



43 dB Gain, 25 Watt Psat, 0.15 MHz to 230 MHz, High Power LDMOS Amplifier, SMA Input, SMA Output, 48 dBm IP3, Class AB

TECHNICAL DATA SHEET

PE15A5028

The PE15A5028 is a high gain Class A/AB RF power amplifier module that uses LDMOS semiconductor technology and operates in the 0.15 MHz to 230 MHz frequency range. The highly linear design supports a variety of input signal formats which includes CW, AM, FM, PM, and Pulse. The amplifier offers 25 watts typical saturated output power, 43 dB min small signal gain with ± 1.5 dB max gain flatness, and +48 dBm typ OIP3. Additional performance features include -15 dBc harmonics at 15 watts, <-60 dBc spurious at 15 watts, and a max RF input power of +1 dBm. The DC supply requires +28 Vdc nominal with 5 amps max of DC current. The connectorized SMA module also supports an open collector pin that's left open for normal operation and shorted to ground to shutdown the amplifier. The rugged package design meets a series of environmental conditions which includes Humidity, Altitude, Shock, and Vibration. A heat sink is required for adequate cooling.

Features

- 0.15 MHz to 230 MHz Frequency Range
- Psat 25 Watts typ
- Small Signal Gain: 43 dB min
- Gain Flatness ± 1.5 dB max
- IP3 48 dBm typ
- 50 Ohms Input and Output Matched
- Unconditionally Stable
- Regulated Supply
- Shutdown Feature

Applications

- Military Radio
- Communication Systems
- High Gain Driver Power Amplifier
- High Gain Output Power Amplifier

Electrical Specifications (TA = +25°C, DC Voltage = 28Volts, DC Current = 5A)

Description	Minimum	Typical	Maximum	Units
Frequency Range	0.15		230	MHz
Small Signal Gain	43			dB
Gain Flatness			± 1.5	dB
Input Power (CW)			+1	dBm
Pout at Sat.		+44		dBm
Output Power at 1 dB Compression Point	+41.8			dBm
Output 3rd Order Intercept Point		+48		dBm
Harmonics		-15		dBc
Spurious		-60		dBc
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input VSWR			2:1	
Load VSWR			3.5:1	
Operating DC Voltage		28		Volts
Operating DC Current			5	A
Shutdown On/Off Speed			350	ms
Operating Temperature Range	0		+50	°C

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Mechanical Specifications

Size

Length	6 in [152.4 mm]
Width	3 in [76.2 mm]
Height	1.1 in [27.94 mm]
Weight	1.154 lbs [523.45 g]
Input Connector	SMA Female
Output Connector	SMA Female
Cooling	Adequate Heatsink Required

Environmental Specifications

Temperature

Operating Range	0 to +50 deg C
Humidity	95
Shock	Normal Truck Transport
Vibration	Normal Truck Transport
Altitude	10000

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.
- Excessive reflected power beyond a 3.5:1 VSWR match will damage the amplifier. For safe operation, it's highly recommended a high power isolator or attenuator be used at the output of the power amplifier.



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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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SHUTDOWN PIN FEATURE: The open collector is not designed to have any voltage applied to it. It can actually damage the amplifier if voltage is applied. The pin leads directly to the gate voltage that turns on the internal transistors. There's a diode in series to protect it from input voltage but if the voltage is too high, it can cause damage.

For normal operation, the shutdown pin is left open. If the amplifier module needs to be shutdown, the pin is shorted to ground. Some external control options could involve using a toggle switch and turn off the module. Another external control option could involve using a Darlington transistor and control the transistor with TTL logic. In this case, the transistor would remain open for normal operation and control the transistor to close to ground for a shutdown.

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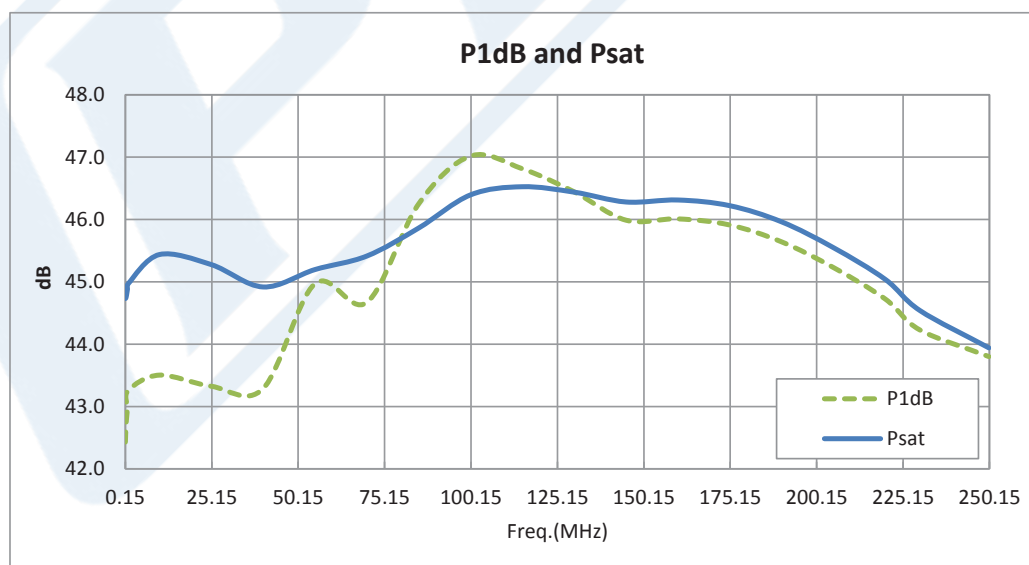
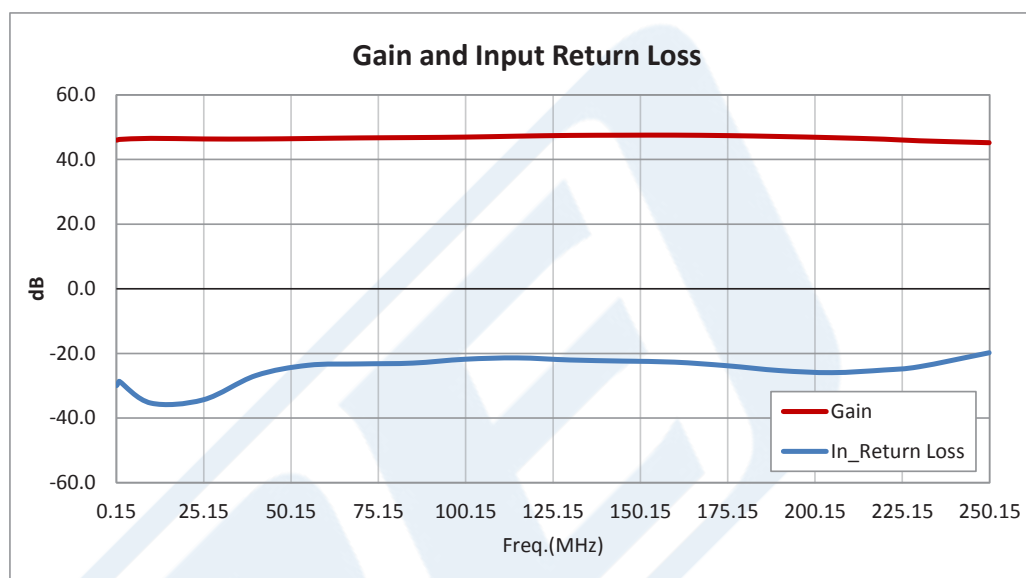


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Typical Performance Data



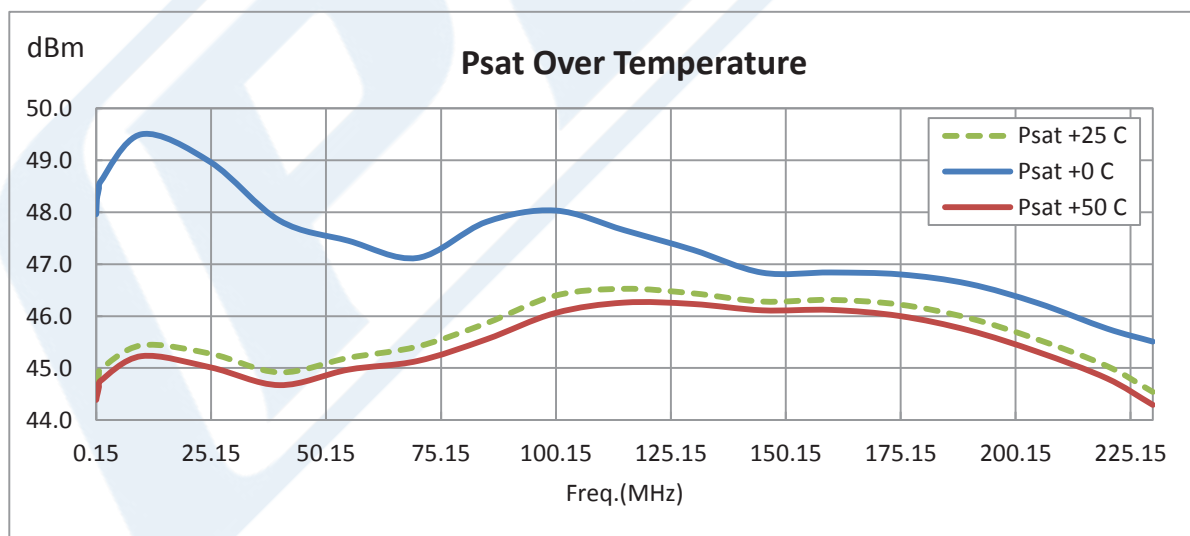
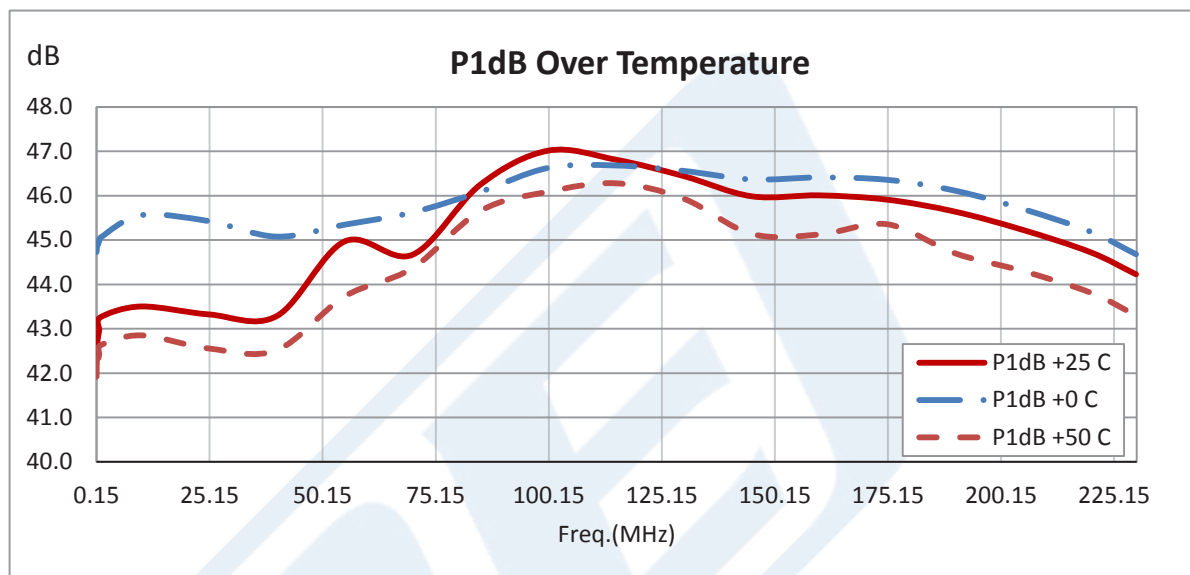
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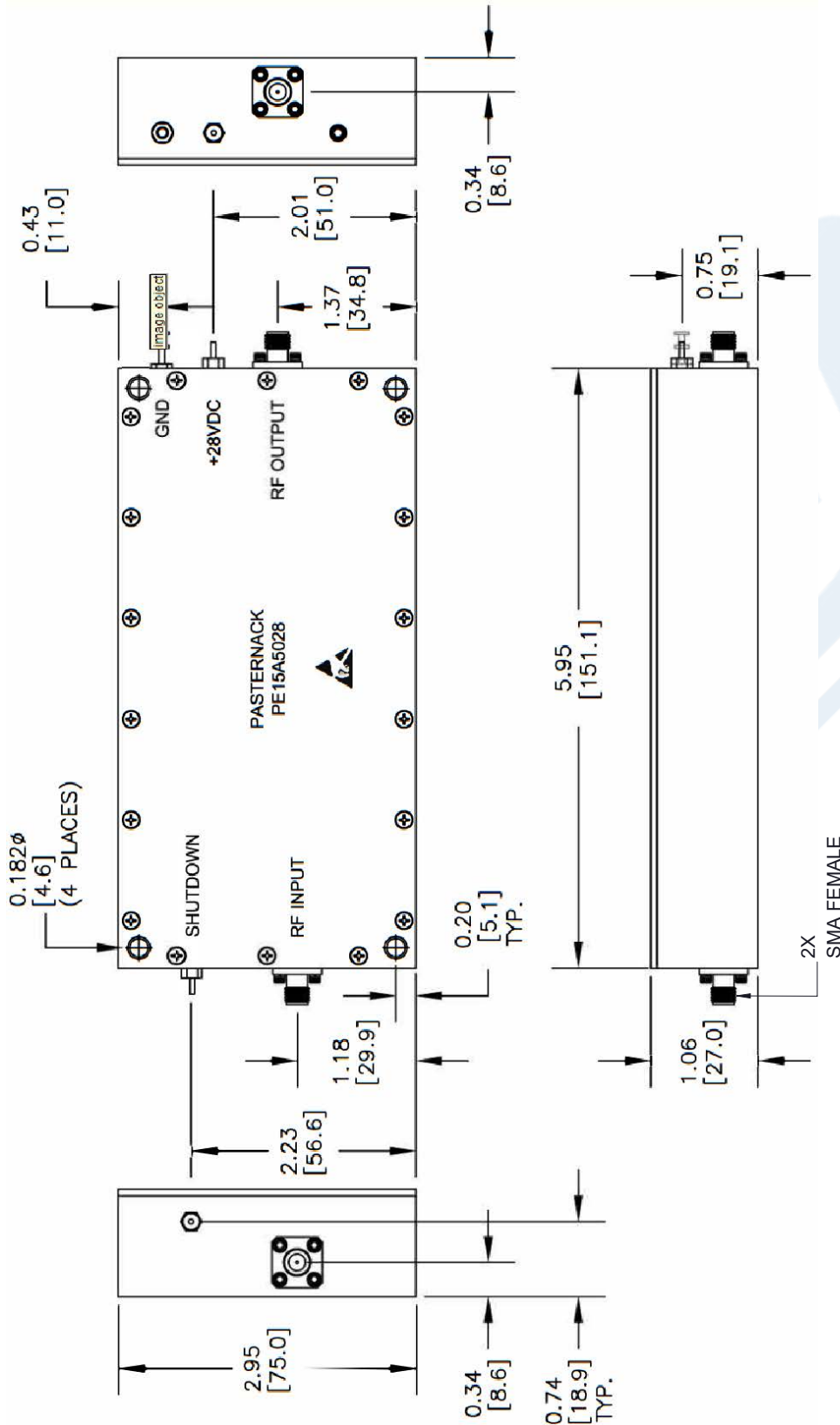
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PE15A5028 CAD Drawing

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NOTES:

- HEAT SINK REQUIRED FOR PROPER OPERATION, UNIT IS COOLED BY CONDUCTING TO HEAT SINK.
- USE A MANUAL TOGGLE SWITCH WITH AN OPEN ON ONE END AND SHORT ON THE OTHER END. ONCE THE PIN IS SHORTED OUT, THE AMPLIFIER WILL SHUT DOWN.
- TTL METHOD: USE A DARLINGTON TRANSISTOR (DARLINGTON PAIR) THAT IS CONNECTED TO A TTL OF YOUR CHOICE WITH AN OPEN AND SHORT PORT. WHEN TTL GOES HIGH (5V), THE UNIT WILL SHUT DOWN.

STANDARD TOLERANCES

.X ± 0.2
.XX ± 0.01
.XXX ± 0.005

*STANDARD TOLERANCES APPLY
ONLY TO DIMENSIONS IN INCHES



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DWG TITLE

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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].

CAGE CODE 53919

CAD FILE 120517

SCALE N/A

SIZE A

7361