RECOMMENDED FOR NEW DESIGNS

ATEK181P3

0.01 to 10 GHz Low Noise Amplifier

Product Description

The ATEK181P3 is a wideband low noise GaAs pHEMT MMIC amplifier that covers 10 MHz to 10 GHz, which can be extended even lower in frequency by increasing external component values. The LNA delivers flat 21dB gain, <0.9dB noise figure below 3 GHz, and a low 1.2dB noise figure >3GHz requiring only a single +5V @ 88mA supply, making it easy to design wideband receiver frontends.

For straightforward integration, the device features internal 50-ohm matching on both the input and output, all while housed in a compact, low-cost 3x3 mm QFN SMD package.

Evaluation Board, bare die, custom package, and module options are available upon request.

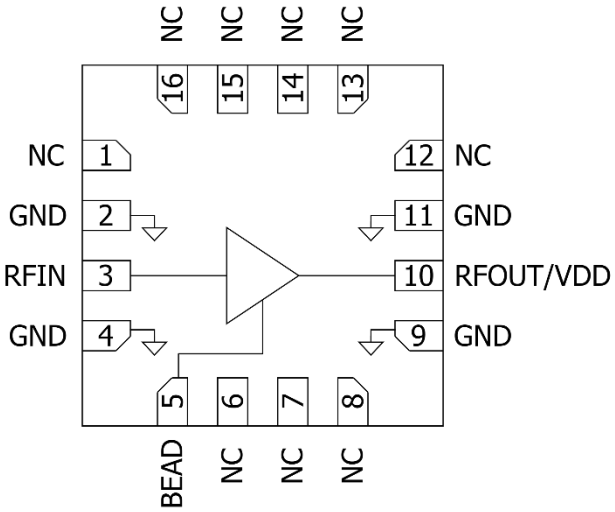
Product Features

- Frequency Range: 0.01 - 10 GHz
- Gain: 21 dB
- Noise Figure: 1.2 dB
- Output P1dB: +20 dBm
- Output IP3: +35dBm
- Single Supply: +5V @ 88mA
- 3x3 mm Compact Size

Applications

- Wideband Receivers, SDRs
- Microwave Radio
- Test and Measurement
- EW / ECM / C-UAS
- Military & Commercial Radar

Functional Block Diagram



Electrical Specifications

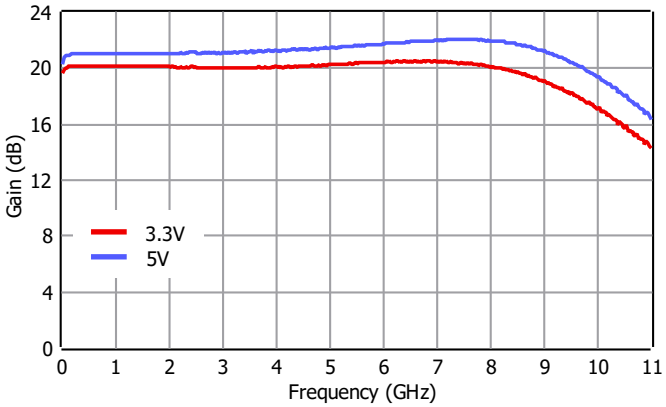
Conditions unless otherwise specified: V_{DD} = 5 V, Typical, T = 25 C, CW.

Parameter		Min	Typ	Max	Units
Operational Frequency Range		LF		10	GHz
Gain	0.01 GHz		20.2		dB
	1 GHz		21		
	3 GHz		21.1		
	6 GHz		21.7		
	10 GHz		19.3		
Noise Figure	0.01 GHz		4.1		dB
	1 GHz		0.85		
	3 GHz		0.85		
	6 GHz		1.4		
	10 GHz		1.75		
Input Return Loss			-12		dB
Output Return Loss			-12		dB
Output IP3			35		dBm
Output P1dB			20		dBm
Psat			21.5		dBm
DC Supply Voltage (Vdd)		3	5		V
DC Supply Current			88		mA
Operating Temperature		-40		85	°C

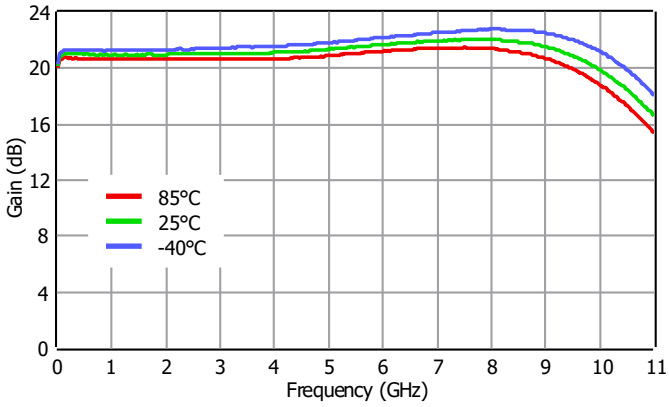
Typical Performance Plots

Conditions unless otherwise specified: V_{DD} = 5 V, Typical, T = 25 C, CW.

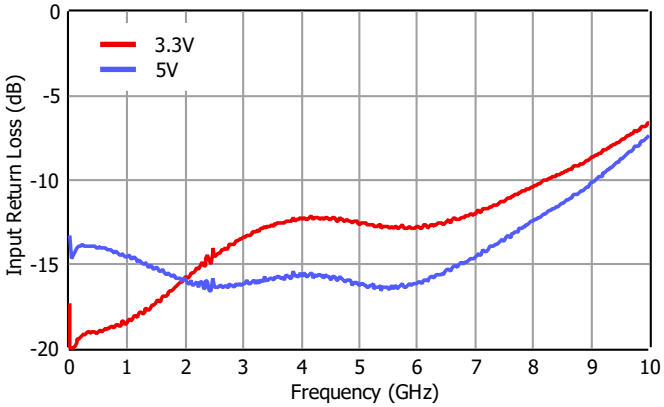
Gain



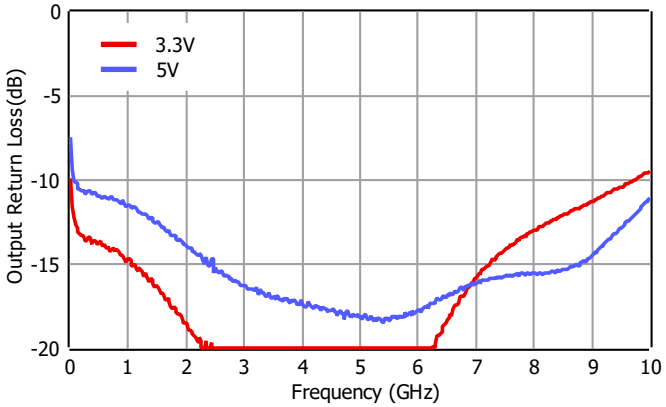
Gain vs Temperature



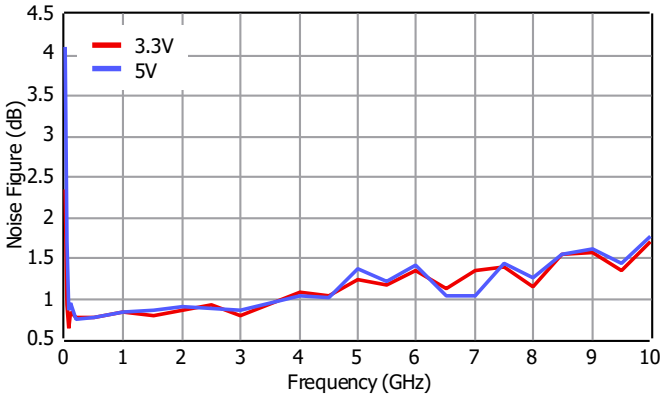
Input Return Loss



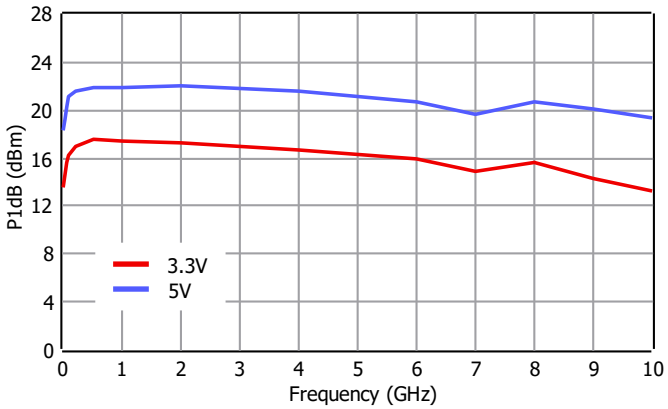
Output Return Loss



Noise Figure



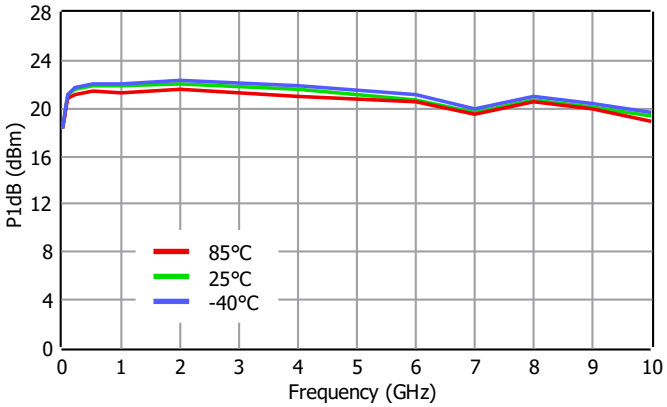
P1dB



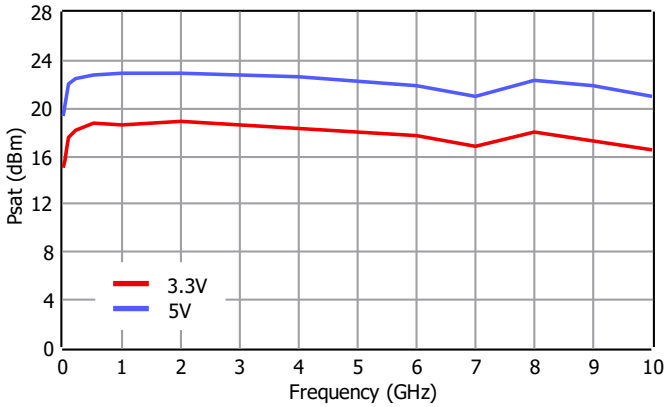
Typical Performance Plots

Conditions unless otherwise specified: V_{DD} = 5 V, Typical, T = 25 C, CW.

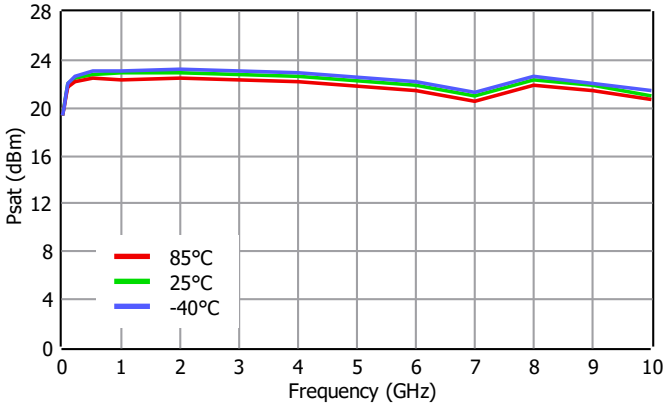
P1dB vs Temperature



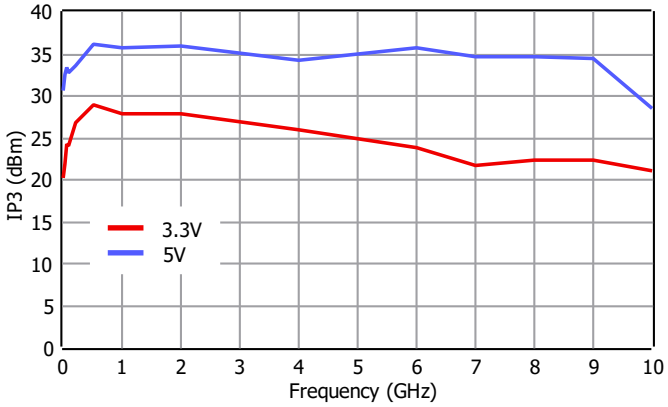
Psat



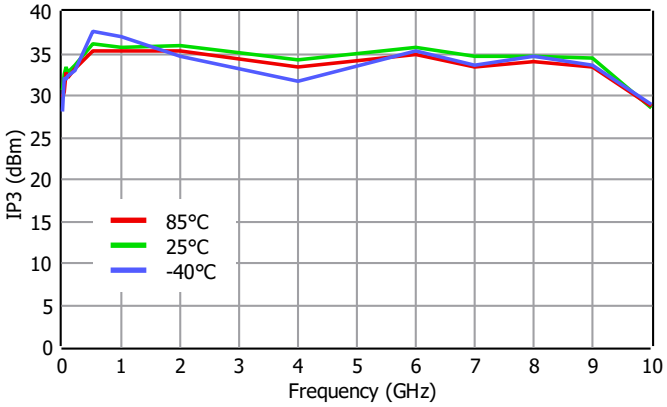
Psat vs Temperature



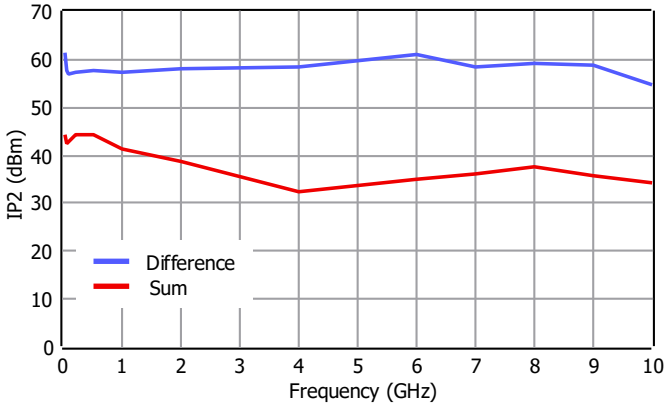
IP3 at Pout = 8 dBm/tone



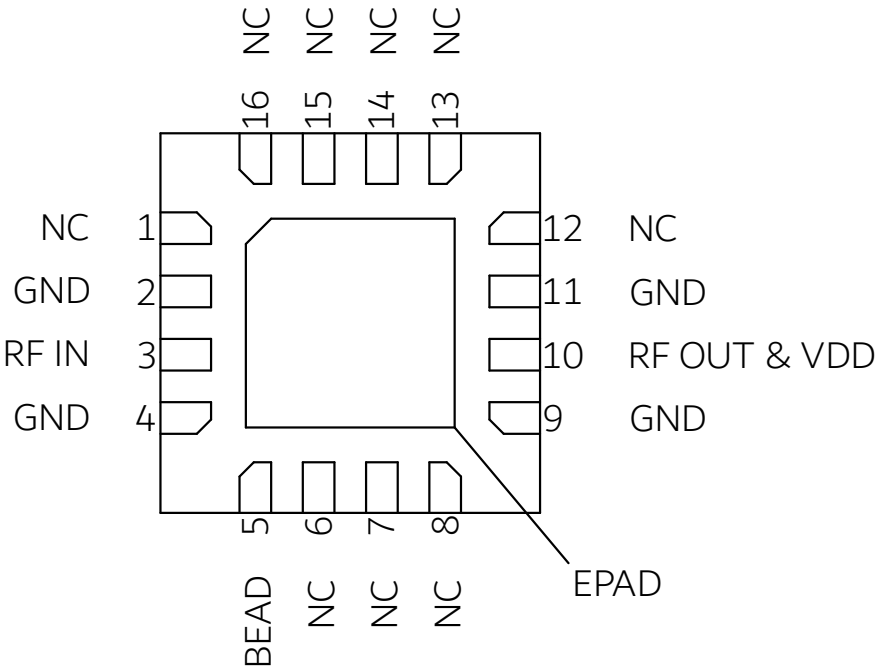
IP3 at Pout = 8 dBm/tone vs Temperature



IP2 at Pout = 8 dBm/tone



Pin Description

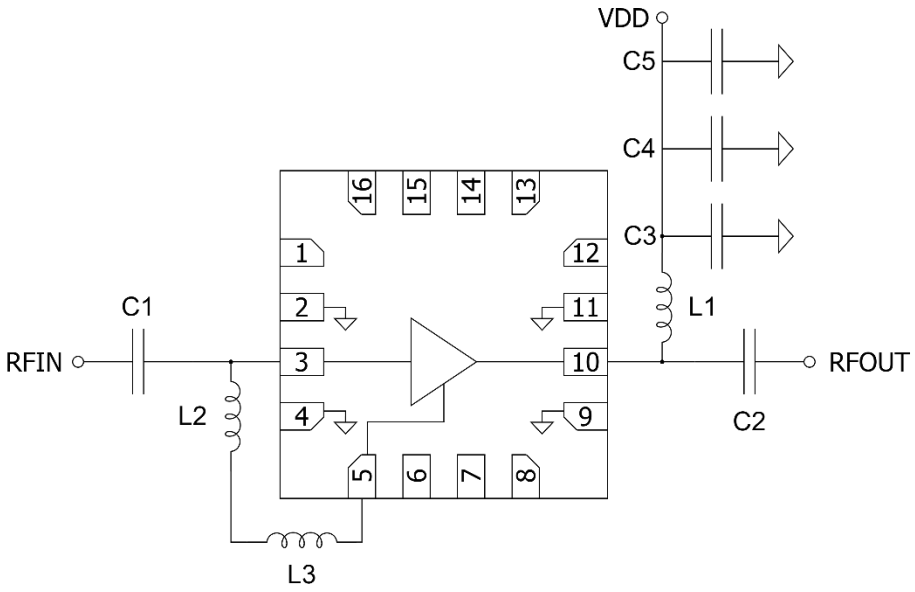


Top View

Pin Number	Pin Name	Description
3	RF IN	RF input pin. Wideband external DC block capacitor is required.
10	RF OUT & Vdd	RF output and Vdd supply pin. Wideband external DC block capacitor and choke inductor are required.
5	BEAD	Connect to RF IN pin with two external ferrite beads.
1, 6-8, 12-16	NC	These pins are not internally connected. Can be grounded on the PCB.
2, 4, 9, 11	GND	Ground.
17	EPAD	Exposed Pad on the bottom of the package should be connected to ground with multiple number of vias to reduce the inductance to the GND.

Applications Information

Signal entering from RF IN goes to RF OUT with an amplification.
Typical application schematic to operate the amplifier is given below.



C1 and C2 are DC block capacitors. It is recommended to use wideband low loss DC block capacitors to achieve the best performance. Using low profile capacitors is also possible, which will result in additional loss.

L1 is used as RF choke inductor. It is recommended to use a wideband RF choke to achieve wideband performance.
To extend the low frequency cutoff of the amplifier from 10 MHz to lower frequencies, high value C1, C2 and L1 external components can be used. This will improve low frequency performance at the expense of flat wideband response, and high frequency response.

Choosing higher values for C1, C2, and L1 will allow amplifier to operate at lower frequencies, compared to the plots that is given in this datasheet. By increasing values of these components, low frequency operation can be extended below 10 MHz, at the expense of flat wideband, and high frequency response.

C3, C4 and C5 are used to filter out the ripples and unwanted signals coming from the Vdd supply. Using additional capacitors in parallel to C3, C4 and C5 will improve this filtering. If this filtering is of no concern, then the amplifier can be operated without C3, C4 and C5.

Small signal data plots are gathered with probe PCB measurements to generate plots shown in this document.

Large signal and noise figure data are generated with connectorized evaluation PCB measurements. Then the PCB trace and connector transition losses are de-embedded, to generate plots shown in this document.

Noise figure data is generated with connectorized evaluation PCB measurements. Then the input loss of the PCB is de-embedded from the noise figure measurement data across frequency, to generate the noise figure data shown in this document.

The NC pins of the Amplifier are connected to the GND on the PCBs used to generate the plots shown in this document.

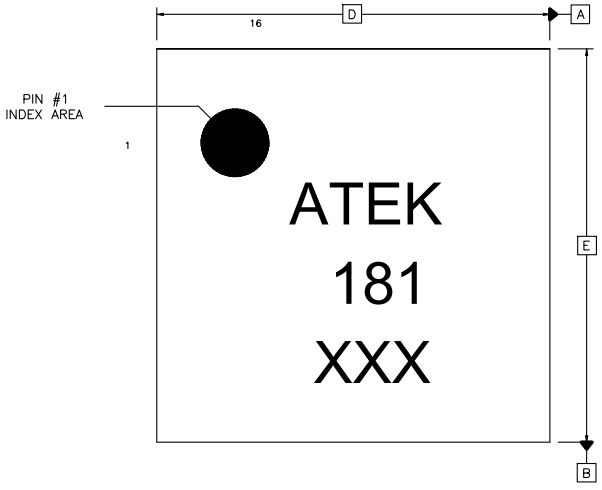
Vdd values shown on the datasheet correspond to the Vdd pins shown on the application schematic, not the output pin of the amplifier. Vdd value can be increased to get higher P1dB performance.

Absolute Maximum Ratings

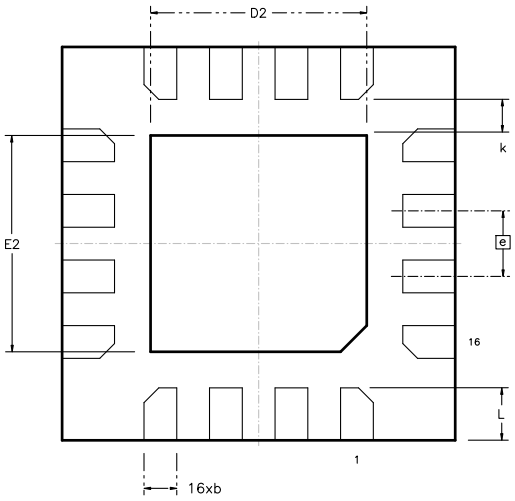
Parameter	Value/Range
Supply Voltage (Vdd)	8V
RF Input Power	+10dBm
Channel Temperature	175°C
Power Dissipation (Ta = 85°C)	0.5W
Thermal Resistance	180
Storage Temperature	−55 to +125°C
Operating Temperature	−40 to +85°C

Operation of this device outside the parameter ranges given above may cause damage. These conditions should not be applied simultaneously.

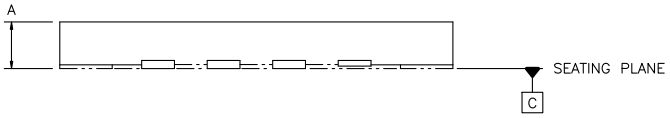
Mechanical and Marking Information



Top View



Bottom View



Side View

NOTES:
1) ALL DIMENSIONS IN MM
2) MARKING XXX INDICATES INTERNAL LOT CODE

SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A, V	0.80	1.00	E2	1.55	1.75
b	0.18	0.30	e	0.50 BSC	
D	3.00 BSC		k	0.20	–
D2	1.55	1.75	L	0.35	0.45
E	3.00 BSC				

Handling Precautions



Caution!
ESD-Sensitive Device
Handle Accordingly

Contact Information

For the latest specifications, additional product information, support, and sales.
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Revisions

Revision No	Revision Date	Revision Reason	Section / Page No
0.1	17.09.2026	Initial Release	
0.2	01.10.2026	Format And Content Fixed	
0.3	14.10.2026	Format And Content Fixed	