

Wide Band Power Amplifier 50MHz-500MHz



Product Description

RFLUPA50M500M is a wide band power amplifier with a frequency range of 50 to 500MHz.

The power output of this amplifier is 53dBm typical. The typical small signal gain is 53dB with a gain flatness of ± 3.0 dB. This power amplifier works with a +48VDC power supply.

The working temperature of this product is between - 40°C and + 60°C.

Features

- Wide band Power Amplifier
- Small Signal Gain 53dB Typical
- Output Saturation Power 53dBm Typical
- Supply Voltage +48VDC
- 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°C)

Parameter	Min	Typ	Max	Units
Frequency Range	50		500	MHz
Gain	48	53		dB
Gain Flatness		± 3.0		dB
Gain Variation Over Temperature (-40°C~+60°C)		± 3.0		dB
Input VSWR		1.5		: 1
*Saturated Output Power (P _{sat})		53		dBm
Supply Current (V _{cc} =+48V)		8.5	13	A
Isolation S12		-55		dB
Efficiency @ P _{sat}		30		%
Weight	Net	2.8 Max.		lbs.
	Including Heat sink	8.6 Max.		
Impedance		50		Ohms
Input / Output Connectors	SMA- Female(Input) – SMA- Female(Output)			
Package	Epoxy Sealed (Standard)			
	Hermetically Sealed (Optional)			

* P1dB, P3dB and P_{sat} power test signal: 200 μ s pulse width with 10% duty cycle.

* For average CW power testing or increased duty cycle, a 5dB back off from P_{sat} is required.

Absolute Maximum Ratings

Parameter	Rating
Operating Voltage	+50VDC
*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.

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

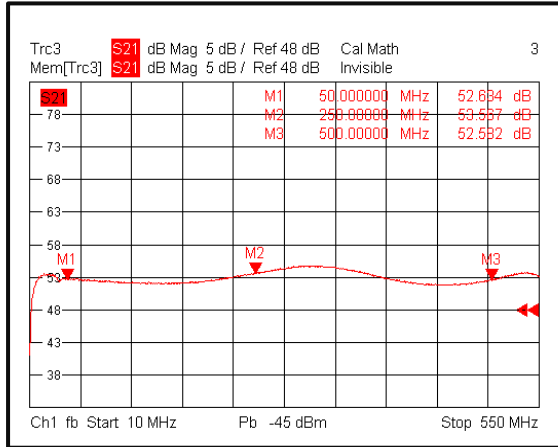
Parameter	Description
Operational Temperature	-40°C to +60°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +60°C for 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.

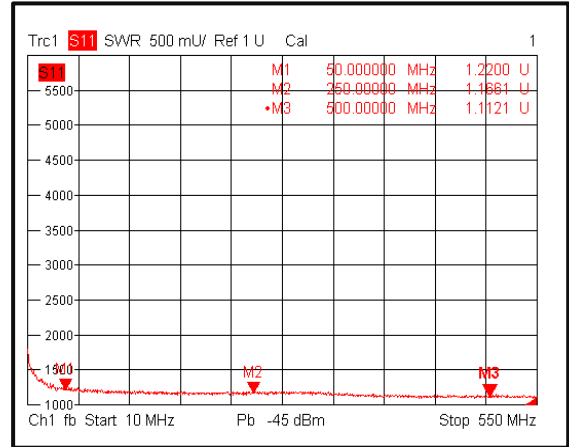
**For vibration testing details please see additional information section.

Typical Performance Plots

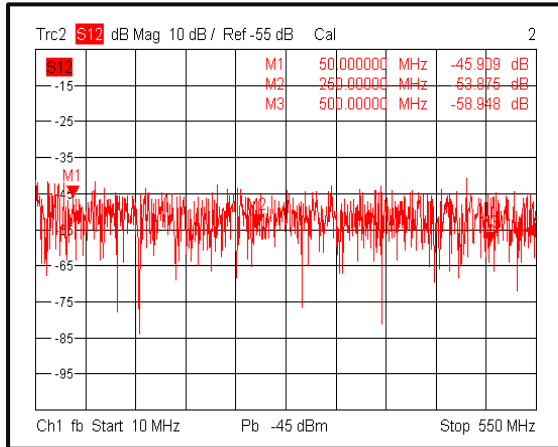
Gain@+25°C



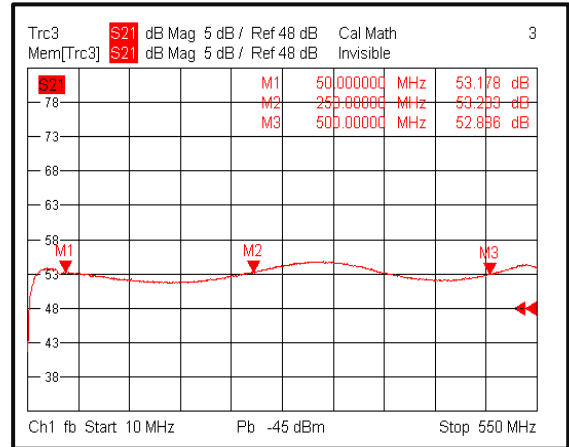
Input VSWR @+25°C



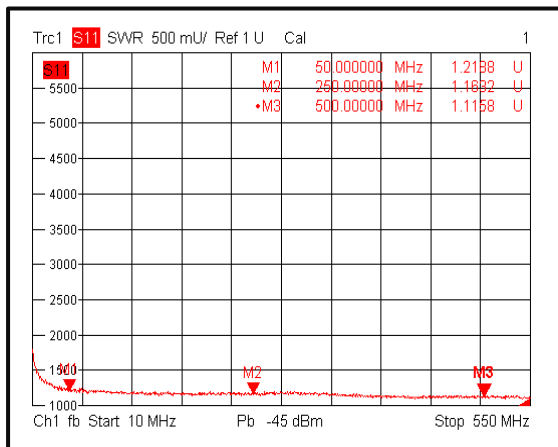
Isolation@+25°C



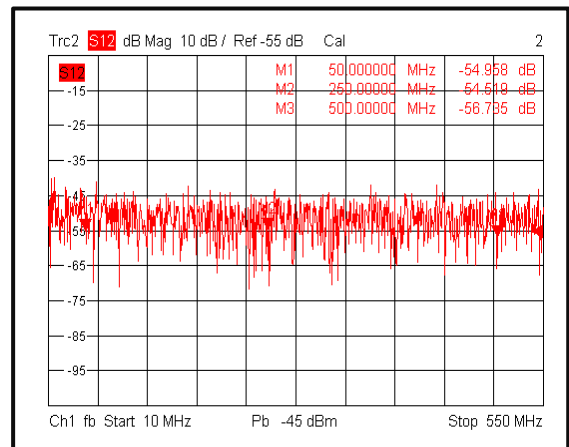
Gain @-40°C



Input VSWR @-40°C

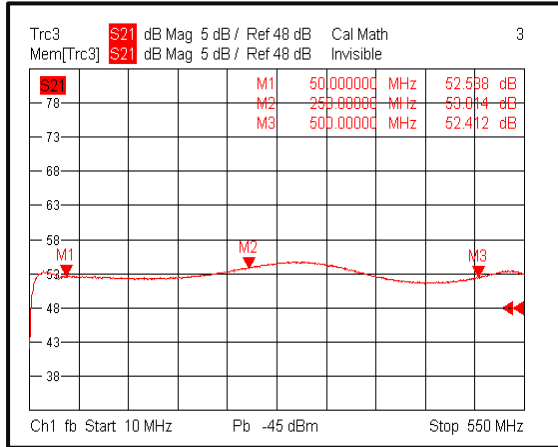


Isolation @-40°C

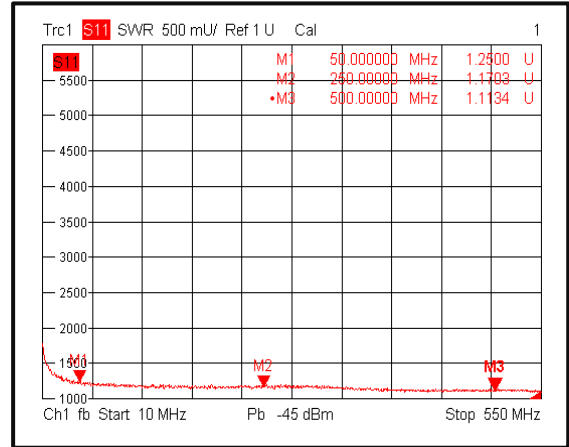


Typical Performance Plots

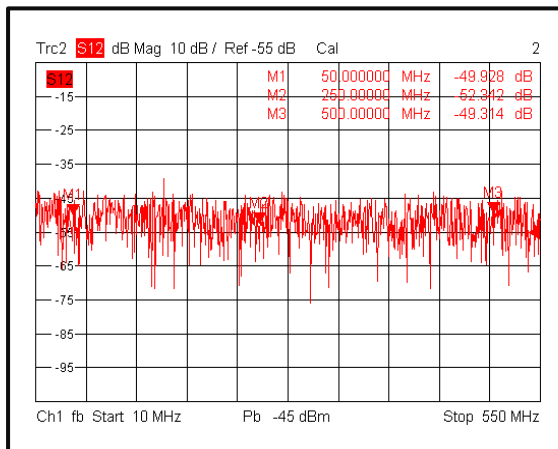
Gain@+60°C



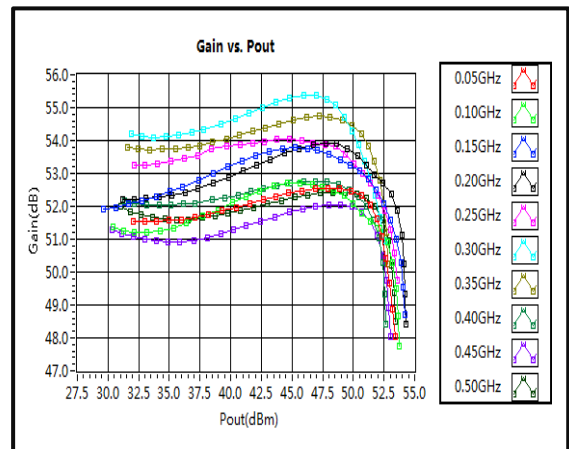
Input VSWR @+60°C



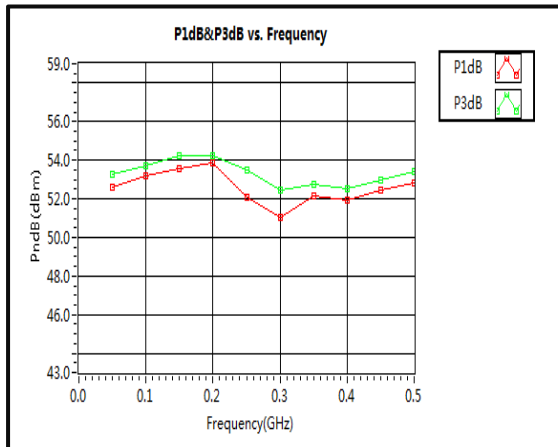
Isolation@+60°C



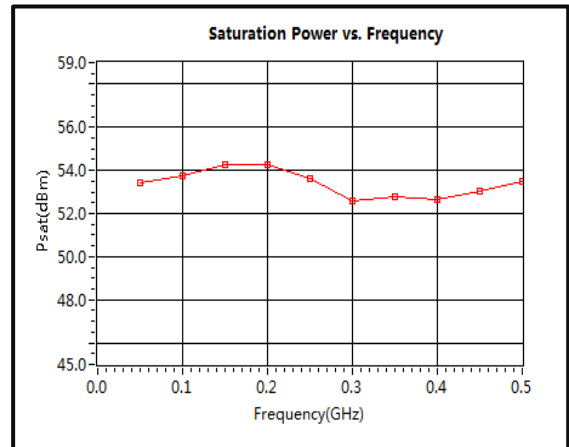
Gain vs. Output Power



P1dB & P3dB vs. Frequency

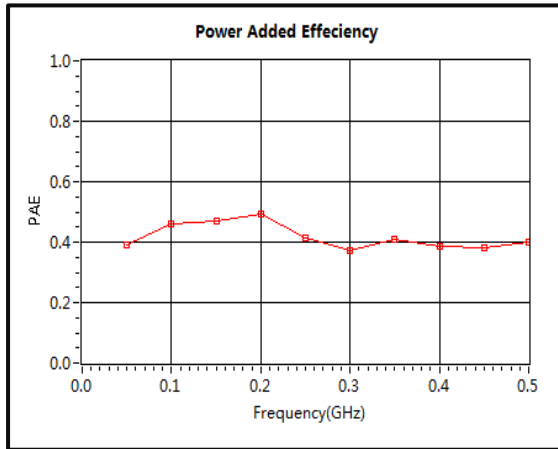


Saturation Power vs. Frequency

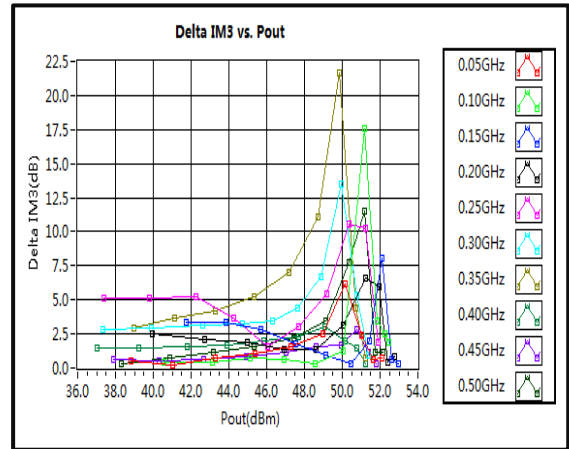


Typical Performance Plots

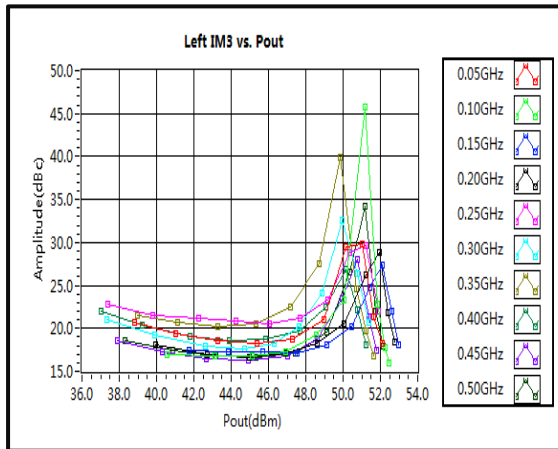
Power Added Efficiency



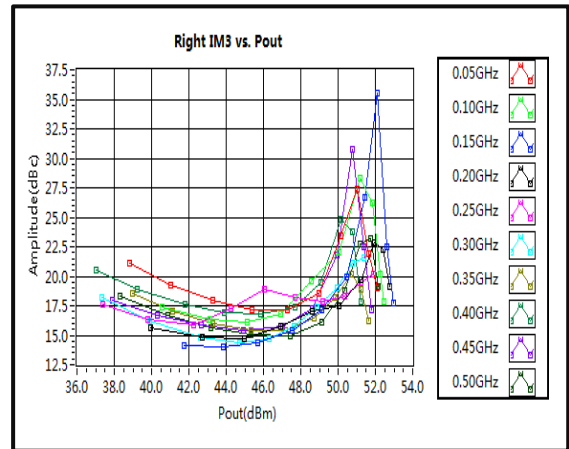
Delta IM3 vs. Pout



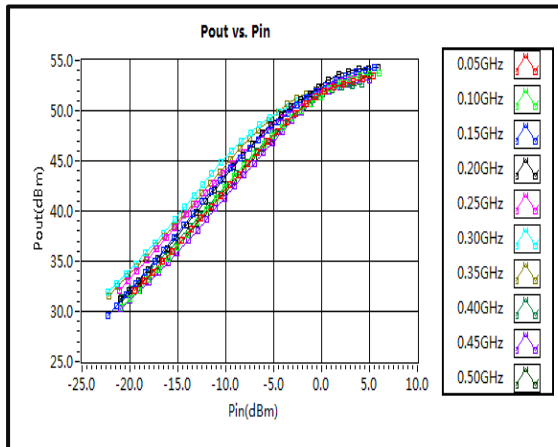
Left IM3 vs. Pout



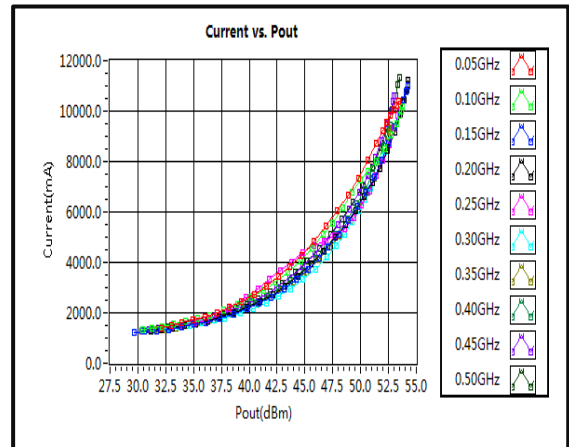
Right IM3 vs. Pout



Pout vs. Pin

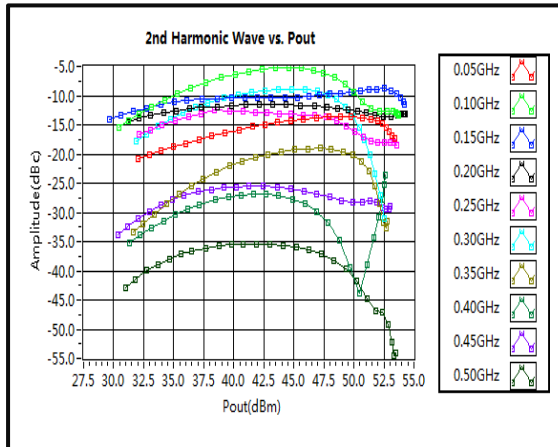


Current vs. Pout

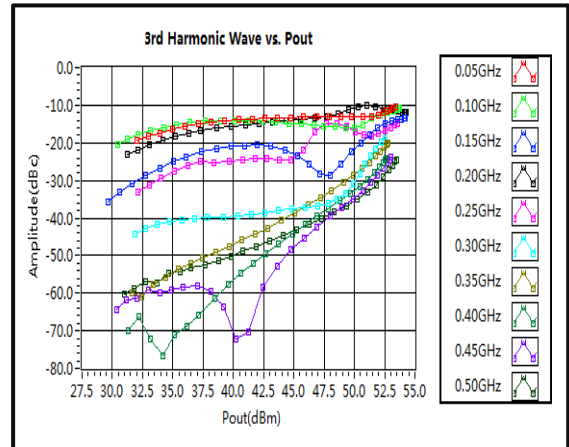


Typical Performance Plots

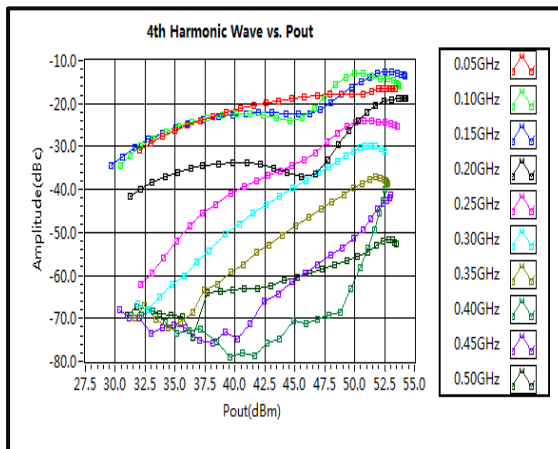
2nd Harmonic Wave Output Power



3rd Harmonic Wave Output Power

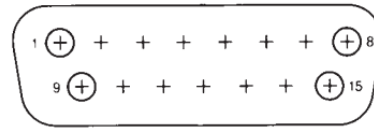


4th Harmonic Wave Output Power



Protection Connector Table

Male D-Sub is on the housing
The mating Female part number: 172-E15-203R001

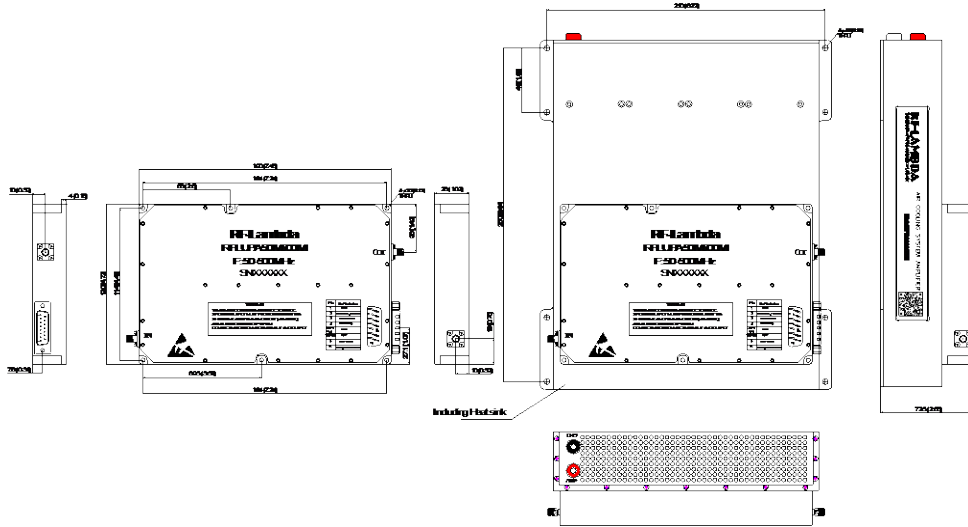


Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	/	Resets PA when logic LOW is applied and released	Yes
2	PA Enable / Disable	Control	High	Amplifier Disable, TTL Logic Low	Yes
3	Over Current	Indicator	Low	Pin will be latched to logic HIGH when drain current limit is reached	Yes
4	Over Temp	Ground	Low	Temp Over	Yes
5	GND	Ground	GND	Ground	Yes
6	GND	Ground	GND	Ground	Yes
7	+48V	Power Supply	+48V	+48V DC is supply Voltage	Yes
8	+48V	Power Supply	+48V	+48V DC is supply Voltage	Yes
9	Over VSWR	Indicator	Low	Pin will be latched to logic HIGH when output reflection is over limit	Yes
10	RF Input Over drive	Indicator	Low	Pin will be latched to logic HIGH when input signal is over limit	Yes
11	GND	Ground	GND	Ground	Yes
12	GND	Ground	GND	Ground	Yes
13	GND	Ground	GND	Ground	Yes
14	+48V	Power Supply	+48V	+48V DC is supply Voltage	Yes
15	+48V	Power Supply	+48V	+48V DC is supply Voltage	Yes

Notes:

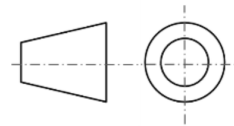
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 700mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Aluminum
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Housing Tolerances ± 0.2 [0.008] 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. DB15 cable is configured for power connection port by default (RFCBLADB15)
7. Standard torque wrench must be used to secure RF connectors



Packing List

ID	Description	QTY
1	Fig a. Fan Adapter	1
2	Fig b. DB15 Cable (RFCBLADB15)	1



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
RFLUPA50M500M	Standard	50MHz-500MHz 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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