

Wide Band Solid State EMC Benchtop Power Amplifier 2GHz-6GHz



Product Description

The REMC02G06GC-B is a wideband solid state EMC benchtop power amplifier with a frequency range of 2 to 6GHz.

The power output of this amplifier is 50dBm typical. The typical small signal gain is 55dB with a gain flatness of ± 5 dB. This performance is achieved through the use of GaN devices. This power amplifier works with a 110/220 VAC supply.

This product has a calibration feature which enables customer to obtain great performance through time and temperature changes. The operating temperature of this product is within -30 to +70°C.

Features

- Wideband EMC Solid State Power Amplifier
- Small Signal Gain 55dB Typical
- Output Saturation Power 50dBm Typical
- Supply Voltage 110/220 VAC
- 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	Units
Frequency Range		2 – 6		GHz
Small Signal Gain		55		dB
Gain Flatness		+/-5		dB
Gain Variation Over Temperature (-30°C ~ +70°C)		+/-3		dB
Input Return Loss		-7		dB
*Output 1dB Compression Point (P1dB)		45		dBm
*Saturated Output Power (Psat)		50		dBm
Supply Current		1.8	10	A
RF Off Speed		500		ns
RF On Speed		20		us
Power Added Efficiency (PAE)		10		%
Weight		42.5		lbs.
Impedance		50		Ohms
Input / Output Connectors		SMA Female, N-Type Female		
Package		Screw Sealed (Standard)		
		Hermetically Sealed (Optional)		

* P1dB, P3dB and Psat power test signal: 200µs pulse width with 10% duty cycle.

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	110VAC to 220VAC
*RF Input Power (RFIN)	Psat – Large Signal Gain

Bias Up Procedure

1. Connect input and output with 50 Ohm source/load.
(In band VSWR < 1.9:1 or >10dB return loss.)

2. Connect Power Cable

3. Turn On Back Panel AC Power Supply Switch

4. Press Front Panel Power Switch to Power Display

Bias Down Procedure

1. Press Front Panel Power Switch to Power Off Display

2. Turn Off Back Panel AC Power Supply Switch

3. Remove Power Cable (If Moving Equipment)

4. Disconnect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)

Environmental Specifications and Test Standards

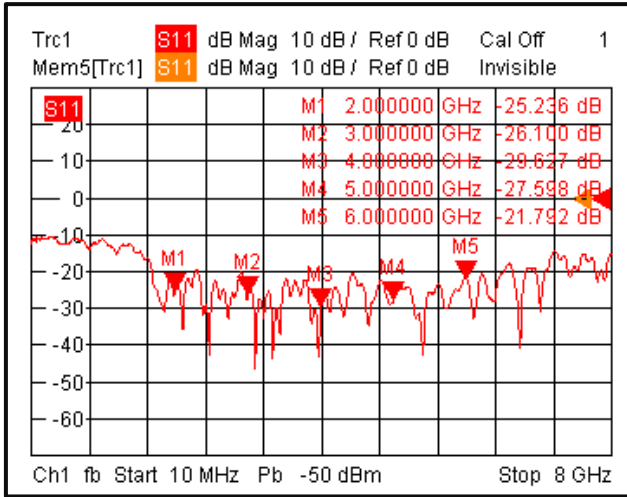
Parameter	Description
Operational Temperature	-30°C to +70°C (Ambient Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +70°C for 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.

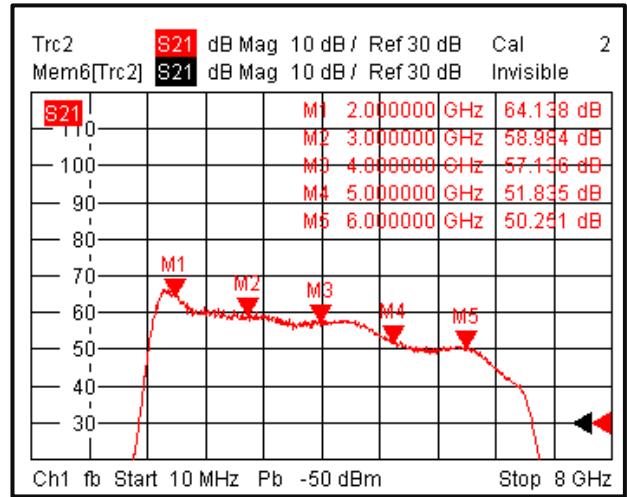
**For vibration testing details please see additional information section.

Typical Performance Plots

Input Return Loss @+25°C

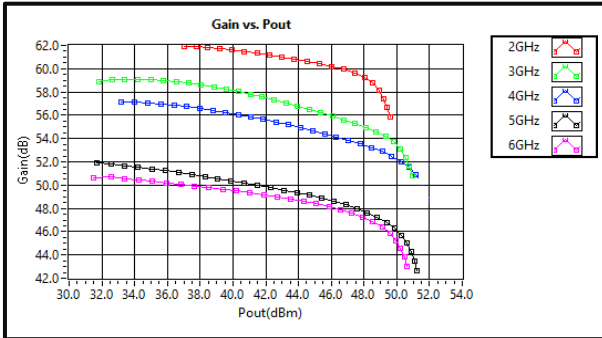


Gain vs. Frequency @+25°C

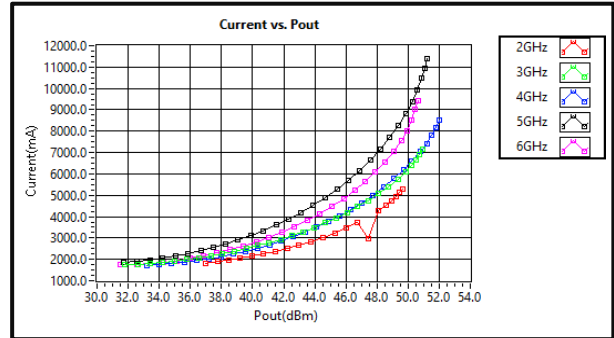


Typical Performance Plots

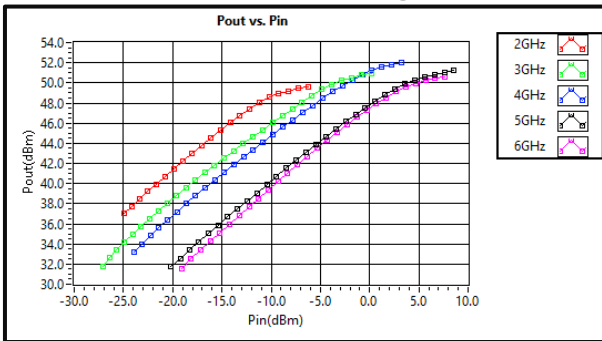
Gain vs Output Power @+25°C



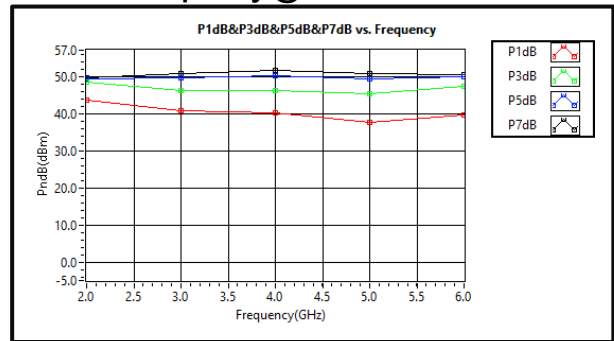
Current vs Output Power @+25°C



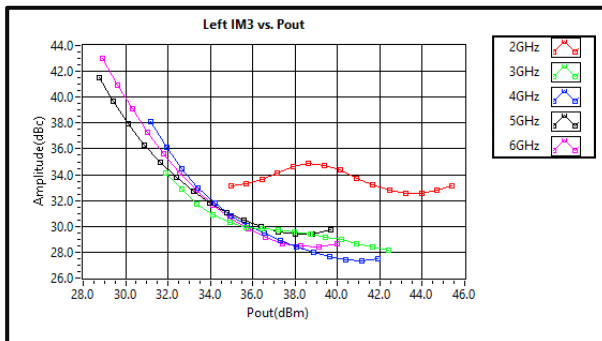
Output Power vs Input Power @+25°C



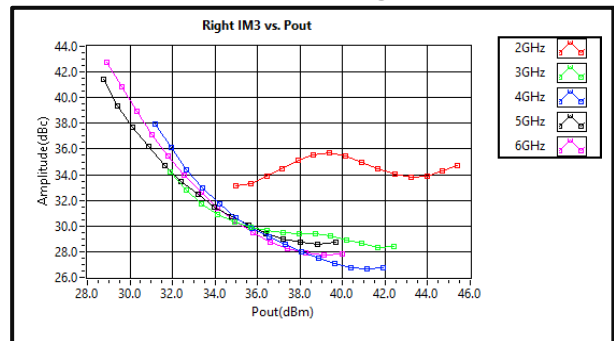
PXdB vs Frequency @+25°C



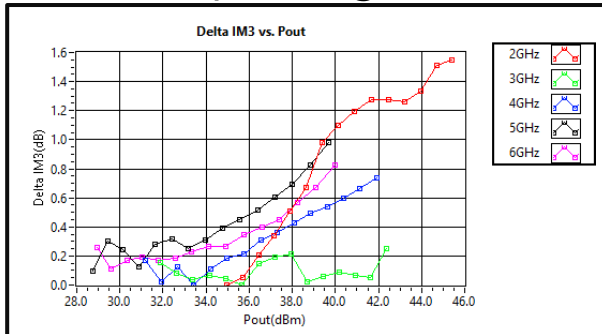
Left IM3 vs Output Power @+25 °C



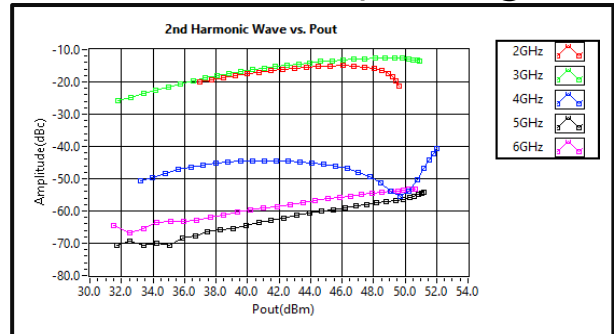
Right IM3 vs Output Power @+25°C



Delta IM3 vs Output Power @+25°C



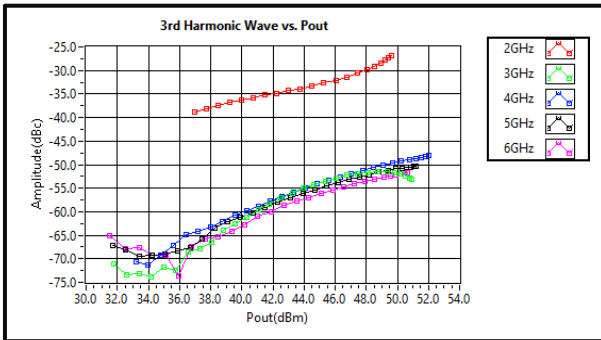
2nd Harmonic Wave vs Output Power @+25 °C



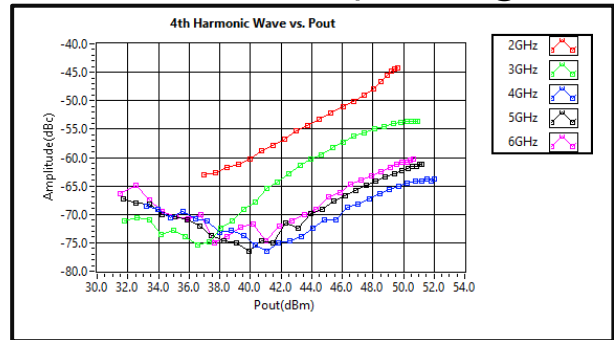
Note: Input/Output return loss measurements include attenuators to protect equipment

Typical Performance Plots

3rd Harmonic Wave vs Output Power @+25°C



4th Harmonic Wave vs Output Power @+25°C



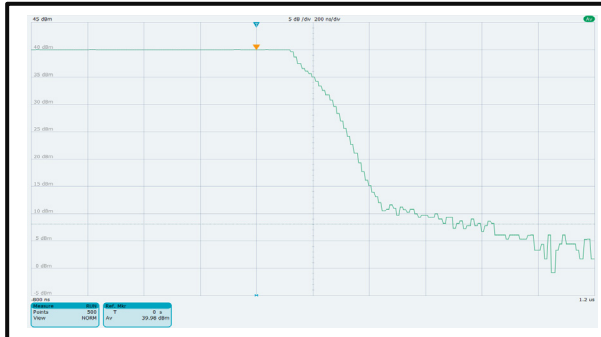
Blanking RF off timing: 30dBm Output Power (200 ns/div)



Blanking RF on timing: 30dBm Output Power (20 us/div)



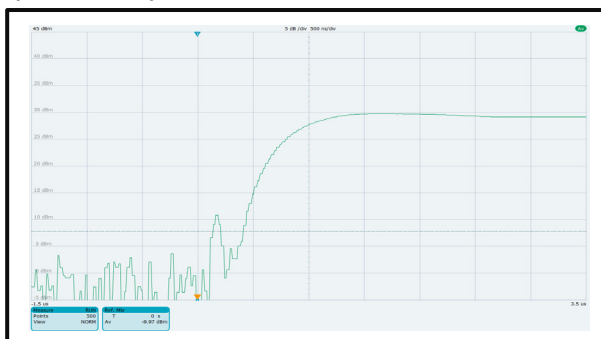
Blanking RF off timing: 40dBm Output Power (200 ns/div)



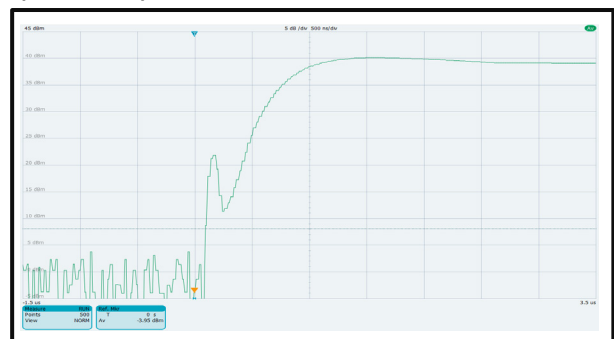
Blanking RF on timing: 40dBm Output Power (20 us/div)



Blanking RF off timing: 40dBm Output Power (200 ns/div)



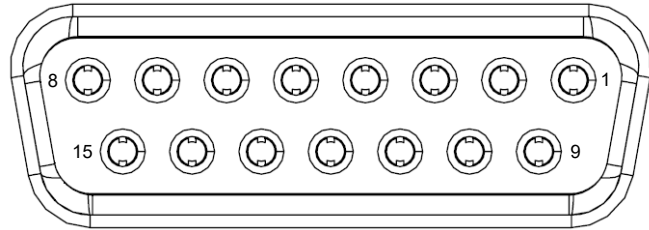
Blanking RF on timing: 40dBm Output Power (20 us/div)



Note: Input/Output return loss measurements include attenuators to protect equipment

Protection Connector Table

Female D-Sub is on housing.
A mating male part number is 172-E15-103R001

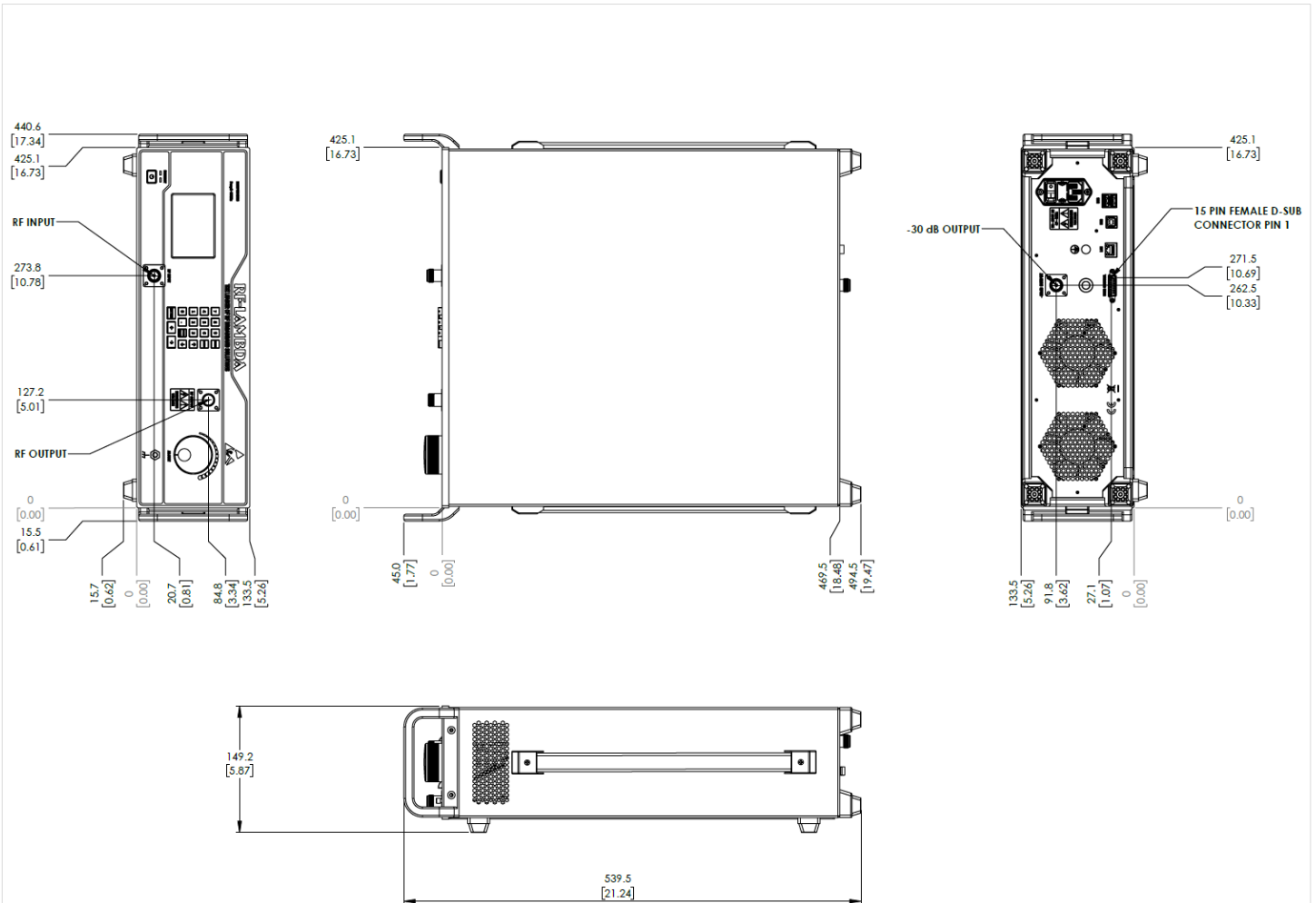


Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	HIGH	Resets PA when logic <u>LOW</u> is applied and released.	Yes
2	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of driver amplifiers.	Yes
3	Drain Disable	Control	LOW	Applying logic <u>HIGH</u> disables drains of ALL amplifiers.	Yes
4	Input Power Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> and amplifier turned off when input RF signal maximum limit is reached.	No
5	Temperature Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> and amplifier turned off when temperature limit is reached.	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> and amplifier turned off when current limit is reached by any RF components.	Yes
7	ID Imbalance	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> and amplifier turned off when current imbalance between combined RF amplifiers happens.	Yes
8	Input Power Over	Indicator	LOW	Applying logic <u>HIGH</u> disables drains and gates of amplifiers.	Yes
9	Fan Failure	Indicator	LOW	Logic will latch <u>HIGH</u> and amplifier turned off when a fan failure is detected.	Yes
10	Temperature Signal	Signal	ANALOG	Analog voltage between zero- and five-volts representing temperature of RF section.	No
11	VSWR	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> and amplifier turned off when output reverse RF signal maximum limit is reached.	Yes
12	Input Power Monitor	Signal	ANALOG	Analog voltage between zero- and five-volts representing input signal power level.	No
13	+5V	Power Supply	+5V	+5V DC is supplied for reference.	Yes
14	Ground	Ground	GND	Ground	Yes
15	Drain Blanking	Ground	GND	Applying logic <u>HIGH</u> disables fast, drains of last stage of amplifier.	Yes

Notes:

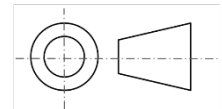
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 100mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Aluminum and Copper
2. Plating: White Paint
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.2 [0.008] 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
REMC02G06GC-B	standard	2GHz~6GHz EMC 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

The information contained herein is believed to be reliable. RF-Lambda makes no warranties regarding the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for any of the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for RF-Lambda products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

RF-Lambda products are not warranted or authorized for use as critical components in medical, life-saving, or life sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.