



Monolithic Amplifier

THE BIG DEAL

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



Generic photo used for illustration purposes only

CASE STYLE: DQ1225

+RoHS Compliant

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

APPLICATIONS

- Wi-Fi
- WLAN
- LTE
- WiMAX
- C-band Satcom

PRODUCT OVERVIEW

The AVA-183P+ is a InGaAs E-PHEMT* based wideband, positive gain slope MMIC amplifier. 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.

*Enhancement mode Pseudomorphic High Electron Mobility Transistor



WIDEBAND, POSITIVE GAIN SLOPE

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AVA-183P+

ELECTRICAL SPECIFICATIONS¹ AT 25°C AND +5V, UNLESS NOTED OTHERWISE

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		dBm
	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		dB
	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 ²			-168.13		µA/°C
Device Current Variation vs. Voltage ³			0.0085		mA/mV
Thermal Resistance, Junction to Ground			292.5		°C/W

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)

MAXIMUM RATINGS⁴

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 ⁶
Input Power (CW), Vd=5V ⁵	+22 dBm (5 minutes max.) +13 dBm (continuous)
DC Voltage	6V

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

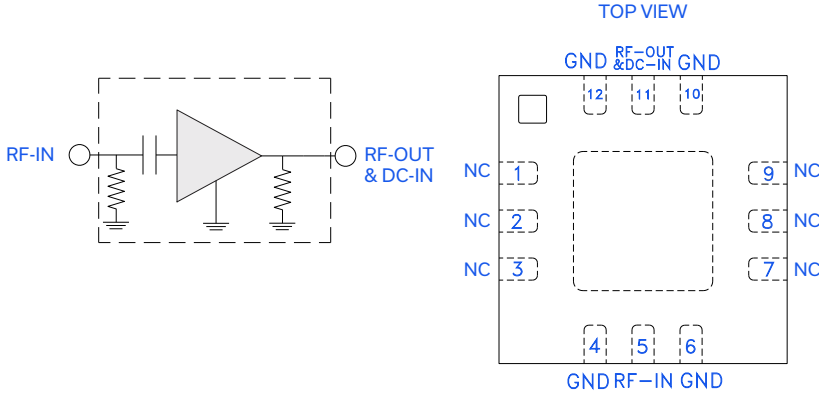
5. Measured on Mini-Circuits test board, TB-AVA-183P+

6. Derates linearly to 0.24W at 100°C





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

RECOMMENDED CHARACTERIZATION TEST CIRCUIT

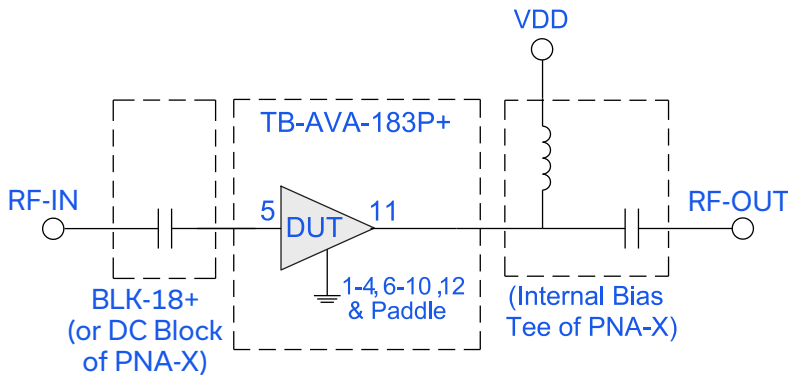


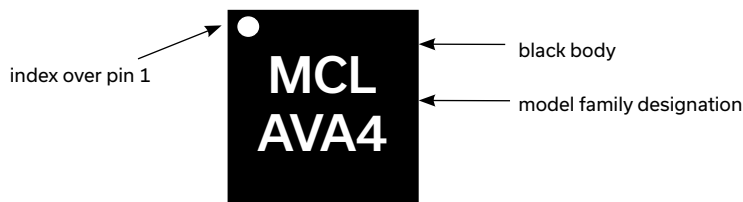
Fig 1. Characterization Test Circuit

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: $P_{in} = -25dBm$
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



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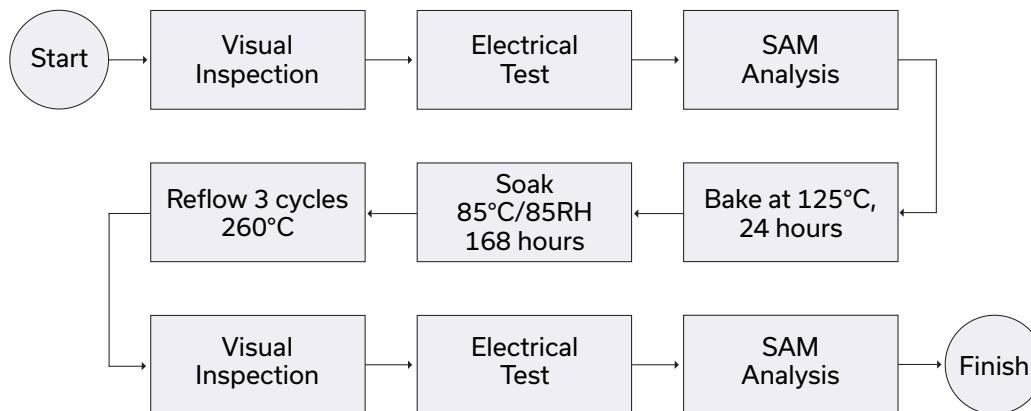
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DQ1225 Plastic package, exposed paddle, lead finish: Matte-Tin
Tape & Reel Standard quantities available on reel	F66 7" reels with 20, 50, 100, 200, 500, 1K, or 2K devices.
Suggested Layout for PCB Design	PL-666
Evaluation Board	TB-AVA-183P+ (no connectors), TB-AVA-183PC+ (with connectors)
Environmental Ratings	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



- 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/terms/viewterm.html

