



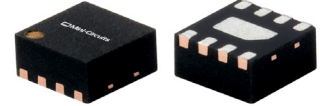
LOW NOISE, WIDEBAND, LOW CURRENT

Monolithic Amplifier **PMA2-183LN+**

50Ω 4 to 18 GHz

THE BIG DEAL

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



Generic photo used for illustration purposes only

CASE STYLE: MC1631-1

+RoHS Compliant

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

APPLICATIONS

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

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"> • 2.7 dB typ. at 4 GHz • 2.5 dB typ. at 18 GHz | Enables lower system noise figure performance. |
| High IP3 <ul style="list-style-type: none"> • +31 dBm at 4 GHz • +29.2 dBm at 20 GHz | 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 & 48 mA | 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. |

*Enhancement mode Pseudomorphic High Electron Mobility Transistor





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ELECTRICAL SPECIFICATIONS¹ AT +25°C, UNLESS NOTED OTHERWISE

| Parameter | Condition (GHz) | V _{DD} = +5V | | | 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 | | dB |
| | 10 | | 2.5 | | |
| | 12 | | 2.5 | | |
| | 15 | | 2.5 | | |
| | 18 | | 2.5 | | |
| | 20 | | 2.9 | | |
| Device Operating Voltage (V _{DD}) | | +4.75 | 5 | +5.25 | V |
| Device Operating Current (I _{DD}) | | — | 48.2 | 58 | mA |
| Device Current Variation vs. Temperature ² | | | 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 mW/V)

ABSOLUTE MAXIMUM RATINGS⁴

| 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 | 0.95 W |
| Input Power (CW), V _d =5V | +24 dBm (5 minutes max.) +12 dBm (continuous) |
| DC Voltage at Pad 5 | +7 V |

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



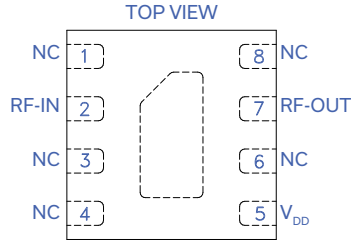
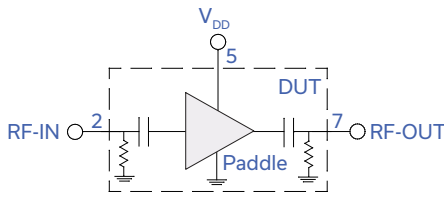


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SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



| 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 _{DD} | 5 | Connects to voltage supply |

CHARACTERIZATION TEST CIRCUIT

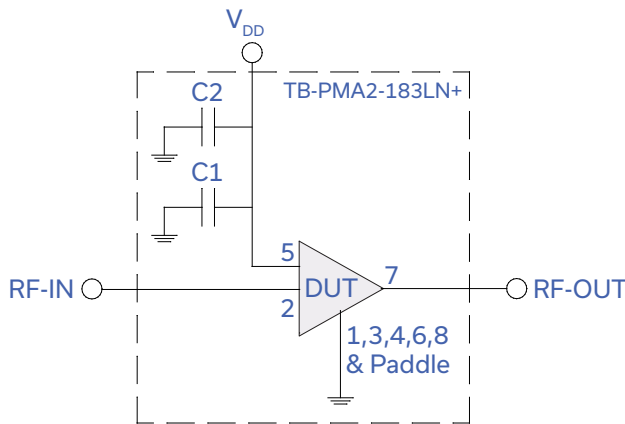


Fig 1. Application and Characterization Circuit

Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA2-183LN+)

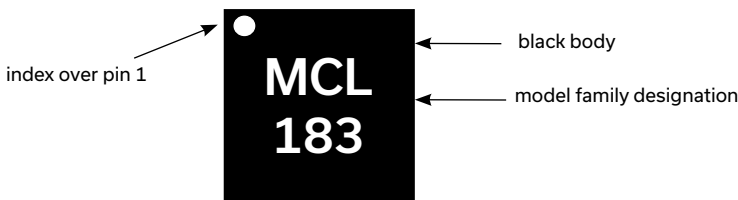
Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain and Return loss: Pin= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0dBm/tone at output.

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

PRODUCT MARKING



Marking may contain other features or characters for internal lot control





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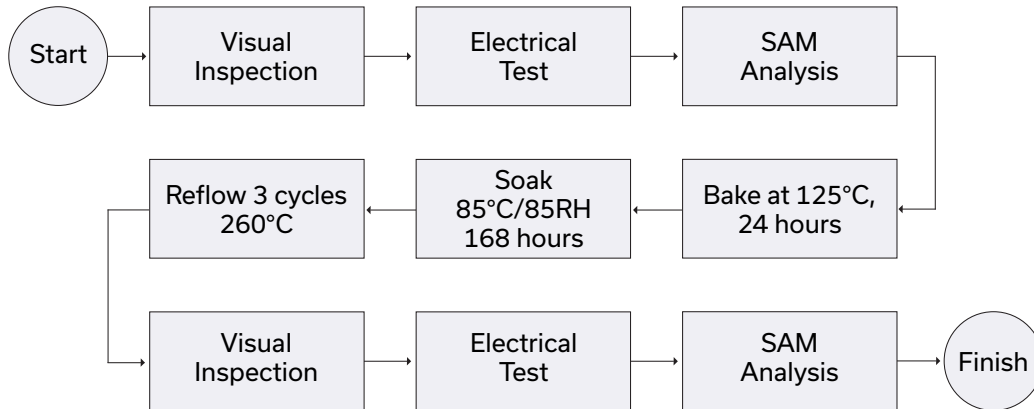
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

| | |
|---------------------------------------|--|
| 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, 2K or 3K devices |
| Suggested Layout for PCB Design | PL-636 |
| Evaluation Board | TB-PMA2-183LN+ |
| Environmental Ratings | 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





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



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