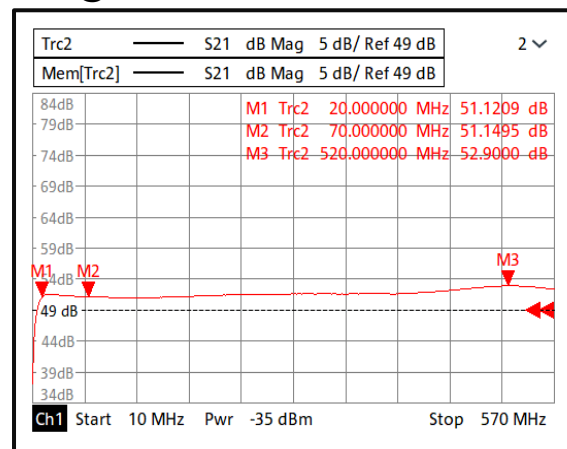
Input VSWR @+25°C



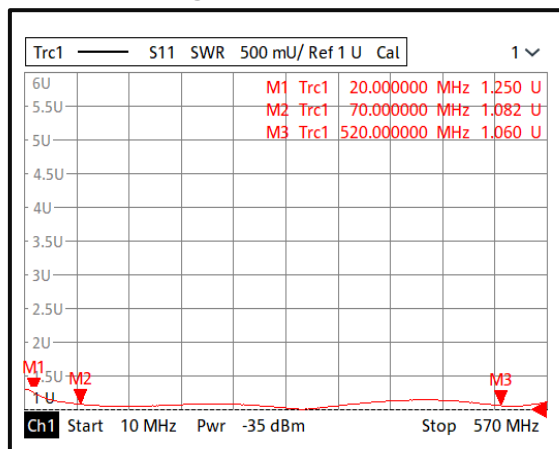
Isolation @+25°C



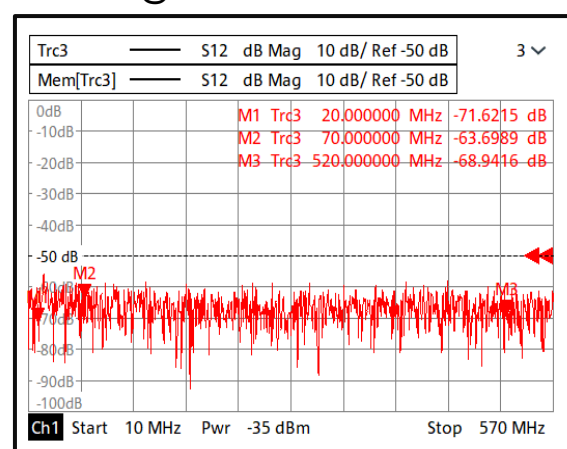
Gain @-40°C



Input VSWR @-40°C



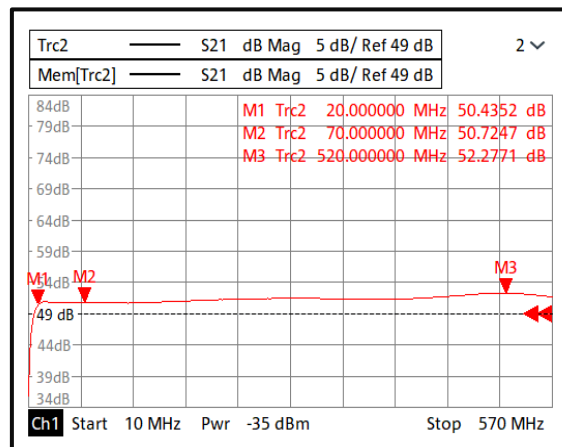
Isolation @-40°C



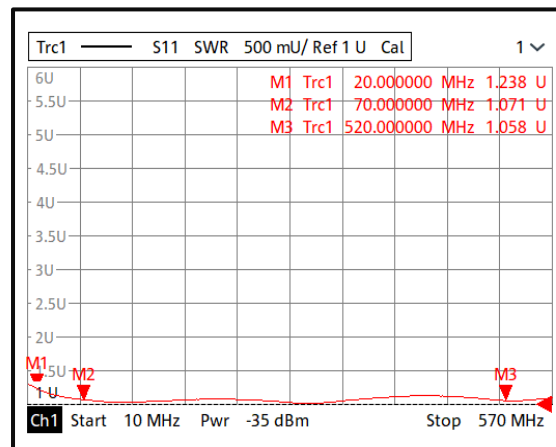
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

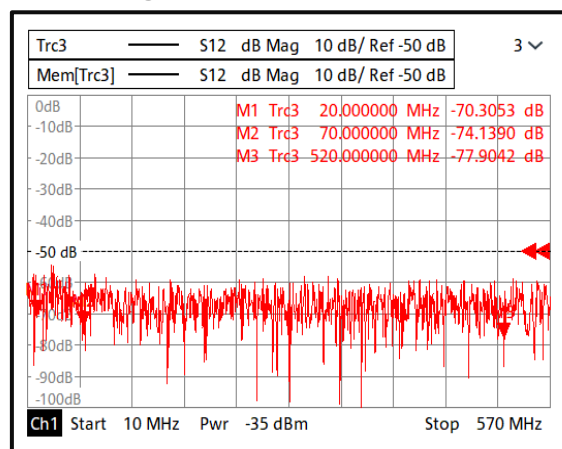
Gain @+70°C



Input VSWR @+70°C



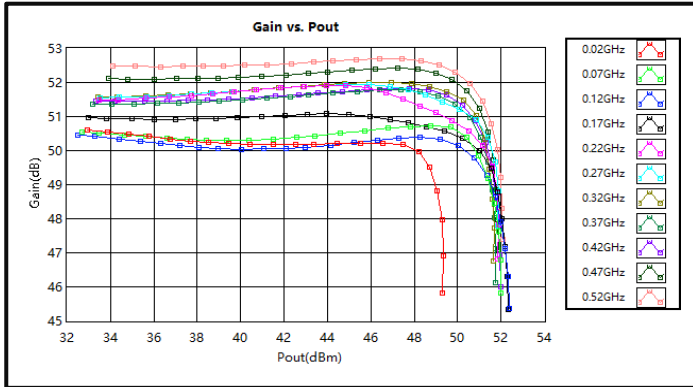
Isolation @+70°C



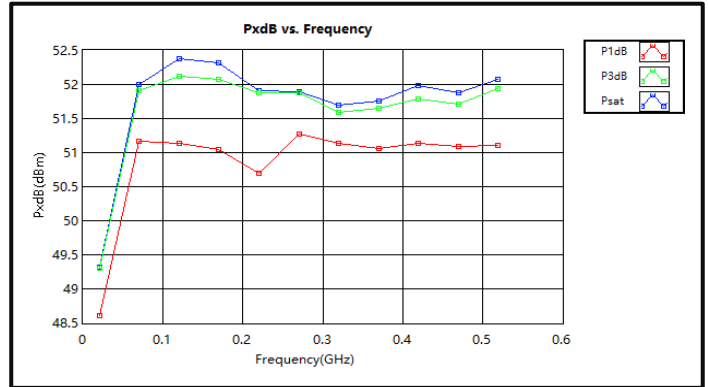
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

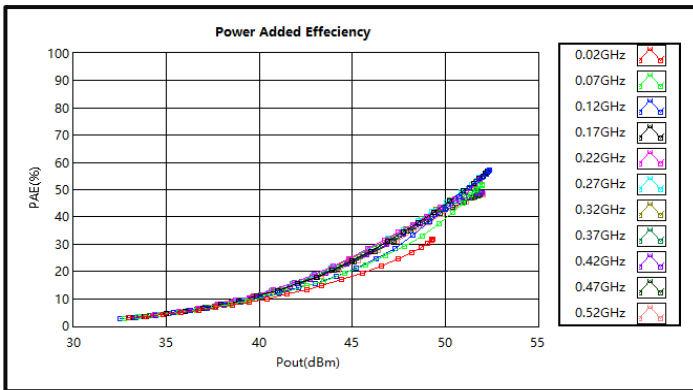
Gain vs. Output Power CW



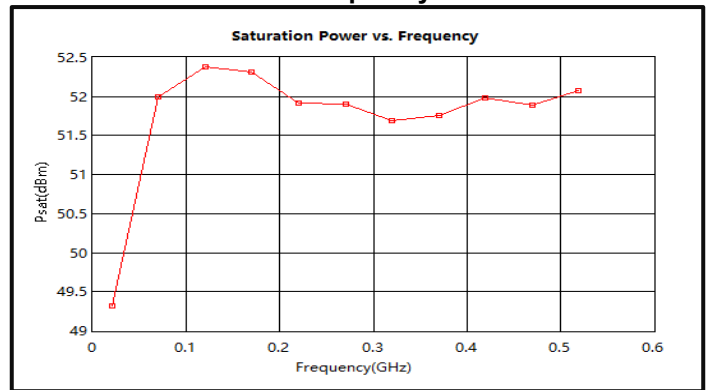
PndB vs. Frequency CW



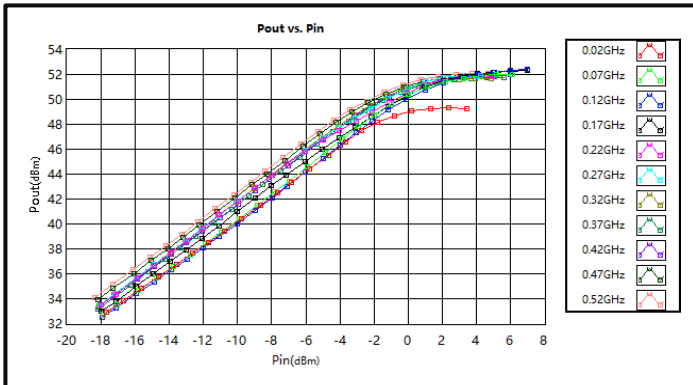
Power Added Efficiency CW



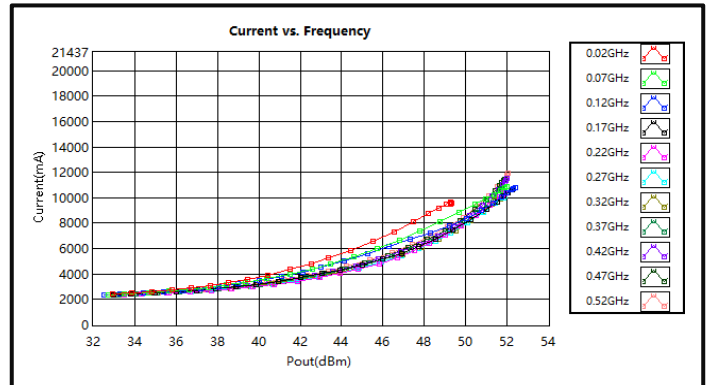
Saturation Power vs. Frequency CW



Pout vs. Pin CW

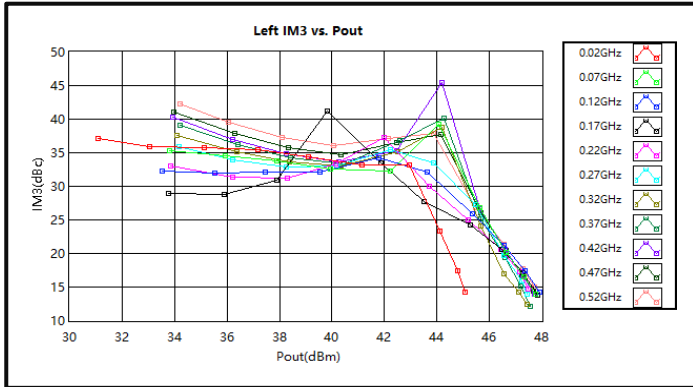


Current vs. Pout CW

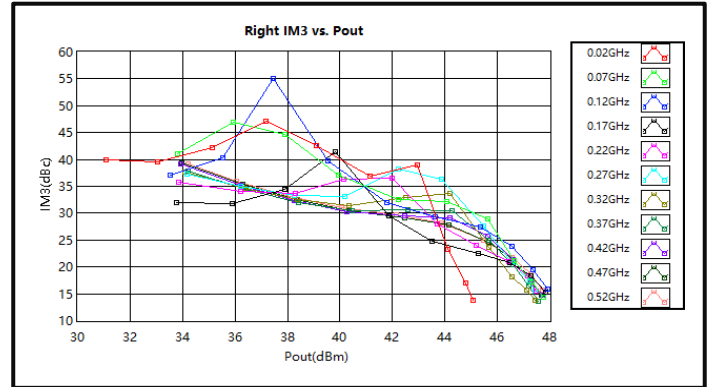


Typical Performance Plots

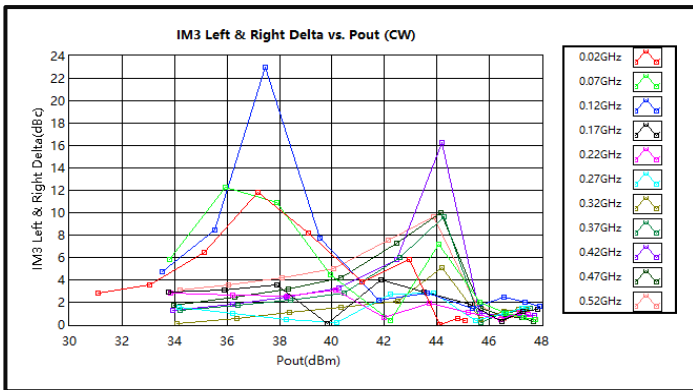
Left IM3 vs. Pout CW



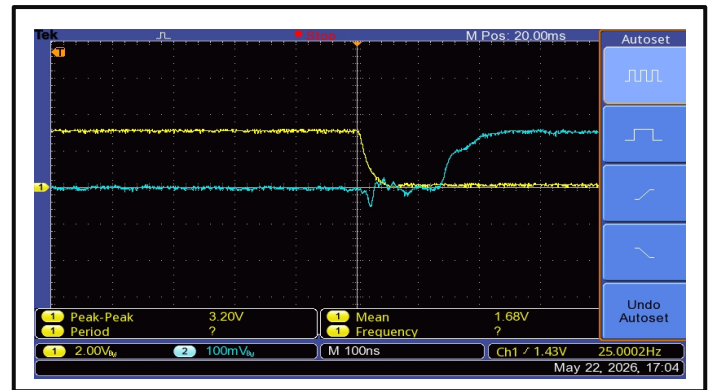
Right IM3 vs. Pout CW



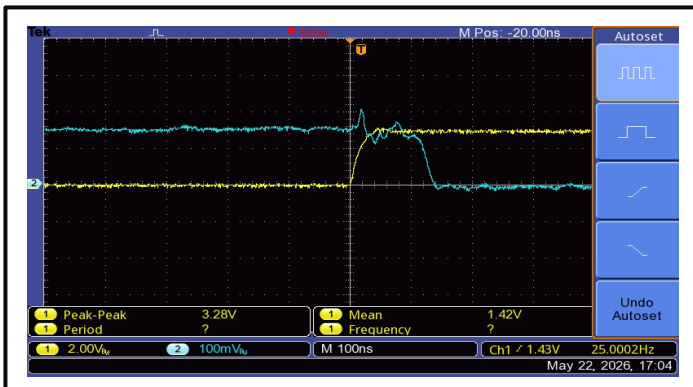
Delta IM3 vs. Pout CW



Speed

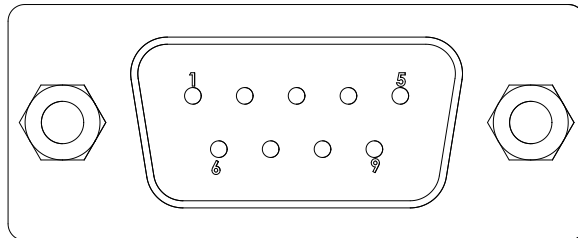


Speed



Note: IM3 test performed with 1MHz tone spacing

DC Interface Connector

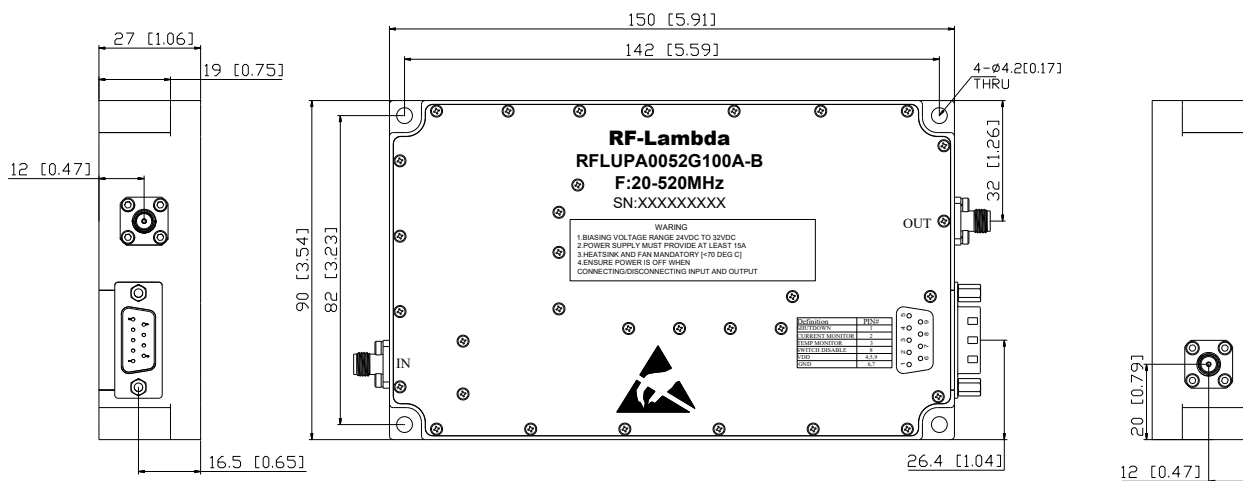


Pin #	Description	Specifications
1	Shutdown	Amplifier Disable: TTL Logic High (3.3V) (Internally Pulled-Low)
2	Current Monitor	Analog voltage relative to IDD @ 100mV per Ampere
3	Temp Monitor	Analog voltage relative to Module's Temperature (500mV+10 mV/°C)
8	Switch Disable	Applying logic HIGH disconnect RF signal of amplifiers
4,5,9	VDD	+28VDC
6,7	GND	Ground

Notes:

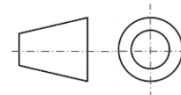
- HIGH/LOW voltages are standard TTL signals 0V to 0.8V = LOW. 2.8V to 5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 200mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Aluminum.
2. Finish: Conductive Oxidation Wire Drawing.
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.5 [0.02] unless otherwise specified (Excluding 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.



Packing List

ID	Description	QTY
1	Fig a. DB9 cable (RFCBLADB9)	1
2	Fig b. Screws (#4-40*5+6)	2

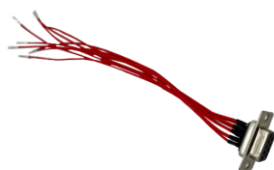


Fig a.



Fig b.

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
RFLUPA0052G100A-B	Standard	20MHz-520MHz 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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