



40 dB Gain, 5 Watt P1dB, 17.5 GHz to 21.5 GHz, High Power GaAs Amplifier, 2.92mm Input, 2.92mm Output, 45 dBm IP3, 5 dB NF

TECHNICAL DATA SHEET

PE15A4020

PE15A4020 is a K-band GaAs MMIC-based high gain and high power output coaxial amplifier, operating in the 17.5 to 21.5 GHz frequency range. The amplifier offers 37 dBm typical of P1dB and 40 dB typical high small signal gain, with the excellent gain flatness of ± 1.5 dB typical, along with an outstanding IP3 performance of 45 dBm typical. This technical performance is achieved through the use of advanced GaAs PHEMT circuitry. This power amplifier requires only a single positive DC supply, Unconditionally stable, and operates over the temperature range of -20°C to 75°C .

Features

- 17.5 to 21.5 GHz Frequency Range
- P1dB: 37 dBm typ
- High Small Signal Gain: 40 dB typ
- Gain Flatness: ± 1.5 dB typ
- Gain Variation Over the Temperature Range: ± 2.5 dB typ
- High Output IP3: 45 dBm typ
- Noise Figure: 5 dB typ
- 50 Ohm Input and Output Matched
- -20 to $+75^{\circ}\text{C}$ Operating Temperature
- Unconditionally Stable
- Single DC Positive Supply
- Built-in DC Voltage Regulator

Applications

- K-band Satellite Communication
- Commercial SATCOM
- Point-to-Point Radio
- Point-to-Multipoint Radio
- Communication Systems
- VSAT
- R&D Labs
- Radar Systems
- Communication Systems
- High Power Output Amplifier

Electrical Specifications (TA = $+25^{\circ}\text{C}$, DC Voltage = 12Volts, DC Current = 3.5A)

Description	Minimum	Typical	Maximum	Units
Frequency Range	17.5		21.5	GHz
Small Signal Gain	37	40	43	dB
Gain Flatness		± 1.5	± 1.75	dB
Gain Variation at OTR*		± 2.5		dB
Input Power (CW)			+10	dBm
Output Power at 1 dB Compression Point	+36	+37		dBm
Output 3rd Intercept Point	+43	+45		dBm
Noise Figure		5	8	dB
Spurious			-60	dBc
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input VSWR		1.8:1	2.5:1	
Output VSWR		1.8:1	2.5:1	
Operating DC Voltage	9		12	Volts
Operating DC Current		3.5	5	A
Operating Temperature Range	-20		+75	$^{\circ}\text{C}$

*OTR= Base Plate Operating Temperature Range

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [40 dB Gain, 5 Watt P1dB, 17.5 GHz to 21.5 GHz, High Power GaAs Amplifier, 2.92mm Input, 2.92mm Output, 45 dBm IP3, 5 dB NF PE15A4020](#)



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Absolute Maximum Rating

Parameter	Rating	Units
Source Voltage	+15	Volts
RF input Power	+10	dBm
Operating Temperature (base-plate)	-20 to +65	°C
Storage Temperature	-55 to +125	°C



ESD Sensitive Material,
Transport material in
Approved ESD bags.
Handle only in approved
ESD Workstation.

Mechanical Specifications

Size

Length	2.6 in [66.04 mm]
Width	2 in [50.8 mm]
Height	0.5 in [12.7 mm]
Weight	0.211 lbs [95.71 g]
Input Connector	2.92mm Female
Output Connector	2.92mm Female
Cooling	HEATSINK REQUIRED use PE15C5013 OR PE15C5013F

Environmental Specifications

Temperature

Operating Range	-20 to +75 deg C
Storage Range	-45 to +85 deg C

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

Plotted and Other Data

Notes:

- Values at +25 °C, sea level
- ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.
- Heat Sink Required for Proper Operation, Unit is cooled by conduction to heat sink.

Caution: This Power Amplifier is matched for a 50 ohm input and output load impedance. Applications such as driving a wideband antenna can introduce a load impedance mismatch condition that could result in reflected waves potentially damaging the amplifier output power stage which will void the warranty. Pasternack highly recommends using an Isolator at the output port of the power amplifier where the termination load will absorb any potentially damaging signal reflections.



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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.

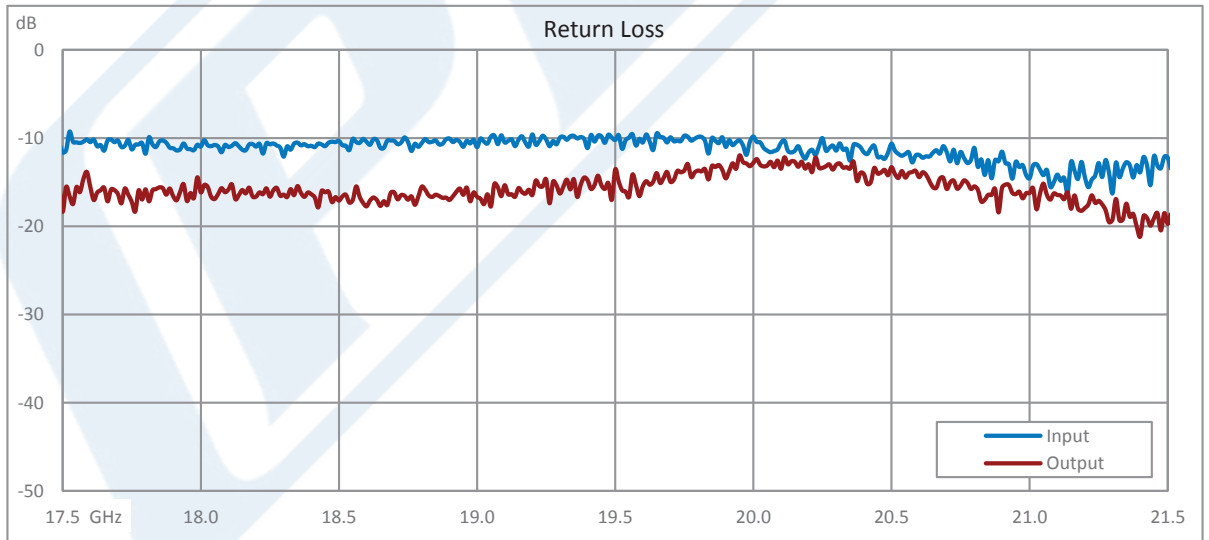
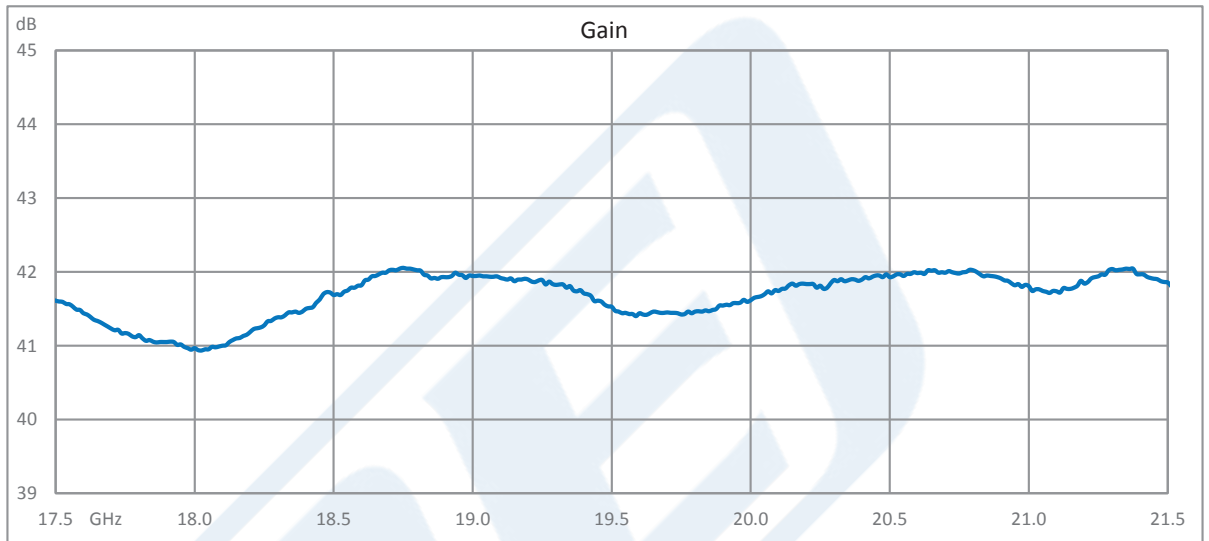
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Typical Performance Data



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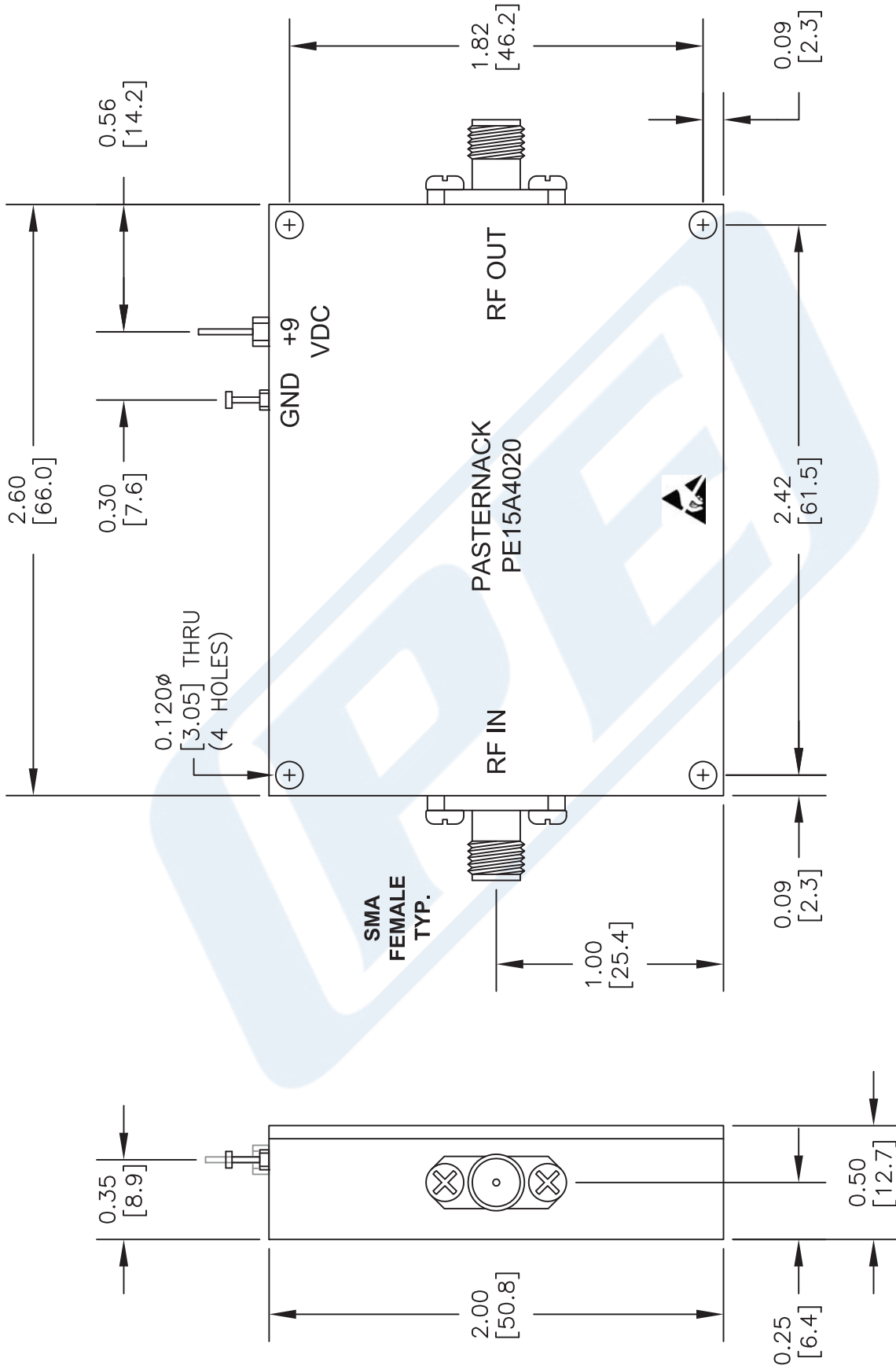
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The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Pasternack reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Pasternack does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Pasternack does not assume any liability arising out of the use of any part or documentation.

PE15A4020 CAD Drawing

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DWG TITLE

PE15A4020

NOTES:
 1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL.
 2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.
 3. DIMENSIONS ARE IN INCHES [mm].

FSCM NO. 53919

CAD FILE 061915

SCALE N/A

SIZE A

2233

PE PASTERNAK
 THE ENGINEER'S RF SOURCE

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