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2W Psat, 35 dB Gain, 6 GHz to 18 GHz, AC Powered Broadband GaAs Power Amplifier with Heatsink, Bench-Top, 110/240VAC, SMA

TECHNICAL DATA SHEET PE15A5097

The PE15A5097 is an AC powered Bench-Top Power Amplifier that operates across a wideband frequency range from 6 GHz to 18 GHz. This 50 Ohm linear design utilizes GaAs semiconductor technology and exhibits impressive typcial performance that includes 35 dB gain, +32 dBm P1dB, and +33.5 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 80 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
- 6 GHz to 18 GHz
- Highly Linear GaAs Semiconductor Design
- Output Psat +33.5 dBm typ
- Output P1dB +32 dBm typ
- Small Signal Gain 35 dB typ
- VSWR 1.6:1 typ
- AC Supply 110-240VAC @ 80 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 = 80 mA)

Description	Minimum	Typical	Maximum	Units
Frequency Range	6		18	GHz
Small Signal Gain	30	35		dB
Gain Flatness		±3	±4	dB
Gain Variation Over Temp.		±1		dB
Input Power (CW)			+6	dBm
Pout at Sat.		+33.5		dBm
Output Power at 1 dB Compression Point	+28	+32		dBm
Output 3rd Order Intercept Point		+43		dBm
Reverse Isolation		55		dB
Noise Figure		3	5.5	dB
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input VSWR		1.6:1	2:1	

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Output VSWR		1.8:1	2.5:1	
Supply Current (AC 110-220V)		80		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	11.6 lbs [5.26 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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TECHNICAL DATA SHEET **PE15A5097**

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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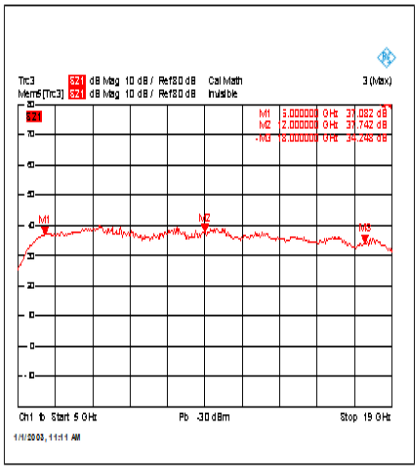


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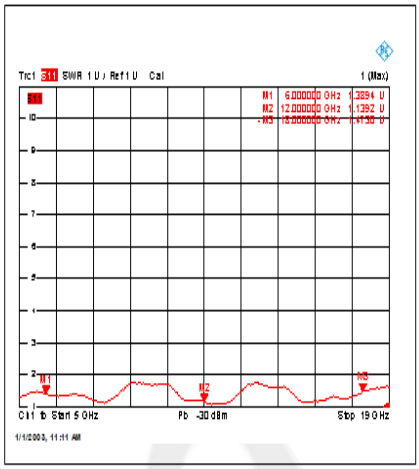
TECHNICAL DATA SHEET PE15A5097

Typical Performance Data

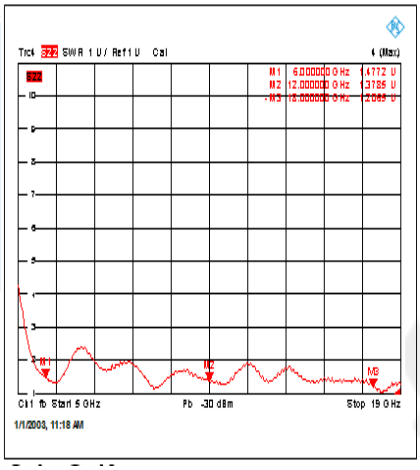
Gain @+25°C



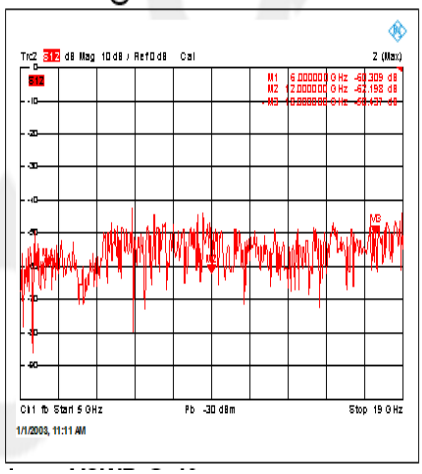
Input VSWR @+25°C



Output VSWR @+25°C



Isolation @+25°C



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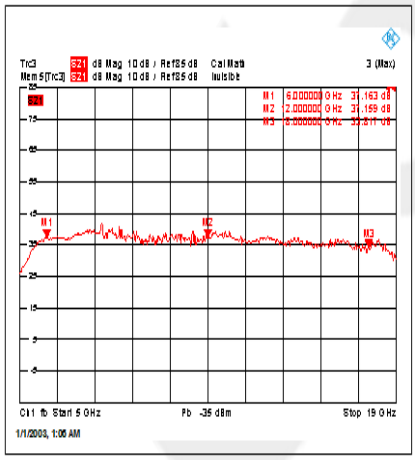
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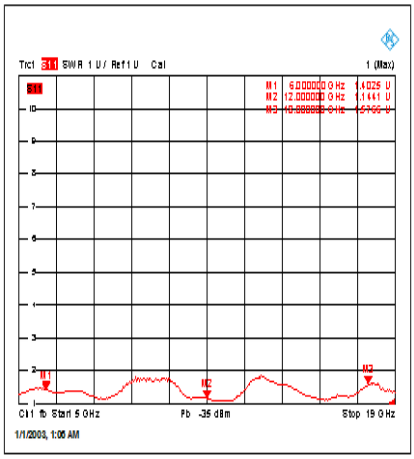
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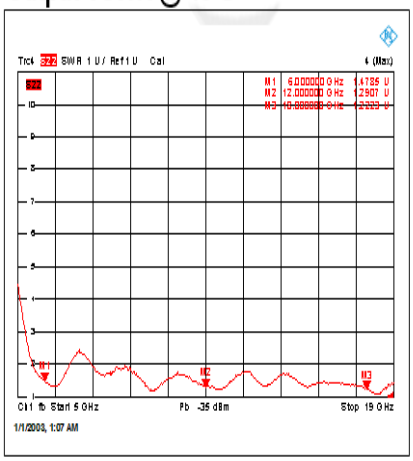
Gain @-40°C



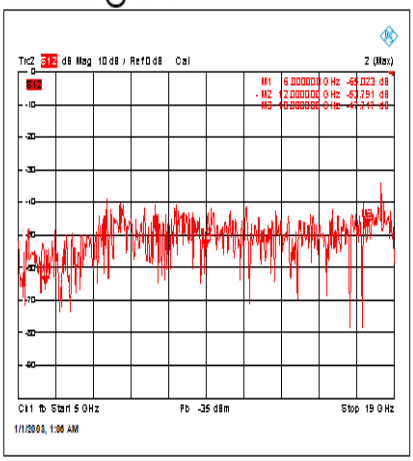
Input VSWR @-40°C



Output VSWR @-40°C



Isolation @-40°C



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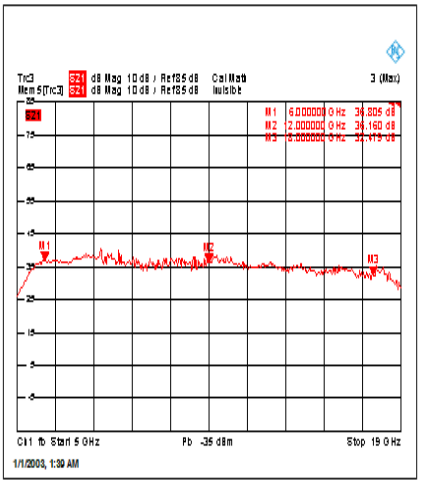
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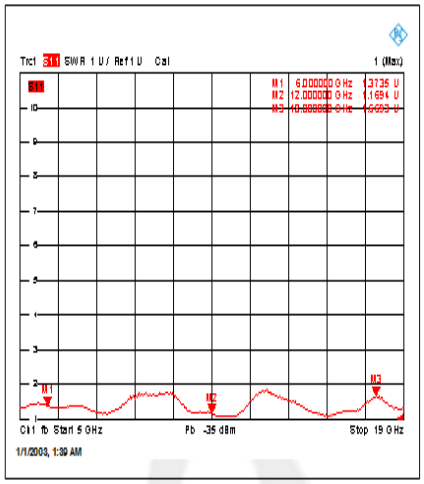
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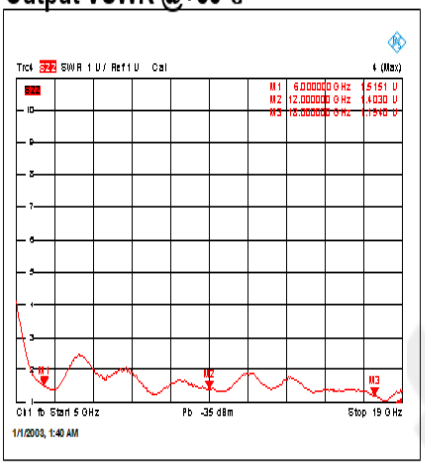
Gain @+85°C



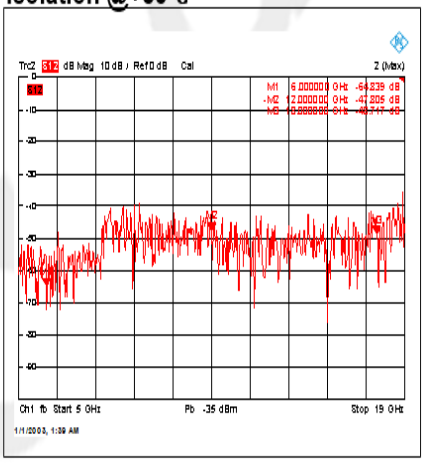
Input VSWR @+85°C



Output VSWR @+85°C



Isolation @+85°C



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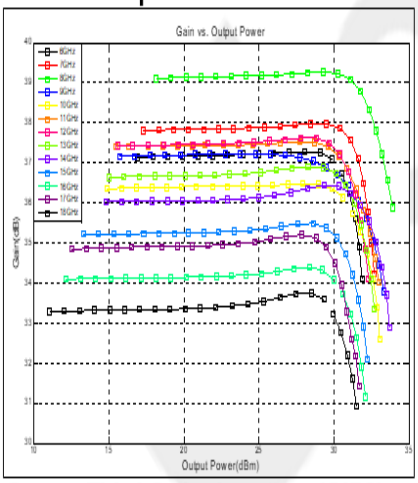
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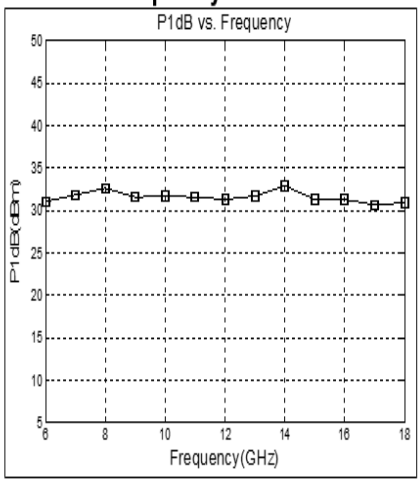
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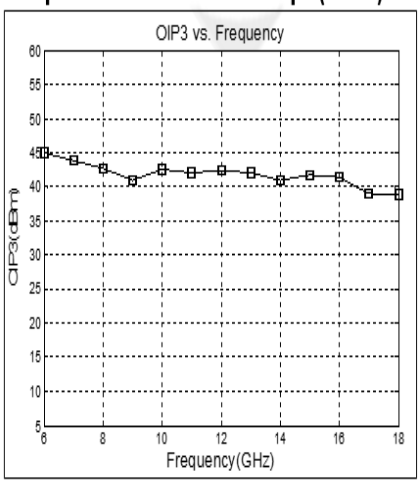
Gain vs. Output Power



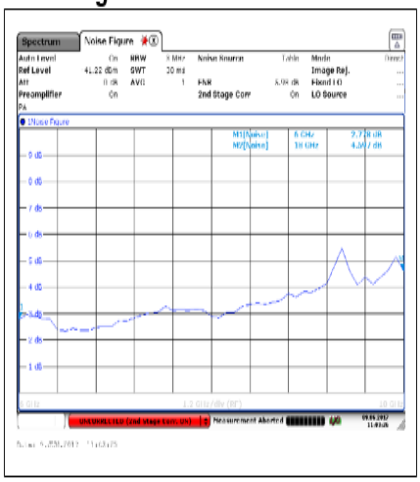
P1dB vs. Frequency



Output Third Order Intercept (OIP3)



Noise Figure



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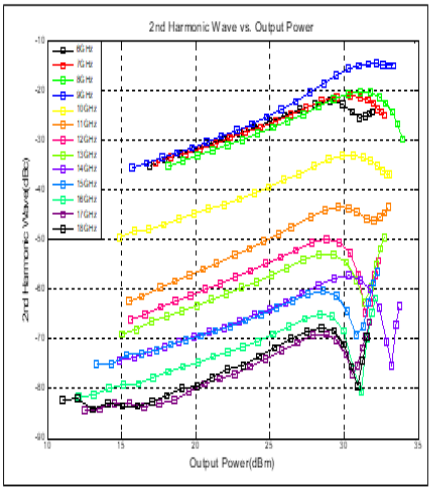
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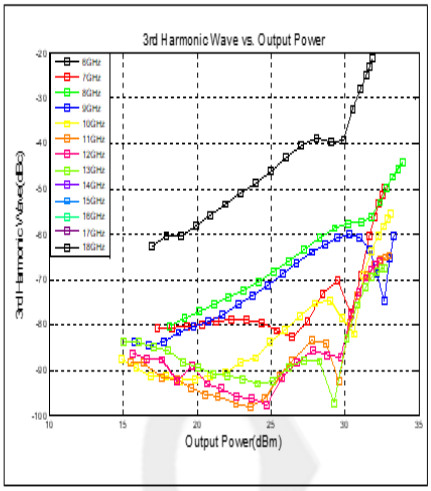
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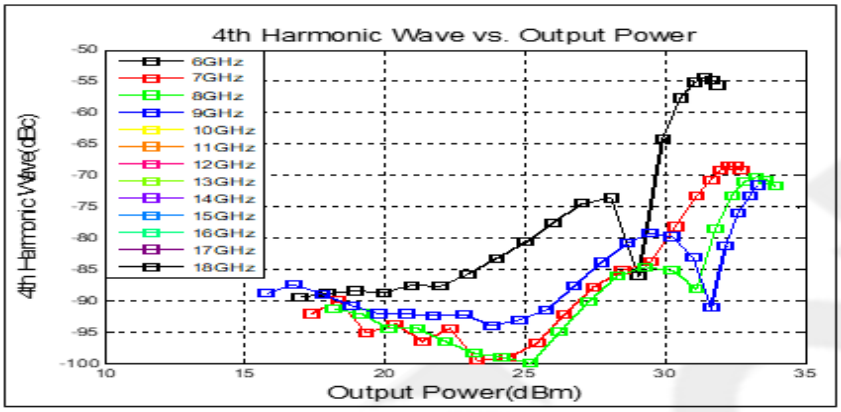
2nd Harmonic Wave output Power



3rd Harmonic Wave output Power



4th Harmonic Wave output Power



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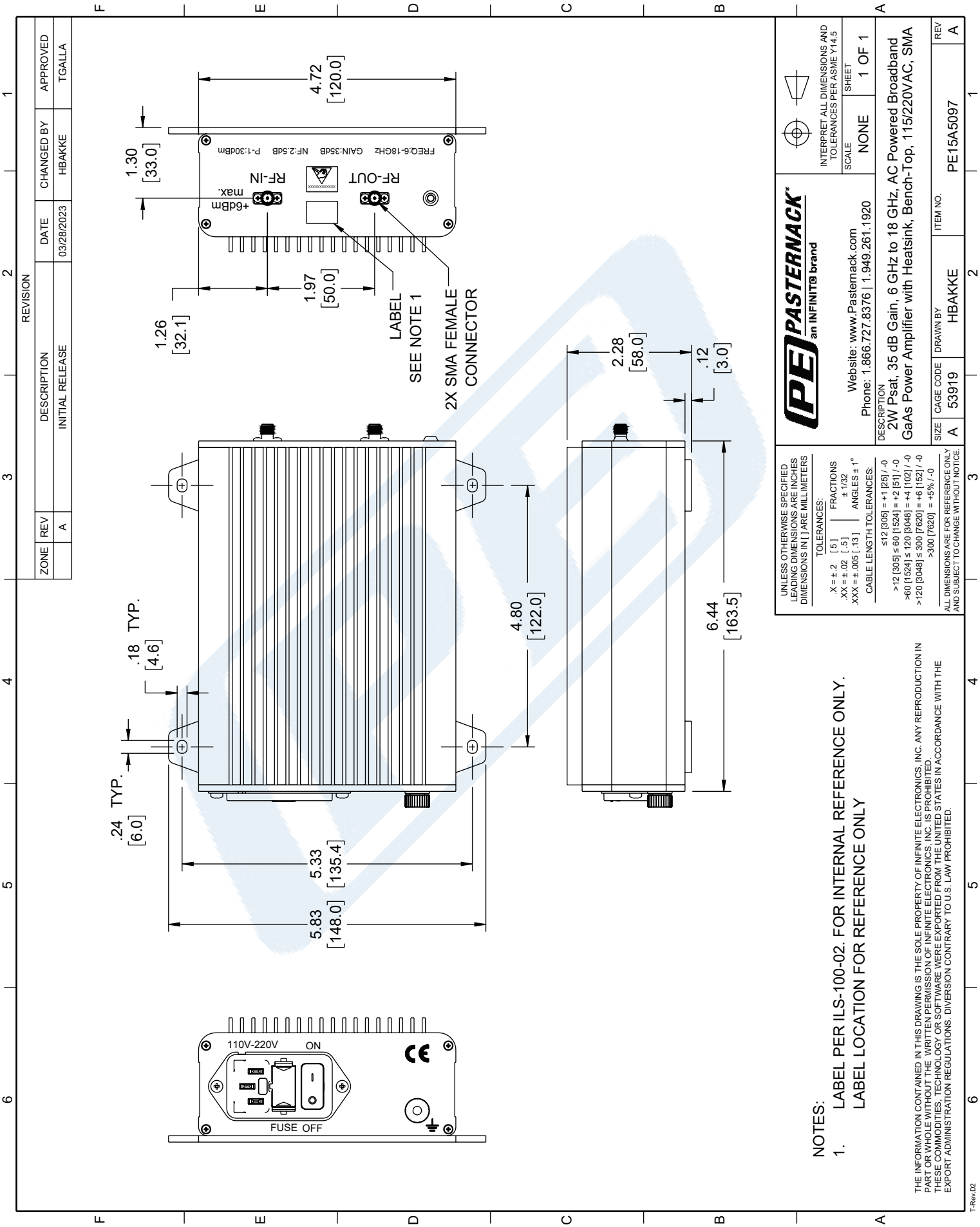
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PE15A5097 CAD Drawing

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