

## Wideband Power Amplifier 30GHz-40GHz



### Product Description

RP28G42GSPA is a wideband power amplifier with a frequency range of 30 to 40GHz.

The power output of this amplifier is 32dBm typical. The typical small signal gain is 16dB with a variance of  $\pm 4$ dB. This excellent 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 16dB Typical
- Output Saturation Power 32dBm Typical
- Supply Voltage +6VDC
- 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 ( $T_A = +25^\circ\text{C}$ )

| Parameter                                        | Min                            | Typ | Max | Min     | Typ | Max | Min     | Typ | Max | Units |
|--------------------------------------------------|--------------------------------|-----|-----|---------|-----|-----|---------|-----|-----|-------|
| Frequency Range                                  | 30 – 34                        |     |     | 34 – 36 |     |     | 36 – 40 |     |     | GHz   |
| Small Signal Gain                                | 16                             |     |     | 20      |     |     | 16      |     |     | dB    |
| Gain Variance                                    | +/-4                           |     |     | +/-2    |     |     | +/-3    |     |     | dB    |
| Gain Variation Over Temperature (-40°C to +85°C) | +/-4                           |     |     | +/-3    |     |     | +/-5    |     |     | dB    |
| Input Return Loss                                | -4                             |     |     | -14     |     |     | -10     |     |     | dB    |
| *Output 1dB Compression Point (P1dB)             | 28                             |     |     | 30      |     |     | 29      |     |     | dBm   |
| *Saturated Output Power (Psat)                   | 32                             |     |     | 33      |     |     | 32      |     |     | dBm   |
| Supply Current (Vcc = +6VDC)                     | 1                              | 2.5 |     | 1       | 2.5 |     | 1       | 2.5 |     | A     |
| IM3                                              | -46                            |     |     | -46     |     |     | -47     |     |     | dBc   |
| Impedance                                        |                                |     |     | 50      |     |     |         |     |     | Ohms  |
| Input / Output Connectors                        | 2.92mm Female                  |     |     |         |     |     |         |     |     |       |
| Package                                          | Epoxy 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   | +6VDC                    |
| *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

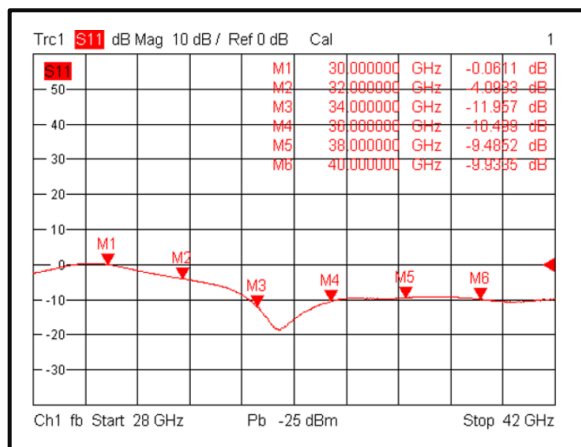
| Parameter                         | Description                                                                                                         |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Operational Temperature           | -40°C to +85°C<br>(Case Temperature)                                                                                |
| Storage Temperature               | -55°C to +125°C                                                                                                     |
| Thermal Shock                     | -40°C → +85°C<br>(5 Cycles / 10 hours)                                                                              |
| **Random Vibration                | MIL-STD-202G<br>Table 214-I, Test Condition Letter C<br>1.5 Hours Per Axis                                          |
| High Temperature Burn In          | Temperature +85°C for 72 Hours                                                                                      |
| Shock                             | MIL-STD-202G<br>Table 213-I, Test Condition Letter K<br>Total 18 times (6 directions, 3 repetitions per direction)  |
| Altitude                          | Standard: 30,000 Ft (Epoxy Sealed Controlled Environment)<br>Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min) |
| Hermetically Sealed<br>(Optional) | MIL-STD-883 (For Hermetically Sealed Units)                                                                         |

#### Notes:

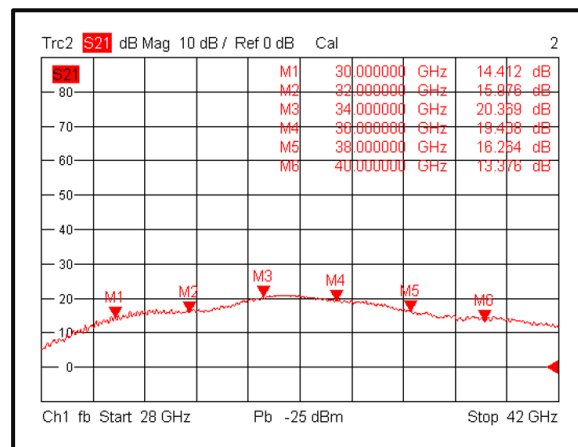
- Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
- For vibration testing details please see additional information section

## Typical Performance Plots

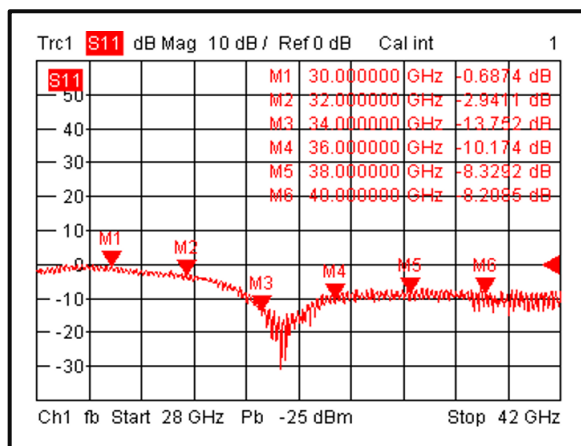
### Input Return Loss @+25°C



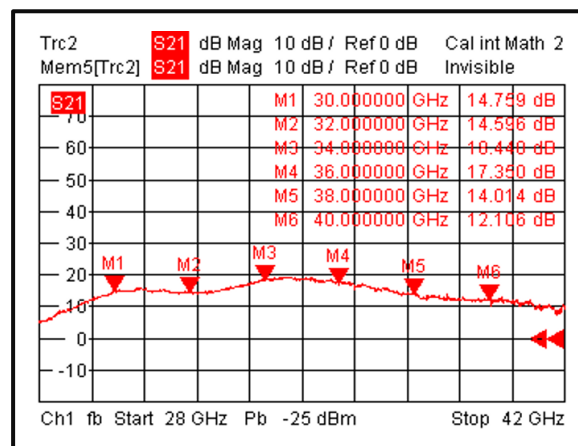
### Gain vs. Frequency @+25°C



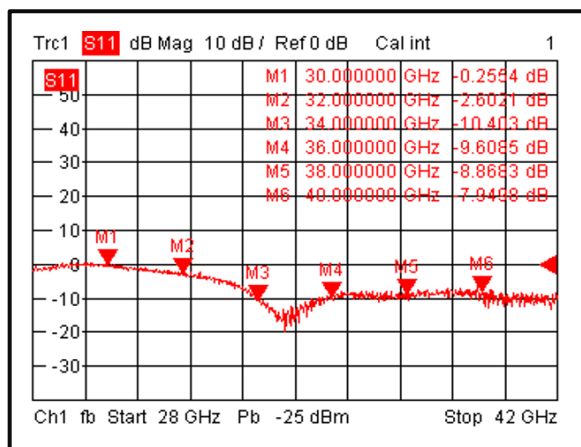
### Input Return Loss @+85°C



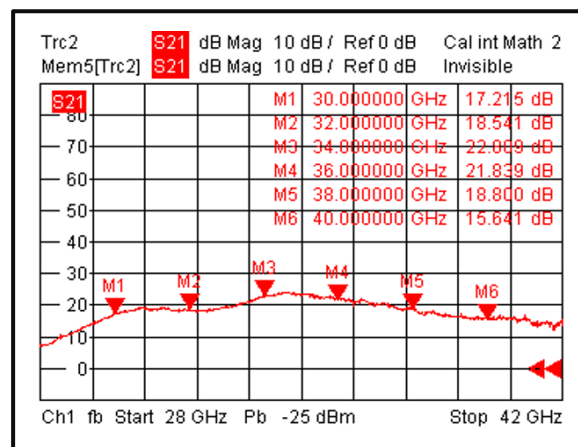
### Gain vs. Frequency @+85°C



### Input Return Loss @-40°C



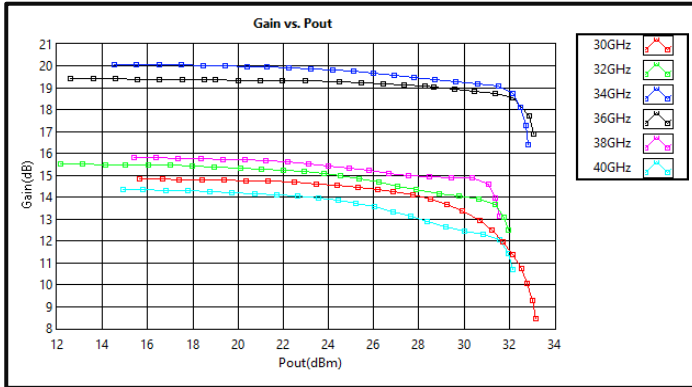
### Gain vs. Frequency @-40°C



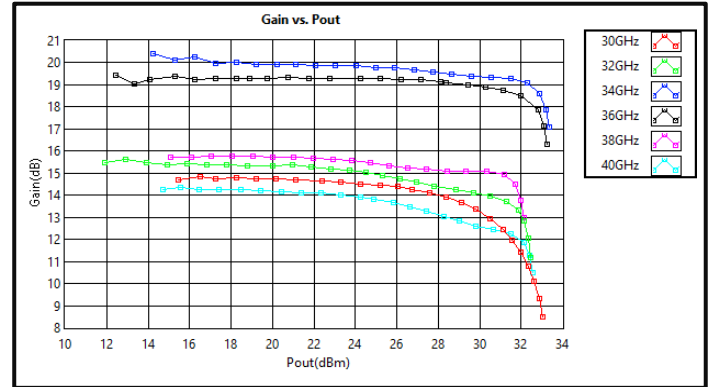
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

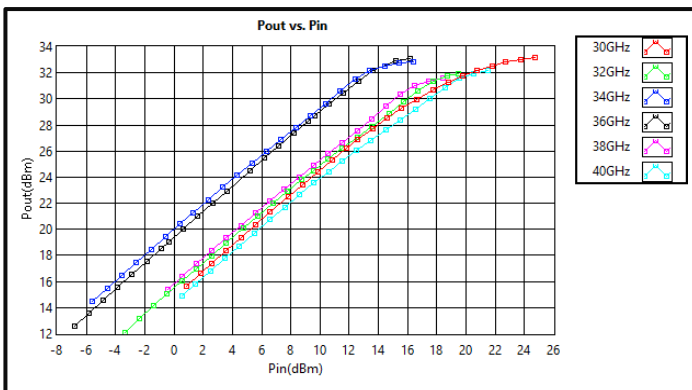
Gain vs Output Power CW



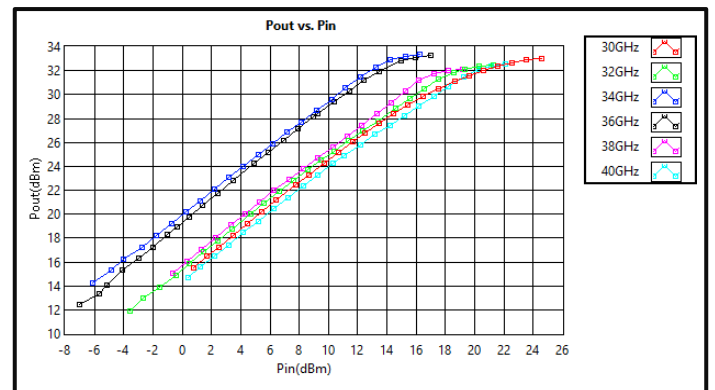
Gain vs Output Power \*Pulse



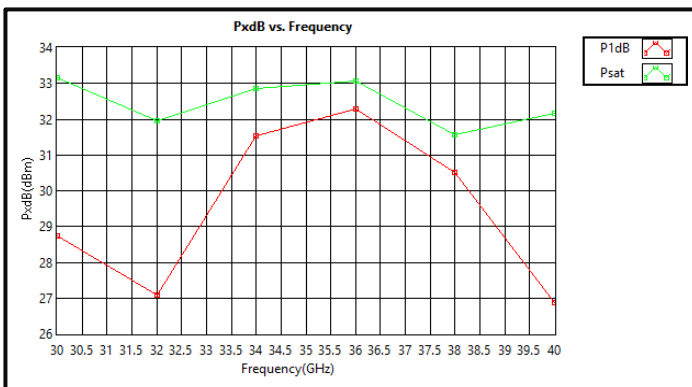
Output vs Input Power CW



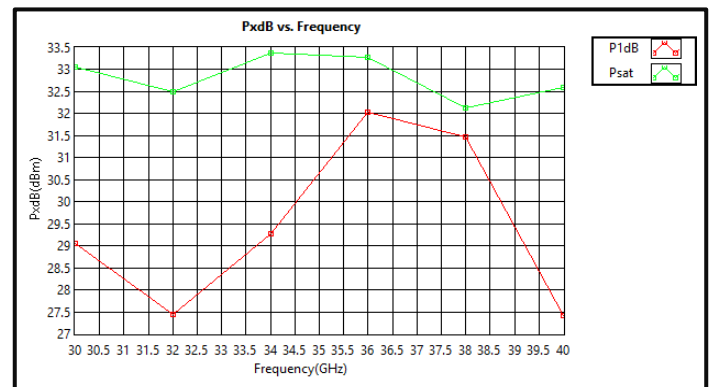
Output vs Input Power \*Pulse



PxdB vs Frequency CW



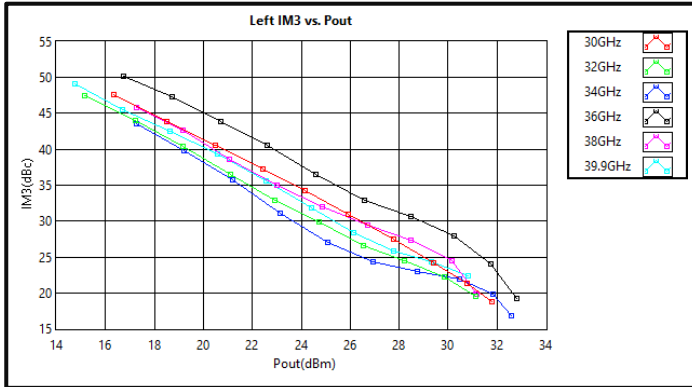
PxdB vs Frequency \*Pulse



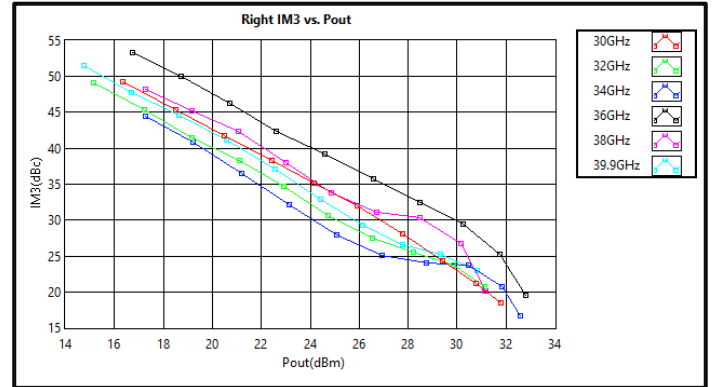
\*Pulse Psat power test signal: 200μs pulse width with 10% duty cycle.

Typical Performance Plots

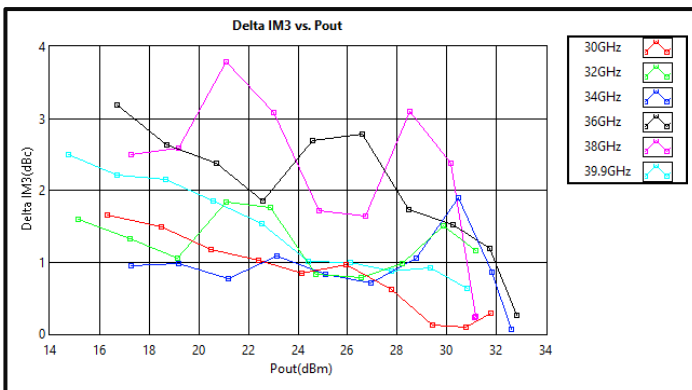
Left IM3 vs Output Power



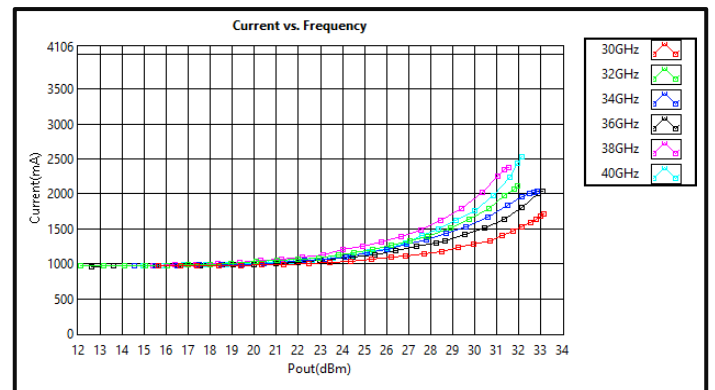
Right IM3 vs Output Power



Delta IM3 vs Output Power

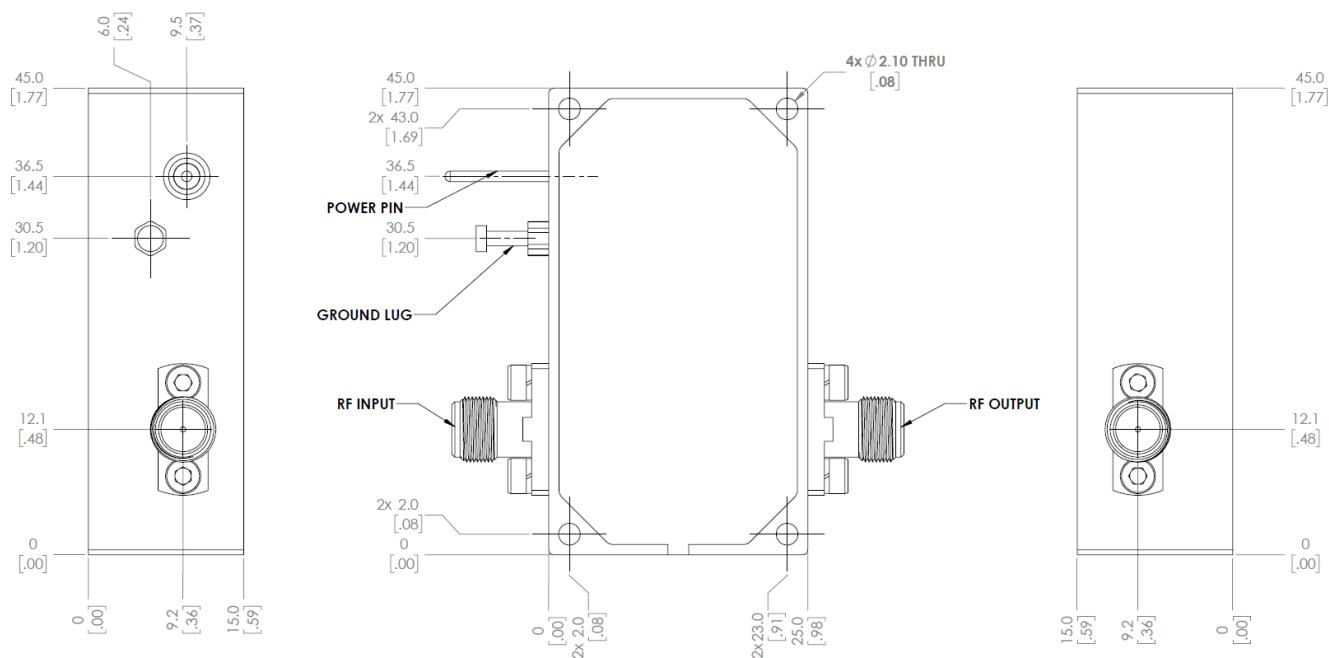


Current vs Output Power (+6VDC)



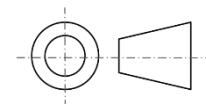
Note: IM3 test performed with 1MHz tone spacing

**Outline Drawing**



**Notes:**

1. Package Material: Aluminum and Copper
2. Plating: Nickel
3. All dimensions are in millimeters [inches].
4. Tolerances  $\pm 0.25$  [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                      | <a href="https://rflambda.com/pdf/rflambda_esd_control.pdf">https://rflambda.com/pdf/rflambda_esd_control.pdf</a>                                             |
| Heatsink Lookup Specifications  | <a href="https://rflambda.com/search_heatsink.jsp">https://rflambda.com/search_heatsink.jsp</a>                                                               |
| Connector Torque Specifications | <a href="https://www.rflambda.com/pdf/Torque_Specifications.pdf">https://www.rflambda.com/pdf/Torque_Specifications.pdf</a>                                   |
| Random Vibration Test Standard  | <a href="https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf">https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf</a> |

## Ordering Information

| Part Number    | Modification     | Description                 |
|----------------|------------------|-----------------------------|
| RP28G42GSPA    | Standard         | 30GHz-40GHz Power Amplifier |
| RP28G42GSPA-DB | Dual Bias Supply | 30GHz-40GHz 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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