

Wideband, Positive Gain Slope

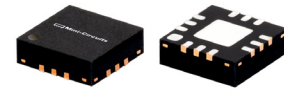
# Monolithic Amplifier

AVA-183P+

50Ω 0.5 to 18 GHz,

## The Big Deal

- Ultra-wideband, 0.5 to 18 GHz
- Positive gain slope
- Single positive supply voltage



CASE STYLE: DQ1225

## Product Overview

The AVA-183P+ is a InGaAs E-PHEMT based wideband, positive gain slope MMIC amplifier applications. This design operates on a single 5V supply, is well matched for 50Ω and comes in a tiny, low profile package (3 x 3 x 0.89mm), accommodating dense circuit board layouts.

## Key Features

Feature	Advantages
Positive Gain Slope vs. Frequency +0.13 dB/GHz (0.5-10 GHz) +0.25 dB/GHz (10-18 GHz)	Useful for compensating negative gain slope of most wideband microwave components and eliminating the need for equalization
Positive Supply Voltage	Simplifies external circuit by eliminating need for negative voltage and sequencing
3 x 3mm, 12-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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0.5-18 GHz

## Product Features

- Wideband, 0.5 to 18 GHz
- Positive Gain Slope
- Single Positive Supply Voltage



Generic photo used for illustration purposes only

## AVA-183P+

CASE STYLE: DQ1225

## Typical Applications

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

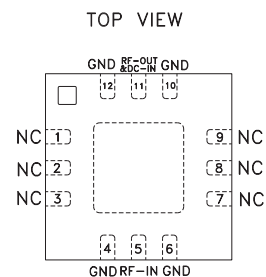
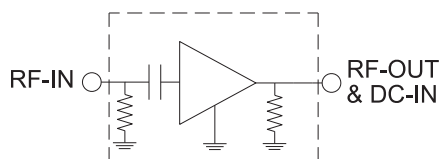
**+RoHS Compliant**

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

## General Description

The AVA-183P+ is a InGaAs E-PHEMT based wideband, positive gain slope MMIC amplifier applications. This design operates on a single 5V supply, is well matched for 50Ω and comes in a tiny, low profile package (3 x 3 x 0.89mm), accommodating dense circuit board layouts.

*simplified schematic & pad description*



Function	Pad Number	Description (See Figure 1)
RF-IN	5	Connects to RF input via external DC blocking capacitor
RF-OUT & DC-IN	11	Connects to RF output & $V_{DD}$ via external bias-tee
Ground	4,6,10,12 & Paddle	Connects to ground
No Connection	1-3, 7-9	Not used internally. Connected to ground on test board



**Electrical Specifications<sup>1</sup> at 25°C and 5V, unless noted**

Parameter	Condition (GHz)	Min.	Typ.	Max.	Unit
Frequency Range		0.5		18	GHz
Gain	0.5	6.1	6.8	7.5	dB
	5	—	7.5	—	
	10	7.3	8.1	8.9	
	15	—	9.8	—	
	18	9.2	10.8	11.9	
Gain Slope	0.5 - 10	—	0.13	—	dB/GHz
	10 - 18	—	0.25	—	
Input Return Loss	0.5		15		dB
	5		13		
	10		10		
	15		23		
	18		14		
Output Return Loss	0.5		11		dB
	5		8		
	10		7		
	15		9		
	18		19		
Output Power at 1dB Compression	0.5		10.9		dB
	5		10.6		
	10		11.7		
	15		12.3		
	18		11.6		
OIP3	0.5		22.8		dBm
	5		21.4		
	10		21.5		
	15		20.6		
	18		19.1		
Noise Figure	0.5		7.5		dBm
	5		5.3		
	10		4.8		
	15		4.6		
	18		5.0		
Device Operating Voltage(VDD)		4.75	5	5.25	V
Device Operating Current (IDD)		—	46.3	54	mA
Device Current Variation vs. Temperature <sup>2</sup>			-168.13		μA/°C
Device Current Variation vs. Voltage <sup>3</sup>			0.0085		mA/mV

1. Measured on Mini-Circuits Characterization test board TB-AVA-183P+. See Characterization Test Circuit (Fig. 1)

2. Current variation vs temperature=(Current at 100°C-Current at -55°C)/155°C

3. Current variation vs Voltage=(Current at 5.25V - Current at 4.75V)/(5.25V-4.75V)

**Absolute Maximum Ratings<sup>4</sup>**

Parameter	Ratings
Operating Temperature (ground lead)	-55°C to 100°C
Storage Temperature	-65°C to 150°C
Junction Temperature	161°C
Total Power Dissipation	0.46W <sup>6</sup>
Input Power (CW), Vd=5V <sup>5</sup>	+22 dBm (5 minutes max.) +13 dBm (continuous)

4. Permanent damage may occur if any of these limits are exceeded.

Electrical maximum ratings are not intended for continuous normal operation.

5. Measured on Mini-Circuits test board, TB-AVA-183P+

6. Derates linearly to 0.24W at 100°C



Recommended Characterization Test Circuit

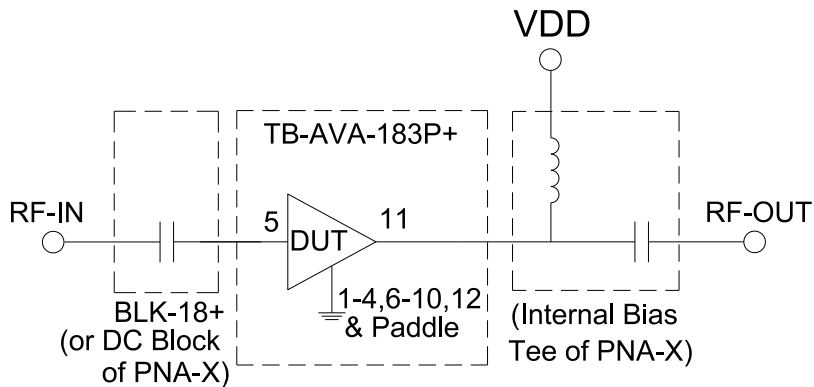


Fig 1. Characterization Test Circuit

Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-AVA-183P+) 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, -3 dBm/tone at output.

Product Marking



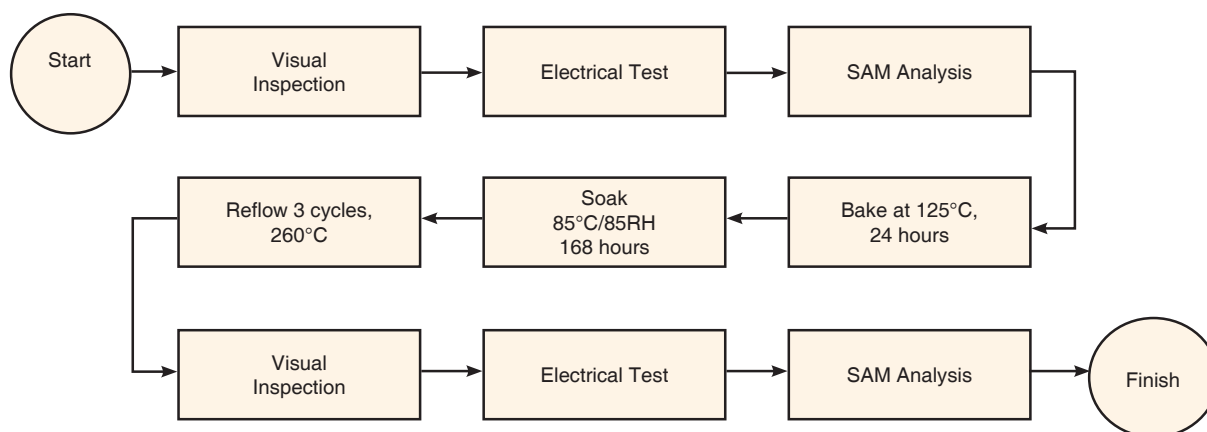
Marking may contain other features or characters for internal lot control

Additional Detailed Technical Information	
<i>additional information is available on our dash board. To access this information <a href="#">click here</a></i>	
<b>Performance Data</b>	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
<b>Case Style</b>	DQ1225 <i>Plastic package, exposed paddle, lead finish: Matte-Tin</i>
<b>Tape &amp; Reel</b> Standard quantities available on reel	F66 <i>7" reels with 20, 50, 100, 200, 500, 1K or 2K devices</i>
<b>Suggested Layout for PCB Design</b>	PL-666
<b>Evaluation Board</b>	TB-AVA-183P+, TB-AVA-183PC+
<b>Environmental Ratings</b>	ENV08T9

### 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

- 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](http://www.minicircuits.com/MCLStore/terms.jsp)