



47 dB G47 dB Gain, 50 Watt Psat, 2 GHz to 6 GHz,
High Power GaN Amplifier, Class AB, SMA

TECHNICAL DATA SHEET

PE15A5121

The PE15A5121 is a high power amplifier that operates from 2000 MHz to 6000 MHz and generates 50 watts of saturated output power. The module utilizes GaN and chip-and-wire technology in the manufacturing process that ensures state-of-the-art power performance with excellent power-to-volume ratio that's ideal for broadband high power S and C band applications. This Class AB amplifier is designed for a 50 ohm input/output impedance and offers high efficiency and high linearity, operating over a wide dynamic range with impressive typical performance that includes 47 dB of gain, -60 dBc spurious suppression, and -15 dBc harmonics at 40W. The design has input RF power handling capability up to +10 dBm max without damage, and can handle a load VSWR at Pout of 30W of 3.0:1 for all load phase and amplitude conditions under continuous operation. Typical DC bias requirements include +28V and 9A of current at 40W. The module uses an SMA female connectors at the RF input and output ports. The DC interface incorporates a D-Sub 9 pin male connector for DC bias, Enable with TTL logic control, Current sense, and Temperature sense functions. A mating D-Sub socket connector is included. The rugged amplifier design operates over a wide temperature range from -20°C to +60°C, and can withstand relative humidity exposure up to 95% maximum. An available heatsink with cooling fan (model PE15G5068F) is recommended to maintain an optimum baseplate temperature during operation.

Features

- GaN High Power Amplifier Design
- 2000 MHz to 6000 MHz Frequency Range
- Psat 50 Watts typ
- Gain: 47 dB typ
- Gain Flatness +/- 3 dB
- Spurious Supression -60 dBc
- DC Bias +28VDC @ 9A Current
- Max RF input Power +10 dBm
- Enable with TTL Logic Control
- Current Sense and Temperature Sense features
- 50 Ohms Input and Output Matched
- Instantaneous Broadband
- Built-In control and protection circuits
- Class AB
- SMA Female Input/Output Connectors
- D-Sub Control Connector with Mating Female Connector
- Operational Temperature -20°C to +60°C
- Optional Heatsink Available: Model PE15G5068F

Applications

- Military Radio
- Communication Systems
- Multioctave High Gain Power Amplifier
- Band Specific High Power Linear Applications in L and S Frequency bands
- Test and Measurement

Electrical Specifications (TA = +25°C, DC Voltage = +30Volts, DC Current = 9A)

Description	Minimum	Typical	Maximum	Units
Frequency Range	2		6	GHz
Small Signal Gain		47		dB
Gain Flatness		±3		dB
Pout at Sat.		+47		dBm
Harmonics @40 Watts		-15		dBc
Spurious		-60		dBc
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input Return Loss			-10	dB

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Operating DC Voltage	+28	+30	+32	Volts
Operating DC Current*		9		A
OFF/ON Switch Time (10% to 90%)		2	5	μs
Operating Temperature Range	-20		+60	°C

*@Pout=40W

Electrical Specification Notes:

Allow for 20% Increased DC Current during initial power-up stage

Absolute Maximum Rating

Parameter	Rating
Input RF drive level without damage	+10 dBm (Max)
Load VSWR @ POUT=30W	∞ @ all load phase & amplitude for duration of 1 minute; 3:1 @ all load phase & amplitude continuous
Over Temperature	85°C @ heatsink [restored @ 60°C]

Mechanical Specifications

Size

Length	6.2 in [157.48 mm]
Width	3.9 in [99.06 mm]
Height	0.98 in [24.89 mm]
Weight	2 lbs [907.18 g]
Input Connector	SMA Female
Output Connector	SMA Female
Bias Connector	9-Pin D-Subminiature Male
Cooling	Baseplate Conduction

Environmental Specifications

Temperature

Operating Range	-20 to +60 deg C
Storage Range	-25 to +65 deg C
Humidity	95%

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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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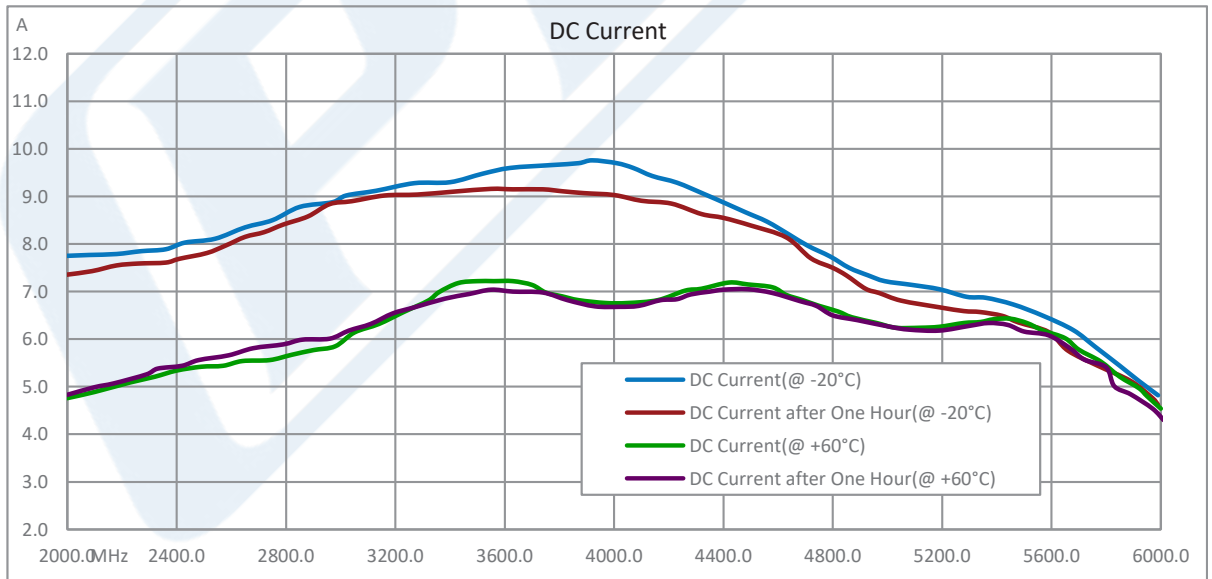
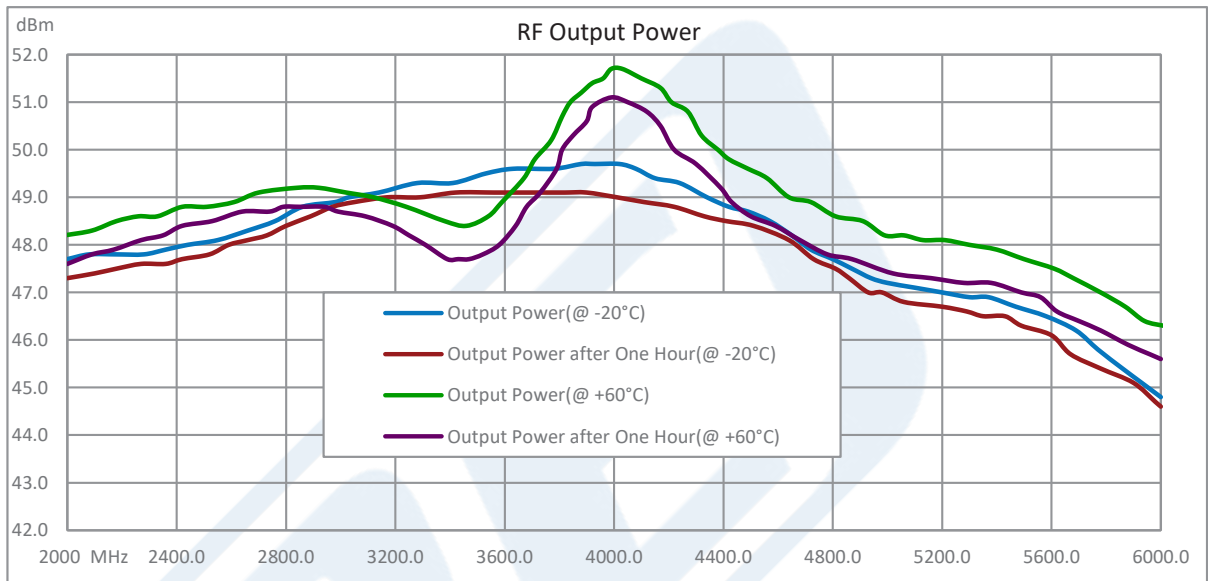


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Typical Performance Data



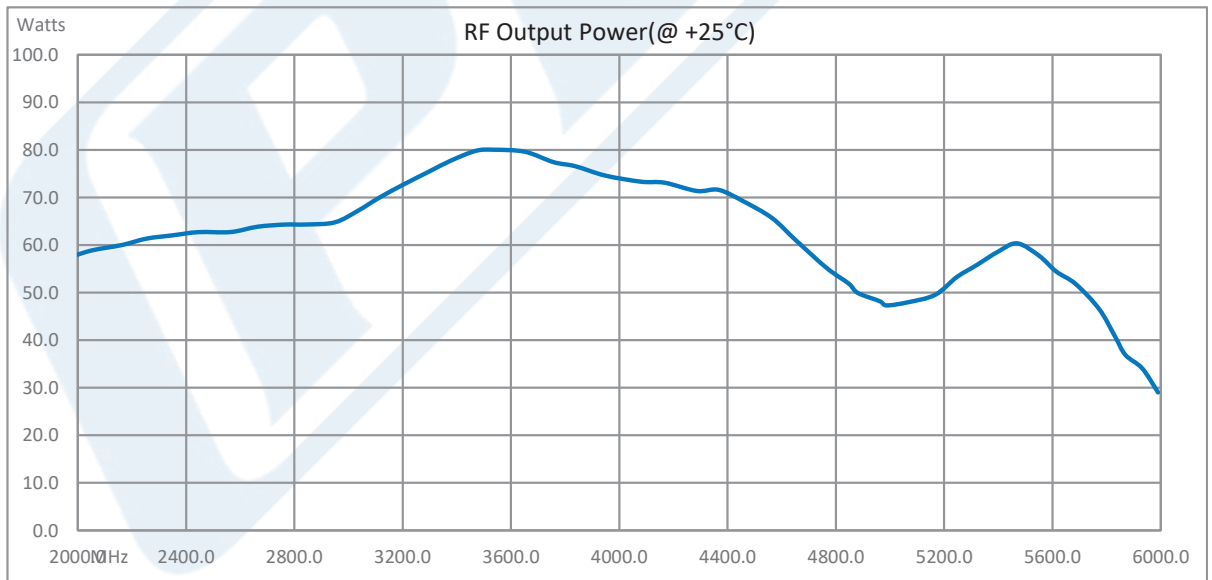
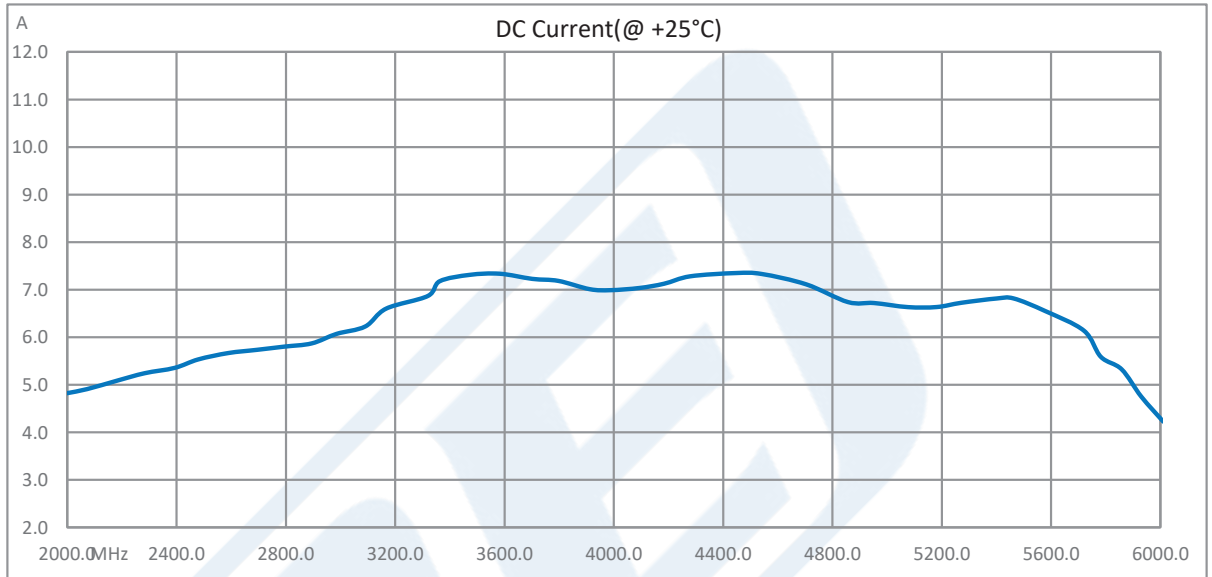
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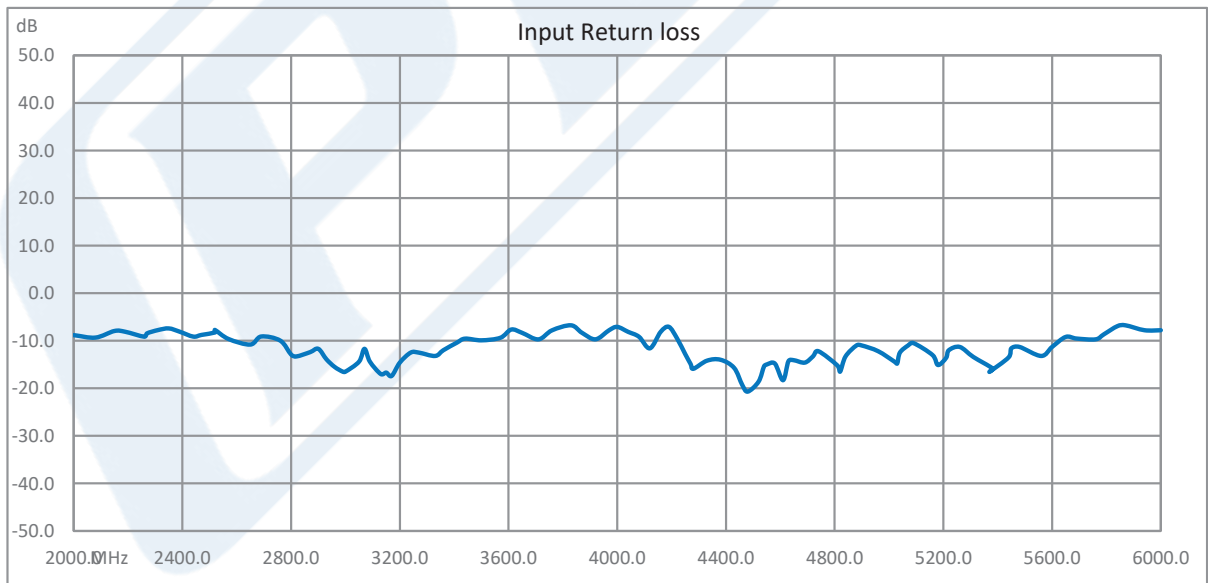
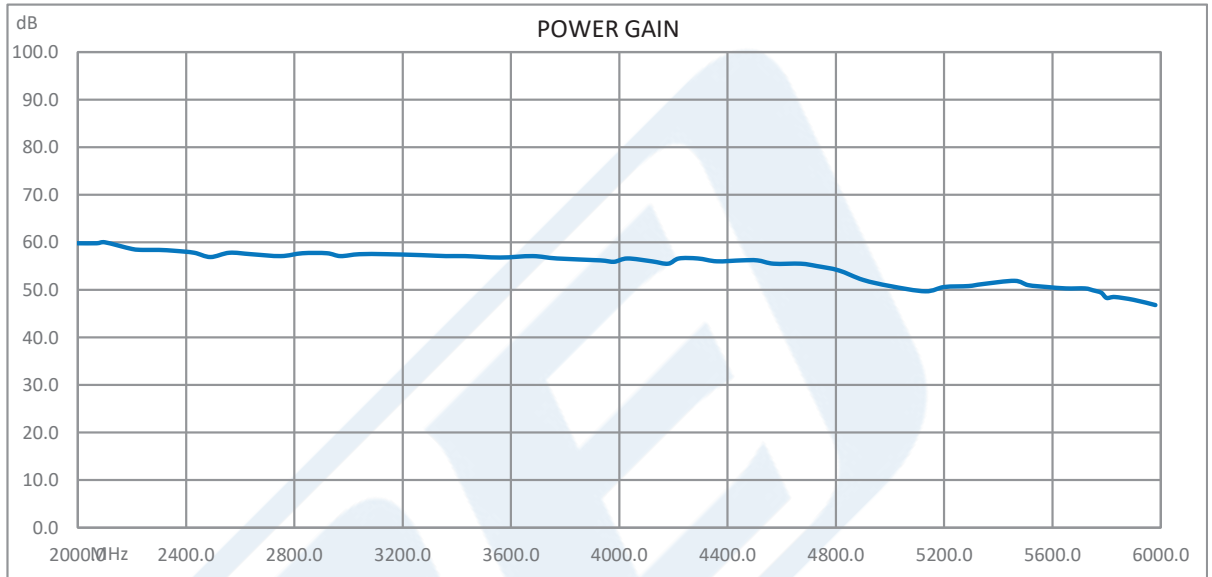
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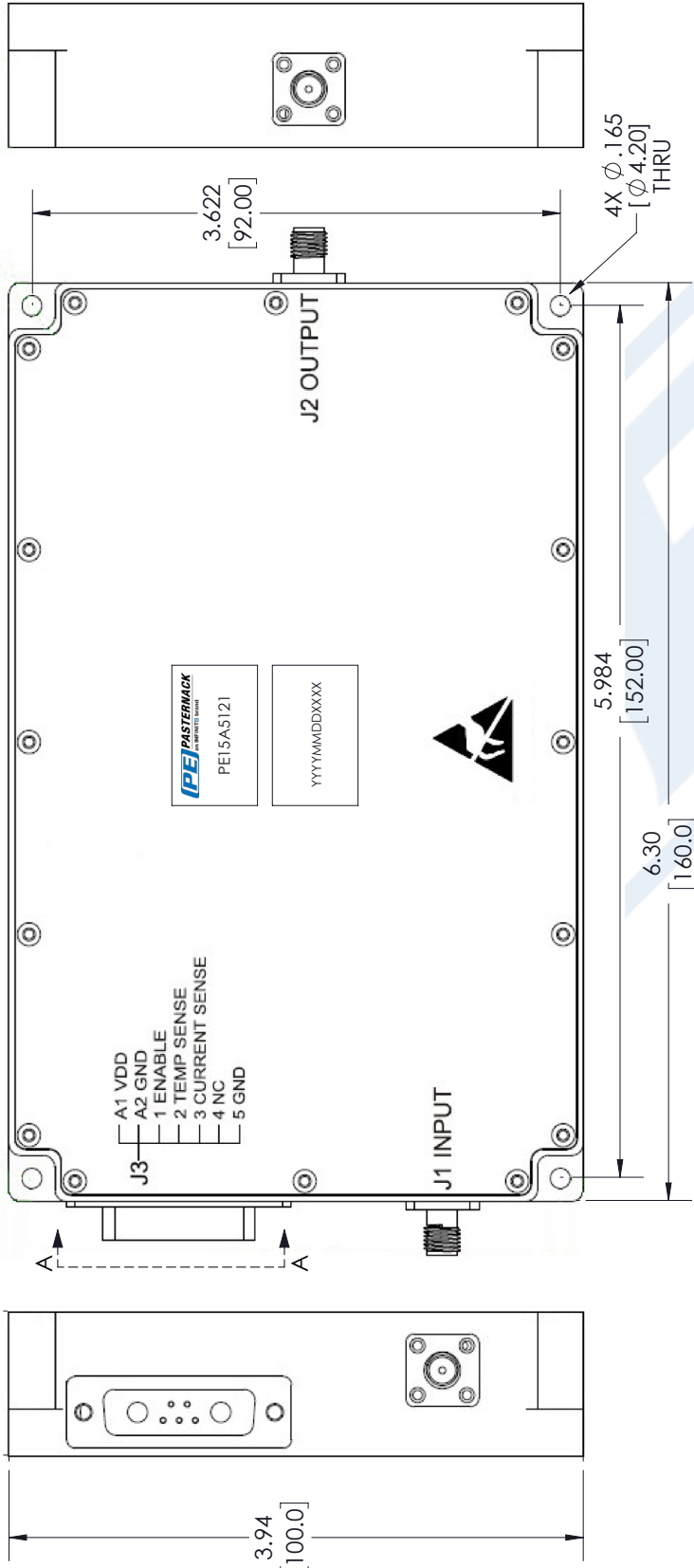
URL: <https://www.pasternack.com/47-db-gain-6-ghz-high-power-high-gain-amplifier-sma-pe15a5121-p.aspx>

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.

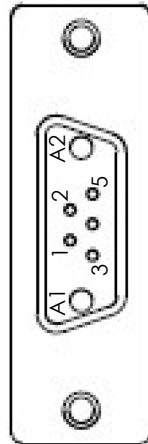
PE15A5121 CAD Drawing

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REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	02/08/2022
		APPROVED
		TGALLA



HYBRID D-SUB 7-PIN, MALE	
PIN #	DESCRIPTION
A1	VDD 30 VDC
A2	Ground
1	ENABLE Amplifier Enable: TTL Logic High (3.3V) (Internally Pulled-Low)
2	TEMP SENSE Analog voltage relative to Module's Temperature @ 10 mV/°C
3	CURRENT SENSE Analog voltage relative to IDD @ 100mV per Ampere
4	NC No connection
5	GND Ground



VIEW A-A

UNLESS OTHERWISE SPECIFIED
LEADING DIMENSIONS ARE INCHES
DIMENSIONS IN [] ARE MILLIMETERS

TOLERANCES:
 .X = ±.2 [5.08] FRACTIONS
 .XX = ±.02 [.51] ±.1/32
 .XXX = ±.005 [.13] ANGLES ± 1°
 CABLE LENGTH (L) TOLERANCES:
 L ≤ 12 [305] = +1 [25] / -0
 12 [305] < L ≤ 60 [1524] = +2 [51] / -0
 60 [1524] < L ≤ 120 [3048] = +4 [102] / -0
 120 [3048] < L ≤ 300 [7620] = +6 [152] / -0
 300 [7620] < L = +5%L / -0

ALL DIMENSIONS SHOWN
ARE FOR REFERENCE ONLY.

PE PASTERNAK
an INFINITE brand

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THIRD-ANGLE PROJECTION

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SHEET 1 OF 1
SCALE N/A

SIZE A CAGE CODE A 53919 DRAWN BY BPUCHASKI ITEM NO. PE15A5121 REV A

NOTES:
1. ADEQUATE HEATSINK REQUIRED.

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