**Low Noise, Wideband, Low Current**

**Monolithic Amplifier**

PMA2-123LN5+

50Ω  0.5 to 12 GHz

**The Big Deal**
- Ultra wideband, 0.5 to 12 GHz
- Excellent noise figure, 1.8 dB at 12 GHz
- Low Current, 30mA
- Usable up to 18 GHz

**Product Overview**
The PMA2-123LN5+ is a E-PHEMT based wideband, low noise MMIC amplifier with a unique combination of low noise, high IP3, and low current making it ideal for sensitive, high-dynamic-range receiver applications. This design operates on a single 5V supply, is well matched for 50Ω and comes in a tiny, low profile package (2 x 2 mm, 8 lead MCLP), accommodating dense circuit board layouts.

**Key Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent Noise Figure up to 18 GHz  • 1.8 dB typ. at 12 GHz  • 2.4 dB typ. at 18 GHz</td>
<td>Enables lower system noise figure performance.</td>
</tr>
<tr>
<td>High IP3  • +24 dBm at 0.5 GHz  • +24.1 dBm at 12 GHz</td>
<td>Combination of low noise figure and high IP3 makes this MMIC amplifier ideal for use in low noise receiver front end (RFE) as it gives the user advantages of sensitivity and two-tone IM performance at both ends of the dynamic range.</td>
</tr>
<tr>
<td>Low operating voltage &amp; current 5V &amp; 30mA</td>
<td>Low voltage &amp; current consumption is ideal for use in amplifier chain.</td>
</tr>
<tr>
<td>2 x 2mm 8-lead MCLP package</td>
<td>Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.</td>
</tr>
</tbody>
</table>
Low Noise, Wideband, Low Current
Monolithic Amplifier

0.5-12 GHz

Product Features
• Ultra wideband, 0.5 to 12 GHz
• Excellent Noise figure, 1.8 dB at 12 GHz
• Low current, 30mA
• Usable to 18 GHz

Typical Applications
• WiFi
• WLAN
• UMTS
• LTE
• WiMAX
• S-band Radar
• C-band Satcom

General Description
The PMA2-123LN5+ is a E-PHEMT based wideband, low noise MMIC amplifier with a unique combination of low noise, high IP3, and low current making it ideal for sensitive, high-dynamic-range receiver applications. This design operates on a single 5V supply, is well matched for 50Ω and comes in a tiny, low profile package (2 x 2 mm, 8 lead MCLP), accommodating dense circuit board layouts.

simplified schematic & pad description

<table>
<thead>
<tr>
<th>Function</th>
<th>Pad Number</th>
<th>Description (See Figure 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF-IN</td>
<td>3</td>
<td>Connects to RF input via a blocking capacitor.</td>
</tr>
<tr>
<td>RF-OUT &amp; DC-IN</td>
<td>6</td>
<td>Connects to RF out and VDD via Bias-Tee &amp; 68.1 Ohm resistor</td>
</tr>
<tr>
<td>Ground</td>
<td>Paddle</td>
<td>Connects to ground</td>
</tr>
<tr>
<td>No Connection</td>
<td>2,4,5,7,8</td>
<td>Not used internally. Connected to ground on Test Board.</td>
</tr>
<tr>
<td>Iadj</td>
<td>1</td>
<td>Current adjust pad. This pad connects to ground on test board.</td>
</tr>
</tbody>
</table>
Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit’s applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, “Standard Terms”); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits’ website at www.minicircuits.com/MCLStore/terms.jsp

Absolute Maximum Ratings

1. Measured on Mini-Circuits Characterization Test Board TB-PMA2-123LN5+. See Characterization Test Circuit (Fig. 1)
2. (Current at 85°C - Current at -45°C)/130
3. Permanent damage may occur if any of these limits are exceeded.
4. Measured on Mini-Circuits Test Board, TB-PMA2-123LN5+
Characterization Test Circuit

![Characterization Test Circuit Diagram](image)

Fig 1. Application and Characterization Circuit

Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA2-123LN5+)

Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent’s N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain and Return loss: Pin = -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5dBm/tone at output.

Product Marking

![Product Marking Diagram](image)

Marking may contain other features or characters for internal lot control

www.minicircuits.com  P.O. Box 350166, Brooklyn, NY 11235-0003  (718) 934-4500  sales@minicircuits.com
### Additional Detailed Technical Information

- Performance Data: Data Table, Swept Graphs, S-Parameter (S2P Files) Data Set (.zip file)
- Case Style: MC1631-1 *Plastic package, exposed paddle, lead finish: Matte-Tin*
- Tape & Reel: F66
  - Standard quantities available on reel: 7” reels with 20, 50, 100, 200, 500, 1K or 2K devices
- Suggested Layout for PCB Design: PL-626
- Evaluation Board: TB-PMA2-123LN5+
- Environmental Ratings: ENV08T1

### ESD Rating

Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

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### MSL Test Flow Chart

- **Start**
  - Visual Inspection

- **Reflow 3 cycles, 260°C**

- **Soak 85°C/85RH 168 hours**

- **Bake at 125°C, 24 hours**

- **Visual Inspection**

- **Electrical Test**

- **SAM Analysis**

- **Finish**

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