

Wideband 2-Watt Power Amplifier 28GHz-42GHz



Product Description

RFLUPA18G42GA is a wideband power amplifier with a frequency range of 28 to 42GHz.

The power output of this amplifier is 2-Watts typical. The typical small signal gain is 31dB with a variance of ± 10 dB. This performance is achieved through the use of GaN devices.

The power amplifier's input and output connectors are 2.92mm.

The operating temperature of this product is within -40 to +85°C.

Features

- Wideband Solid State Power Amplifier
- Small Signal Gain 31dB Typical
- Output Saturation Power 2-Watts Typical
- Supply Voltage +36VDC
- 50 Ohm Matched Input/Output
- Drain Overvoltage Protection
- Drain Overcurrent Protection

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		28 – 35			35 – 42		GHz
Small Signal Gain		33			29		dB
Gain Variance		+/-10			+/-10		dB
Gain Variation Over Temperature (-40°C to +85°C)		+/-5			+/-5		dB
Input Return Loss		-7			-7		dB
*Saturated Output Power (Psat)		33			33		dBm
		2			2		Watts
Supply Current (Vcc = +36VDC)		300	450		300	450	mA
IM3		-28			-28		dBc
Turn On/Off Speed (Gate Disable)	ON		200				us
	OFF		150				us
Weight			1.4				lbs.
Impedance			50				Ohms
Input / Output Connectors						2.92mm Female	
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	+36VDC
*RF Input Power (RFIN)	Psat – Large Signal Gain

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

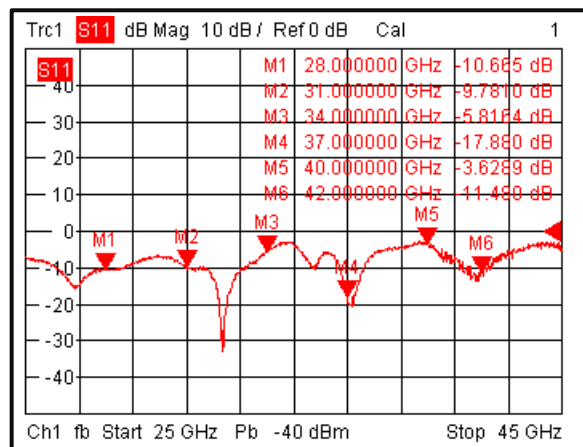
Parameter	Description
Operational Temperature	-40°C to +85°C (Case Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for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

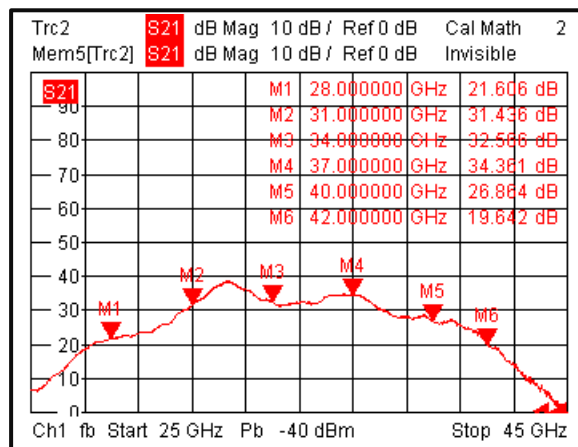
- Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
- For vibration testing details please see additional information section

Typical Performance Plots

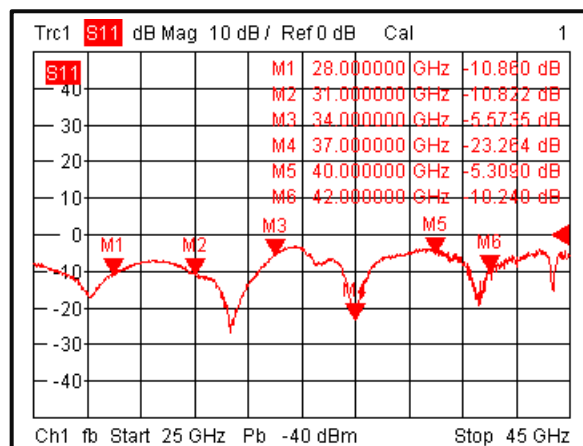
Input Return Loss @+25°C



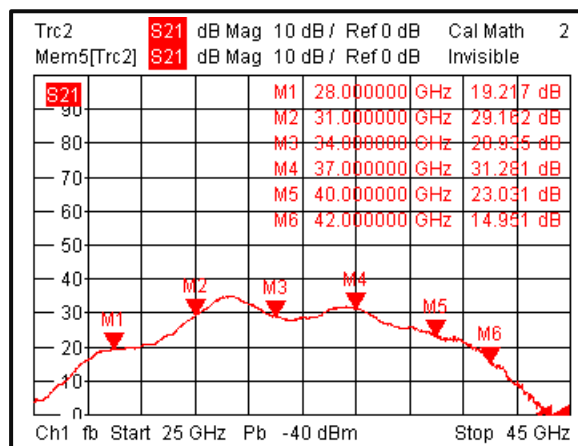
Gain vs. Frequency @+25°C



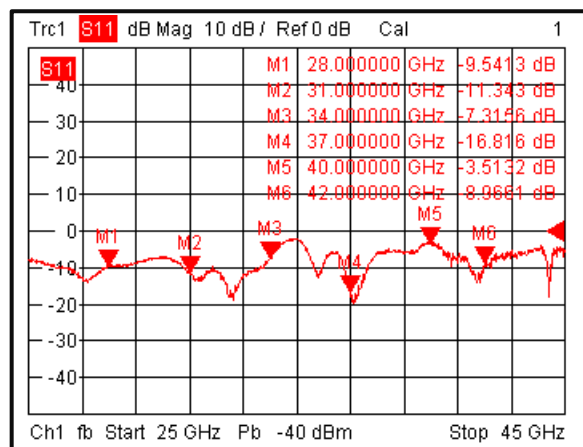
Input Return Loss @+85°C



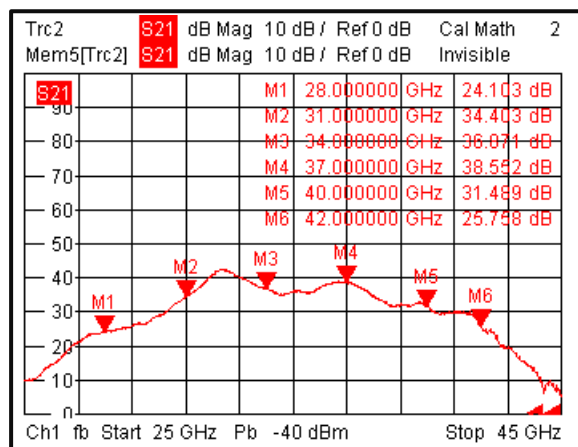
Gain vs. Frequency @+85°C



Input Return Loss @-40°C



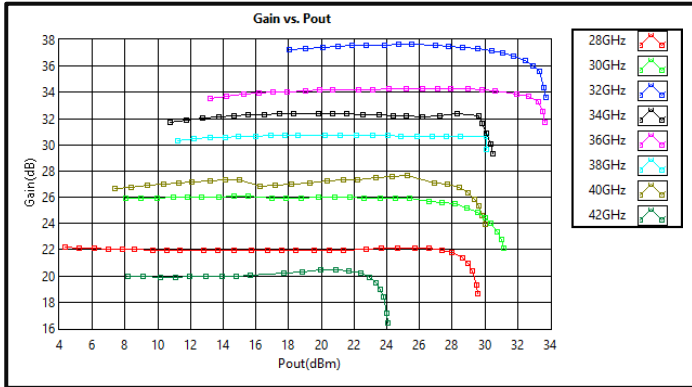
Gain vs. Frequency @-40°C



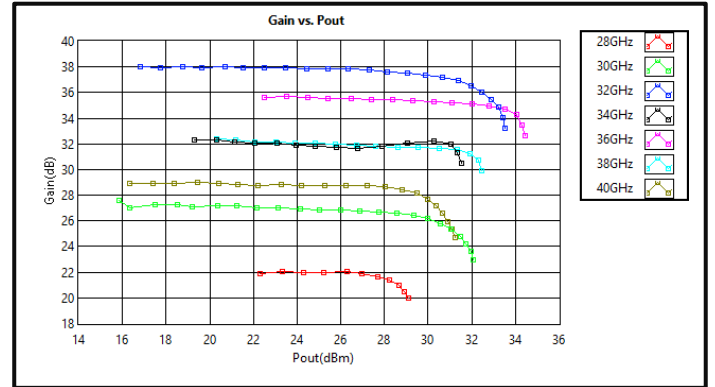
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

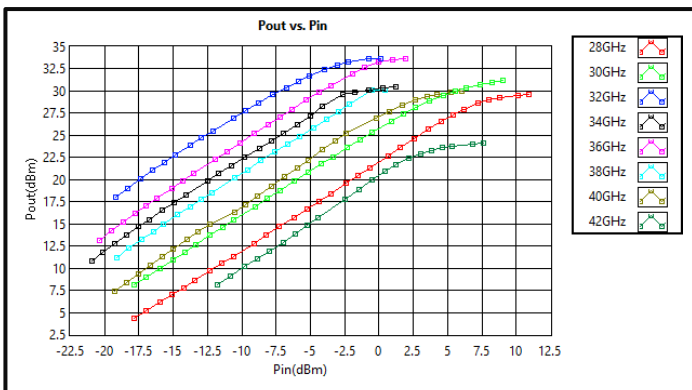
Gain vs Output Power CW



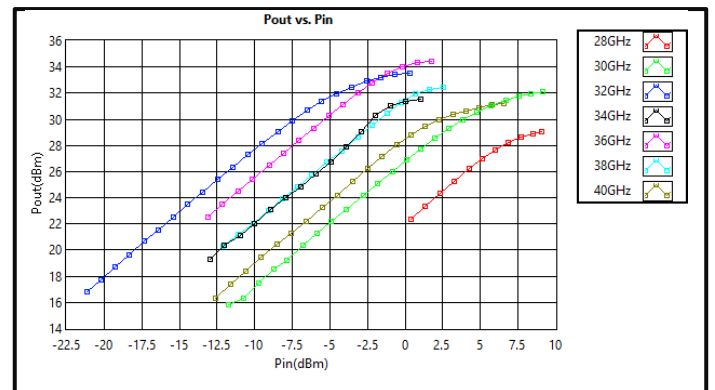
Gain vs Output Power *Pulse



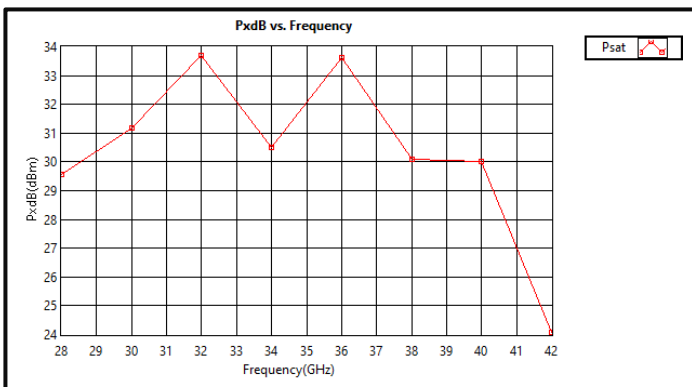
Output vs Input Power CW



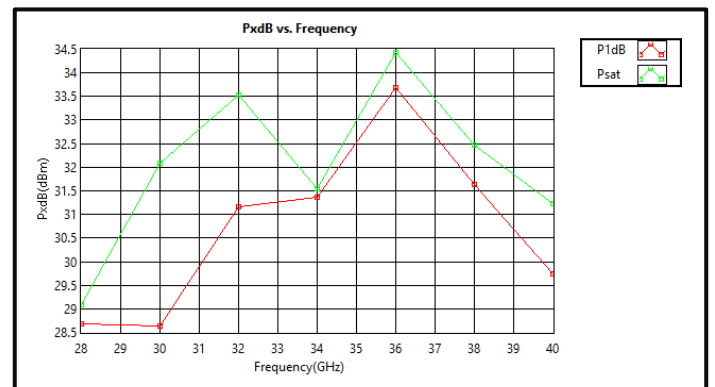
Output vs Input Power *Pulse



PxdB vs Frequency CW



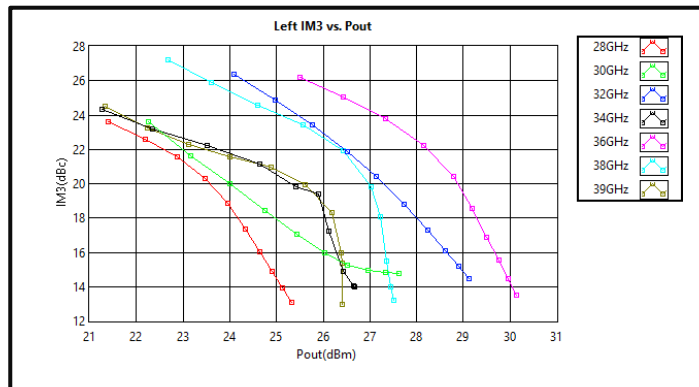
PxdB vs Frequency *Pulse



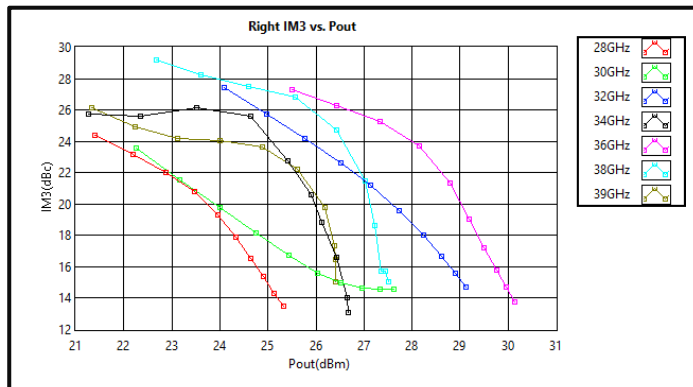
*Pulse Psat power test signal: 200μs pulse width with 10% duty cycle.

Typical Performance Plots

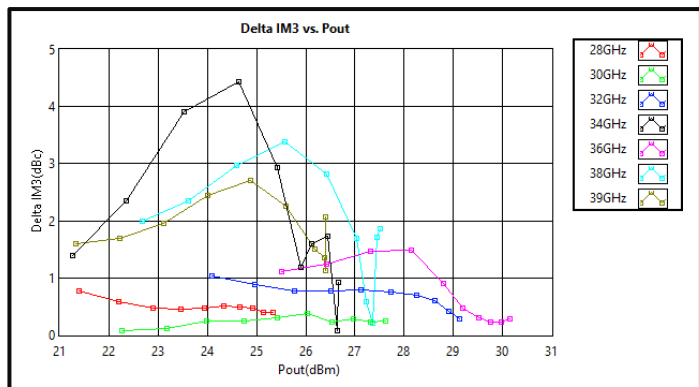
Left IM3 vs Output Power



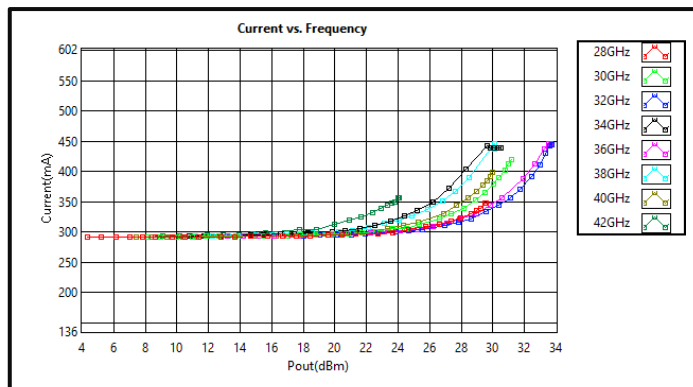
Right IM3 vs Output Power



Delta IM3 vs Output Power

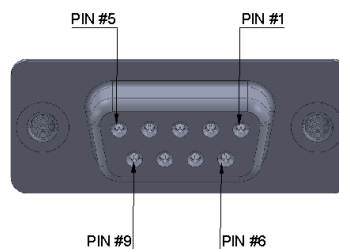


Current vs Output Power (+36VDC)



Note: IM3 test performed with 1MHz tone spacing

Protection Connector Table

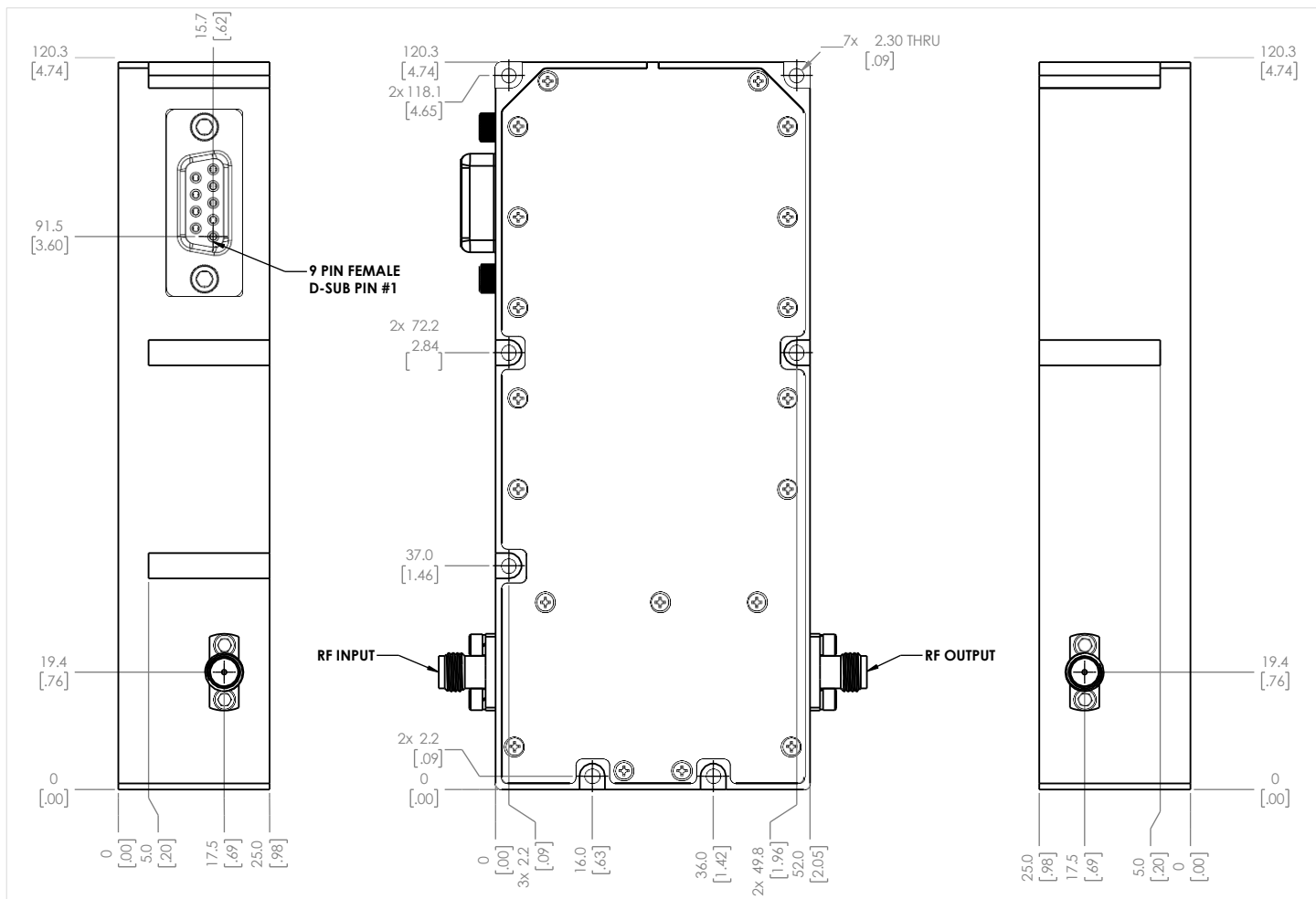


Pin #	Name	Function	Initial State	Description	Applied
1	NC	NC	NA	NA	NA
2	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when drain current limit is reached	Yes
3	ID Signal	Indicator	NA	Current provided to the drain of the last stage of the amplifier is represented by voltage	Yes
4	VDC	VDC	NA	DC power supply pin for amplifier	Yes
5	VDC	VDC	NA	DC power supply pin for amplifier	Yes
6	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gates of amplifiers	Yes
7	Temp Signal	Indicator	NA	PA carrier case temperature is represented by voltage	Yes
8	GND	Ground	GND	Ground	Yes
9	GND	Ground	GND	Ground	Yes

Notes:

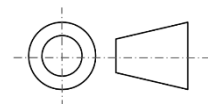
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 700mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Aluminum and Copper
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.25 [0.010] 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
RFLUPA28G42GA	Input connector 2.92mm and Output connector 2.92mm	27GHz-32GHz Power Amplifier
RAMP28G42GA	Input connector 2.92mm and Output connector 2.92mm	27-32GHz Power Amplifier with AC Supply

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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