PASTERNACK
an INFINITE brand

30 Watt GaN Power Amplifier, 2000 MHz to 2600 MHz, Class AB, S-Band, 45% Efficiency, 28V, SMA

TECHNICAL DATA SHEET PE15A5074

The PE15A5074 is a Class AB high power amplifier that operates in S-Band from 2000 MHz to 2600 MHz and generates up to 30 Watts RF output power and 12 watts linear power wit 5% EVM @ 41 dBm. The module utilizes the latest Gallium Nitride (GaN) semiconductor technology with 45% power efficiency. The package design features a small form factor of <10in³ that's ideal for size, weight, and power (SWaP) constrained applications used in broadband RF telemetry, tactical communication, electronic warfare, and unmanned aircraft systems, as well as software defined radios. Impressive typical performance includes 54 dB of linear gain, 1.9:1 VSWR, +43 dBm third order intercept point, and harmonic suppression of -18 dBc. Additionally with a nominal 0 dBm (1 mW) RF input power, the amplifier can provide 44 dB of gain and near-constant envelope waveforms. Operating voltage is +28 Vdc with 2.4A of DC current. Additional features include overvoltage protection, reverse voltage protection, and logic on/off control. The rugged Mil-Grade assembly supports female SMA RF input/output connectors and a micro-D 9 pin socket command control connector with an accessory cable assembly included. The operating baseplate temperature range is -40°C to +85°C and the unit is guaranteed to withstand up to 95% relative humidity, altitude levels up to 30,000 ft, and random vibration and shock profiles (see chart below). Pasternak also offers an accessory Harmonic filter option, model PEHFL0000 that can be used at the output of the PE15A5074 power amplifier. This lowpass RF filter has low insertion loss with power handling up to 50W and specifically designed to reduce harmonics at the output of transmitters operating at up through L-Band and offers rejection levels of greater than 25 dB from 3.25 GHz to 5 GHz. The filter is offered in a miniature SMA connectorized package.

Features

- 30W GaN High Power Amplifier
- 12W Linear Power with 5% EVM @ 41 dBm
- S Band Class AB Design
- Frequency Range: 2000 MHz to 2600 MHz
- 54 dB linear Gain
- VSWR: 1.9:1
- +43 dBm IP3
- PAE: 45%
- Small Form Factor Rugged Mil-Grade Package
- 50 Ohm Design
- Female SMA RF Connectors
- +28Vdc @ 2.4A DC current
- -40°C to +85°C Operating Baseplate Temperature
- Output Harmonic Filter Accessory Option

Applications

- Broadband RF Telemetry
- RF Communications Systems
- Electronic Warfare - Airborne Electronic Attack
- Unmanned Aircraft Systems (UAS)
- Unmanned Ground Vehicles (UGV), Software Defined Radios
- Data Links
- Transmitters
- Test & Measurement
- Telecom Infrastructure

Electrical Specifications (TA = +25°C, DC Voltage = 28Volts, DC Current = 2.4A)

Description	Minimum	Typical	Maximum	Units
Frequency Range	2		2.6	GHz
Small Signal Gain		54		dB
Gain Flatness		±2.5		dB
Input Power (CW)		+0		dBm
Pout at Sat.	20	30		Watts
Efficiency (PAE)		45		%
Output Power at 1 dB Compression Point		+31		dBm
Output 3rd Order Intercept Point		+43		dBm
Output Mismatch			10:1	

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: 30 Watt GaN Power Amplifier, 2000 MHz to 2600 MHz, Class AB, S-Band, 45% Efficiency, 28V, SMA PE15A5074

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
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2nd Harmonics		-20		dBc
3rd Harmonics		-18		dBc
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input VSWR		1.9:1		
Switching Speed for On/Off Switch Gate			2	usec
Operating DC Voltage	27	28	30	Volts
Operating DC Current		2.4		A
Quiescent Current Biased (RF Enable Low)		650		mA
Quiescent Current Unbiased (RF Enable Floating)		100		mA
Operating Temperature Range	-40		+85	°C

Performance by Frequency

Description	F1	F2	F3	Units
Frequency Condition	2000	2300	2600	MHz
Output Power @ 1dB Compression, Typ	31	31	29	dBm
Small Signal Gain, Typ (@-40dBm Input)	51	49	49	dB
Third Order Intercept Point	44	44	43	dBm

Absolute Maximum Rating

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	3.25	A
Max RF Input Power, Z_L = 50 Ω	12.00	dBm
Max Operating Temperature (ambient)	85.00	°C
Max Operating Temperature (baseplate)	85.00	°C
Max Storage Temperature	85.00	°C

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

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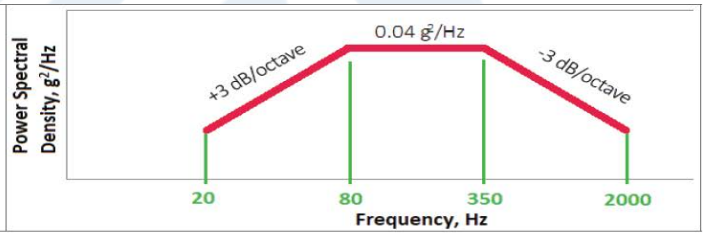
Mechanical Specifications

Size

Length	4.5 in [114.3 mm]
Width	3.5 in [88.9 mm]
Height	0.61 in [15.49 mm]
Weight	0.6 lbs [272.16 g]
Input Connector	SMA Female
Output Connector	SMA Female
Bias Connector	9-Pin Micro-D Socket

Environmental Specifications

Vibration / Shock Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)	

Temperature

Operating Range	-40 to +85 deg C
Storage Range	-55 to +85 deg C
Humidity	95% Non-Condensing
Altitude	MIL-STD-810F Method 5004

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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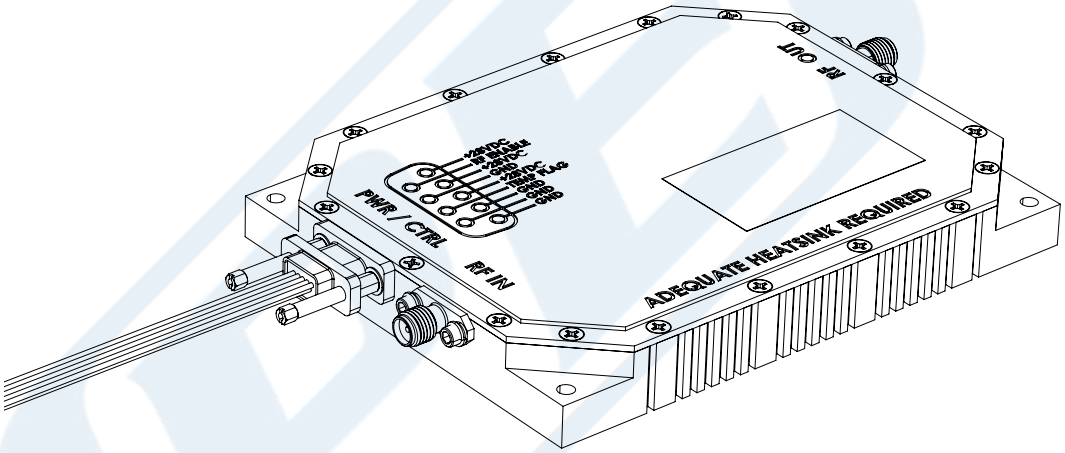

illustration of Amplifier & Interface Cable

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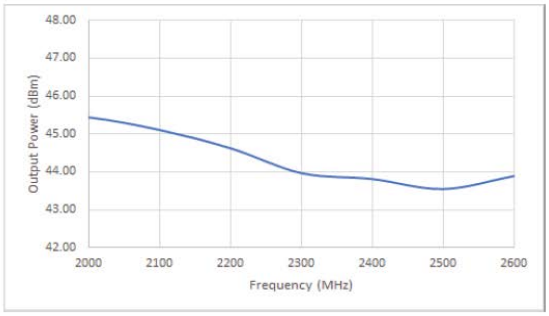
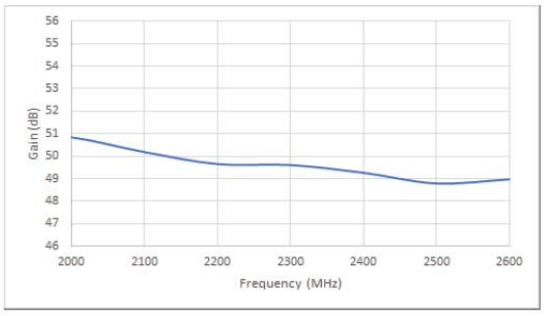
Typical Performance Data

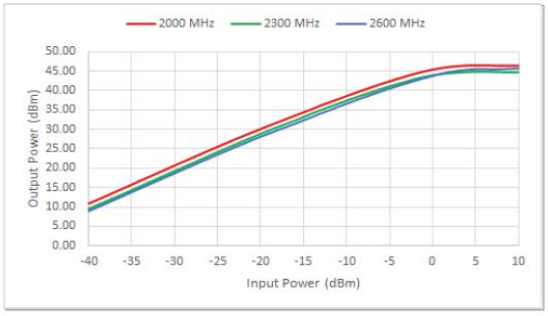
Output Power [0dBm Input Power]



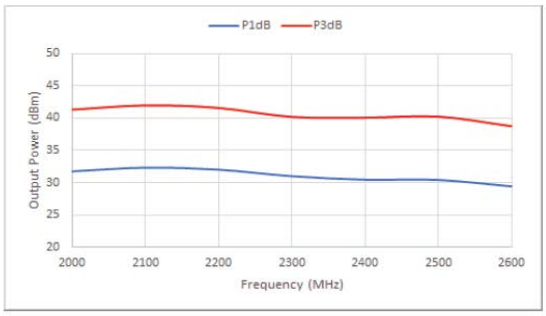
Small Signal Gain [-40dBm Input Power]



Output Power vs. Input Power



P1dB & P3dB



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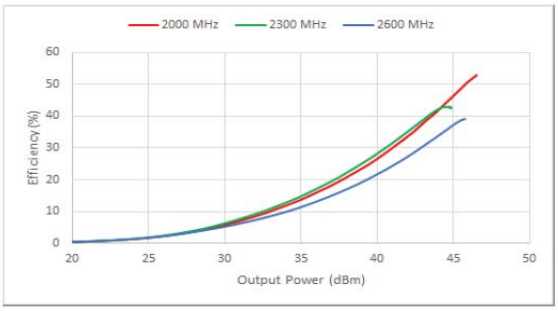
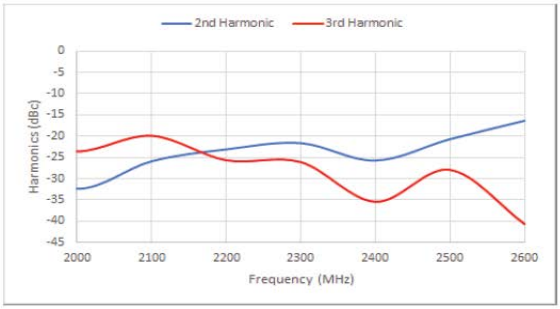
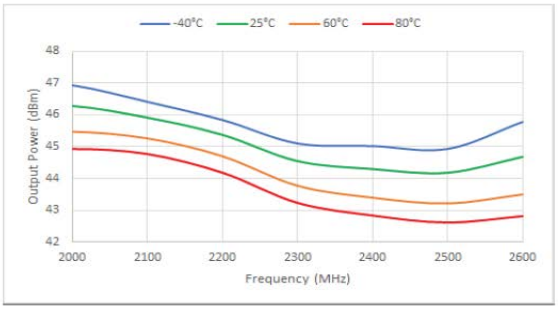
Efficiency vs. Output Power



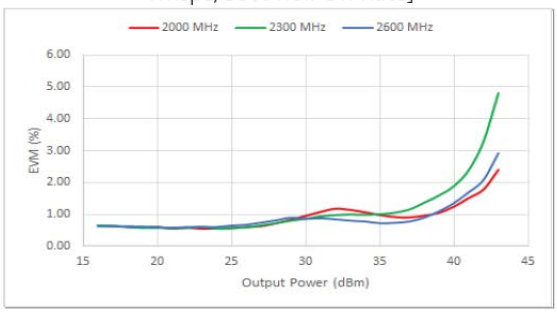
Harmonics [@Psat]



Output Power vs. Temperature [Baseplate]



Error Vector Magnitude vs. Output Power [QPSK, 1Msps, 35% Roll Off Rate]



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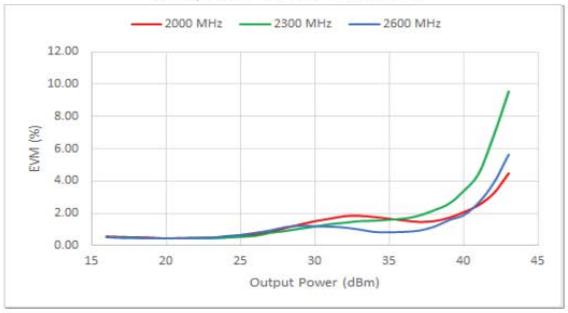
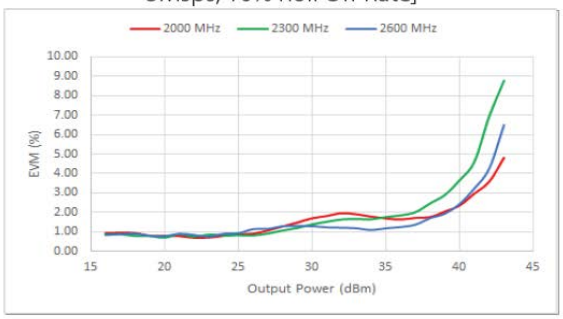
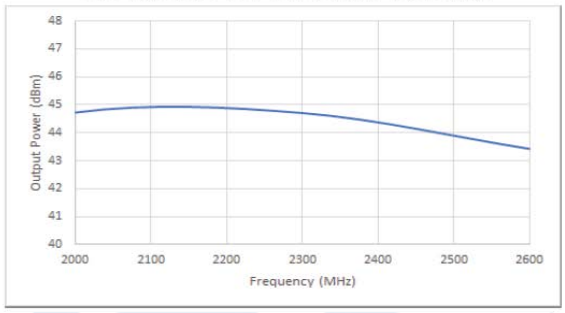
Error Vector Magnitude vs. Output Power [16QAM, 2Msps, 35% Roll Off Rate]



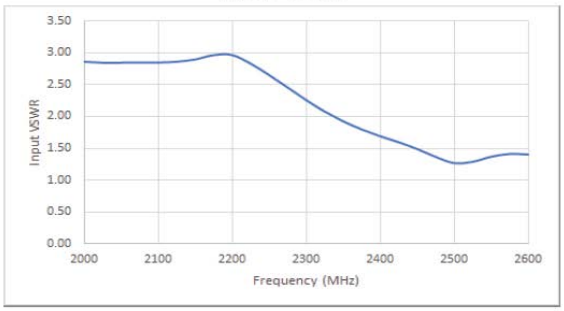
Error Vector Magnitude vs. Output Power [64QAM, 5Msps, 10% Roll Off Rate]



OIP3 [20dBm per tone, 1MHz spacing]



Input VSWR



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URL: https://www.pasternack.com/54-db-gain-2.6-ghz-medium-power-high-gain-amplifier-sma-pe15a5074-p.aspx

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PE15A5074 CAD Drawing

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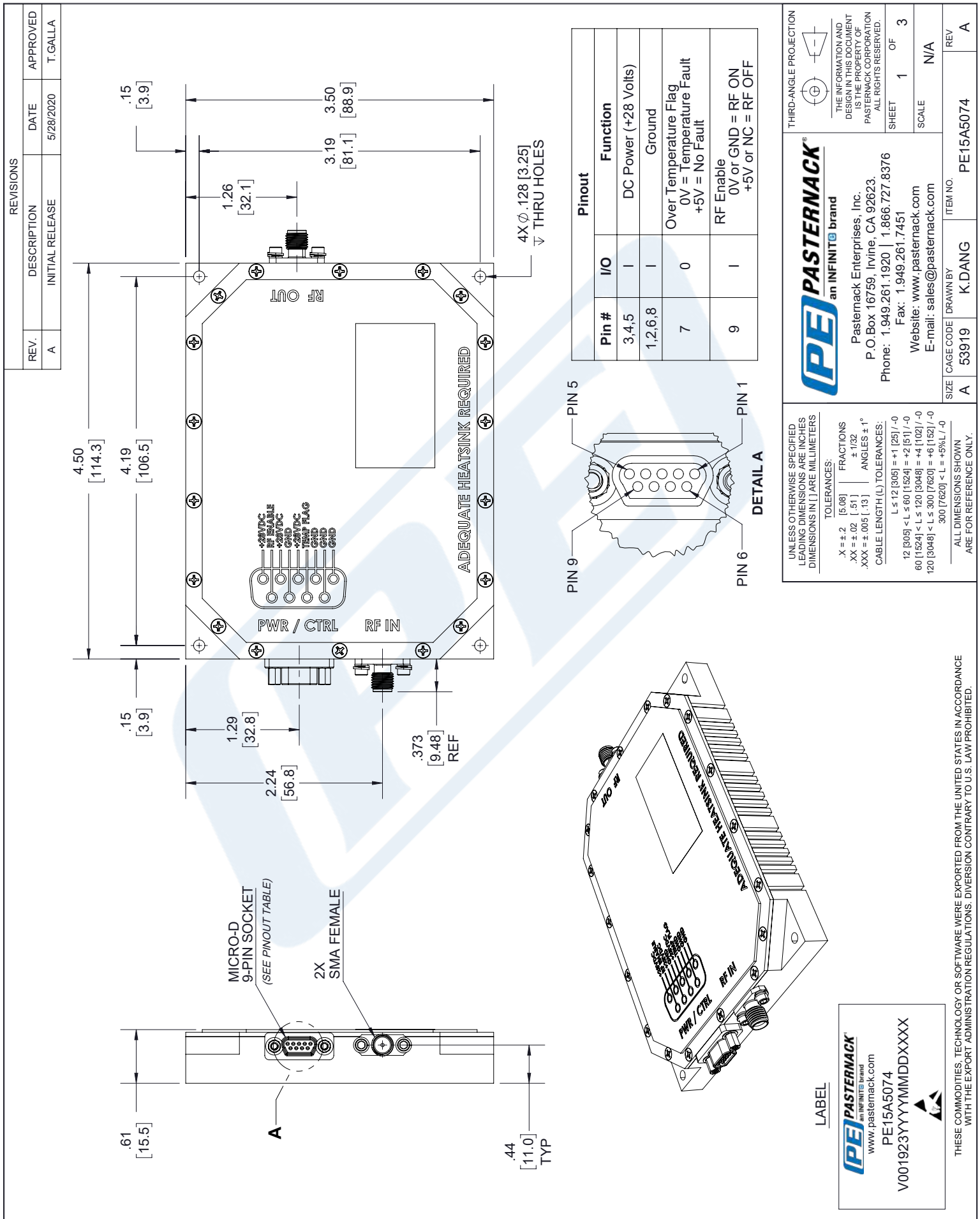
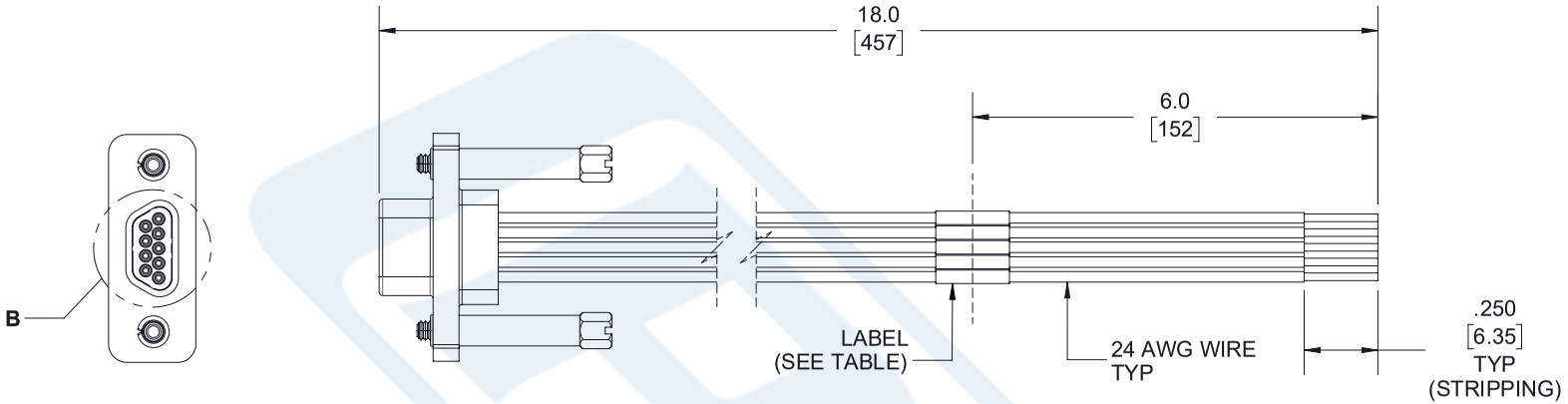
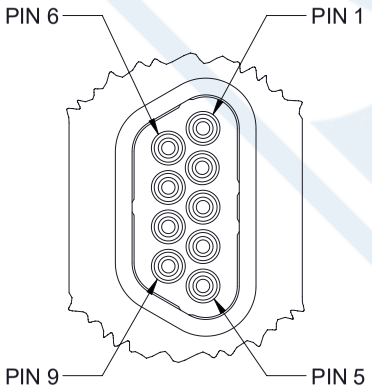


INTERFACE CABLE





DETAIL B

Pinout		
Pin #	**Wire Color**	**Label**
1	Black	GND
2	Brown	GND
3	Red	+ 28V
4	Orange	+ 28V
5	Yellow	+ 28V
6	Green	GND
7	Blue	Temp Flag
8	Purple	GND
9	Gray	RF Enable

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

TOLERANCES:

.X = ± .2 [5.08] | FRACTIONS ± 1/32
.XX = ± .02 [.51] | ANGLES ± 1°
.XXX = ± .005 [.13]

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.

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THIRD-ANGLE PROJECTION

SHEET 2 OF 3

SCALE N/A

SIZE	CAGE CODE	DRAWN BY	ITEM NO.	REV
A	53919	K.DANG	PE15A5074	A

T-Rev.D

PE15A5074 CAD Drawing

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