

## Wideband Power Amplifier 27GHz-32GHz



### Product Description

RFLUPA27G32GA2 is a wideband power amplifier with a frequency range of 27 to 32GHz.

The power output of this amplifier is 43dBm typical. The typical small signal gain is 58dB with a variance of  $\pm 9$ 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 58dB Typical
- Output Saturation Power 43dBm Typical
- Supply Voltage +28VDC
- 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 ( $T_A = +25^\circ\text{C}$ )

| Parameter                                        | Min | Typ                            | Max | Units |
|--------------------------------------------------|-----|--------------------------------|-----|-------|
| Frequency Range                                  |     | 27-32                          |     | GHz   |
| Small Signal Gain                                |     | 58                             |     | dB    |
| Gain Variance                                    |     | +/- 9                          |     | dB    |
| Gain Variation Over Temperature (-40°C to +85°C) |     | +/-10                          |     | dB    |
| Input Return Loss                                |     | -16                            | -   | dB    |
| *Saturated Output Power (Psat)                   |     | 43                             |     | dBm   |
| Supply Current (Vcc = +28VDC)                    |     | 1.3                            | 4.5 | A     |
| IM3                                              |     | -30                            |     | dBc   |
| Weight                                           |     | 1.2                            |     | 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   | +30VDC                   |
| *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

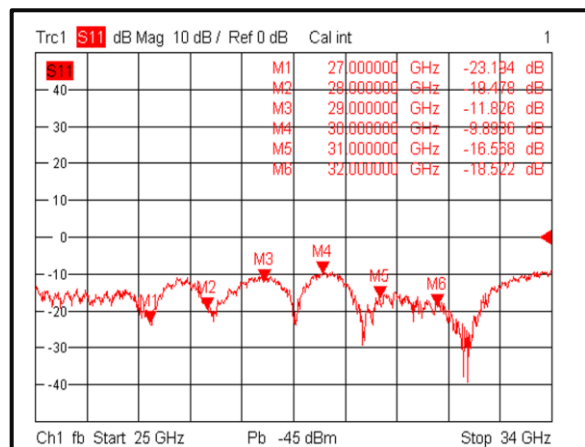
| Parameter                         | Description                                                                                                                                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                             | 1. Weight >20g, 50g half sine wave for 11ms, Speed variation 3.44m/s<br>2. Weight <=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s<br>3. 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:

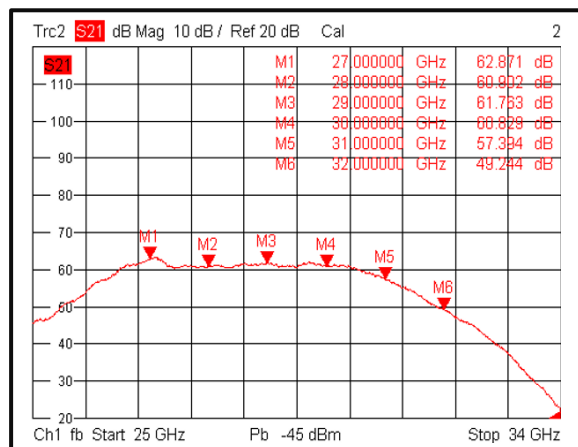
- Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
- For vibration testing details please see additional information section

Typical Performance Plots

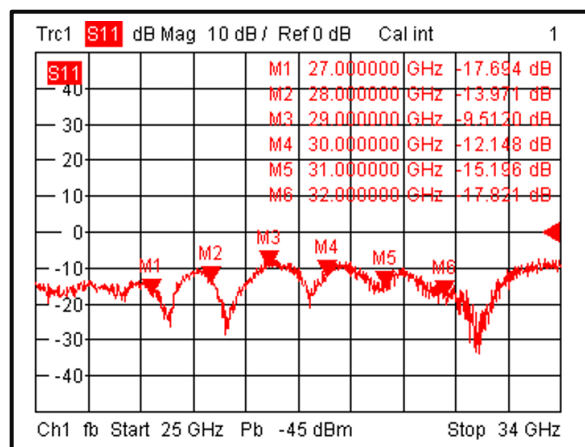
Input Return Loss vs Frequency @+25°C



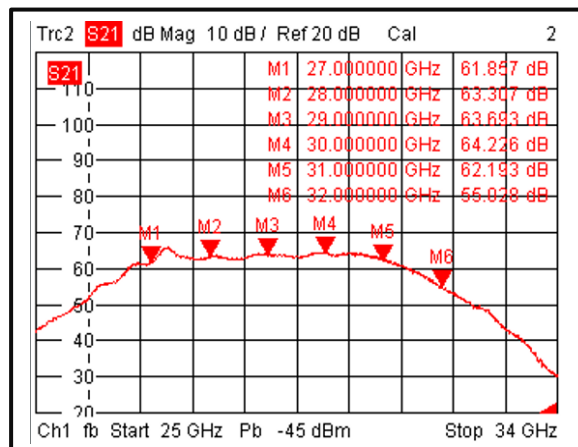
Gain vs Frequency @+25°C



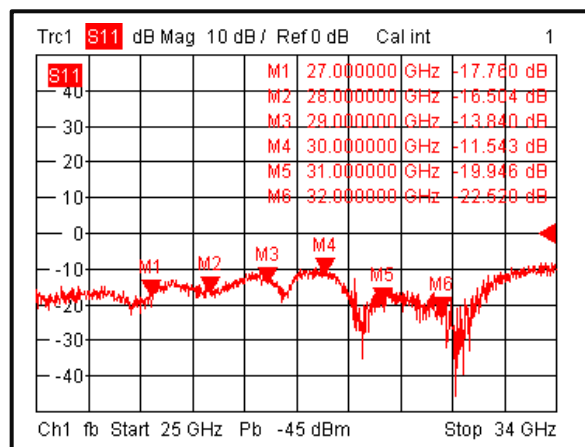
Input Return Loss vs Frequency @-40°C



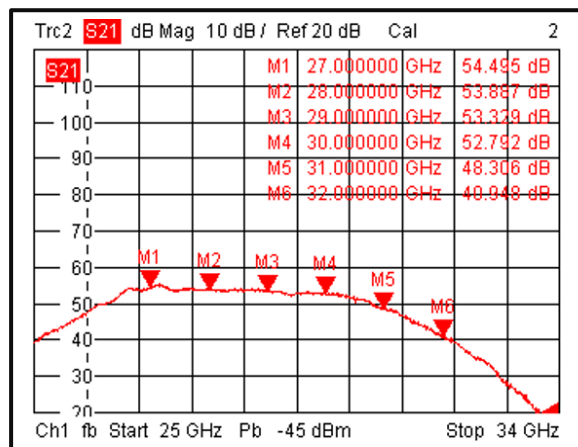
Gain vs Frequency @-40°C



Input Return Loss vs Frequency @+85°C



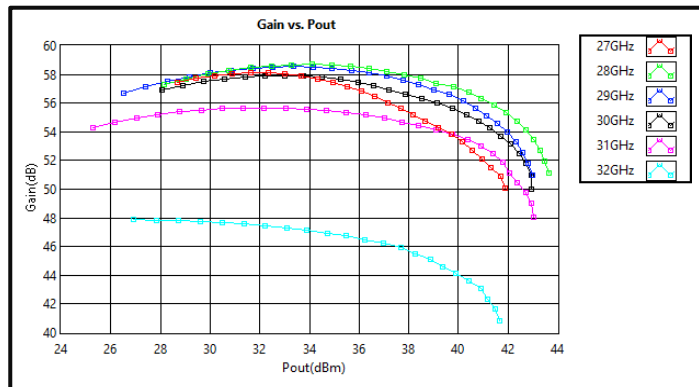
Gain vs Frequency @+85°C



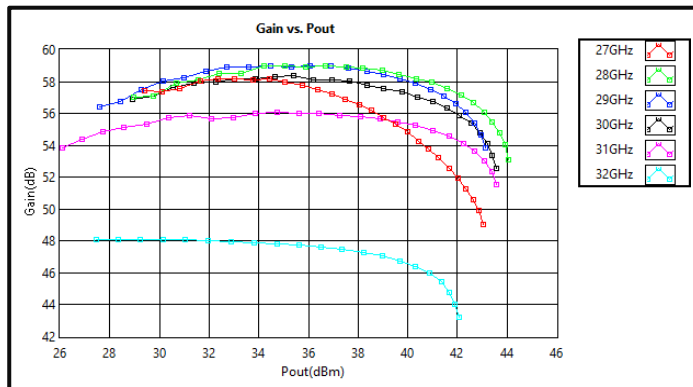
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

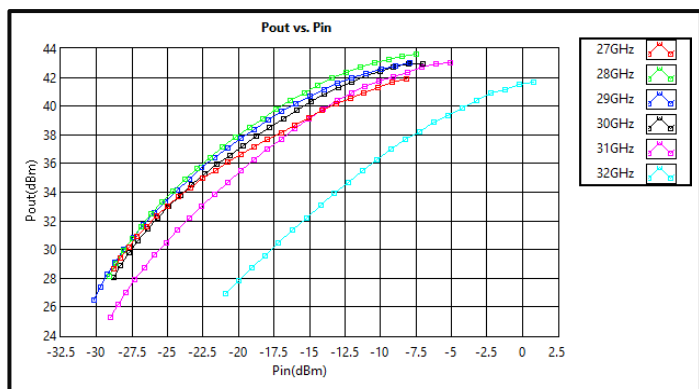
Gain vs Output Power CW



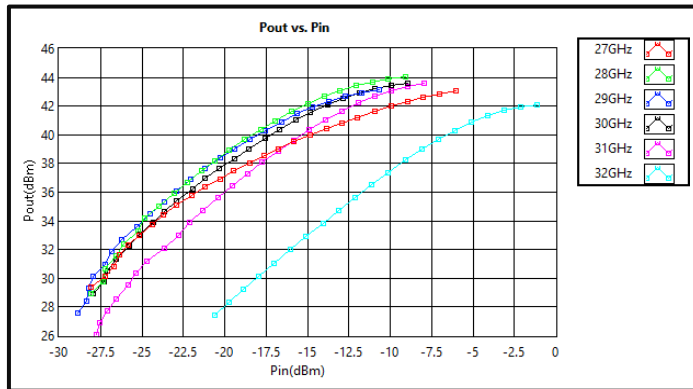
Gain vs Output Power \*Pulse



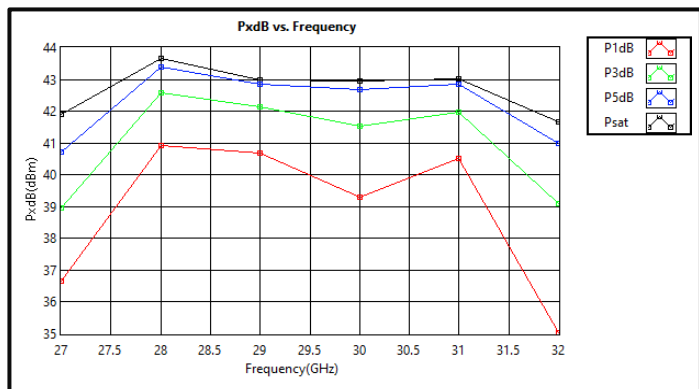
Output vs Input Power CW



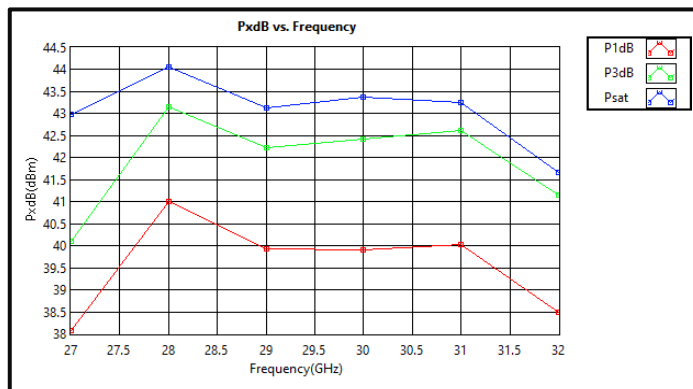
Output vs Input Power \*Pulse



PxdB vs Frequency CW



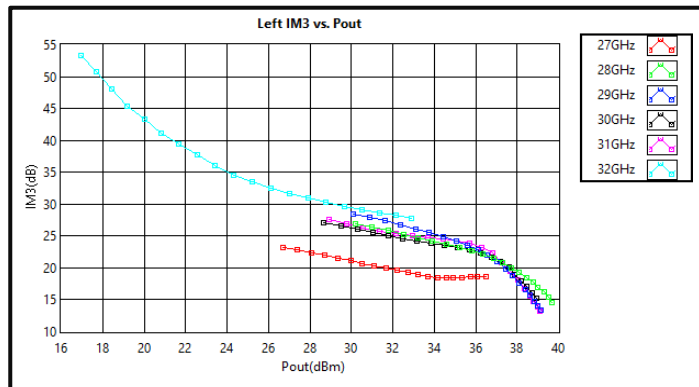
PxdB vs Frequency \*Pulse



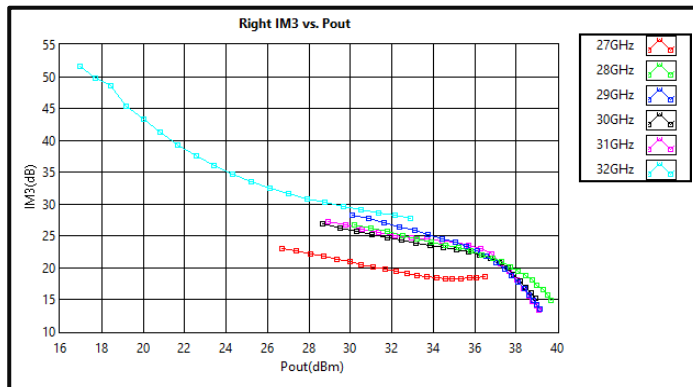
\*Pulse Psat power test signal: 200μs pulse width with 10% duty cycle.

## Typical Performance Plots

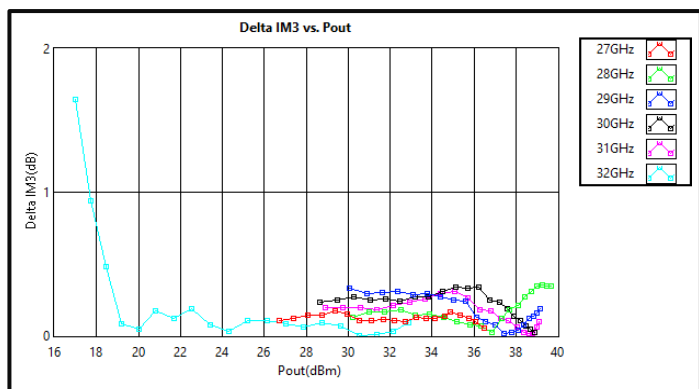
**Left IM3 vs Output Power**



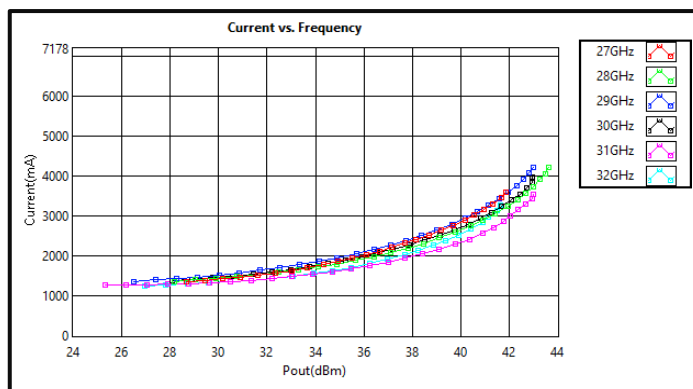
**Right IM3 vs Output Power**



**Delta IM3 vs Output Power**

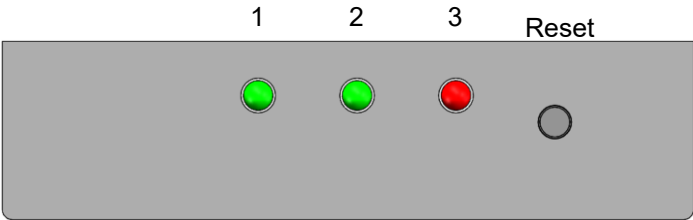


**Current vs Output Power (+28VDC)**



Note: IM3 test performed with 1MHz tone spacing

Alarm Status Panel

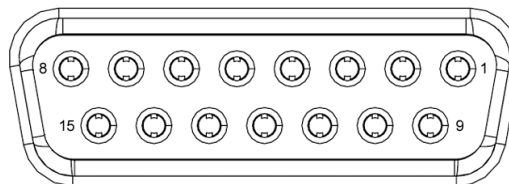


| LED # | Name   | Function  | Initial State | Description                                                                                       | Applied |
|-------|--------|-----------|---------------|---------------------------------------------------------------------------------------------------|---------|
| 1     | Temp   | Indicator | Green         | PA will shut down and latch this LED to a RED color when recommended case temperature is exceeded | Yes     |
| 2     | ID     | Indicator | Green         | PA will shut down and latch this LED to a RED color when a drain current limit is exceeded        | Yes     |
| 3     | Power  | Indicator | Red           | LED will light to RED color when supply power is applied                                          | Yes     |
|       | Reset* | Control   |               | Manual reset button to reset PA                                                                   | 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 male part number: 172-E15-103R001

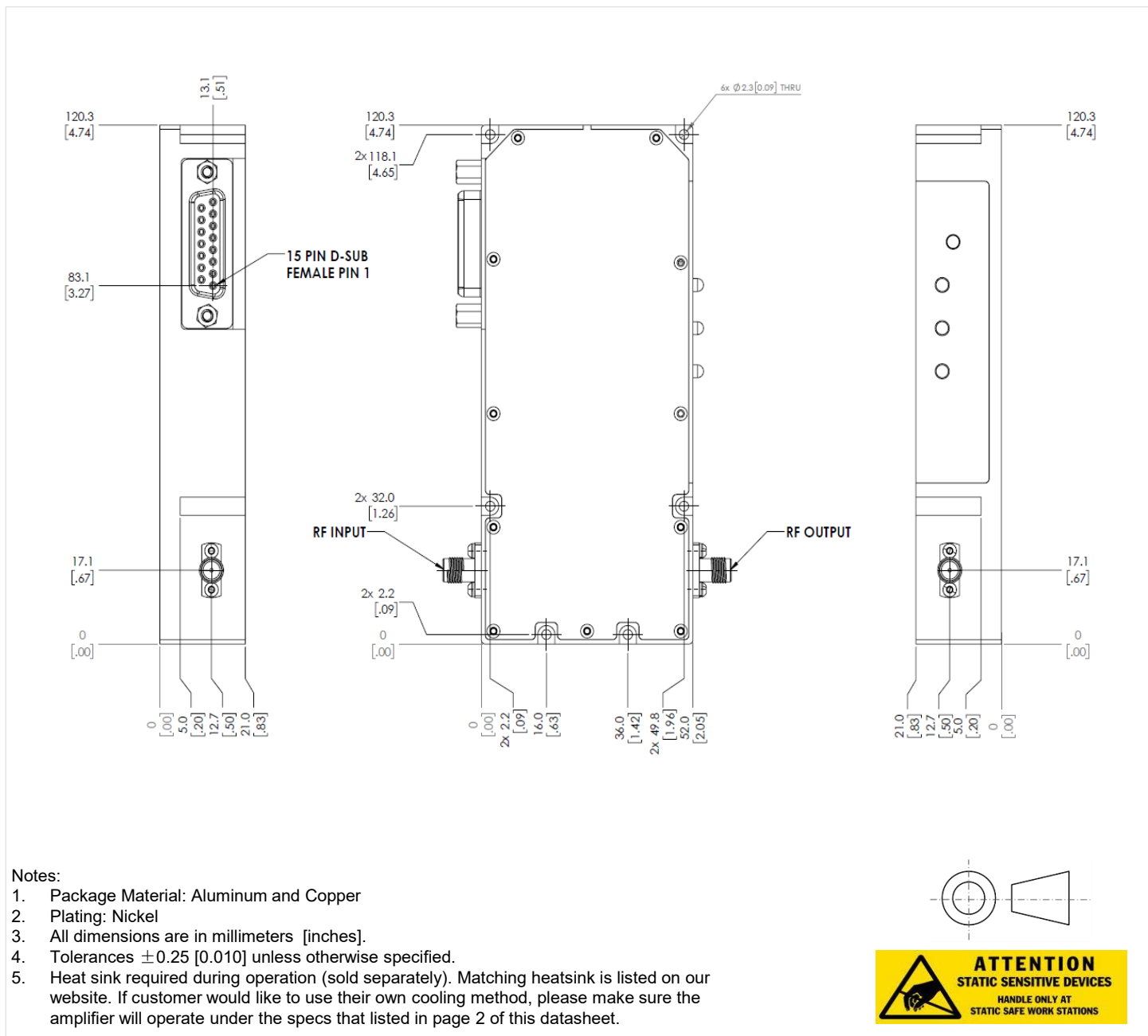


| Pin # | Name          | Function     | Initial State | Description                                                                                | Applied |
|-------|---------------|--------------|---------------|--------------------------------------------------------------------------------------------|---------|
| 1     | Reset         | Control      | HIGH          | Resets PA when logic <u>LOW</u> is applied and released                                    | Yes     |
| 2     | Drain Disable | Control      | LOW           | Applying logic <u>HIGH</u> disables drains of amplifiers                                   | Yes     |
| 3     | Gate Disable  | Control      | LOW           | Applying logic <u>HIGH</u> disables gates of amplifiers                                    | Yes     |
| 4     | NC            | NC           | NA            | NA                                                                                         | NA      |
| 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     | NC            | NC           | NA            | NA                                                                                         | NA      |
| 8     | GND           | Ground       | NA            | GND                                                                                        | Yes     |
| 9     | VDC           | VDC          | NA            | DC power supply pin for amplifier                                                          | Yes     |
| 10    | VDC           | VDC          | NA            | DC power supply pin for amplifier                                                          | Yes     |
| 11    | ID Signal     | Indicator    | NA            | Current provided to the drain of the last stage of the amplifier is represented by voltage | Yes     |
| 12    | Temp Signal   | Indicator    | NA            | PA carrier case temperature is represented by voltage                                      | Yes     |
| 13    | +5V User      | Power Supply | +5V           | +5V DC is supplied for reference                                                           | Yes     |
| 14    | GND           | Ground       | GND           | Ground                                                                                     | 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 700mA.
- Indicator output signals can source 24mA.

**Outline Drawing**



**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> |