

250-Watt Wide Band Power Amplifier 6GHz-12GHz



Product Description

RFLUPA06G12GE is a wideband power amplifier with a frequency range of 6 to 12GHz.

The power output of this amplifier is 250 Watts typical. The typical small signal gain is 68dB with a gain flatness of ± 10 dB. This performance is achieved through the use of GaN devices.

The power amplifier's input connector is SMA and output connector is WRD-500D36. 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 -40 to +85°C.

Features

- Wideband Solid State Power Amplifier
- Small Signal Gain 68dB Typical
- Output Saturation Power 54dBm Typical
- Supply Voltage +48VDC
- 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	Min	Typ	Max	Units
Frequency Range		6 – 10			10 – 12		GHz
Small Signal Gain		71			64		dB
Gain Variance		+/-4			+/-4		dB
Gain Variation Over Temperature (-40°C to +85°C)		+/-10			+/-10		dB
Input Return Loss		-13			-10		dB
*Saturated Output Power (Psat)		54			53		dBm
		250			200		Watts
Supply Current (Vcc = +48VDC)		12	29		12	28	A
IM3		-25			-25		dBc
Turn On/Off Speed (Drain Disable)	ON		700				us
	OFF		1.25				ms
Turn On/Off Speed (Gate Disable)	ON		4				ms
	OFF		300				us
Weight			24				lbs.
Impedance			50				Ohms
Input / Output Connectors			SMA / WRD-500D36				
Package			Screw Sealed (Standard)				
			Hermetically Sealed (Optional)				

Note: Special screening is available with extra cost. Please inquire with sales..

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	+60VDC
*RF Input Power (RFIN)	Psat – Large Signal Gain
RF Output power level (Continues Wave Operation)	53dBm

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

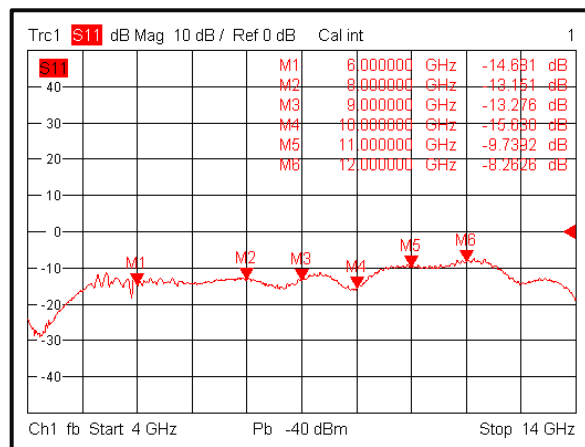
Parameter	Description
Operational Temperature	-40°C to +85°C (Case Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for 72 Hours
Shock	MIL-STD-202G Table 213-I, Test Condition Letter K 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)

Notes:

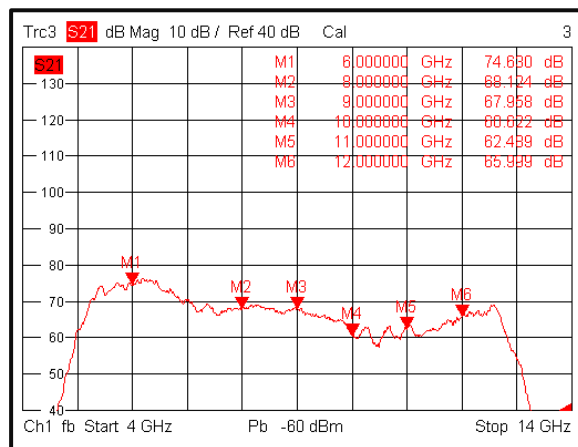
- Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
- For vibration testing details please see additional information section

Typical Performance Plots

Input Return Loss vs Frequency @+25°C



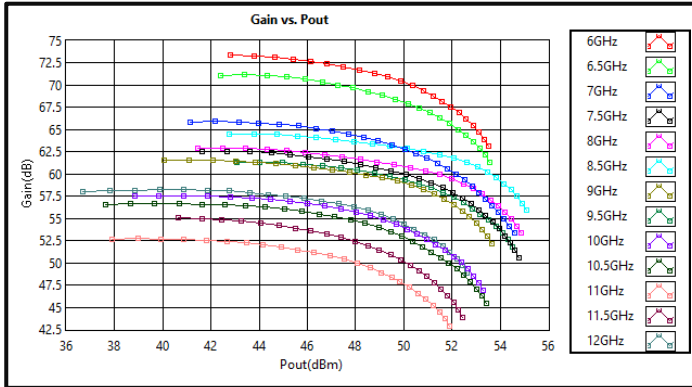
Gain vs Frequency @+25°C



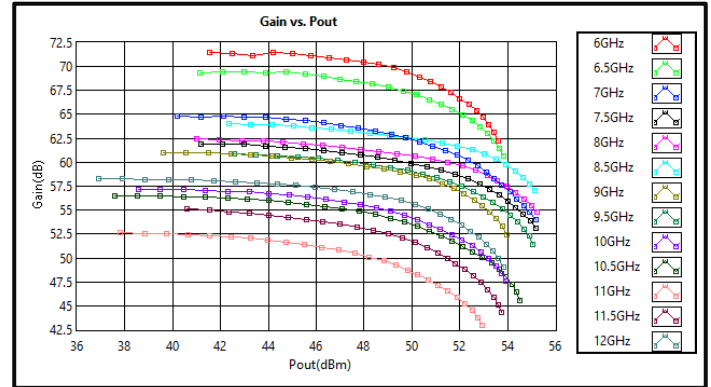
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

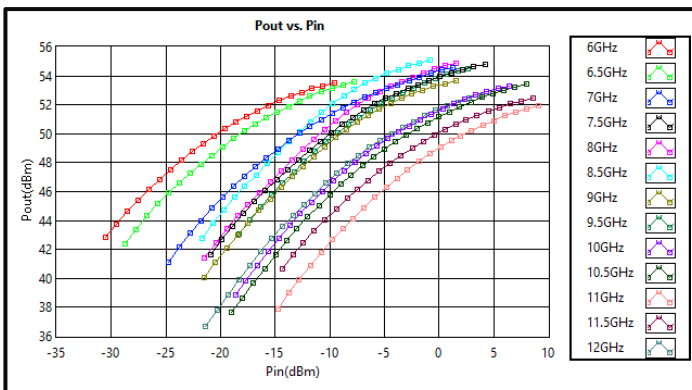
Gain vs Output Power CW



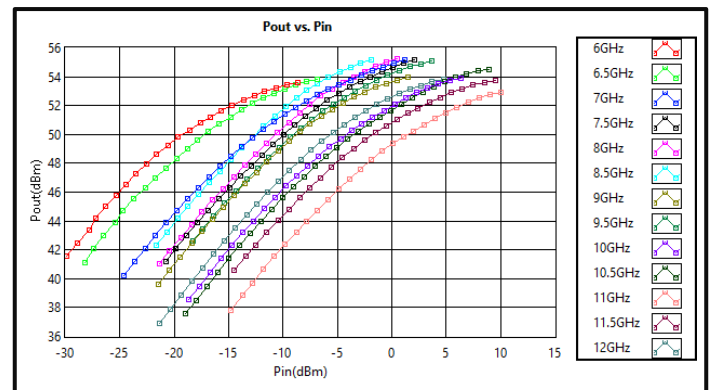
Gain vs Output Power *Pulse



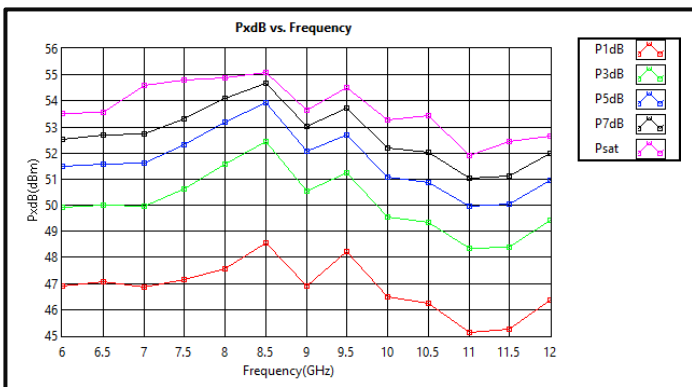
Output vs Input Power CW



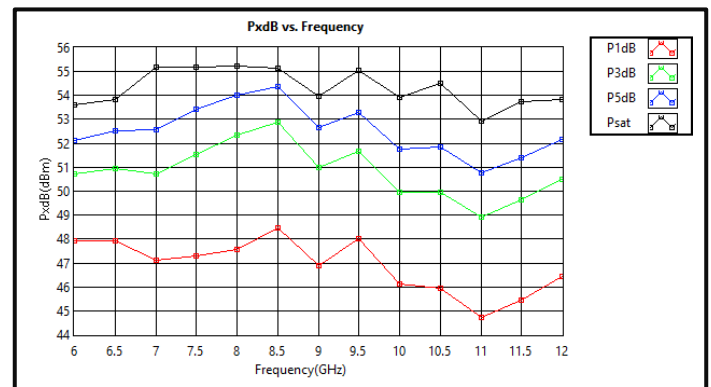
Output vs Input Power *Pulse



PxdB vs Frequency CW



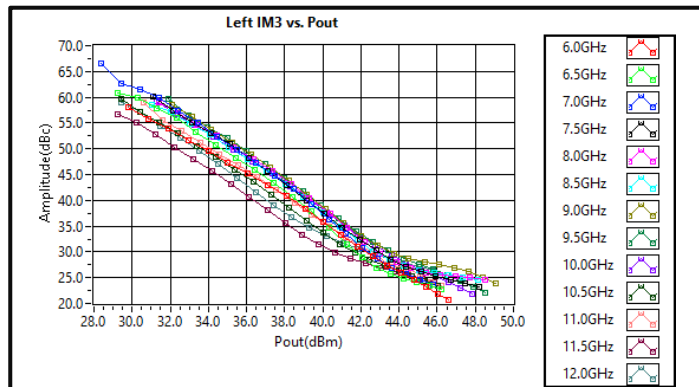
PxdB vs Frequency *Pulse



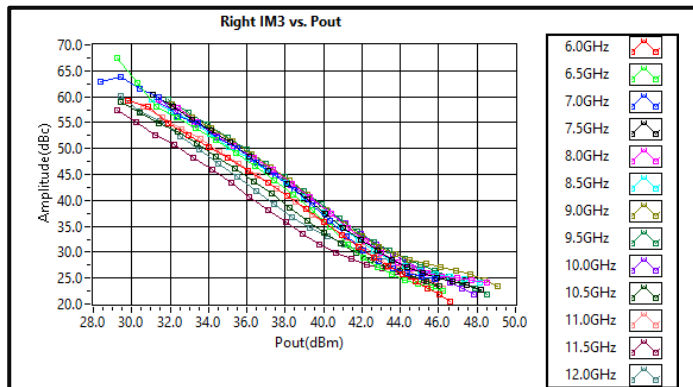
*Pulse Psat power test signal: 200μs pulse width with 10% duty cycle.

Typical Performance Plots

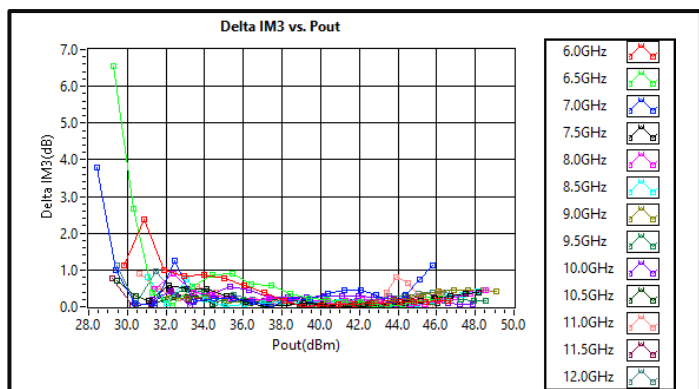
Left IM3 vs Output Power



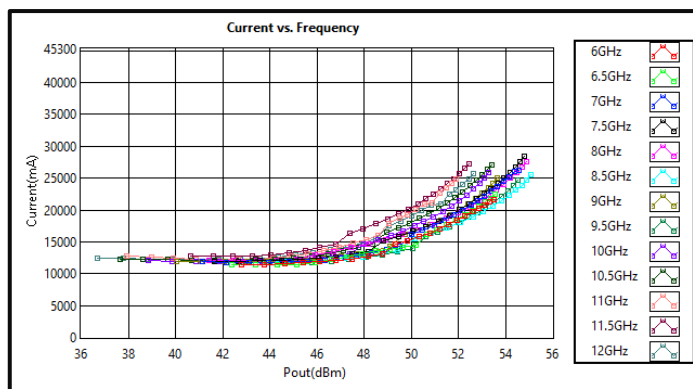
Right IM3 vs Output Power



Delta IM3 vs Output Power

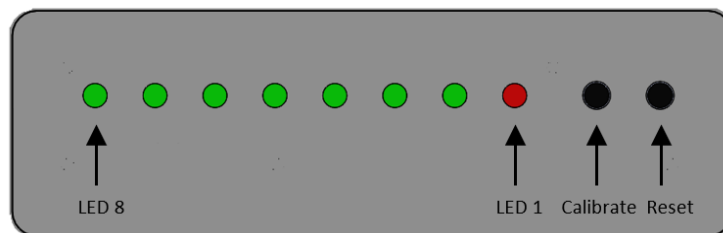


Current vs Output Power (+48VDC)



Note: IM3 test performed with 1MHz tone spacing

Alarm Status Panel

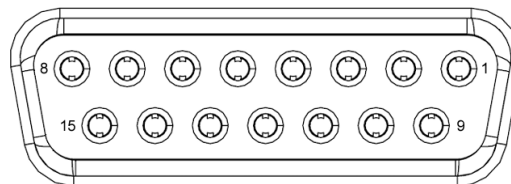


LED #	Name	Function	Initial State	Description	Applied
	Reset*	Control		Manual reset button to reset PA	Yes
	Calibration	Control		When pressed, button will start manual calibration	Yes
1	Power	Control	Red	LED will light to RED color when supply power is applied	Yes
2	Pout	Indicator	Red	LED will light to GREEN color when RF output power is ON	Yes
3	System Initialing	Indicator	Green	LED will blink while system is booting or calibrating	Yes
4	RF IN	Indicator	Green	PA will shut down and latch this LED to a RED color when input signal is over limit *	No
5	VSWR	Indicator	Green	PA will shut down and latch this LED to a RED color when output reflection is over limit *	Yes
6	ID	Indicator	Green	PA will shut down and latch this LED to a RED color when an imbalance in the drain current of the combining branches occurs or if a drain current limit is reached *	Yes
7	TEMP	Indicator	Green	PA will shut down and latch this LED to a RED color when driven over temperature *	Yes
8	CAL	Indicator	Green	PA will shut down and latch this LED to a RED while in calibration mode	Yes

Note: LED needs to be manually reset to initial state by pressing RESET button

Protection Connector Table

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



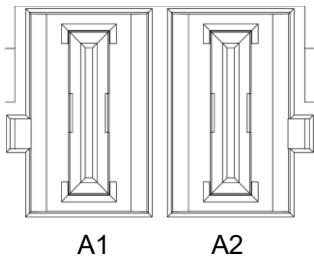
Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gate of amplifiers	Yes
3	Drain Disable	Control	LOW	Applying logic <u>HIGH</u> disables drain of amplifiers	Yes
4	RF IN Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when input signal is over limit	No
5	Temp Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when amplifier is driven over temperature	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when drain current limit is reached	Yes
7	ID Imbalance	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> 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 <u>HIGH</u> when any of the protection limit is reached	Yes
9	Fan Alarm	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when Fan limit is reached	No
10	RF Switch OFF	Control	LOW	Applying logic <u>HIGH</u> turns RF switch to load path	Yes
11	VSWR	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when output reflection is over limit	No
12	5dB Attenuation	Control	LOW	Applying logic <u>HIGH</u> enables 5dB attenuation	Yes
13	10dB Attenuation	Control	LOW	Applying logic <u>HIGH</u> enables 10dB attenuation	Yes
14	+5V	Power Supply	+5V	+5V DC is available for reference 400mA current ability	Yes
15	GND	Ground	GND	Ground	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 400mA.
- Indicator output signals can source 24mA.

Power Supply Connector Table

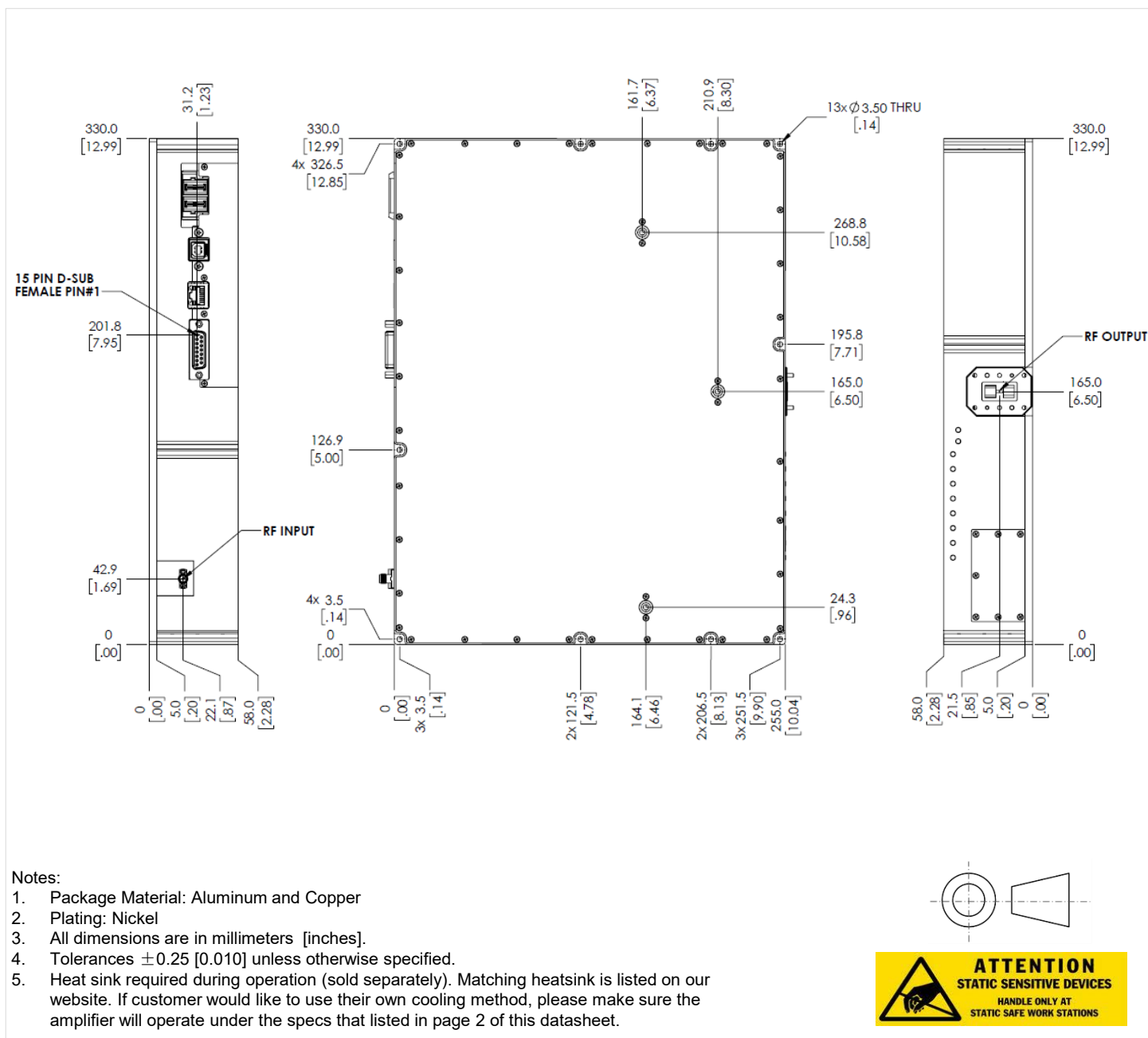
Male Molex Connector on housing
The mating female part number: 1510340012



Pin #	Gender on the Housing	Function	Initial State	Description	Applied
A1	Male	GND	GND	Ground	Yes
A2	Male	VDC		Supply Voltage	Yes

- Notes:
- Matching connector and cable will be shipped with the product.
 - If customer would like to use their own wires, 12 AWG wire is required for high current applications.

Outline Drawing



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