Wide Band Solid State Power Amplifier
47GHz~51GHz

Features

- Wideband Solid State Power Amplifier
- Gain: 45dB Typical
- Psat: +40 dBm Typical
- Supply Voltage: +36V
- Must be operated using DC Pulse

Typical Applications

- Military & Defense Applications
- Wireless Infrastructure
- Test and Measurement

Electrical Specifications, T_A = +25°C

Parameter	Min.	Typ.	Max.	Units
Frequency Range		47 – 51		GHz
Gain		44		dB
Gain Flatness		±2		dB
Gain Variation Over Temperature (-45°C ~ +85°C)		±5		dB
Input Return Loss		12		dB
Output Return Loss		10		dB
Saturated Output Power (Psat) (Tested using DC Pulse) **		39		dBm
Supply Current +36 VDC		8.9	12.1	A
Isolation S12		60		dB
Input Max Power (No Damage)		Psat – Gain		dBm
Weight		1285		g
Impedance		50		Ohms
Input / Output Connectors		2.4mm-Female Waveguide Input / Output Available Upon Request		
Finish		Nickel Plated		
Material		Aluminum / Copper		
Package Sealing		Epoxy Sealed (Standard)		
		Hermetically Sealed (Optional)		

* Note: This amplifier needs to be operated in a DC pulse mode.
** P1dB, P3dB and Psat tested using DC pulse signal. (Details in last page)

Absolute Maximum Ratings	
Supply Voltage	+60VDC
RF Input Power	Psat – Gain

Note: 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.

Biasing Up Procedure	
Step 1	Connect input and output with 50 Ohm source/load. (in band VSWR<1.9:1 or >10dB return loss)
Step 2	Connect Ground Pin
Step 3	Connect VDC
Power OFF Procedure	
Step 1	Turn Off VDC
Step 2	Remove RF Connection
Step 3	Remove Ground

Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40°C~+55°C (Case Temperature less than 85°C)
Storage Temperature	-50°C~+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 +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)

Note: The operating temperature for the unit is specified at the package base. It is the user's responsibility to ensure the part is in an environment capable of maintaining the temperature within the specified limits

Ordering Information	
Part No.	**Description**
RFLUPA47G53GA2	**47GHz~51GHz Power Amplifier With Protection**

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.

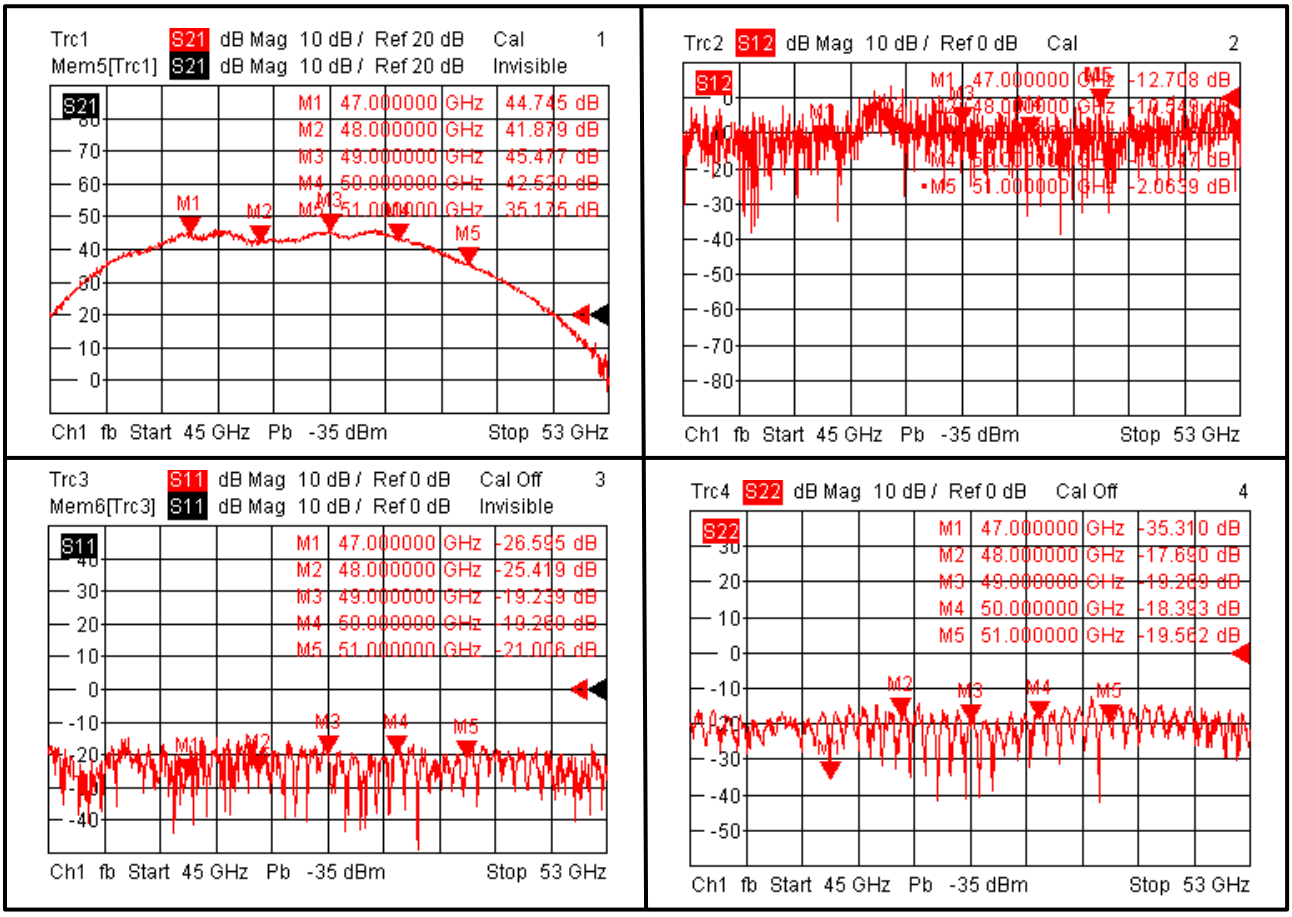
Proper electrostatic discharge (ESD) precautions are recommended to avoid performance degradation or loss of functionality.

What is not covered with warranty?

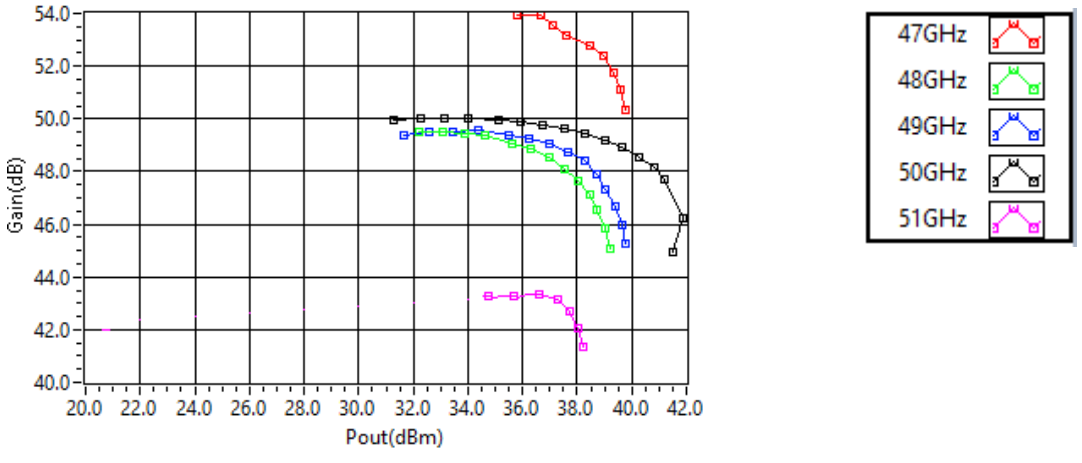
Each RF - Lambda amplifier will go through power and temperature stress testing.
Since the die, ICs or MMICs are fragile, these are not covered by warranty. Any damage to these will NOT be free to repair.

Typical Performance Plots

Small Signal S-parameters



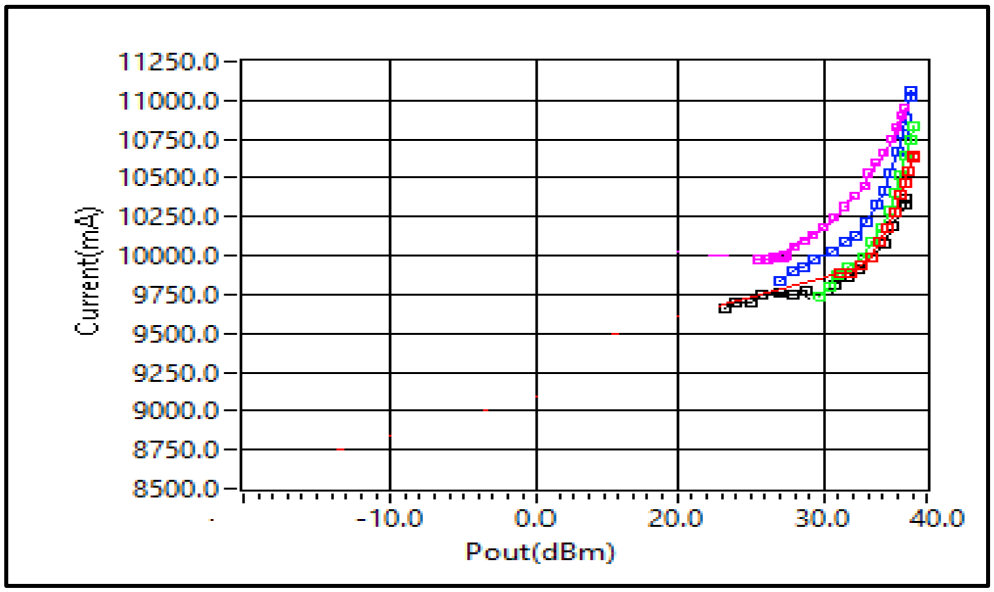
Psat vs. Frequency (DC Pulse Method)



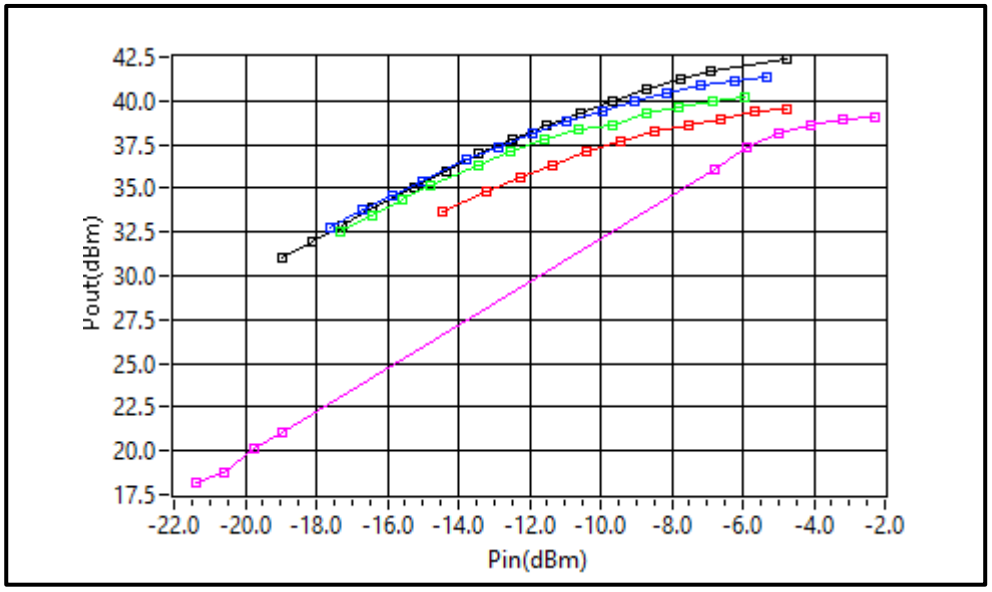
*** Psat data is tested with a DC pulsed signal**
DC pulse control is mandatory for this product.
More details on the last page of the datasheet.

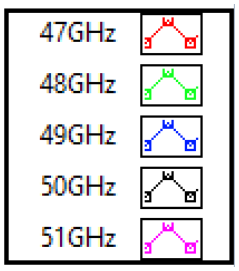
Wide Band Solid State Power Amplifier 47 - 51GHz

Current vs. Pout

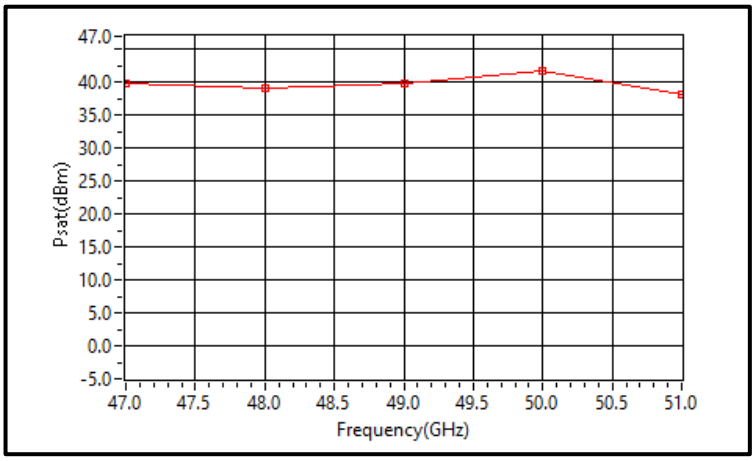


Pin vs. Pout

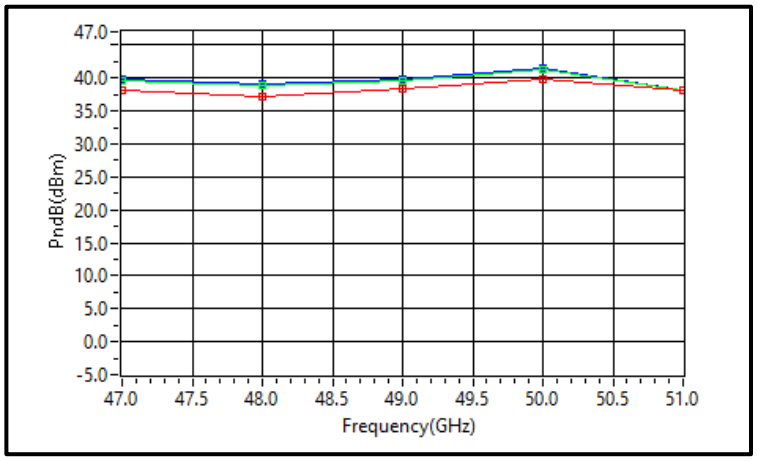


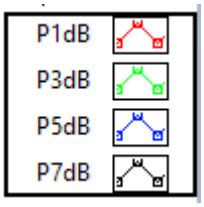


Psat vs. Frequency (DC Pulse Method)

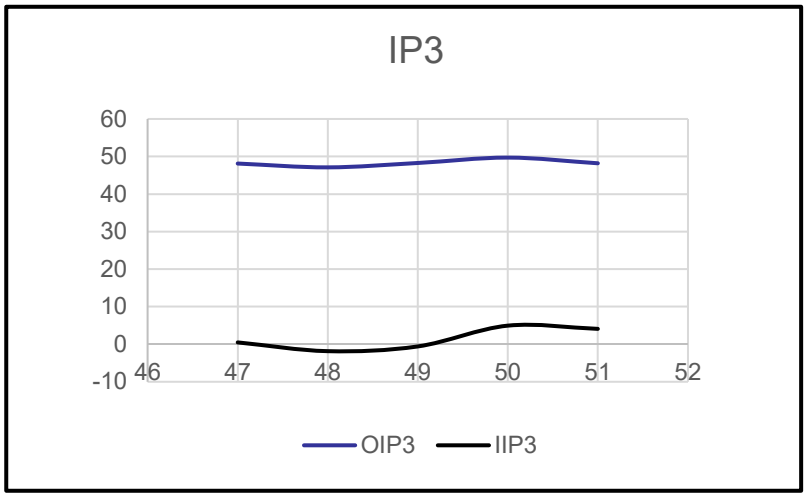


PxdB vs. Frequency (DC Pulse Method)





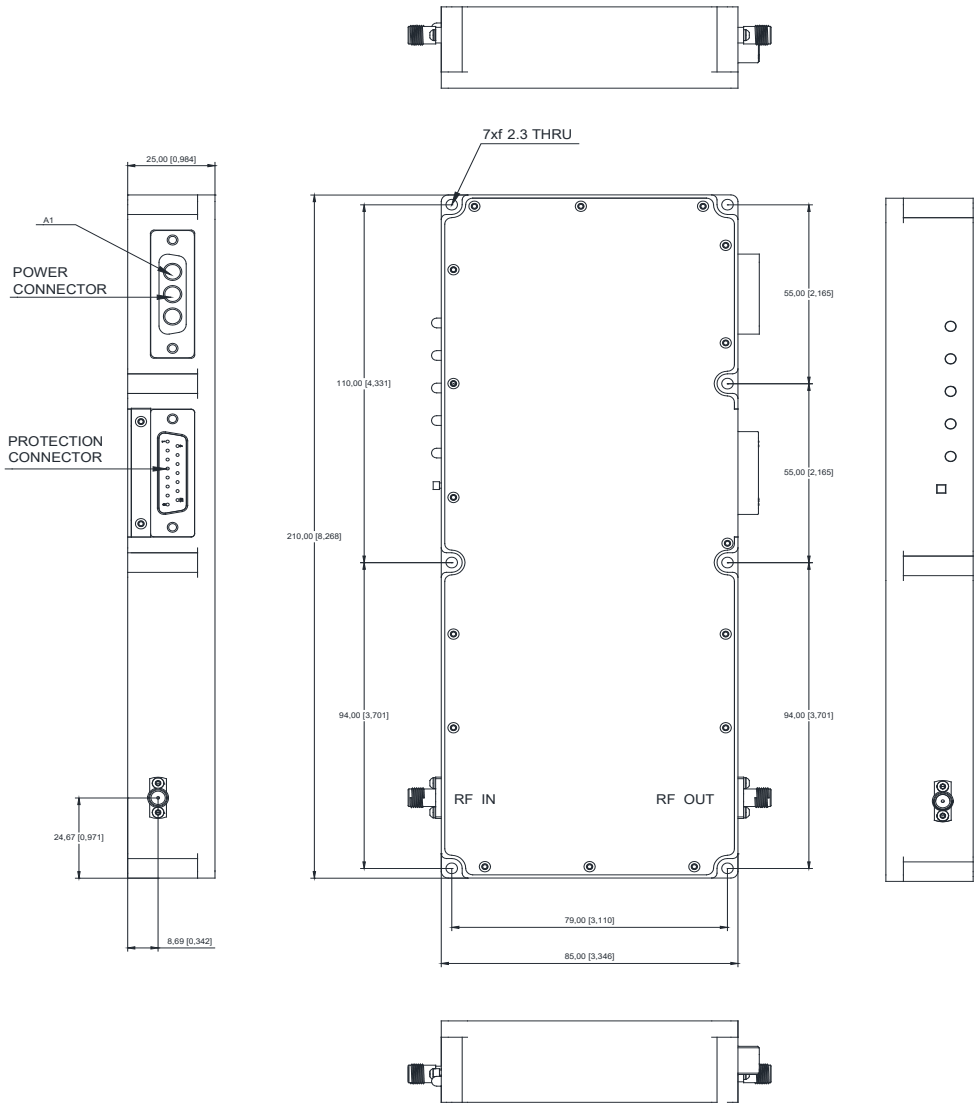
IP3 vs. Frequency



Wide Band Solid State Power Amplifier 47 - 51GHz

Outline Drawing:

All Dimensions in mm [inches]



Heat Sink required during operation (Sold Separately)
Standard torque wrench must be used to secure RF connectors.

Important Notice

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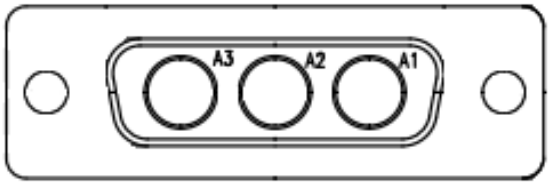
User Interface Table:

(Male d-sub connector on the housing)

Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic LOW is applied and released	Yes
2	Drain Disable	Control	LOW	Appling logic HIGH disables drains of amplifiers (Use this signal for DC Pulse Operation)	Yes
3	Gate Disable	Control	LOW	Applying logic HIGH disables gates of amplifiers	Yes
4	RF IN Over	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	No
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	VDC	Power Supply	VDC	Supply Voltage (this pin is up to 5A, for high current applications please use the power connector, refer to page 9 of this datasheet)	Yes
8	VDC	Power Supply	VDC	Supply Voltage (this pin is up to 5A, for high current applications please use the power connector, refer to page 9 of this datasheet)	Yes
9	VSWR	Indicator	LOW	Pin will be latched to logic HIGH when output reflection is over limit	No
10	+5V	Power Supply	+5V	+5V DC is supplied for reference	Yes
11	GND	GND	GND	Ground	Yes
12	GND	GND	GND	Ground	Yes
13	GND	GND	GND	Ground	Yes
14	ID Imbalance	Indicator	LOW	Pin will be latched to logic HIGH when an imbalance in the drain current of the combining branches occurs	Yes
15	Temp Signal	Indicator		PA carrier case temperature is represented by voltage	Yes

HIGH/LOW voltages are standard TTL signals:
0.0V-0.8V = LOW
2V-5V = HIGH

Power Connector
(Female on the housing, all dimensions are in mm):



	Name	Function	Initial State	Description	Applied
A3	GND	GND	GND	GND (this pin is up to 20A)	Yes
A2	VDC	Power Supply	VDC	Supply Voltage (this pin is up to 20A)	Yes
A1	VDC	Power Supply	VDC	Supply Voltage (this pin is up to 20A)	Yes

12 AWG wire is required for high current applications.

DC Pulse Operation

Important notice: This product must operate with a DC pulsed signal.
With continuous DC power there can be thermal damage caused to the amplifier.

Procedure

Apply TTL signal to control internal amplifier biasing via pin #2 on d-sub user interface connector to control the RF output.

Maintaining a logic HIGH on Pin #2 while not transmitting will help avoid an over temperature condition.