PASTERNACK
an INFINITE brand

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012

PE15A4012 is a broadband 5W GaAs PHEMT MMIC-based coaxial power amplifier module designed to be used in a wide range of commercial and defense applications in the 3.5 to 7.0 GHz frequency range. The amplifier offers 26 dB small signal gain with the gain flatness of ±2 dB. This performance is achieved through the use of advanced GaAs PHEMT MMIC circuitry. The amplifier requires manual voltage sequencing (see pages 4 & 5) and operates over the temperature range of -55°C to 85°C. This Innovative design is characterized by light weight (45 g) and small size (1.5"x1.2"x0.56"). An available finned heatsink (model PE15C5014) is recommended to maintain an optimum baseplate temperature during operation. To prevent damage use Isolator PE8316 on RF output port.

Features

- 3.5 GHz to 7 GHz Frequency Range
- P1dB Output Power: 36 dBm
- Psat: 37 dBm
- Small Signal Gain: 26 dB
- Gain Flatness: ±2 dB
- Power Added Effiency @Psat: 24%
- 50 Ohm Input and Output Matched
- -55 to +85°C Operating Temperature
- Small Size & Light Weight
- Manual Voltage Sequencing
- Optional Heatsink Available: Model PE15C5014

Applications

- Telecom Infrastructure
- Fixed Microwave Backhaul
- Microwave Radio Systems
- Military & Space
- Radar & Sensors
- Satellite Communication
- Driver Amplifier
- High Power Output
- General Purpose Amplification

Electrical Specifications (TA = +25°C, DC Current = 1.6A)

Description	Minimum	Typical	Maximum	Units
Frequency Range	3.5		7	GHz
Small Signal Gain		26		dB
Gain Flatness		±2		dB
Input Power (CW)			+12	dBm
Pout at Sat.	+35	+37		dBm
Efficiency Psat		24		%
Output Power at 1 dB Compression Point		+36		dBm
Output 3rd Order Intercept Point		+45		dBm
Noise Figure		11		dB
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input Return Loss		13		dB
Output Return Loss		5		dB
Operating DC Drain Source Voltage		8		Volts
Operating DC Gate Source Voltage		-1		Volts
Operating DC Current		1.6		A
Operating Temperature Range	-55		+85	°C
Thermal Resistance		3.7		°C/W

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

PASTERNACK
an INFINITE brand

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012

Absolute Maximum Rating

Parameter	Rating	Units
Drain Source Voltage, Vds 1,2,3	+9	Volts
Gate Source Voltage, Vgs 1,2,3	-3	Volts
Drain Source Current Idsq 1	0.125	A
Drain Source Current Idsq 2	0.5	A
Drain Source Current Idsq 3	2	A
Continuous Dissipation at 25°C	30	W
Channel Temperature	175	°C
Operating Temperature (base-plate)	-55 to +85	°C
Storage Temperature	-55° to +135	°C

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

Mechanical Specifications

Size

Length	1.2 in [30.48 mm]
Width	1.5 in [38.1 mm]
Height	0.56 in [14.22 mm]
Weight	0.1045 lbs [47.4 g]
Input Connector	SMA Female
Output Connector	SMA Female

Environmental Specifications

Temperature

Operating Range	-55 to +85 deg C
Storage Range	-55 to +135 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. The amplifier module has 4 screw slots for mounting to a heat sink.
- DO NOT apply Vds without proper negative voltage on Vgs pins.

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

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.) Preform 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.

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

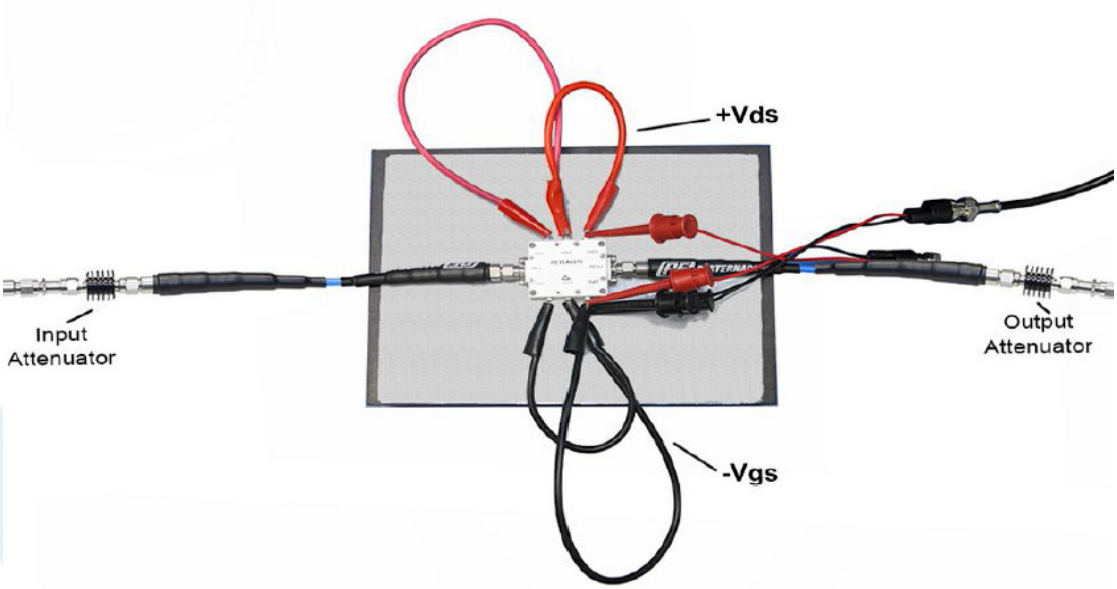
5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012

- GaAs PHEMT MMIC-Based Power up sequence

GaAs PHEMT MMIC-Based Power up sequence

1. Connect common ports
   a. Connect single GND lead
   b. Connect all -Vgs ports together
   c. Connect all +Vds ports together
2. Connect the load, attenuator to protect the VNA.
3. Connect the input port, may have an attenuator at the input (perform the CAL with the loads before connecting the amplifier to the VNA).



4. Apply the -Vgs voltage -1.0 Volts (Always apply -Vgs first).
5. Apply the +Vds +8 Volts (Then apply +Vds second).
6. Suggested to add an Isolator on Output to prevent damage to Amplifier. Refer to PE8316 as a possible Isolator for PE15A4012.

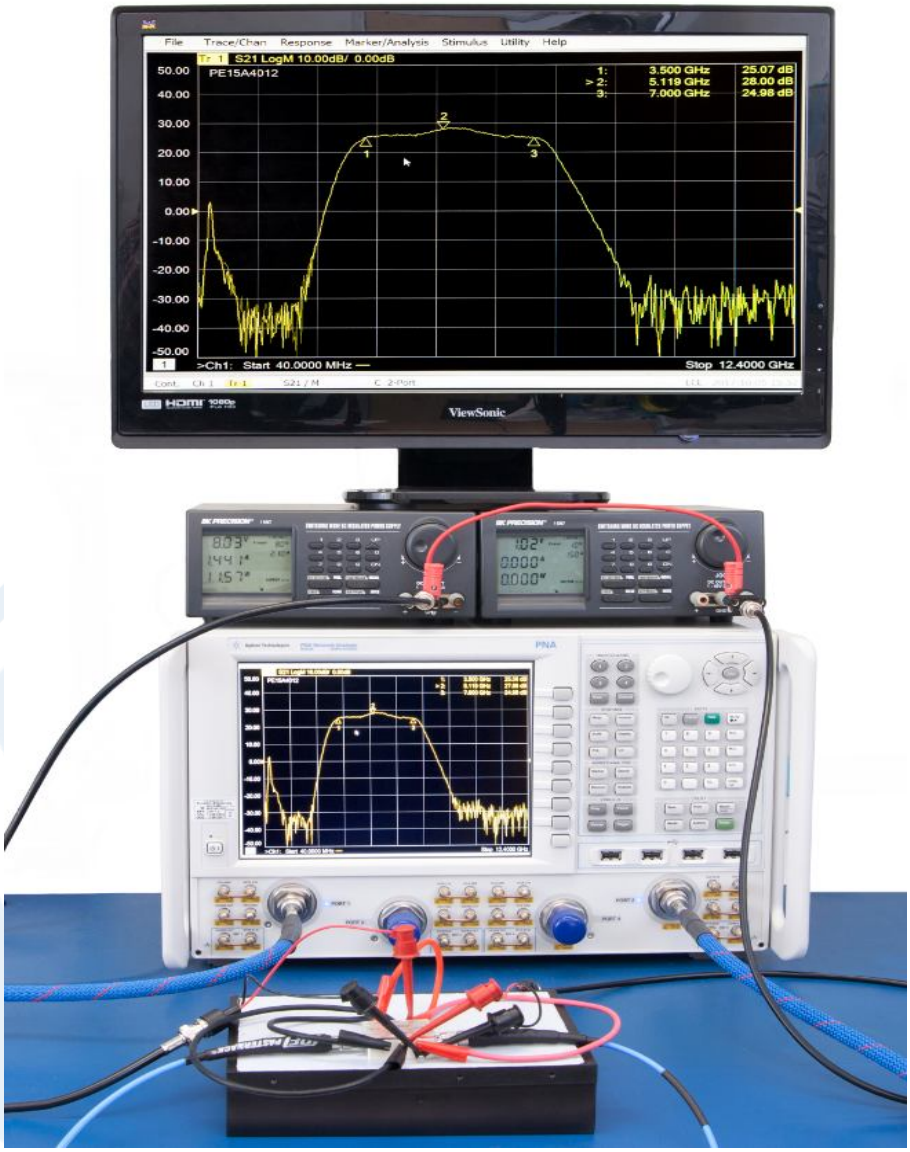
Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012



7. Observe the gain and power output

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

PASTERNACK
an INFINITE brand

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012

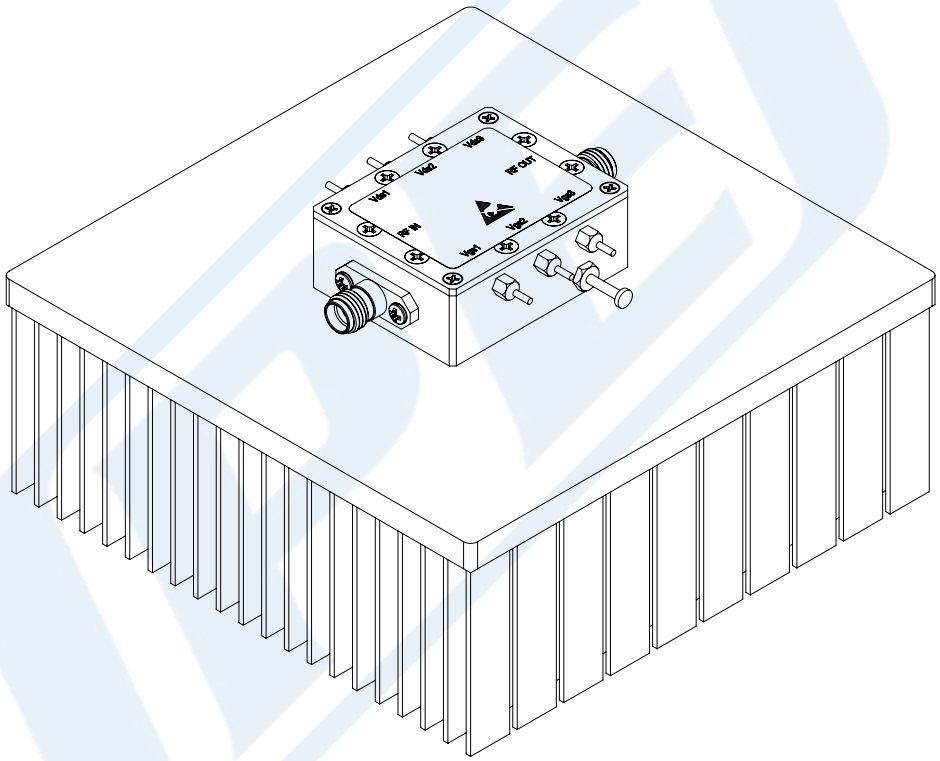


illustration of Amplifier mounted on Heatsink.
Heatsink model PE15C5014 sold separately.
(Picture shown for Reference Only)

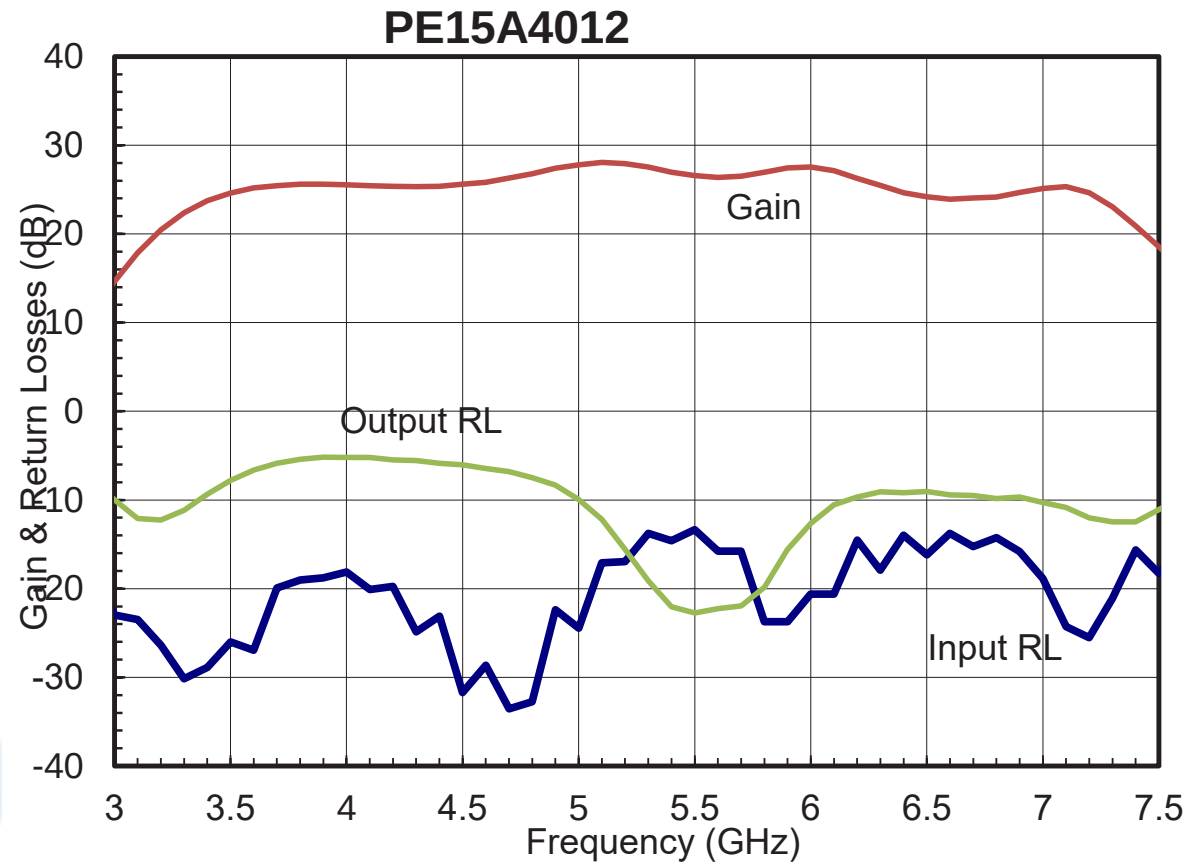
Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

Typical Performance Data



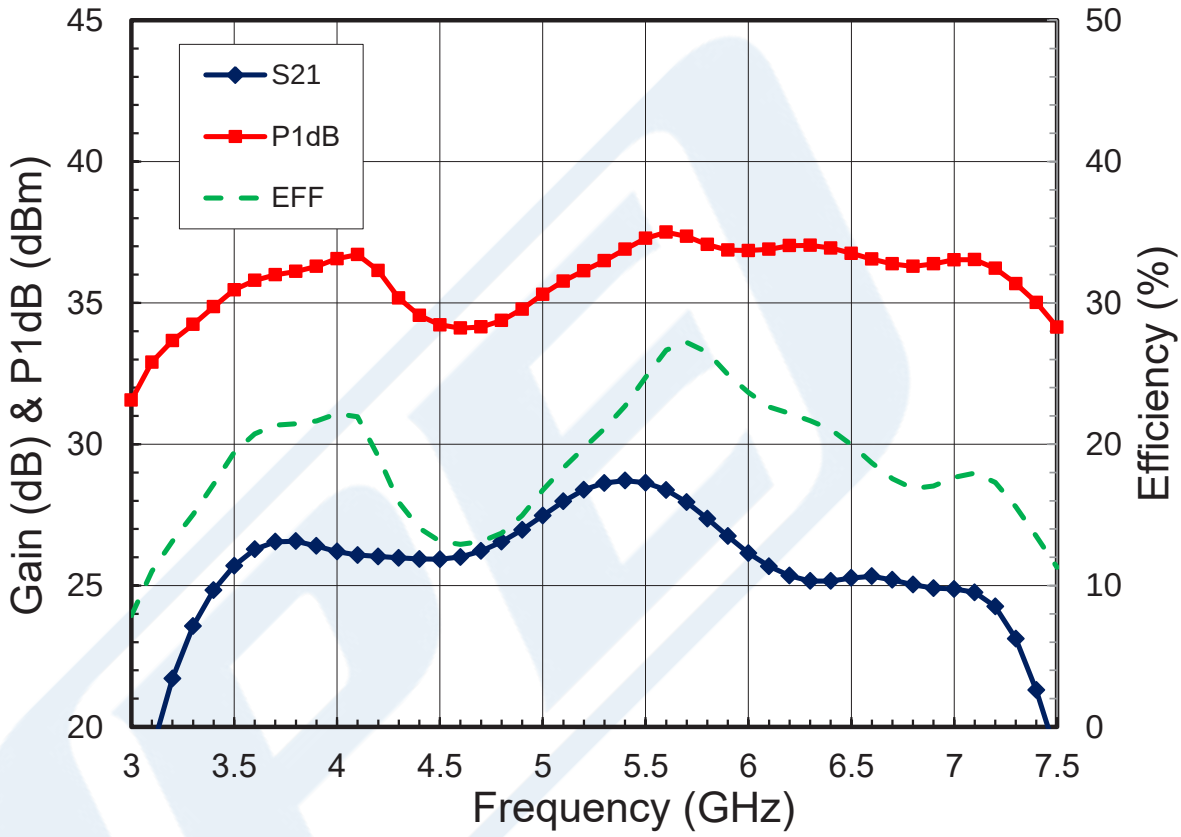
Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012



Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

PASTERNACK
an INFINITE brand

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF

TECHNICAL DATA SHEET PE15A4012

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF from Pasternack Enterprises has same day shipment for domestic and International orders. Our RF, microwave and millimeter wave products maintain a 99.4% availability and are part of the broadest selection in the industry.

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: 5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier, SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF PE15A4012

URL: https://www.pasternack.com/7-ghz-high-power-amplifier-26-db-gain-45-dbm-ip3-11-db-sma-pe15a4012-p.aspx

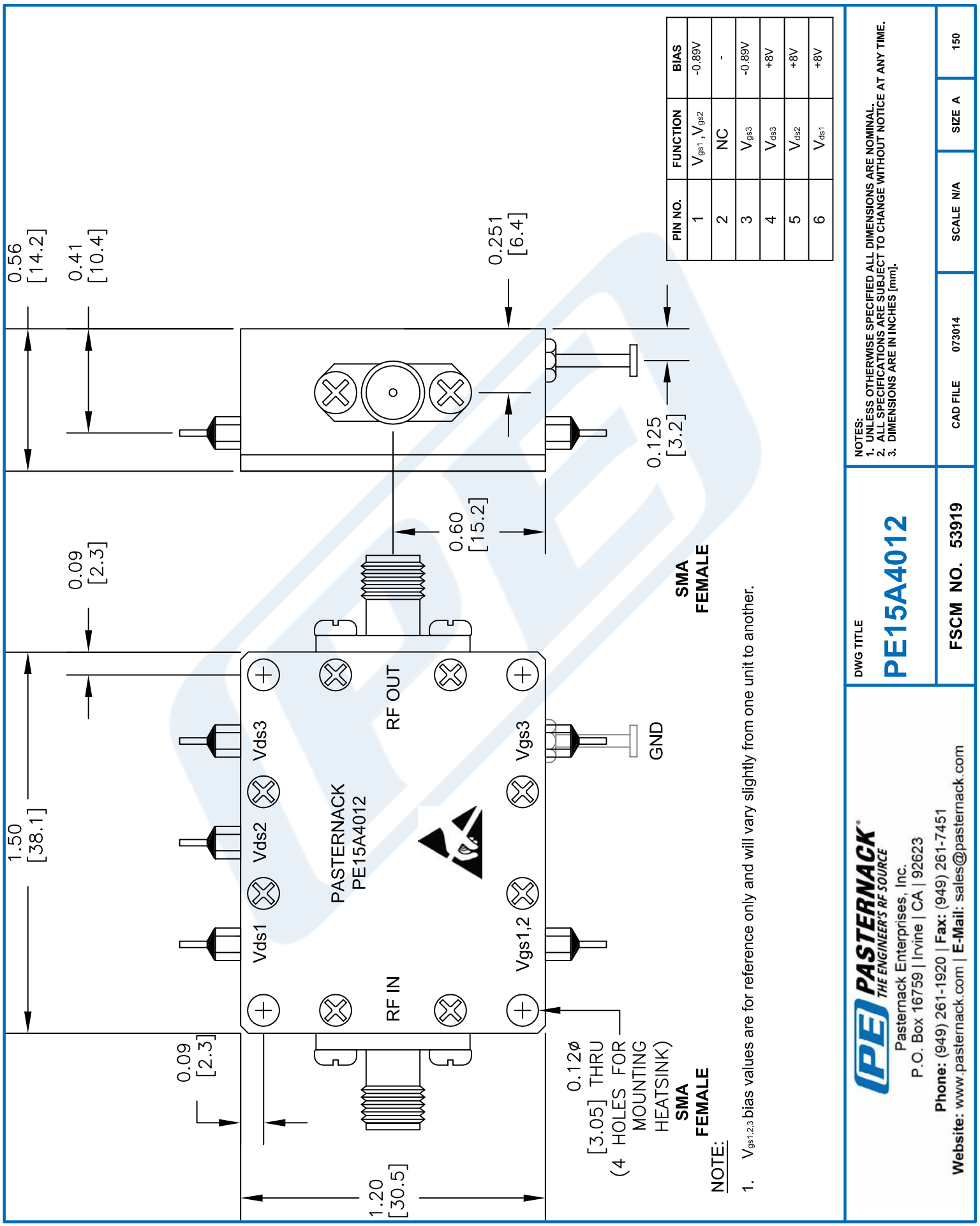
The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Pasternack reserves the right to make such 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.

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • **Fax:** (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved

PE15A4012 CAD Drawing

5 Watt Psat, 3.5 GHz to 7 GHz, High Power GaAs Amplifier,
SMA, 26 dB Gain, 45 dBm IP3, 11 dB NF



PIN NO.	FUNCTION	BIAS
1	V_{gs1}, V_{gs2}	-0.89V
2	NC	-
3	V_{gs3}	-0.89V
4	V_{ds3}	+8V
5	V_{ds2}	+8V
6	V_{ds1}	+8V

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].

DWG TITLE: PE15A4012

FSCM NO. 53919 | CAD FILE 073014 | SCALE N/A | SIZE A | 150

PASTERNACK® THE ENGINEER'S RF SOURCE
Pasternack Enterprises, Inc.
P.O. Box 16759 | Irvine | CA | 92623
Phone: (949) 261-1920 | **Fax:** (949) 261-7451
Website: www.pasternack.com | **E-Mail:** sales@pasternack.com

© 2019 Pasternack Enterprises All Rights Reserved