

Wideband 500W EMC Solid State Power Amplifier 6-12GHz



Product Description

REMC06G12GF is a wideband EMC power amplifier with a frequency range of 6 to 12GHz.

The power output of this amplifier is 57.5dBm typical. The typical small signal gain is 60dB with a gain flatness of ± 10 dB. This performance is achieved through the use of GaN devices. This power amplifier works with a 110/208 VAC supply.

The power amplifier's input and output are both female N-type connectors. 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 +50°C.

Features

- Wideband EMC Solid State Power Amplifier
- Small Signal Gain 60dB Typical
- Output Saturation Power 57.5dBm Typical
- Supply Voltage 110/208 VAC
- 50 Ohm Matched Input/Output
- Overvoltage Protection
- Overcurrent Protection
- Auto Calibration

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		6 – 12		GHz
Small Signal Gain		60		dB
Gain Flatness		+/-10		dB
Gain Variation Over Temperature (-30°C to +50°C)		+/-3		dB
Input Return Loss		-10		dB
*Output 1dB Compression Point (P1dB)		51		dBm
*Saturated Output Power (Psat)		57.5		dBm
Supply Current (V _{cc} = 208VAC)		5	21	A
IM3		-22		dBc
RF ON and OFF Speed		80/2500		us
Power Added Efficiency (PAE)		20		%
Weight		100/45		Lbs/KG
Impedance		50		Ohms
Input / Output Connectors		N-Type Female		
Package		Please see the mechanical drawing		

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

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	110VAC to 208VAC
*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

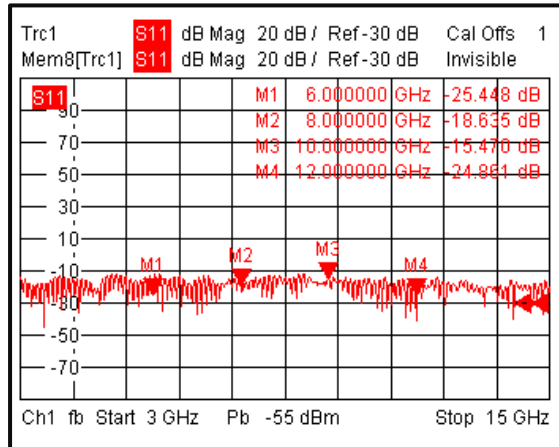
Parameter	Description
Operational Temperature	-30°C to +50°C (Case Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for 72 Hours
Shock	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.

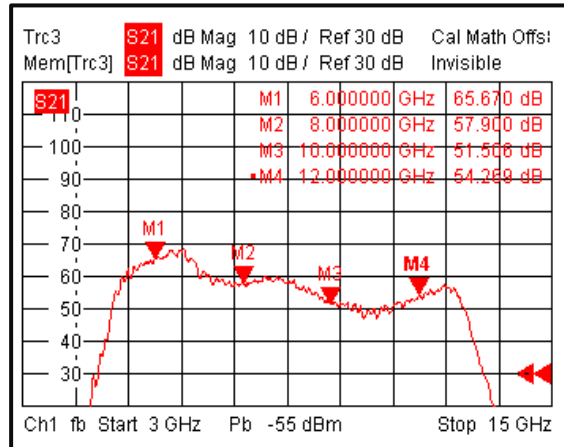
**For vibration testing details please see additional information section.

Typical Performance Plots

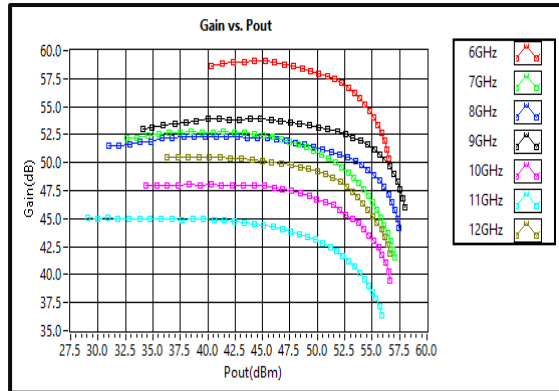
Input Return Loss @+25°C



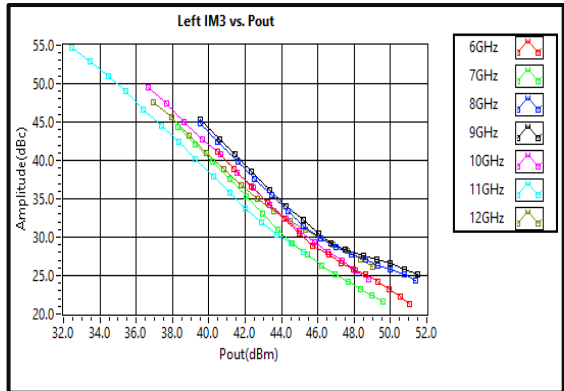
Gain vs. Frequency @+25°C



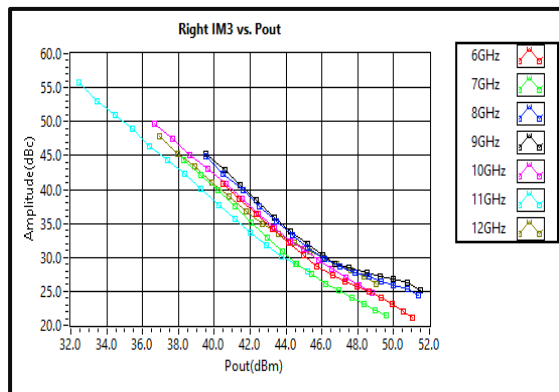
Gain vs. Output Power @+25°C



Left IM3 @+25°C



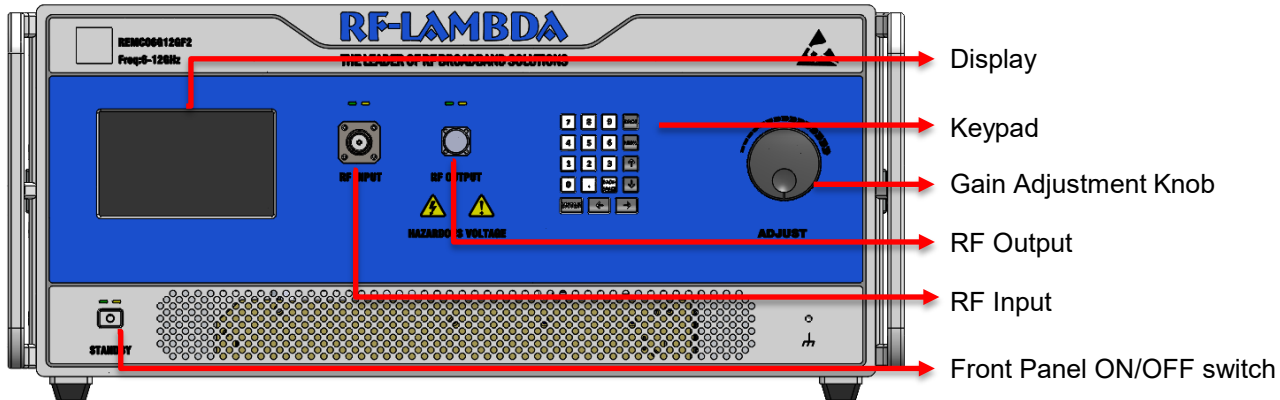
Right IM3 @+25°C



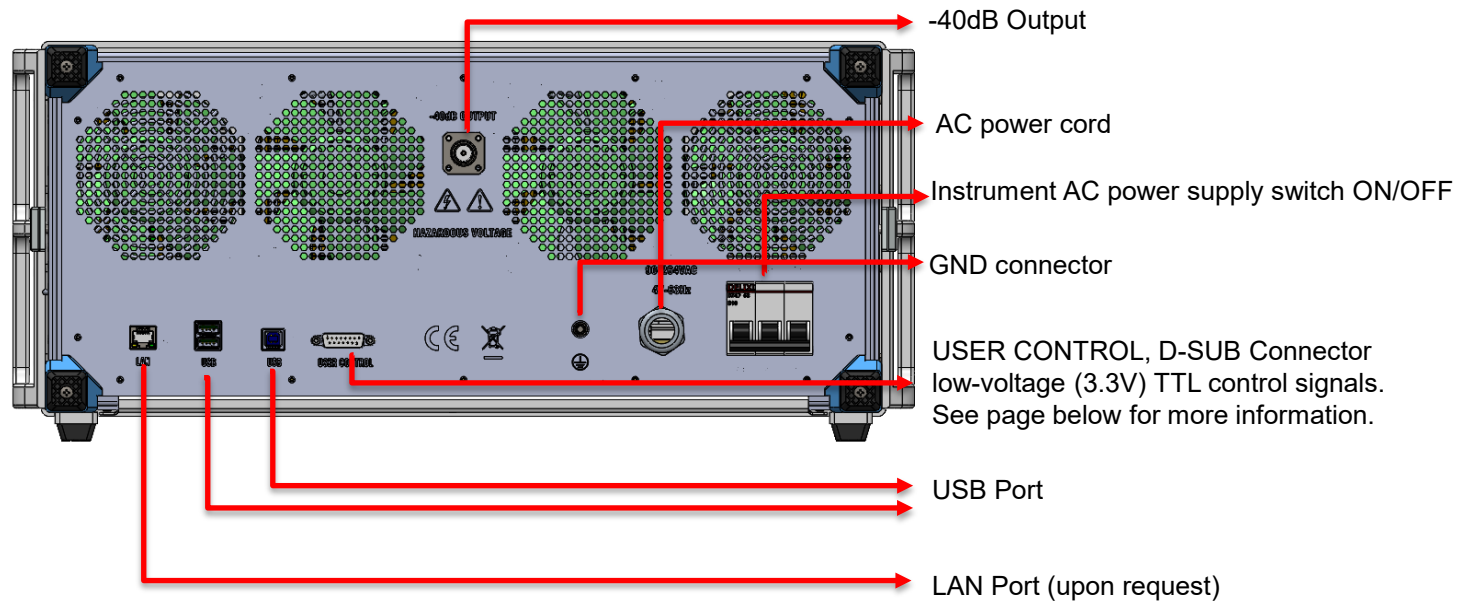
Note: Small signal VNA measurements include attenuators to protect equipment

EMC Equipment Specifications

Front Panel

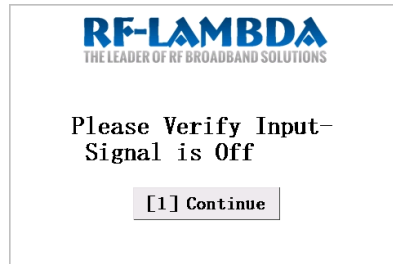


Rear Panel



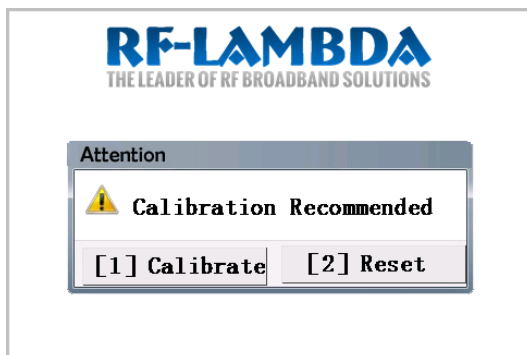
Front Panel LCD Screen Display

Switching On Instrument



Please follow the instructions on the front panel LCD screen after switching on the power.
Press "1" on keypad to continue.

Self Calibration Screen

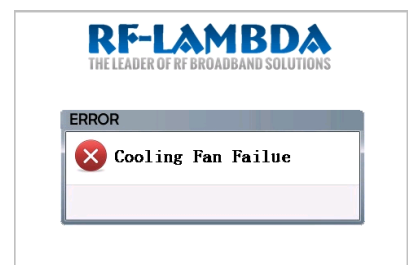
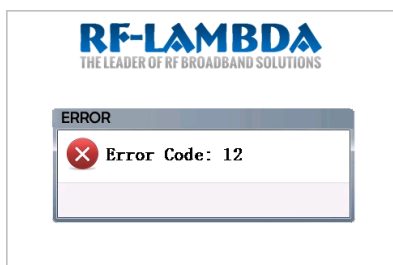


Calibration is may be recommended
"[1] **Calibrate**" to execute instrument self calibration process.

"[2] **Reset**" to reboot the instrument.

*Please turn OFF RF input power, and terminate the RF output port while applying calibration function

Instrument Protection Alarms



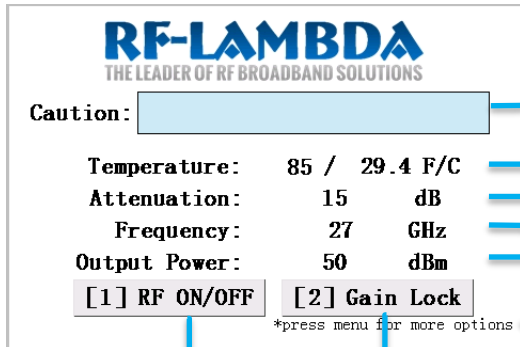
The front panel LCD screen will display the error code or error message when instrument self protection is triggered. Front panel alarm indicator will light up.

To eliminate the error code, press "RESET" on front panel keypad to reboot the instrument and clear the alarms.

If error code can not be eliminated after reboot, please contact support@rflambda.com

Front Panel LCD Screen Function

Instrument Status Display Page



Indicates instrument RF output status. It will display:
Output is Ready to Turn on or RF Output is ON

Instrument temperature

RF output attenuation (change with adjustment knob)

RF input signal center frequency

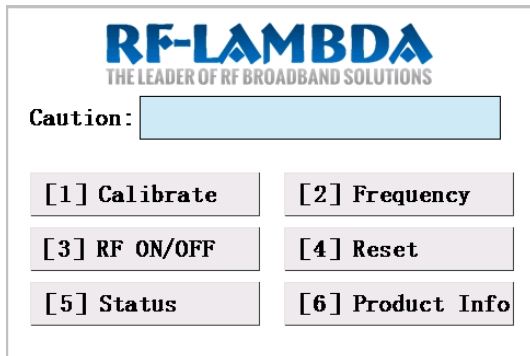
Instrument RF output power

Press "Menu" on keypad to enter instrument functions selection menu

User can set a constant gain for the unit. Equipment will automatically adjust the gain at certain frequency

Switches On or Off for instrument RF output port

Instrument Function Selection Page



To enter this function selection page, press "Menu" on front panel keypad while the instrument is showing the status page. Press the corresponding number on front panel keypad to select:

"[1] Calibrate" calibrates the instruments.

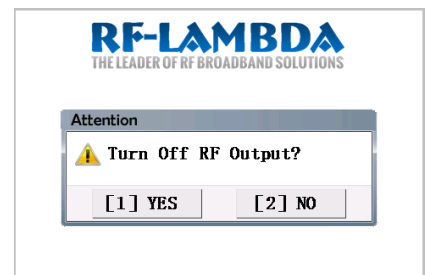
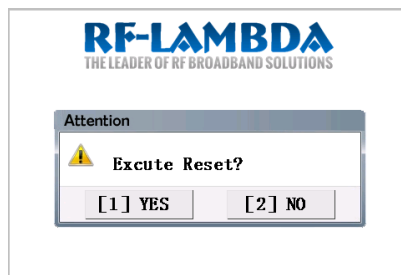
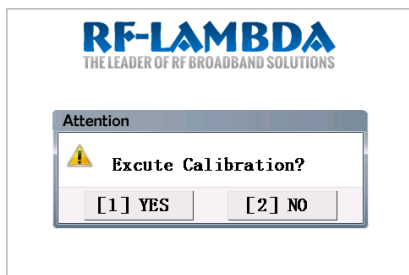
"[2] Frequency" enters RF input signal center frequency.

"[3] RF ON/OFF" switches the RF output port on or off.

"[4] Reset" Restarts the instrument (Turns RF output off)

"[5] Status" enters instrument status display page.

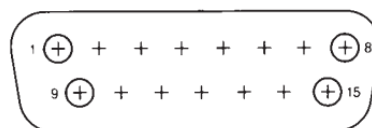
"[6] Product Info" displays product part number and serial number



All action functions will ask for confirming execution when selected from function selection menu.

Protection Connector Table

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



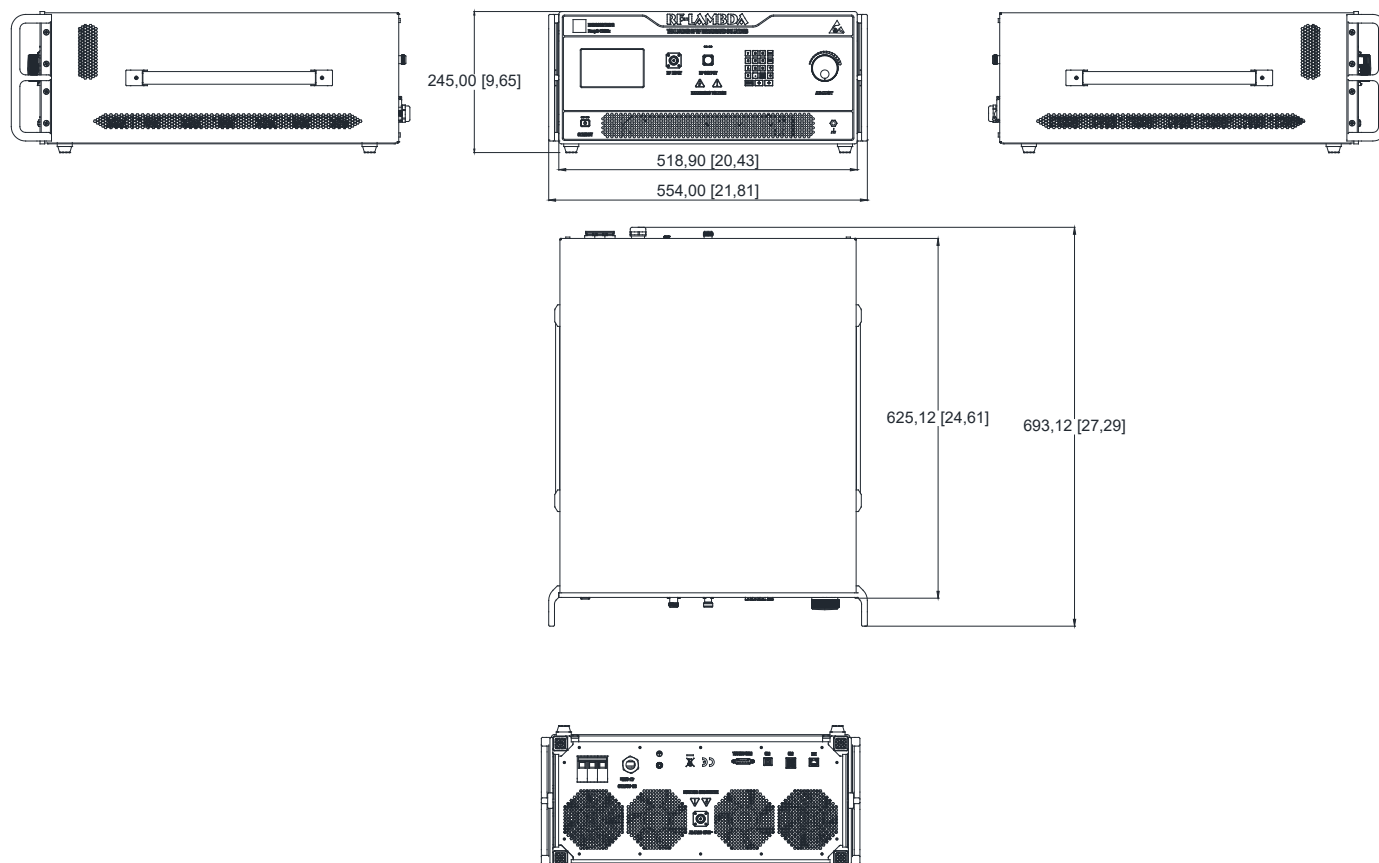
Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Driver Disable	Control	LOW	Applying logic <u>HIGH</u> disables drains of amplifiers	Yes
3	Last Amplifier Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of amplifiers	Yes
4	RF IN Over	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when input signal is over limit	Yes
5	Temp Over	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when amplifier is driven over temperature	Yes
6	Current Over	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when drain current limit is reached	Yes
7	ID Imbalance	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when an imbalance in the drain current of the combining branches occurs	Yes
8	PA Off Alarm	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when any of the protection limit is reached	Yes
9	Fan Alarm	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when Fan limit is reached	Yes
10	GND	Ground	GND	PA output reflection power is represented by voltage	Yes
11	VSWR	Indicator	HIGH	Pin will be latched to logic <u>LOW</u> when output reflection is over limit	Yes
12	GND	Ground	GND	PA carrier case temperature is represented by voltage	Yes
13	+5V	Power Supply	+5V	+5V DC is supplied for reference	Yes
14	GND	Ground	GND	Ground	Yes
15	NC	NC	NC	NC	No

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.

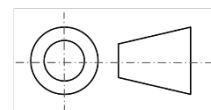
Outline Drawing

All dimensions are in millimeters [inches]



Notes:

1. All dimensions are in millimeters [inches].



Additional Information

Documentation

Webpage

ESD Policy

https://rflambda.com/pdf/rflambda_esd_control.pdf

Heatsink Lookup Specifications

https://rflambda.com/search_heatsink.jsp

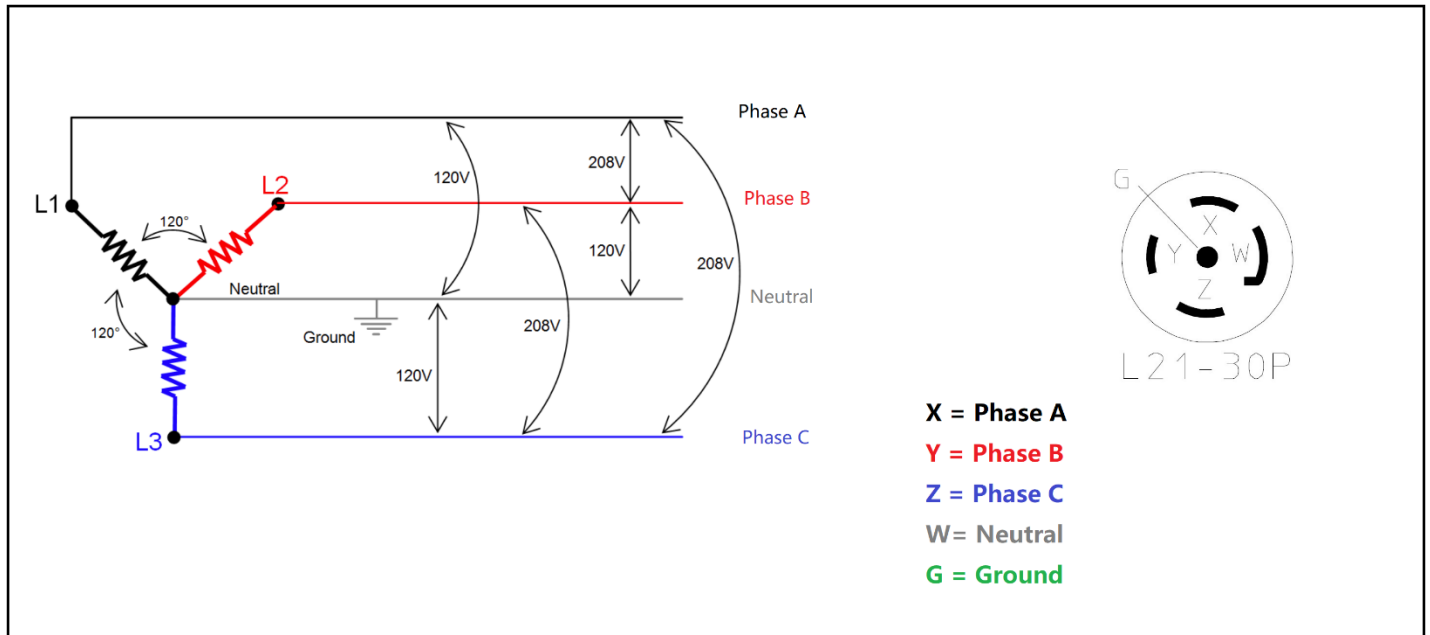
Connector Torque Specifications

https://www.rflambda.com/pdf/Torque_Specifications.pdf

Random Vibration Test Standard

https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf

NEMA Configuration: L21-30P PLUG



Ordering Information

Part Number	Modification	Description
REMC06G12GF2	Input connector N-Type and Output connector N-Type	6GHz-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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