

Wide Band Power Amplifier 20MHz-540MHz



Product Description

RFLNPA535W20 is a wideband power amplifier with a frequency range of 20 to 540MHz.

The power output of this amplifier is 45dBm typical. The typical small signal gain is 45dB with a gain flatness of ± 1.0 dB.

This power amplifier works with a +24 VDC power supply.

The working temperature of this product is between - 40°C and + 70°C.

Features

- Wideband Power Amplifier
- Small Signal Gain 45dB Typical
- Output Saturation Power 46dBm Typical
- Supply Voltage +24VDC
- 50 Ohm Matched Input/Output

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),VCC=+24VDC

| Parameter | Min | Typ | Max | Min | Typ | Max | Units |
|---|-----|-----------|-----------|-----|-----------|--------------------------------|-------|
| Frequency Range | 20 | | 250 | 250 | | 540 | MHz |
| Gain | 40 | 45 | 49 | 40 | 45 | 49 | dB |
| Gain Flatness | | ± 1.0 | ± 1.5 | | ± 1.0 | ± 1.5 | dB |
| Gain Variation Over Temperature (-40°C~+70°C) | | ± 2.0 | | | ± 2.0 | | dB |
| Input VSWR | | 1.2 | 1.5 | | 1.2 | 1.5 | : 1 |
| *Output 1dB Compression Point (P1dB) | 44 | 45 | | 43 | 44 | | dBm |
| *Saturated Output Power (Psat) | | 46 | | | 45 | | dBm |
| Efficiency @ P1dB | | 45 | | | 25 | | % |
| Supply Current (Vcc=+24V) | | 0.8 | 6.5 | | 0.8 | 6.5 | A |
| Isolation S12 | | -55 | | | -55 | | dB |
| Weight | | | 1.03 Max. | | | | lbs. |
| Impedance | | | 50 | | | | Ohms |
| Input / Output Connectors | | | | | | SMA- Female | |
| Package | | | | | | Epoxy Sealed (Standard) | |
| | | | | | | Hermetically Sealed (Optional) | |

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

Absolute Maximum Ratings

| Parameter | Rating |
|------------------------|--------|
| Operating Voltage | +25V |
| *RF Input Power (RFIN) | +5dBm |

Bias Up Procedure

- 1.Connect Ground Pin
- 2.Connect input and output
- 3.Connect +24V biasing

Bias Down Procedure

- 1.Turn off +24V biasing
- 2.Remove RF connection
- 3.Remove Ground.

Environmental Specifications and Test Standards

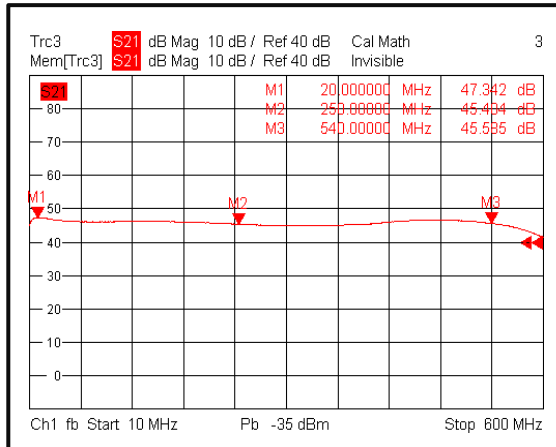
| Parameter | Description |
|-----------------------------------|---|
| Operational Temperature | -40°C to +70°C (Case Temperature) |
| Storage Temperature | -50°C to +105°C |
| Thermal Shock | -40°C → +85°C (5 Cycles / 10 hours) |
| **Random Vibration | MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis |
| High Temperature Burn In | Temperature +70°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.

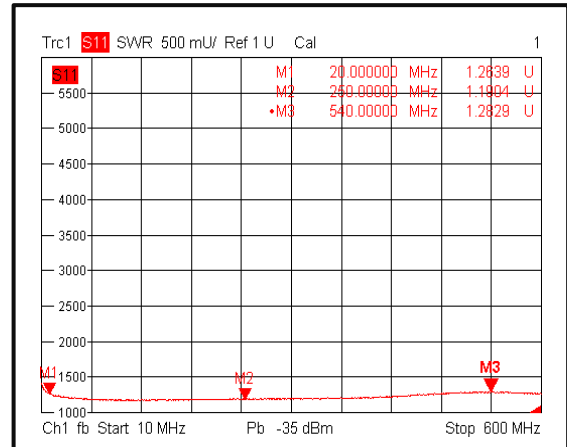
**For vibration testing details please see additional information section.

Typical Performance Plots

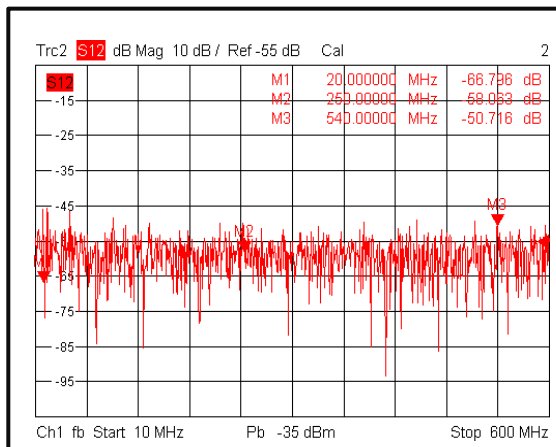
Gain@+25°C



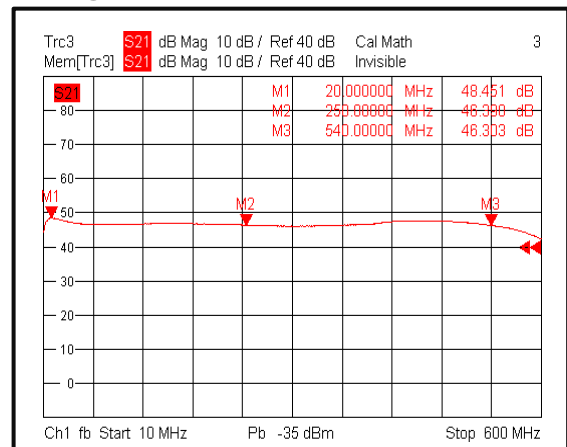
Input VSWR @+25°C



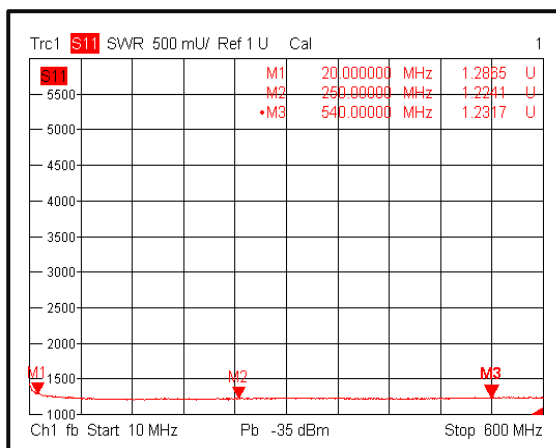
Isolation@+25°C



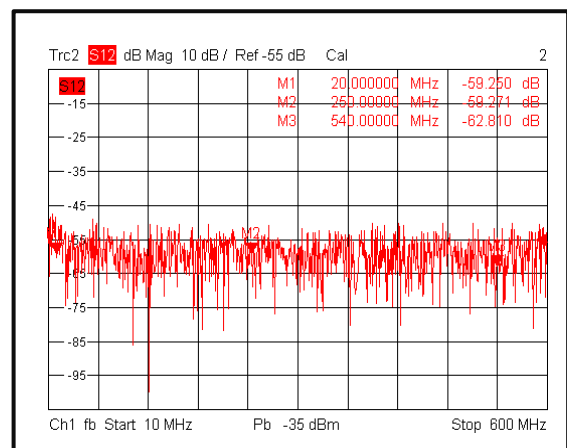
Gain@-40°C



Input VSWR @-40°C



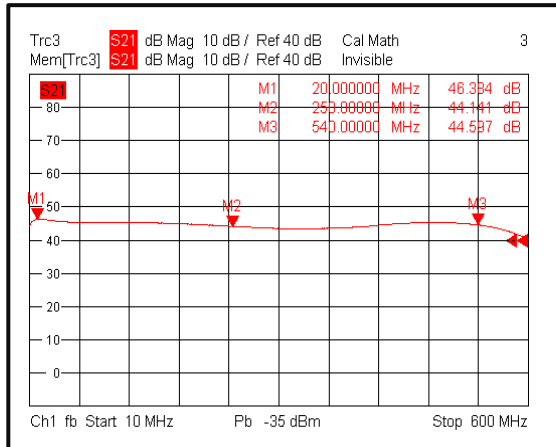
Isolation@-40°C



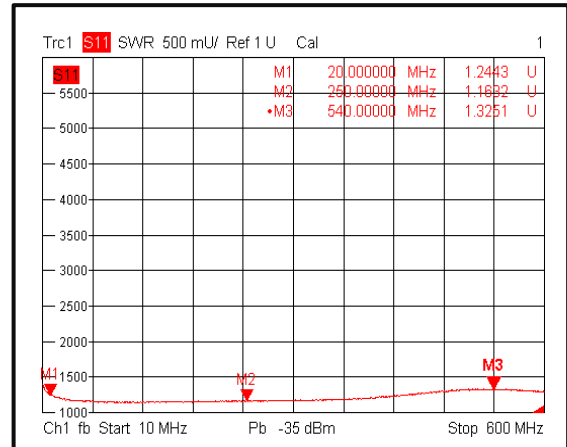
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

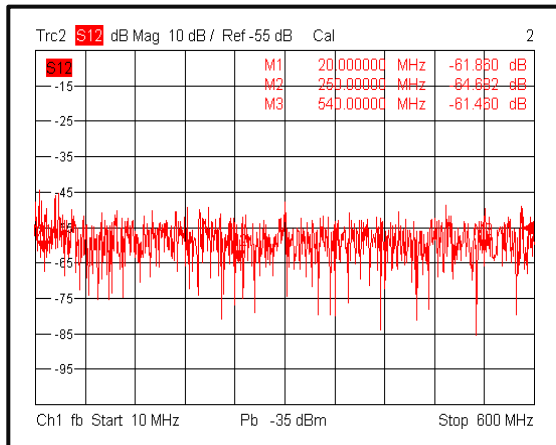
Gain@+70°C



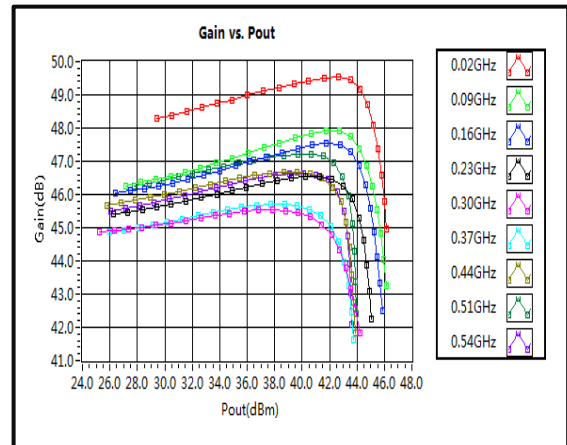
Input VSWR @+70°C



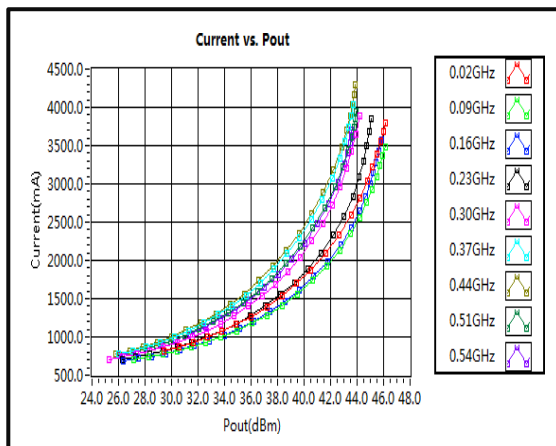
Isolation@+70°C



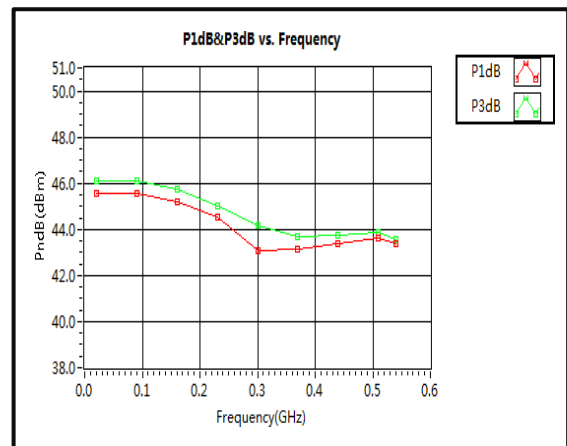
Gain vs. Output Power



Current



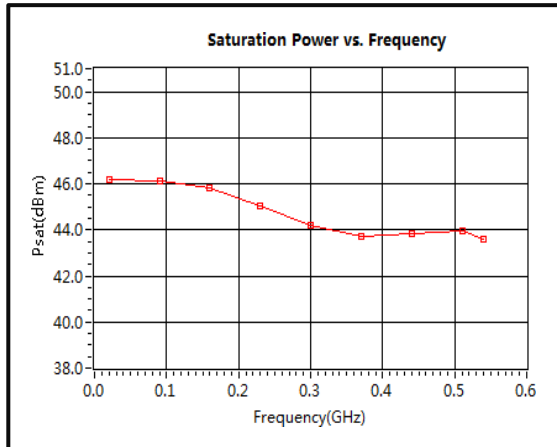
P1dB & P3dB vs. Frequency



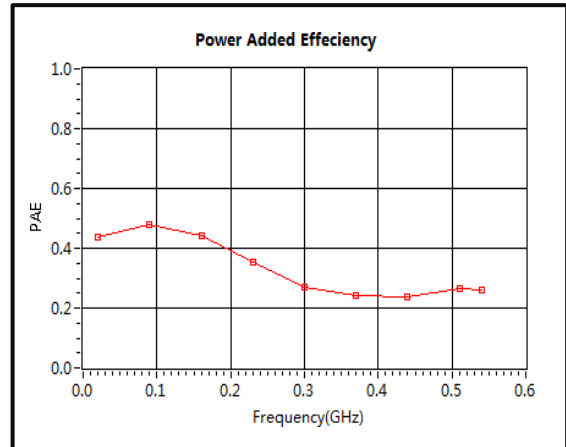
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

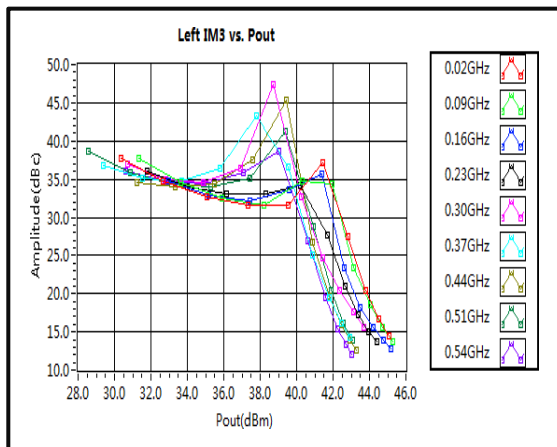
Saturation Power vs. Frequency



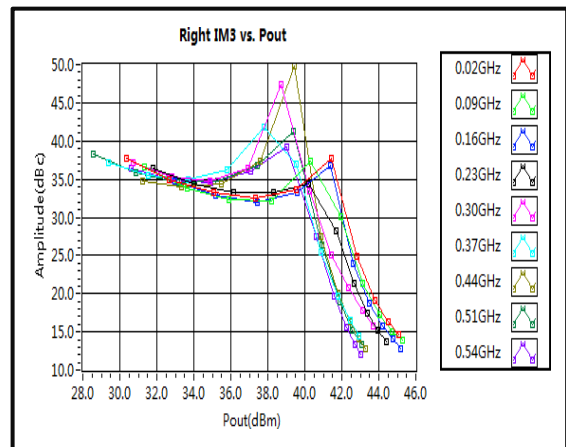
Power Added Efficiency



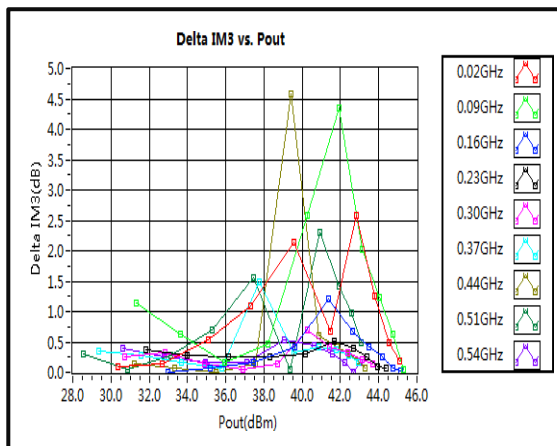
Left IM3 vs. Pout



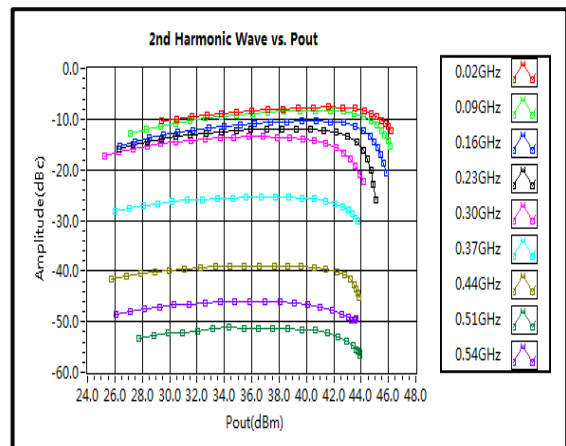
Right IM3 vs. Pout



Delta IM3 vs. Pout

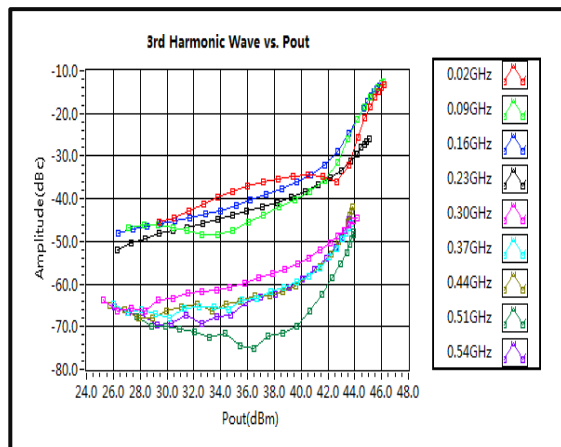


2nd Harmonic Wave Output Power

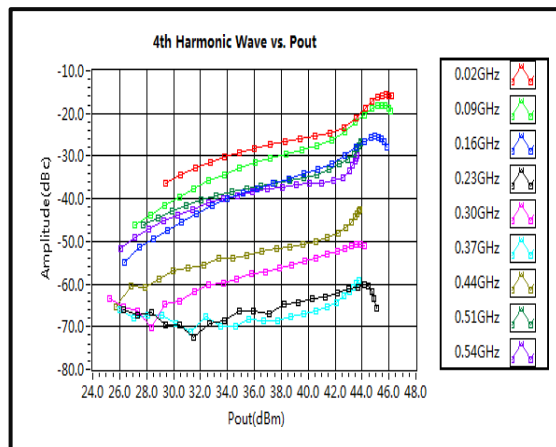


Typical Performance Plots

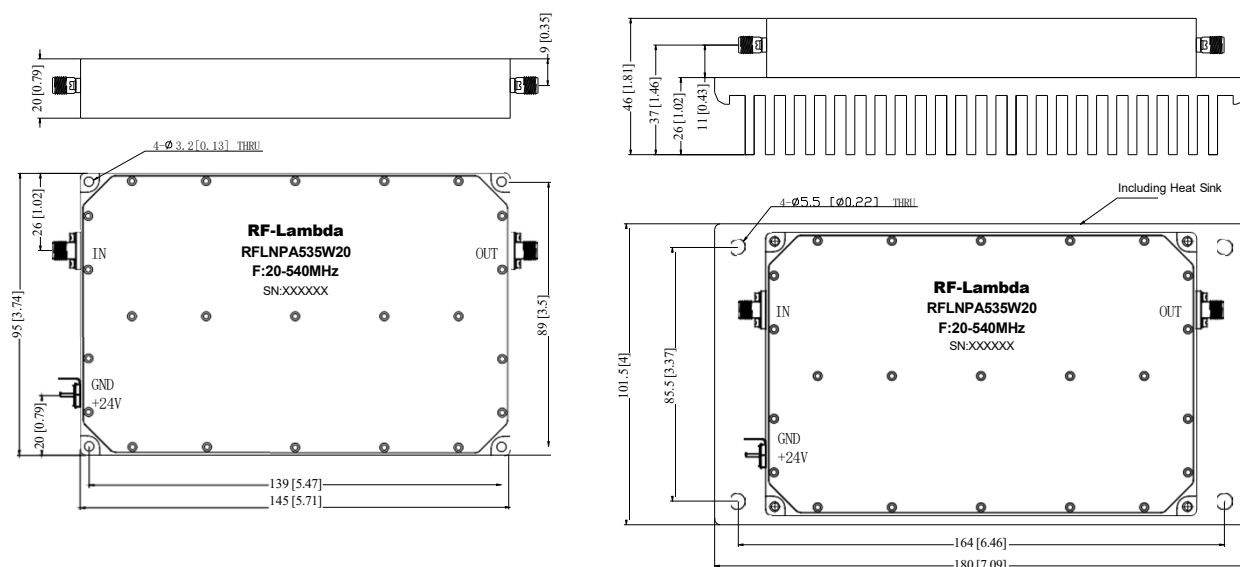
3rd Harmonic Wave Output Power



4th Harmonic Wave Output Power

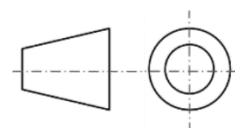


Outline Drawing



Notes:

1. Package Material: Aluminum
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Housing Tolerances ± 0.5 [0.02] 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

ESD Policy

Heatsink Lookup Specifications

Connector Torque Specifications

Random Vibration Test Standard

Webpage

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

https://rflambda.com/search_heatsink.jsp

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

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

Ordering Information

| Part Number | Modification | Description |
|--------------|--------------|---------------------------|
| RFLNPA535W20 | Standard | 20-540MHz 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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