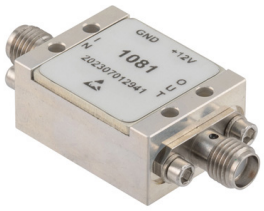
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2.1 dB NF Low Noise Amplifier, Operating from 10 MHz to 6 GHz with 18 dB Gain, 20 dBm P1dB and SMA

TECHNICAL DATA SHEET PE15A1081

The PE15A1081 is a low noise coaxial packaged amplifier operating across a wideband frequency from 10 MHz to 6 GHz. Impressive typical performance includes 2.1 dB noise figure, 18 dB small signal gain, +20 dBm P1dB, and an output 3rd order intercept point of +35 dBm. Maximum RF input power is +20 dBm. This exceptional technical performance is achieved through the use of a hybrid MIC design and advanced E-pHEMT devices. The amplifier has internal voltage regulation and can operate across a DC voltage range from +9V to +15V (+12V nominal) with 100 mA of DC current. The operational temperature range is -40°C to +85°C. The rugged and compact package supports SMA female connectors and RFI and Ground pins. And for highly reliable operation, the model is guaranteed to meet environmental test conditions for Humidity, Shock, Vibration, and Altitude.

Features

- Low Noise Amplifier
- 10 MHz to 6 GHz
- Noise Figure 2.1 dB typ
- Small Signal Gain 18 dB typ
- Output P1dB +20 dBm, Output IP3 +35 dBm
- Max RF Input Power +20 dBm
- Reverse DC Protection
- Internal Voltage Regulation
- DC Voltage +12Vdc
- DC Current 100 mA
- Operational Temperature Range -40°C to +85°C
- SMA Female Connectors
- 50 Ohm Design
- Rugged Design meets MIL-STD-202 Test Conditions

Applications

- Aerospace & Defense
- Test & Measurement
- Microwave Radio Systems
- Military & Commercial Communication Systems
- Research & Development
- SATCOM
- Wireless Communications

Electrical Specifications (TA = +25°C, DC Voltage = +12Vdc, DC Current = 100mA)

Description	Minimum	Typical	Maximum	Units
Frequency Range	0.01		6	GHz
Small Signal Gain		18		dB
Gain Flatness		±0.6	±1	dB
Output at 1 dB Compression Point*	+18	+20		dBm
Output 3rd Intercept Point*	+32	+35		dBm
Noise Figure*		2.1	2.5	dB
Input VSWR		1.9:1		
Output VSWR		2.2:1		
Reverse Isolation*	-20	-25		dB
Operating DC Voltage	+6	+12	+15	Volts
Operating DC Current		100	115	mA
Operating Temperature Range	-40		+85	°C

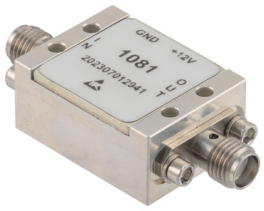
*Test Frequency = 3 GHz

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Absolute Maximum Rating

Parameter	Absolute Maximum
RF Input Power	+20dBm
Supply Voltage	+16V
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-55 °C to +125 °C

Mechanical Specifications

Size

Length	1.79 in [45.47 mm]
Width	1.1 in [27.94 mm]
Height	0.45 in [11.43 mm]
Weight	0.55 lbs [249.48 g]
Input Connector	SMA Female
Output Connector	SMA Female

Environmental Specifications

Temperature

Operating Range	-40 to +85 deg C
Storage Range	-55 to +105 deg C
Humidity	MIL-STD-202, Method 103B, Condition B
Shock	MIL-STD-202F, Method 213B, Condition B
Vibration	MIL-STD-202F, Method 204D, Condition B
Altitude	MIL-STD-202F, Method 105C, Condition B

Compliance Certifications (see product page for current document)

Plotted and Other Data

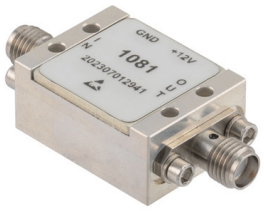
Notes:

- 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.

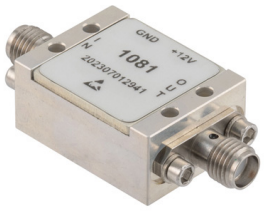
14.) The attenuator or isolator used at the output port of the Amplifier must be rated to handle the output power level and operational frequency band of the amplifier.

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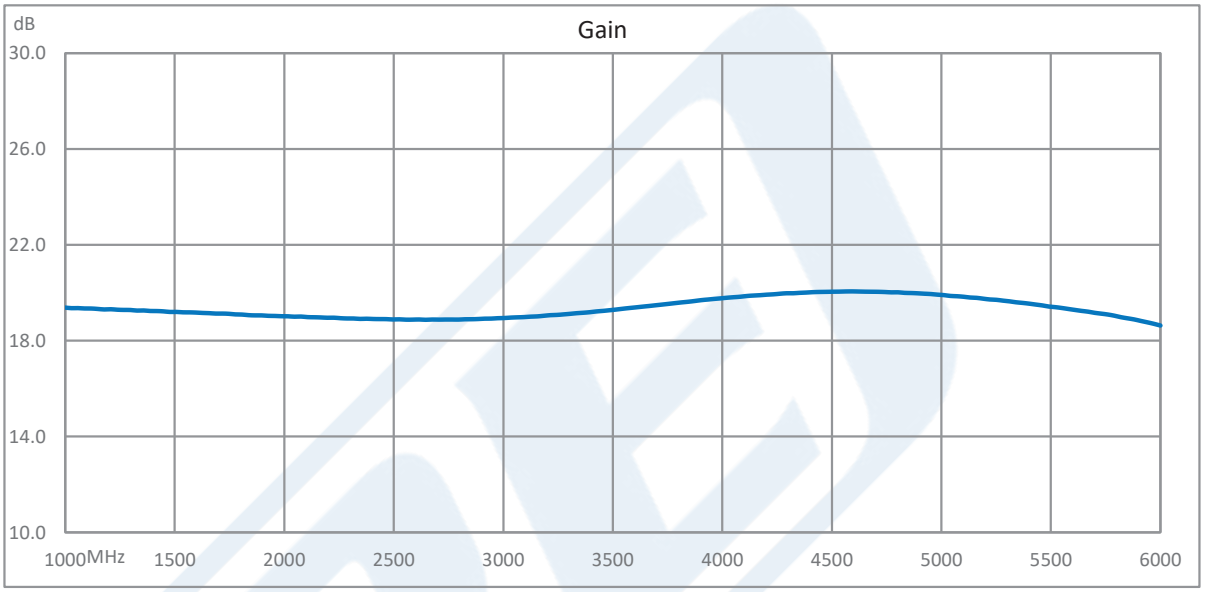
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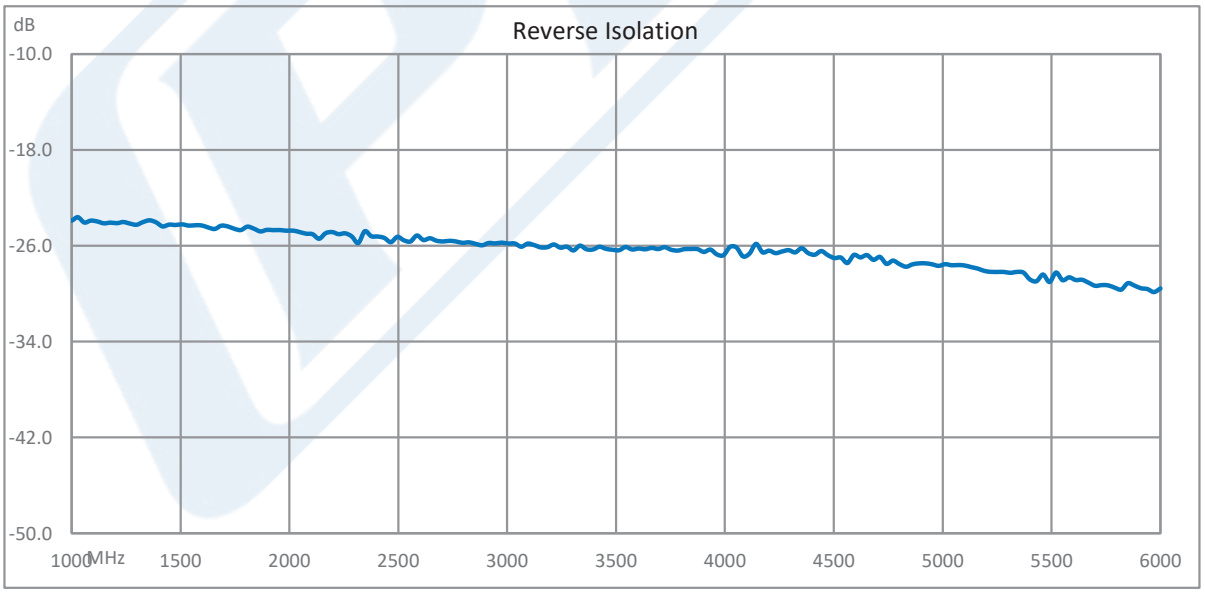


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Typical Performance Data



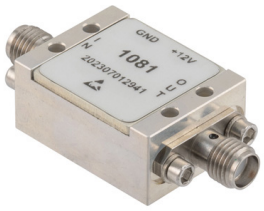


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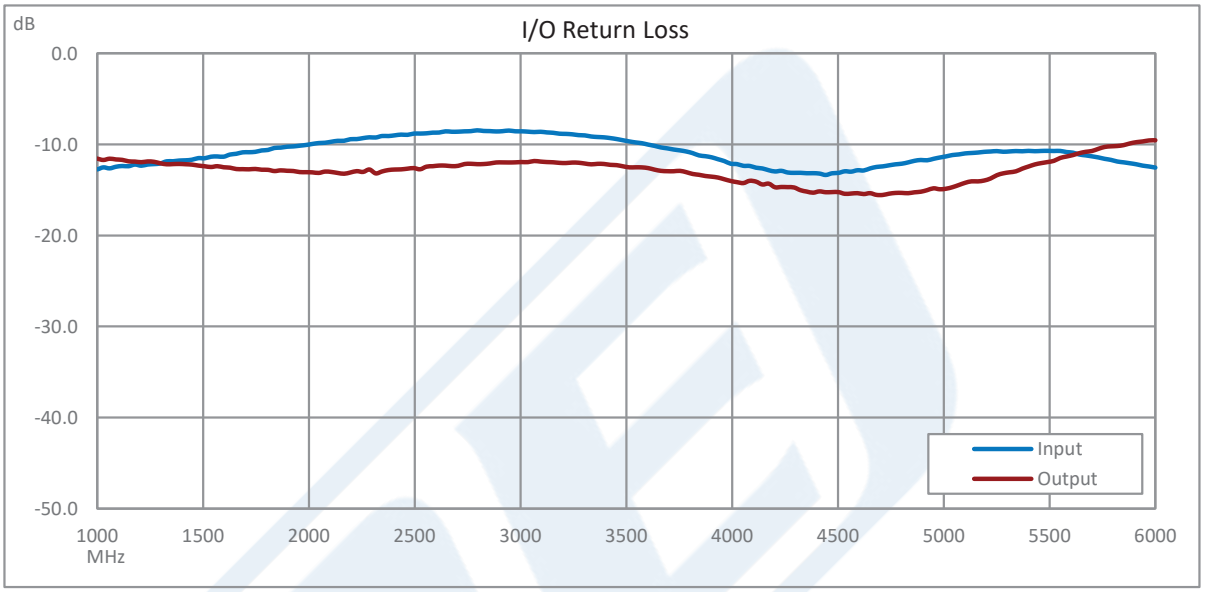
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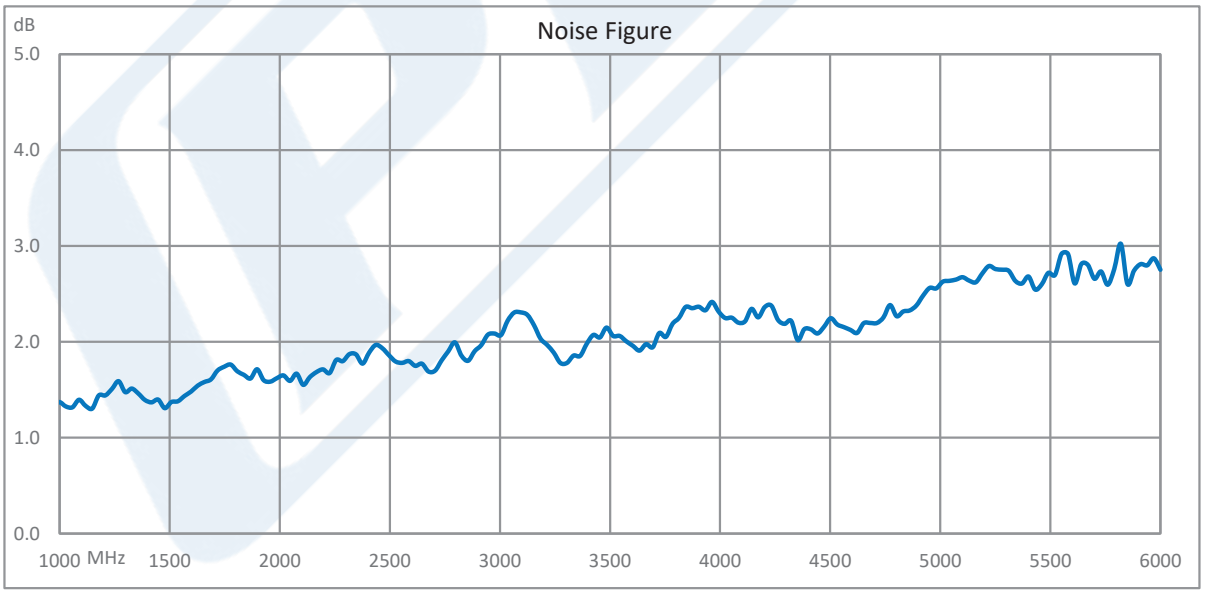
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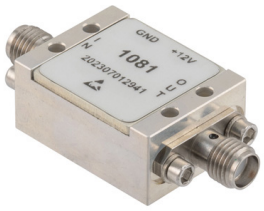


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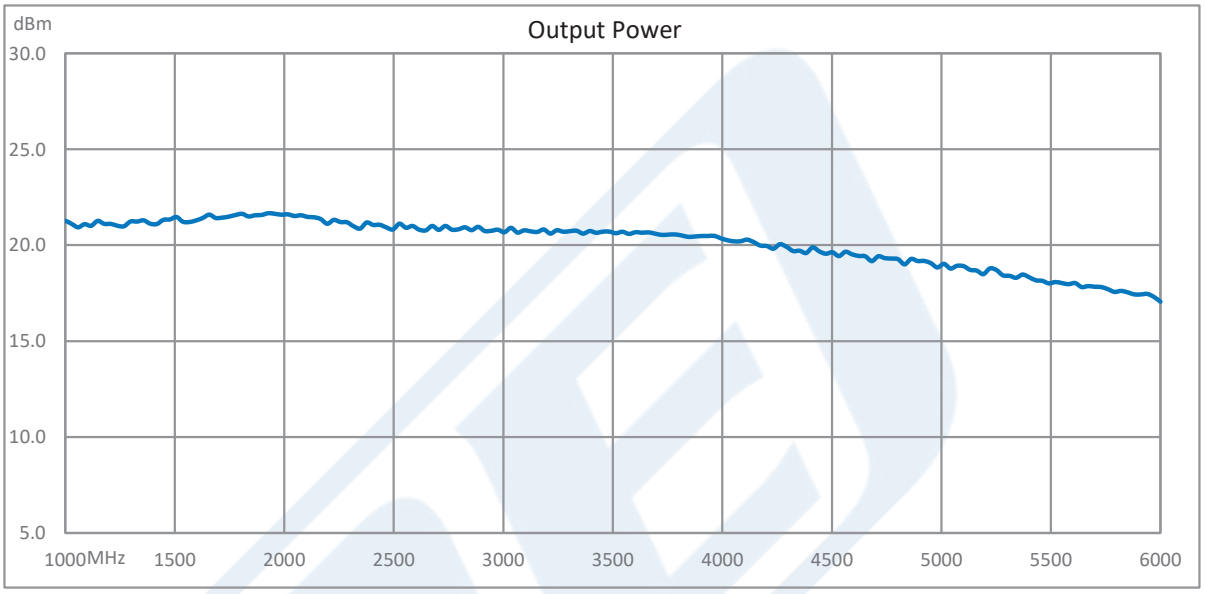
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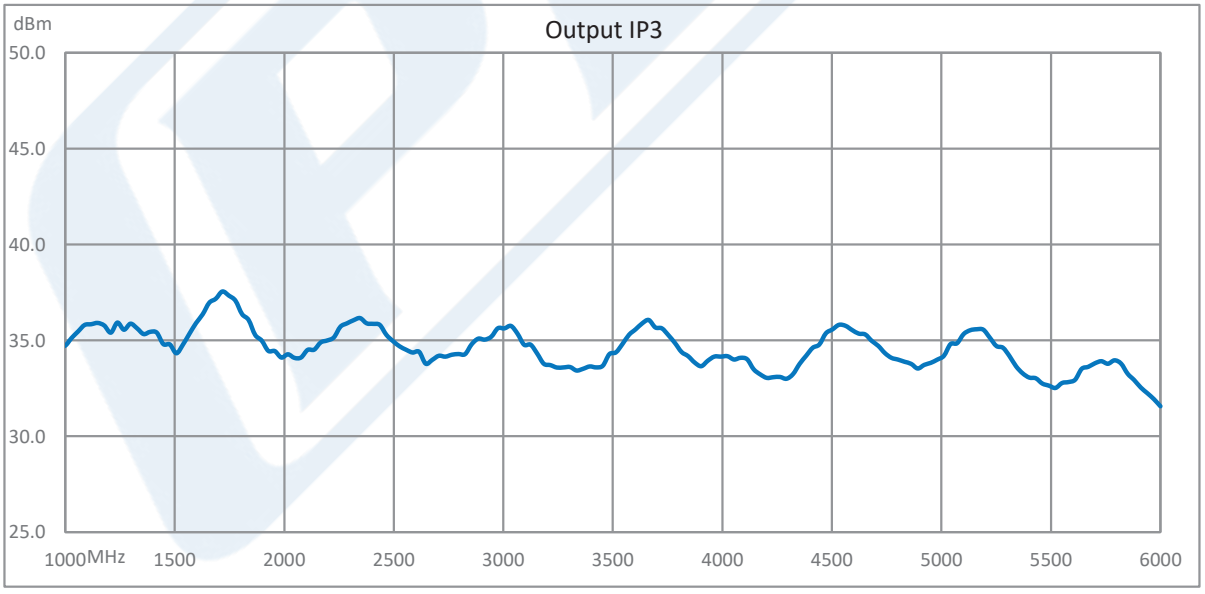
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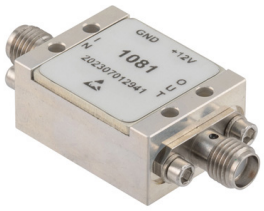


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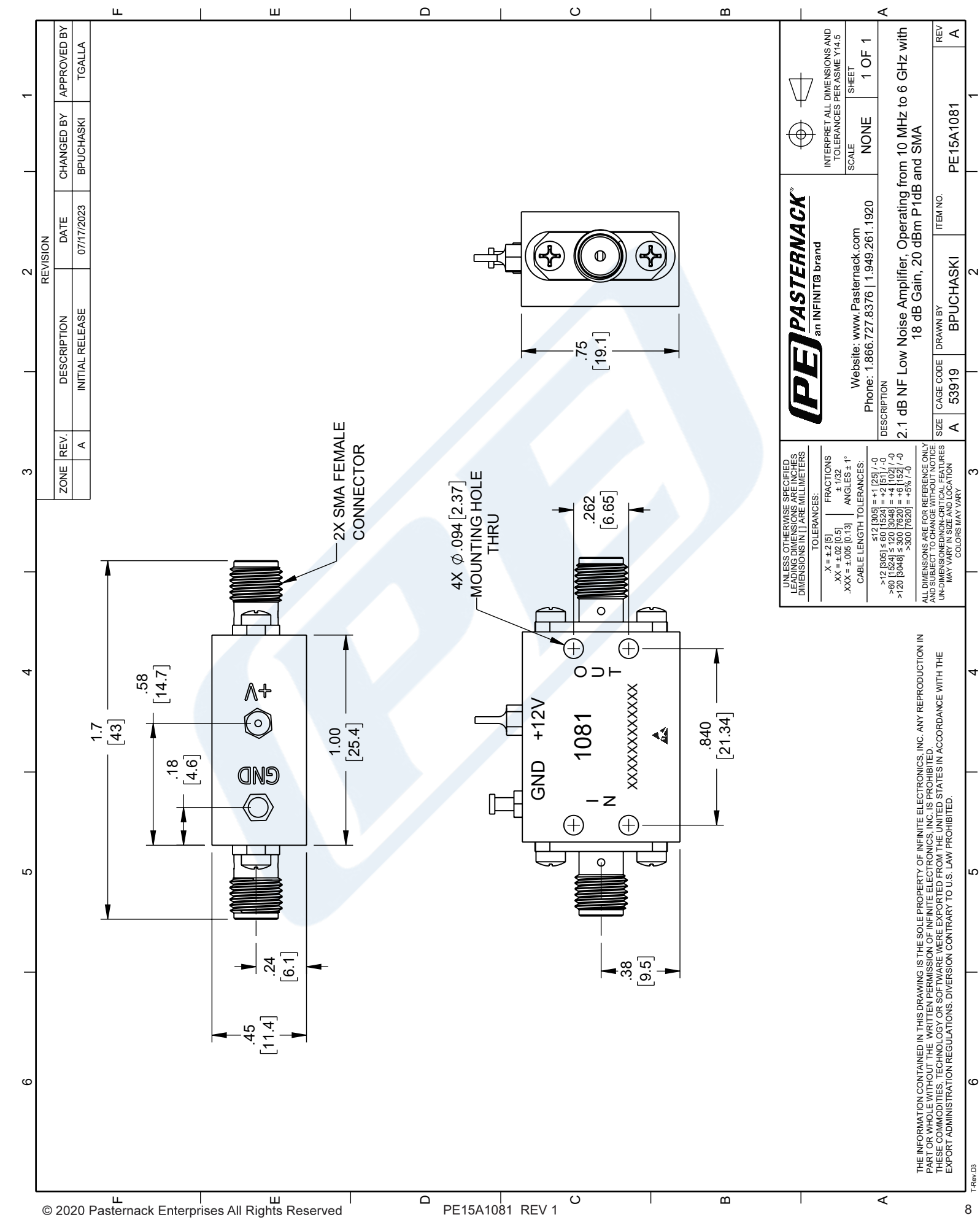
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PE15A1081 CAD Drawing

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