

RF-LAMBDA

THE LEADER OF RF BROADBAND SOLUTIONS

**60W Wideband EMC
Benchtop Power Amplifier
18GHz-40GHz**

REMC18G40GM



Sales: sales@rflambda.com
Technical: support@rflambda.com

www.rflambda.com

PRODUCT SUMMARY

PRODUCT OVERVIEW

GENERAL DESCRIPTION

REMC18G40GM is a wideband EMC power amplifier with a frequency range of 18 to 40GHz.

The power output of this amplifier is 48dBm typical. The typical small signal gain is 65dB with a flatness of ± 8 dB. This performance is achieved through the use of GaN devices. The power amplifier's input connector is 2.92mm-Male and Output connector is WRD180C24. 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 0°C to +50°C.



FEATURES

- » Wide band EMC Solid State Power Amplifier
- » Small Signal Gain 65dB Typical
- » Output Saturation Power 48dBm Typical
- » Supply Voltage 110/220 VAC
- » 50 Ohm Matched Input / Output
- » Fast RF Blanking
- » Real Time VSWR measurement
- » Internal Signal Generator – Optional
- » Over temperature Protection
- » Over current Protection
- » Over voltage 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

QUALITY STANDARDS



ESD Policy



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

Random Vibration Test Standard



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

Connector Torque Specifications



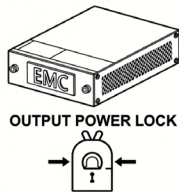
https://www.rflambda.com/pdf/Torque_Specifications.pdf

Parameter	Description
Thermal Shock	0°C ~ +50°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 +50°C for 72 Hours
Storage Temperature	-40°C to +85°C

*For vibration testing details please see additional information section.

RF-Lambda is ISO: 9000 certified with 25,000 ft² combined R&D and production space, including an ISO7 10K Clean Room to meet ISO-14644-1.

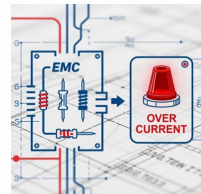
PRODUCT FUNCTIONS



Local/Remote Control Toggle



Select control mode:
Local (direct) or Remote (network)



1 EMC Functions

- Output Power Lock
- Automatic Calibration

2 Mode Selections

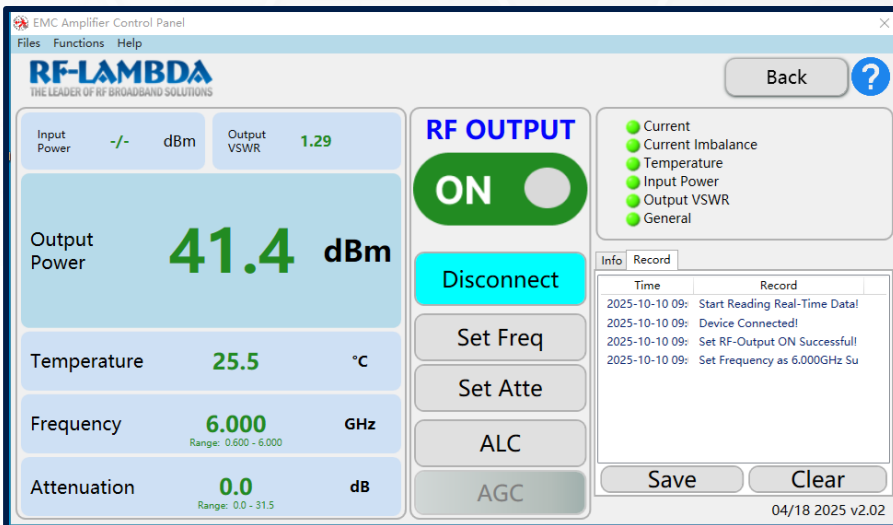
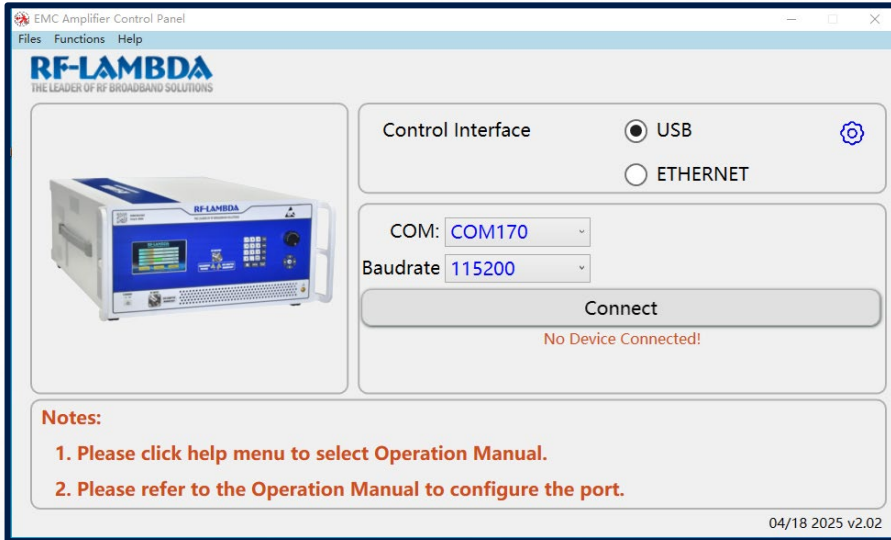
- Local
- Remote Control

3 Product Safety Interlock

- Input Power Overload Protection
- Output Mismatch Protection
- Over temperature Protection
- Over current Protection
- Cooling System Anomaly Protection

Category	Function	Included	Optional (Licensing)	Optional (Hardware)	NOT Applicable
Product Safety Interlock	Input Overload Protection	☒	☐	☐	☐
	Output VSWR Protection	☒	☐	☐	☐
	Current Overload Protection	☒	☐	☐	☐
	Temperature Protection	☒	☐	☐	☐
	Current Imbalance Protection	☒	☐	☐	☐
	Overvoltage and Undervoltage Protection	☒	☐	☐	☐
	AC Power Abnormality Protection	☒	☐	☐	☐
	Fan Abnormality Protection	☒	☐	☐	☐
User Operation Functions	USB, LAN Communication	☒	☐	☐	☐
	DB Interface	☒	☐	☐	☐
	Self-Calibration Function	☒	☐	☐	☐
	Gain Compensation Over Temperature	☒	☐	☐	☐
	Current Compensation Over Temperature	☒	☐	☐	☐
	TDD Control - RF Switch Enable	☒	☐	☐	☐
	TDD Control - Positive Voltage Enable	☒	☐	☐	☐
	TDD Control - Negative Voltage Enable	☒	☐	☐	☐
	GUI Interface	☒	☐	☐	☐
	Parameter Setting	☒	☐	☐	☐
	Gain Calibration Each Stage	☒	☐	☐	☐
	Software ON/OFF Function	☒	☐	☐	☐
	Modularized System Integration	☒	☐	☐	☐
	Remote Software Control ON/OFF	☒	☐	☐	☐
	Rotary Gain Adjustment	☒	☐	☐	☐
EMC Functions	Screen Protection Function	☒	☐	☐	☐
	Touch Screen Display	☒	☐	☐	☐
	Developer Interface	☒	☐	☐	☐
	System Log Recording	☒	☒	☐	☐
User Customization Functions	Output VSWR Measurement	☒	☒	☐	☐
	Input Power Measurement	☒	☒	☐	☐
	ALC - Automatic Loop Control Gain	☒	☒	☐	☐
	AGC - Automatic Gain Control Function	☐	☒	☐	☐
	Input Circulator Protection (Internal Load)	☐	☐	☒	☐
	Output Circulator Protection (Internal Load)	☐	☐	☒	☐
	Waveguide Adapter (E-H)	☐	☐	☒	☐
	Fast RF Blanking	☒	☐	☐	☐
	Single Frequency Output	☐	☒	☐	☐
	Frequency Auto Sweeping	☐	☒	☐	☐
Internal Signal Generator	Frequency Hopping	☐	☒	☐	☐
	External Signal	☐	☒	☐	☐

REMOTE CONTROL

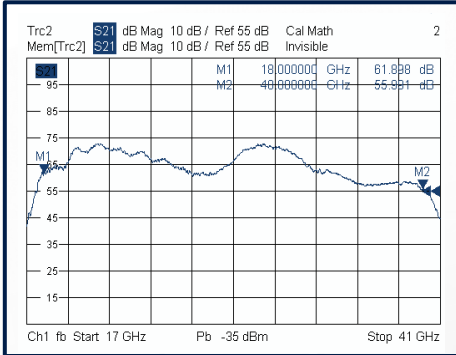


TECHNICAL DATA SPECIFICATIONS

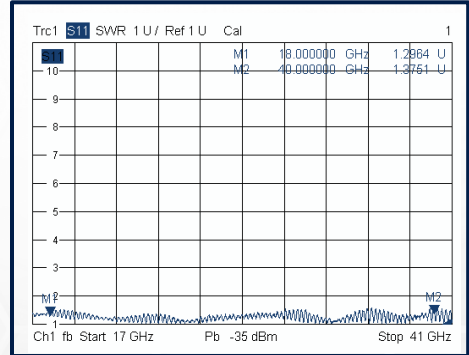
Parameter	Min	Typ	Max	Units
Frequency Range	18		40	GHz
Small Signal Gain	52	65		dB
Gain Flatness		±8.0		dB
Gain Variation Over Temperature (0°C to +50°C)		±3.0		dB
Input VSWR		1.5	2.0	:1
Output 1dB Compression Point (P1dB)		45		dBm
Saturated Output Power (Psat)	46	48		dBm
Supply Current (220V AC)		3.5	5	A
Power Added Efficiency (PAE)		10		%
Turn On/Off Speed (Switch Disable)	ON	100		ns
	OFF	100		ns
Turn On/Off Speed (Drain Disable)	ON	50		us
	OFF	250		us
Turn On/Off Speed (Gate Disable)	ON	2000		us
	OFF	200		us
Weight		52.5		lbs.
Impedance		50		Ohms
Package	4U Rack-mount/Tabletop Chassis			

TYPICAL PERFORMANCE PLOTS

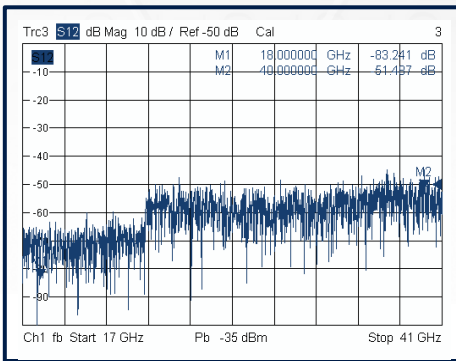
Gain



Input VSWR



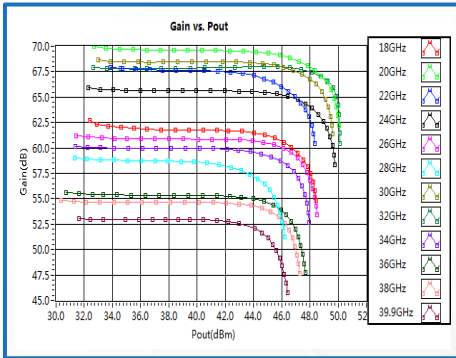
Isolation



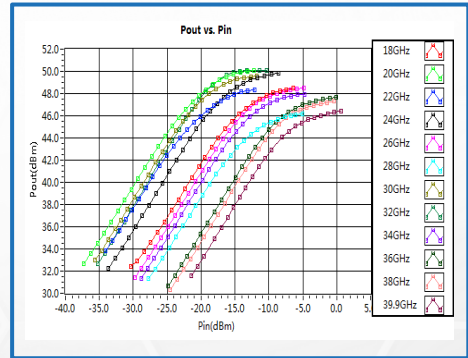
Note: Small signal VNA measurements include attenuators to protect equipment.

TYPICAL PERFORMANCE PLOTS

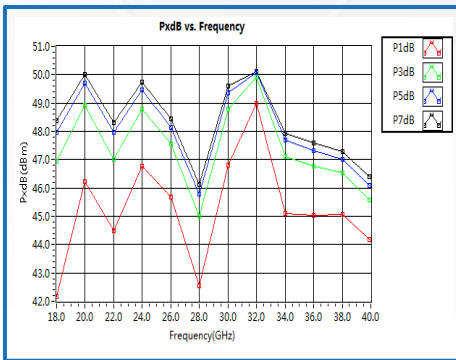
Gain vs. Output Power CW



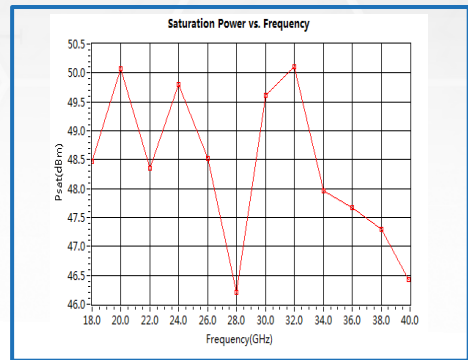
Pout vs. Pin



PndB vs. Frequency CW

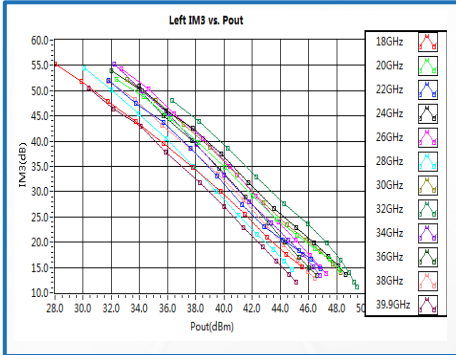


Saturation Power vs. Frequency CW

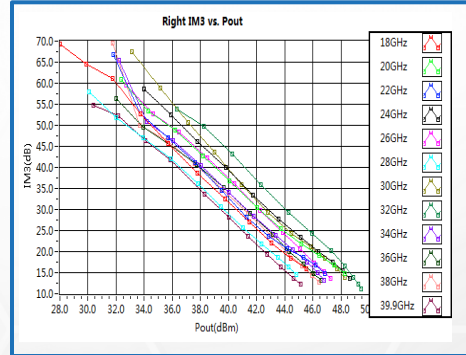


TYPICAL PERFORMANCE PLOTS

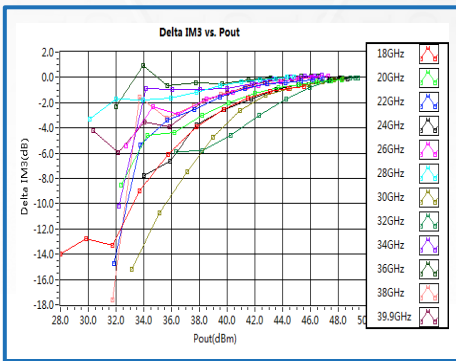
Left IM3 vs. Pout



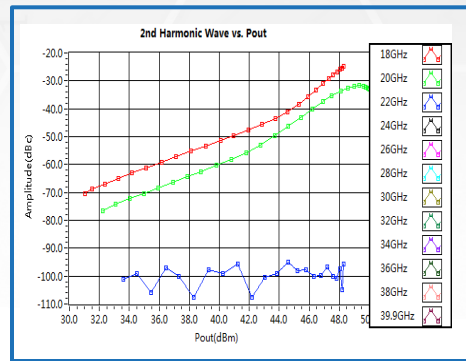
Right IM3 vs. Pout



Delta IM3 vs. Pout



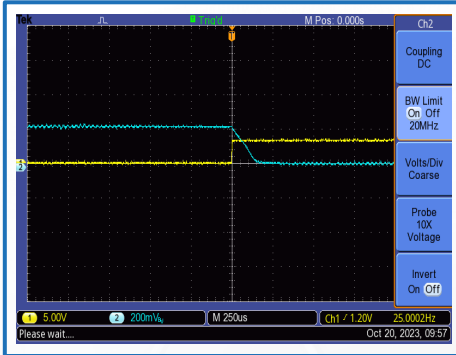
2nd Harmonic Wave Output Power



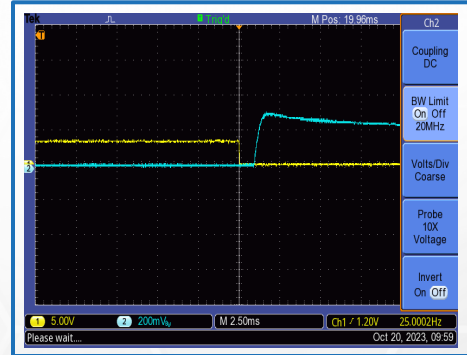
Note: IM3 test performed with 1 MHz tone spacing

TYPICAL PERFORMANCE PLOTS

The Gate-Enable Rise Time is 200 us

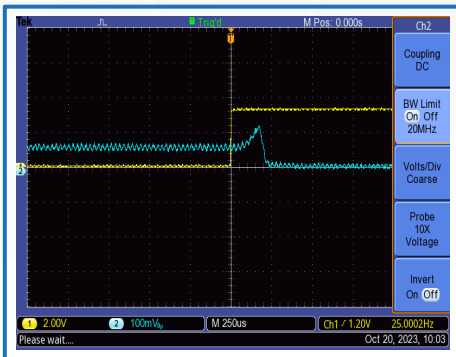


The Gate-Enable Fall Time is 2000us

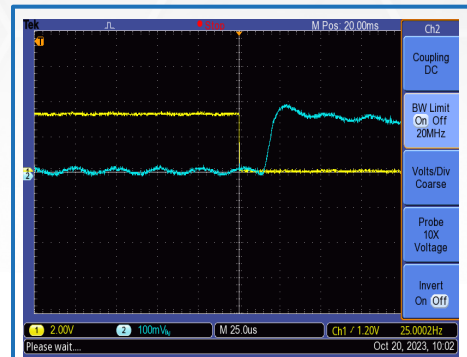


The gate control port: D-sub 15 PIN #2 (Gate Disable).
The yellow curve is the gate control signal, the blue curve is RF output envelope.

The Drain-Enable Rise Time is 250us



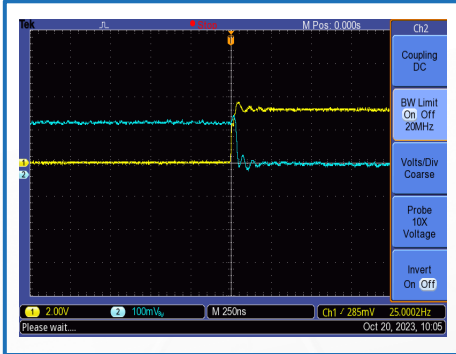
The Drain-Disable Fall Time is 50 us



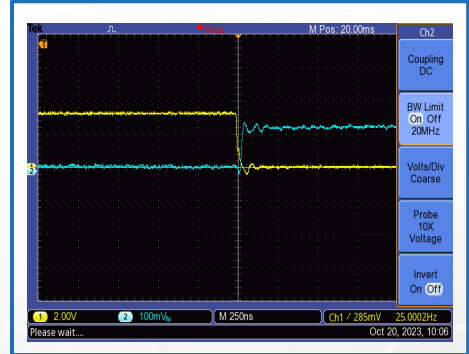
The drain control port: D-sub 15 PIN #3(Drain Disable).
The yellow curve is the drain control signal, the blue curve is RF output envelope.

TYPICAL PERFORMANCE PLOTS

The Switching Rise Time is 100 ns

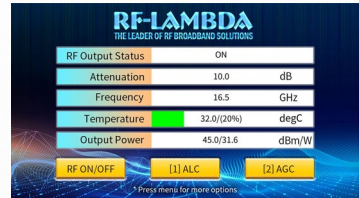


The Switching Fall Time is 100 ns



Switch control port: D-sub 15 PIN #10(Switch Disable) .
The yellow curve is the switch control signal, the blue curve is RF output envelope.

INSTRUCTIONS FOR USE



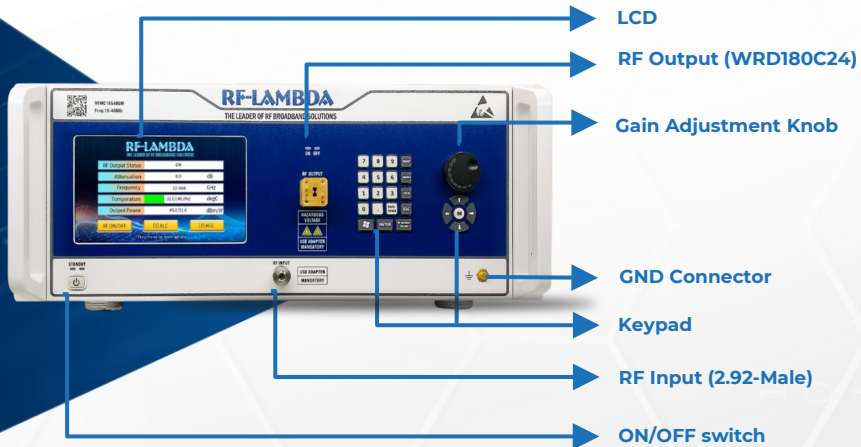
Please follow the instructions on the front panel LCD screen after switching on the power. Press “1” on keypad to continue.

Please follow the instructions.

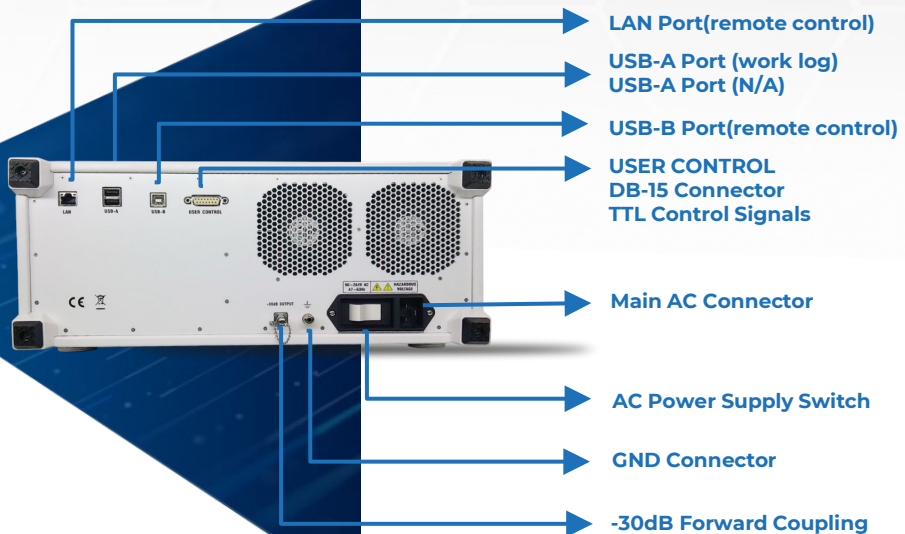
Name	Description
RF Output Status	Indicates instrument RF output status. It will display: ON or OFF
Attenuation	RF output attenuation (change with adjustment knob)
Frequency	RF input signal frequency (For illustrative purposes only)
Temperature	Instrument temperature (For illustrative purposes only)
Output Power	Instrument RF output power (For illustrative purposes only)
RF ON/OFF	Switches On or Off for instrument RF output port
ALC	ALC mode, Automatic Loop Control
AGC	AGC mode, Automatic Gain Control, this function is invalid

INTERFACE DESCRIPTION

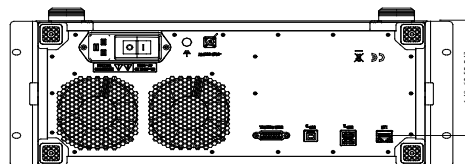
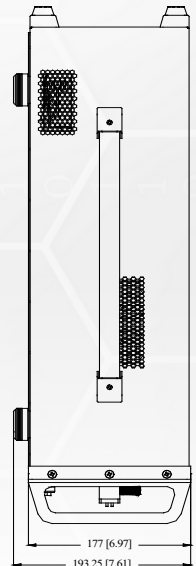
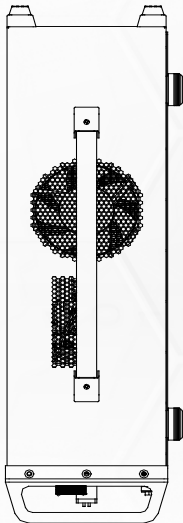
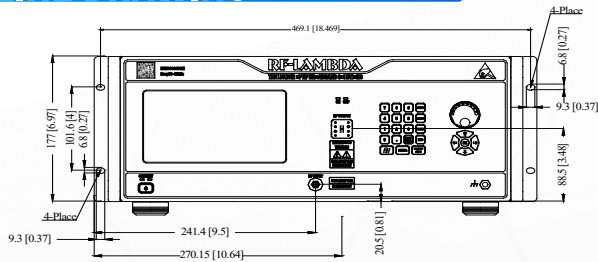
FRONT PANEL



REAR PANEL



OUTLINE DRAWING

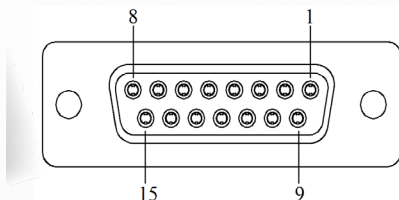


Notes:

1. Package Material: Aluminum
2. Finish: White Baking Paint
3. All dimensions are in millimeters [inches].
4. Standard torque wrench must be used to secure RF connectors.

PROTECTION CONNECTOR TABLE

Female D-Sub is on the housing
The mating male part number: 172-E15-103R001



Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	HIGH	Resets PA when logic LOW is applied for five more seconds and released	Yes
2	Gate Disable	Control	LOW	Applying logic HIGH disables gate of amplifiers	Yes
3	Drain Disable	Control	LOW	Applying logic HIGH disables drain of amplifiers	Yes
4	RF Input Over Drive	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
5	Temp Over	Indicator	LOW	Pin will be latched to logic HIGH when amplifier is driven over temperature	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic HIGH when drain current limit is reached	Yes
7	Current Imbalance	Indicator	LOW	Pin will be latched to logic HIGH when an imbalance in the drain current of the combining branches occurs	Yes
8	PA Off Alarm	Indicator	LOW	Pin will be latched to logic HIGH when any of the protection limit is reached	Yes
9	Fan Alarm	Indicator	LOW	Pin will be latched to logic HIGH when Fan limit is reached	Yes
10	RF Input Switch	Control	LOW	Applying logic HIGH turns OFF RF front-end switch to terminator	Yes
11	VSWR	Indicator	LOW	Pin will be latched to logic HIGH when output reflection is over limit	Yes
12	Fixed Attenuation 10dB	Control	LOW	Applying and holding logic HIGH to enable 10dB fixed attenuation	No
13	Fixed Attenuation 20dB	Control	LOW	Applying and holding logic HIGH to enable 20dB fixed attenuation	No
14	+5V	Power Supply	+5V	+5V DC is provided for reference *	Yes
15	GND	GND	GND	GND	Yes

Notes:

- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2.8V-5V = HIGH.

PACKING LIST

ID	Description	QTY
1	Fig a. AC power supply line (Consulting sales)	1
2	Fig b. Adapter (RFCARAKFKF)	1
3	Fig c. Waveguide to coaxial adapter(RFWAD180E0COBS) (Consulting sales)	0
4	Fig d. Waveguide twist (RFTWWRD180C24) (Consulting sales)	0



Fig a.



Fig b.



Fig c.



Fig d.

ORDERING INFORMATION

Part Number	Modification	Description
REMC18G40GM	Input connector 2.92-Male and Output connector WRD180C24	18GHz-40GHz Wideband EMC Benchtop 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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