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# 1W Psat, 26 dB Gain, 0.01 GHz to 22 GHz, AC Powered Broadband GaAs GaN Power Amplifier with Heatsink, Bench-Top, 110/240VAC, SMA

## TECHNICAL DATA SHEET PE15A5091

The PE15A5091 is an AC powered Bench-Top Power Amplifier that operates across a wideband frequency range from 10 MHz to 22 GHz. This 50 Ohm linear design utilizes GaAs and GaN semiconductor technology for high efficiency and exhibits impressive typcial performance that includes 26 dB gain, 2.8 dB noise figure, +28 dBm P1dB, and +30 dBm Psat. Maximum RF input power (CW) is +6 dBm. The rugged MIL Grade aluminium package is finished in gray paint with SMA Female connectors at the RF input and output ports, and an indicator light on the front panel. The rear panel supports an IEC 320-C14 AC power socket (IEC 320-C13 plug required), a fuse compartment, an On/Off switch, and a dedicated package common ground connector. The module supports a wide operating AC voltage range from 110VAC to 240VAC with 60 mA supply current. Designed for high reliabiltiy, the package supports an integrated heatsink and cooling fan and is suitable for outdoor operation (moisture exposure dependent on temperaure and humidity conditions). The amplifier has an operational temperature range from -40°C to +85°C and meets a series of environmental test conditions including Altitude, Vibration, Humidity, and Shock.

### Features

- AC Powered Bench-Top Power Amplifier
- 10 MHz to 22 GHz
- Highly Linear GaAs and GaN Semiconductor Design
- Output Psat +30 dBm typ
- Output P1dB +28 dBm typ
- Small Signal Gain 26 dB typ
- Noise FIgure 2.8 dB typ
- Output IP3 34 dBm
- VSWR 1.8:1 typ
- AC Supply 110-240VAC @ 60 mA
- Max RF Input Power (CW) +6 dBm
- 50 Ohm Design
- Integrated Heatsink and Cooling Fan
- RF Input and Output SMA Female Connectors
- On/Off Switch with Indicator Light
- Operational Temperature Range -40°C to +85°C
- Rugged MIL Grade Aluminum Package Design with Gray Paint finish
- Guaranteed Environmental Test Conditions Altitude, Vibration, Humidity, Shock

### Applications

- Test & Measurement
- 5G Communication
- Wireless Infrastructure
- Military & Commercial Communications
- Military Electronic Systems
- Research & Development
- Microwave Radio
- VSAT
- Fiber Optics

### Electrical Specifications (TA = +25°C, AC Current = 60 mA)

| Description | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|
| Frequency Range | 0.01 | | 22 | GHz |
| Small Signal Gain | 24 | 26 | | dB |
| Gain Flatness | | ±1.75 | ±4 | dB |
| Gain Variation Over Temp. | | ±1.25 | | dB |
| Input Power (CW) | | | +6 | dBm |
| Pout at Sat. | | +30 | | dBm |
| Output Power at 1 dB Compression Point | | +28 | | dBm |
| Output 3rd Order Intercept Point | | +34 | | dBm |
| Reverse Isolation | | 55 | | dB |
| Noise Figure | | 2.8 | | dB |
| Impedance (Input) | | 50 | | Ohms |

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 1W Psat, 26 dB Gain, 0.01 GHz to 22 GHz, AC Powered Broadband GaAs GaN Power Amplifier with Heatsink, Bench-Top, 110/240VAC, SMA PE15A5091

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| | | | | |
|---|---|---|---|---|
| Impedance (Output) | | 50 | | Ohms |
| Input VSWR | | 1.8:1 | | |
| Output VSWR | | 1.7:1 | | |
| Supply Current (AC 110-220V) | | 60 | | mA |
| Operating Temperature Range | -40 | | +85 | °C |

**Performance by Frequency**

| Biasing Up Procedure | | Power OFF Procedure | |
|---|---|---|---|
| Step 1 | Connect input and output with 50 Ohm source and load with in band return loss better than 10dB. | Step 1 | Flip switch to “OFF” position |
| Step 2 | Connect AC Plug | Step 2 | Remove AC Plug |
| Step 3 | Flip switch to “ON” position | Step 3 | Remove RF Connection |

**Absolute Maximum Rating**

| Parameter | Rating |
|---|---|
| Operating Voltage | 110 to 240V AC |
| RF Input Power (RFIN)* | +6dBm |

*Note: Maximum RF input power is defined to protect the amplifier from damage. Input power may be increased at the users own risk to achieve the full output power of the amplifier. Please reference gain and power curves and monitor the temperature

### Mechanical Specifications

| | |
|---|---|
| **Size** | |
| Length | 6.44 in [163.58 mm] |
| Width | 5.83 in [148.08 mm] |
| Height | 2.28 in [57.91 mm] |
| Weight | 7.9 lbs [3.58 kg] |
| Input Connector | SMA Female |
| Output Connector | SMA Female |

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### Environmental Specifications

**Temperature**

| | |
|---|---|
| Operating Range | -40 to +85 deg C |
| Storage Range | -50 to +105 deg C |
| Humidity | 100% RH at 35°C, 95% RH at 40°C |
| Shock | 20G for 11 msec half sinewave, 3 axis both directions |
| Vibration | 25g RMA (15 degrees 2KHz) endurance, 1 hour per axis |
| Altitude | 30,000 ft |

### Compliance Certifications (see product page for current document)

### Plotted and Other Data

Notes:

- Values at +25 °C, sea level

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## Amplifier Power-up Precautions

1.) Confirm that proper ESD precautions and controls are always in place before handling any Amplifier module.

2.) Confirm adequate thermal management is in place to effectively dissipate heat away from the Amplifier package. The Amplifier operational baseplate temperature must be within the operational temperature range stated in the Amplifier datasheet. Depending on the design and thermal requirements, using a heatsink with cooling fan is always recommended for safe reliable operation. A heat sink without a cooling fan may also be used. Damage caused from overheating will void the warranty.

3.) Confirm adequate system grounding is established. The DC power supply and Amplifier must have a common ground in order to operate properly.

4.) Power Amplifiers may require additional DC Current when initially powered-up. Depending on the design, the input current draw could range from an additional 10% to 100% above the maximum rated DC current of the Amplifier. This varies based on product part number.

5.) Confirm the DC power supply, if limited, is set to allow for additional start-up current that's rated for the Power Amplifier.

6.) Confirm the system is designed and calibrated for 50 ohms. Any impedance mismatch may cause performance issues.

7.) Perform a CALIBRATION (if required) with the loads before connecting the Amplifier to the Network Analyzer to ensure proper performance.

8.) Use a fixed attenuator between the signal source and input port of the Amplifier to optimize the input VSWR match.

9.) Confirm the input power level at the input port of the amplifier does not exceed the maximum rated limit for input power (as stated in the Amplifier datasheet).
$P_{in}$ for Small Signal Gain = P1dB-SSG-10 dB
$P_{in}$ for P1dB = P1dB-SSG+1 dB

10.) Confirm the Network Analyzer is always connected to the Amplifier first before DC power is applied to the Amplifier.

11.) As long as the input and output ports of the amplifier are connected to a 50Ohm load and RF signal power is applied, the Amplifier can be powered up with DC voltage.

12.) Confirm the Amplifier output load is matched for a 50 Ohm impedance and will not exceed the maximum rated VSWR or Return Loss limit for the Amplifier. Exceeding the maximum rated VSWR or Return Loss limit will result in reflected signal power that could damage the Amplifier and void the warranty.

13.) **Power Amplifier connected to an Antenna for signal transmission** - It's strongly recommended to use a high power fixed attenuator pad or an Isolator between the output port of the Amplifier and input port to the antenna. Any reflected signal power due to impedance mismatch will likely damage the Amplifier and void the warranty.

14.) The attenuator or isolator used at the output port of the Amplifier must be rated to handle the output power level and operational frequency band of the amplifier.

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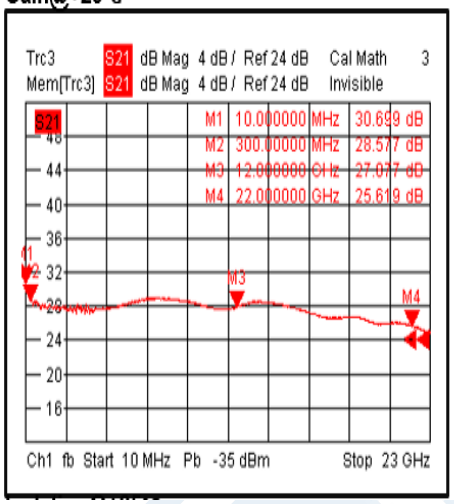
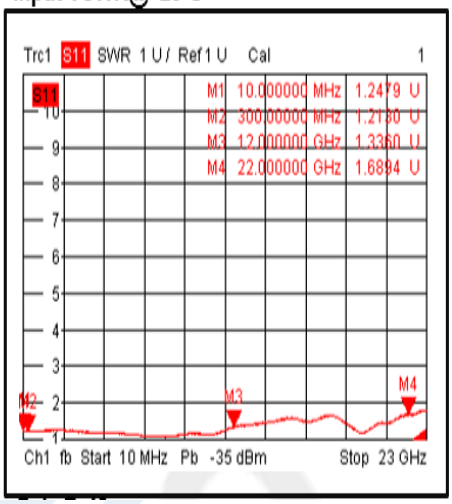
### Typical Performance Data

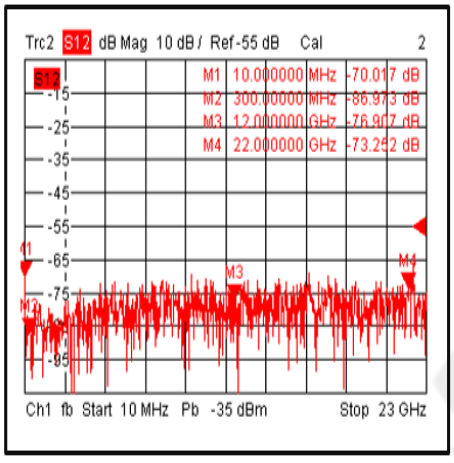
Gain@+25°C



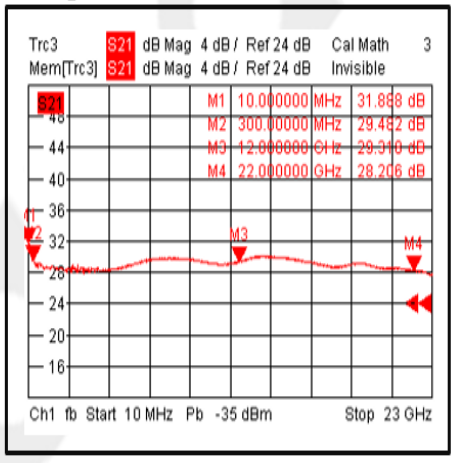

Input VSWR@+25°C




Isolation@+25°C




Gain@-40°C

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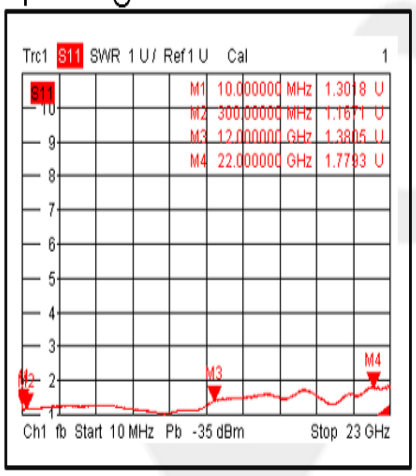
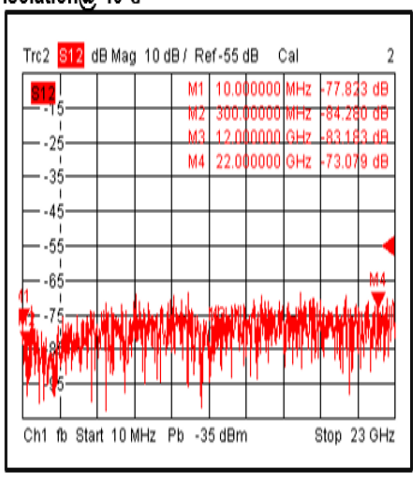
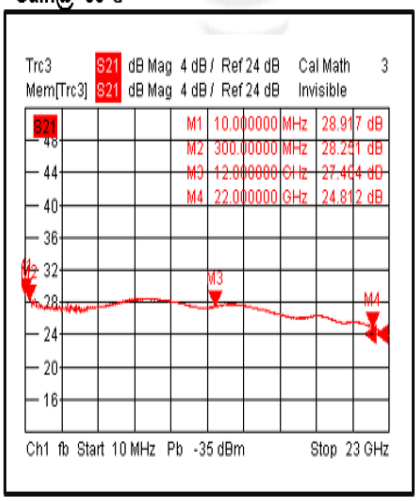
Input VSWR@-40°C



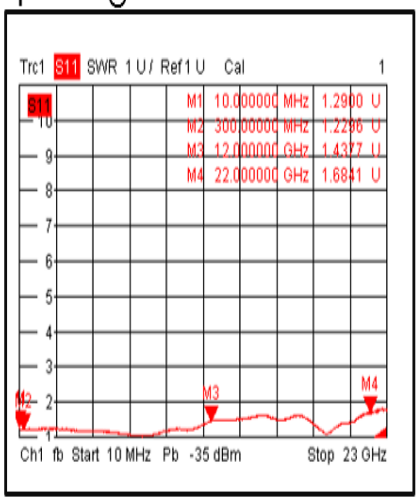

Isolation@-40°C




Gain@+85°C




Input VSWR@+85°C

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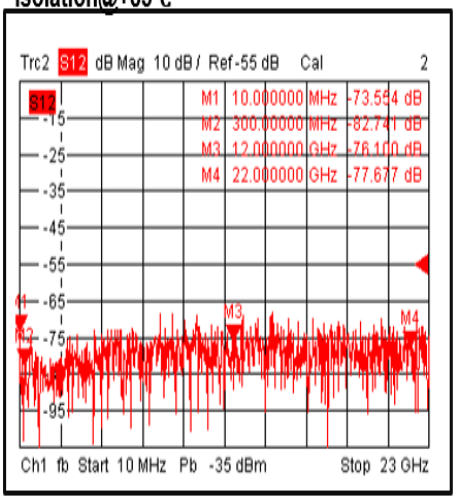
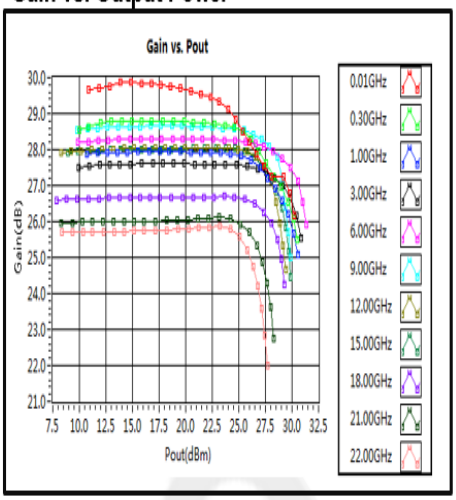
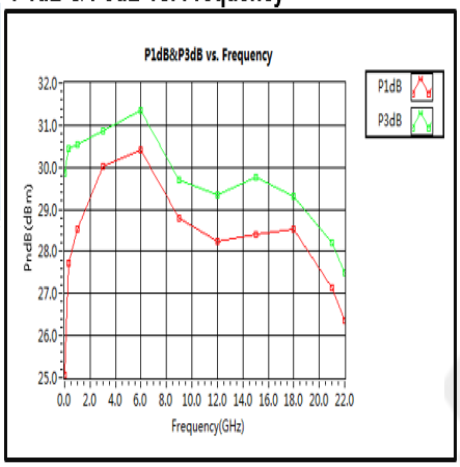
### Isolation@+85°C



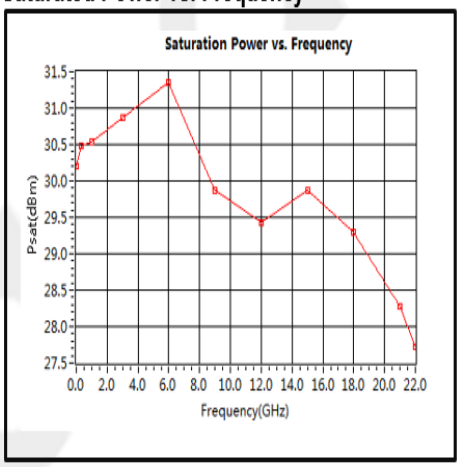

### Gain vs. Output Power




### P1dB & P3dB vs. Frequency




### Saturated Power vs. Frequency

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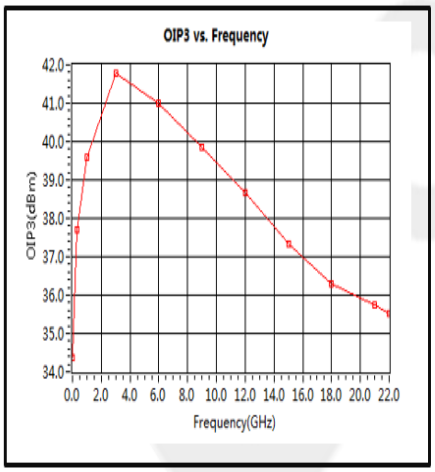
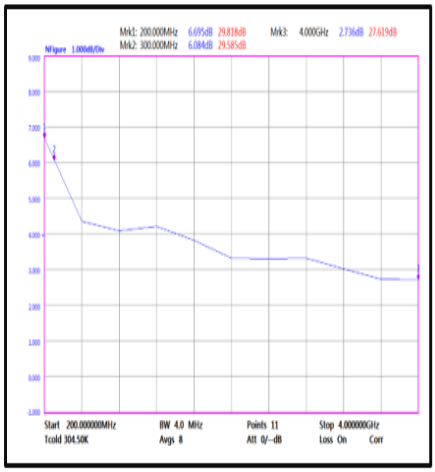
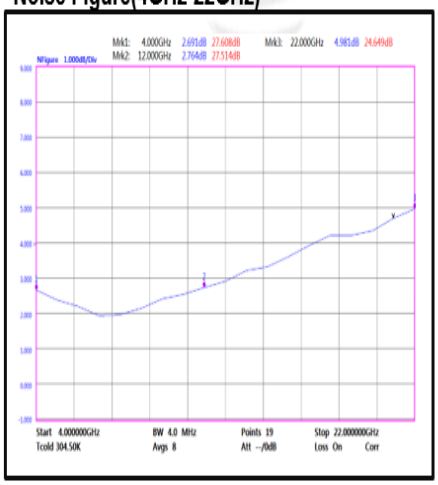
### OIP3 vs. Frequency



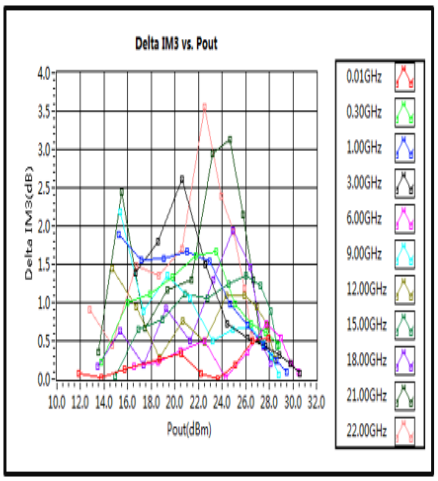

### Noise Figure(0.2GHz-4GHz)



### Noise Figure(4GHz-22GHz)



### Delta IM3 vs. Pout

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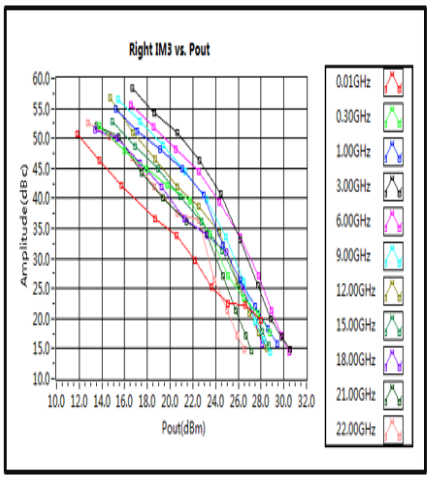
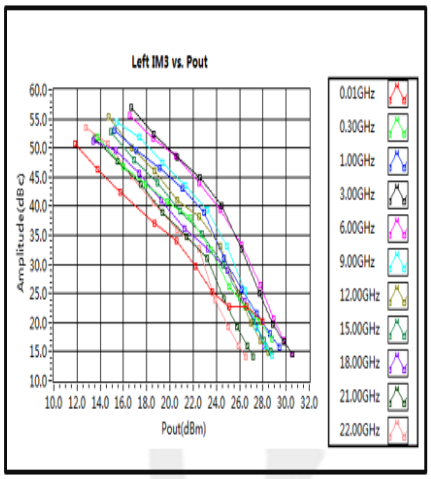
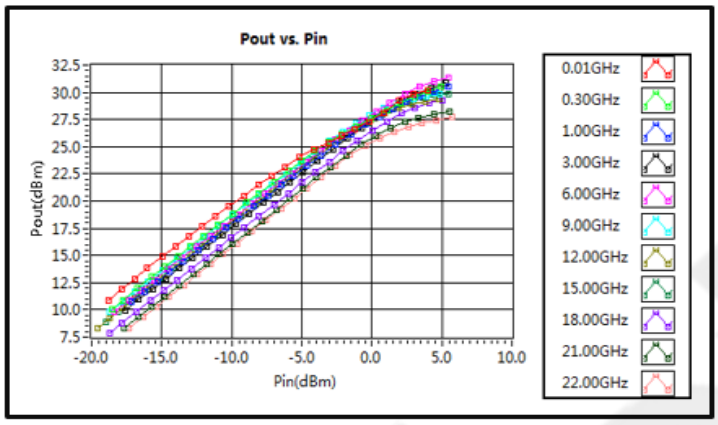
### Right IM3 vs. Pout




### Left IM3 vs. Pout




### Pout vs. Pin

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URL: https://www.pasternack.com/22-ghz-medium-power-amplifier-26-db-gain-sma-pe15a5091-p.aspx



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# PE15A5091 CAD Drawing

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