

Low Noise, Wideband, Low Current

# Monolithic Amplifier

PMA2-183LN+

50Ω 4 to 18 GHz



2mm x 2mm

## The Big Deal

- Ultra wideband, 4 to 18 GHz
- Excellent noise figure, 2.5 dB at 15GHz
- Low Current, 48mA
- Usable up to 20 GHz

## Product Overview

The PMA2-183LN+ is a E-PHEMT based wideband, low noise MMIC amplifier with an 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

Feature	Advantages
Excellent Noise Figure up to 18 GHz <ul style="list-style-type: none"><li>• 2.7 dB typ. at 4 GHz</li><li>• 2.5 dB typ. at 18 GHz</li></ul>	Enables lower system noise figure performance.
High IP3 <ul style="list-style-type: none"><li>• +31 dBm at 4 GHz</li><li>• +29.2 dBm at 20 GHz</li></ul>	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.
Low operating voltage & current 5V & 48mA	Low voltage & current consumption is ideal for use in amplifier chain.
2 x 2mm 8-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.



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Generic photo used for illustration purposes only

CASE STYLE: MC1631-1

## +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

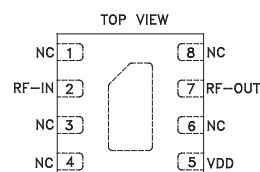
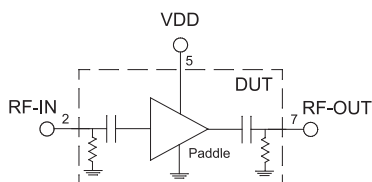
## Typical Applications

- WiFi
- WLAN
- LTE
- WiMAX
- C-band Satcom

## General Description

The PMA2-183LN+ is a E-PHEMT based wideband, low noise MMIC amplifier with an 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



Function	Pad Number	Description (See Figure 1)
RF-IN	2	Connects to RF input
RF-OUT	7	Connects to RF output
Ground	Paddle	Connects to ground
No Connection	1,3,4,6,8	Not used internally. Connected to ground on Test Board.
V <sub>DD</sub>	5	Connects to voltage supply



Electrical Specifications<sup>1</sup> at 25°C, unless noted

Parameter	Condition (GHz)	V <sub>DD</sub> =5.0			Units
		Min.	Typ.	Max.	
Frequency Range		4		18	GHz
Gain	4	11.9	13.2	14.5	dB
	10	10.6	11.8	13.0	
	12	9.4	10.4	11.5	
	15	9.8	10.9	12.0	
	18	9.1	10.2	11.2	
	20	--	9.3	--	
Input Return Loss	4		10		dB
	10		11		
	12		11		
	15		15		
	18		12		
	20		11		
Output Return Loss	4		12		dB
	10		15		
	12		15		
	15		20		
	18		13		
	20		11		
Output Power at 1dB Compression	4		16		dBm
	10		14.4		
	12		14.2		
	15		15.8		
	18		14.6		
	20		12.8		
Output IP3	4		31		dBm
	10		26.3		
	12		25.6		
	15		28.1		
	18		27.7		
	20		29.2		
Noise Figure	4		2.7		
	10		2.5		
	12		2.5		
	15		2.5		
	18		2.5		
	20		2.9		
Device Operating Voltage (V <sub>DD</sub> )		4.75	5	5.25	V
Device Operating Current (I <sub>DD</sub> )		—	48.2	58	mA
Device Current Variation vs. Temperature <sup>2</sup>			2.31		μA/°C
Device Current Variation vs. Voltage			0.01		mA/mV
Thermal Resistance, junction-to-ground lead			71.9		°C/W

1. Measured on Mini-Circuits Characterization Test Board TB-PMA2-183LN+. See Characterization Test Circuit (Fig. 1)

2. Device Current Variation vs. Temperature= (Current at 85°C - Current at -45°C)/130

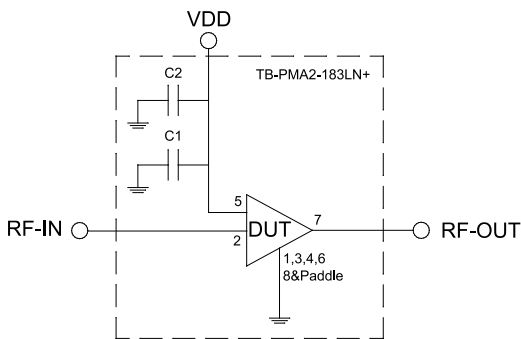
3. Device Current Variation vs. Voltage = (Current at 5.25V - Current at 4.75V) / ((5.25V-4.75V)\*1000 mV/V)

Absolute Maximum Ratings<sup>4</sup>

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Junction Temperature	141°C
Total Power Dissipation	0.95W
Input Power (CW), V <sub>d</sub> =5V	+24 dBm (5 minutes max.) +12 dBm (continuous)
DC Voltage at Pad 5	7V

4. Permanent damage may occur if any of these limits are exceeded.  
Electrical maximum ratings are not intended for continuous normal operation.

Characterization Test Circuit



Component	Size	Value	Part Number	Manufacturer
C1	0402	100pF	GRM1555C1H101JA01J	Murata
C2	0402	0.1uF	GRM155R71C104KA88D	Murata

Fig 1. Application and Characterization Circuit  
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA2-183LN+) 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, 0dBm/tone at output.

Product Marking



Marking may contain other features or characters for internal lot control

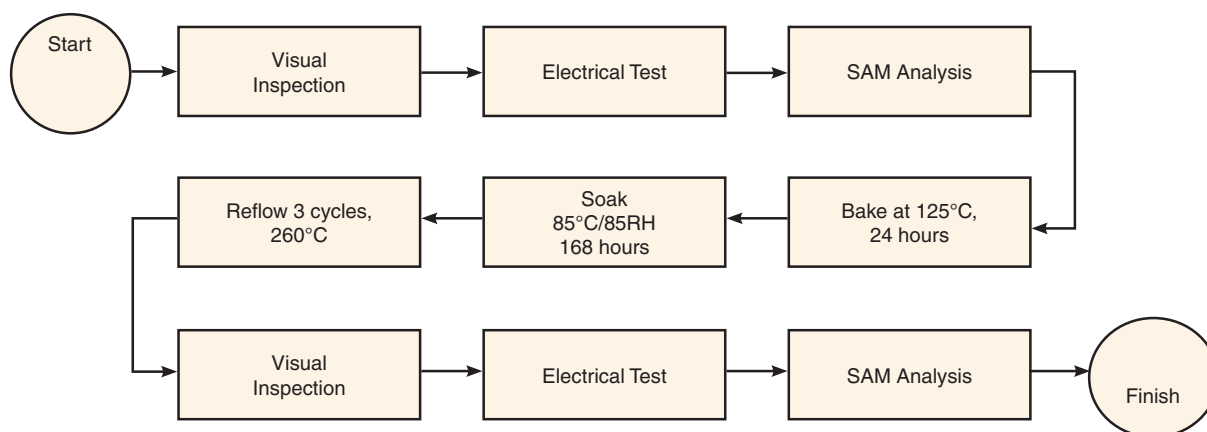
**Additional Detailed Technical Information**

additional information is available on our dash board. To access this information [click here](#)

<b>Performance Data</b>	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
<b>Case Style</b>	MC1631-1 Plastic package, exposed paddle, lead finish: Matte-Tin
<b>Tape &amp; Reel</b> Standard quantities available on reel	F66 7" reels with 20, 50, 100, 200, 500, 1K or 2K devices
<b>Suggested Layout for PCB Design</b>	PL-636
<b>Evaluation Board</b>	TB-PMA2-183LN+
<b>Environmental Ratings</b>	ENV08T1

**ESD Rating**

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

**MSL Test Flow Chart****Additional Notes**

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)



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