High Gain, Low Current

Monolithic Amplifier

PSA-8A+

50Ω DC to 4 GHz

CASE STYLE: CA1389

The Big Deal

- Wideband, DC to 4 GHz
- High Gain, 31 dB typ. at 0.1GHz
- Low NF 3.0 dB typ. at 0.1GHz
- Low Current, 36mA typ.

Product Overview

The PSA-8A+ is a HBT based wideband low noise MMIC Amplifier with high gain and low current. This design operates on a single 5V supply, is well matched for 50 Ohms and comes in a SOT-363 package, accommodating dense circuit board layouts.

Key Features

Feature	Advantages
High Gain, 31 dB typ. at 0.1GHz	Enables signal amplification without the need for multiple gain stages.
Low Noise, 3.0 dB typ. at 0.1GHz	Enables lower system noise figure performance. Low NF and High Gain results in lower NF systems
SOT-363 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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- Low Current, 36 mA typ.
- Protected by US Patent 6,943,629

Generic photo used for illustration purposes only

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+RoHS Compliant

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

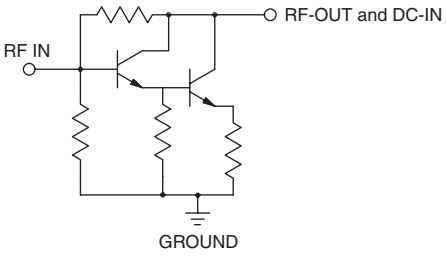
Typical Applications

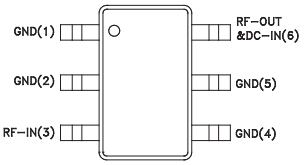
- Cellular
- PCS
- Communication receivers & Transmitters
- Satellite communication
- Military

General Description

The PSA-8A+ is a HBT based wideband low noise MMIC Amplifier with high gain and low current. This design operates on a single 5V supply, is well matched for 50 Ohms and comes in a SOT-363 package, accommodating dense circuit board layouts.

Simplified schematic and Pad description





Function	Pin Number	Description *(See Application Circuit, Fig. 1)*
RF-IN	3	RF input pin (connect to RF-IN via C1)
RF-OUT & DC-IN	6	RF output pin (connected to RF-OUT via blocking cap C2 and supply voltage VDD via RF Choke (CHK) & Resistor R1)
GND	1,2,4,5	Connections to ground

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.
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Electrical Specifications[1] at 25°C, Zo=50Ω

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range[4]		DC		4.0	GHz
Gain	0.01	26.7	30.8	36.2	dB
	0.1	26.9	31	36.4	
	1.0	22.1	25.4	29.9	
	2.0	17.5	20.1	23.6	
	3.0	—	15.6	—	
	4.0	—	11.2	—	
Input Return Loss	0.01		11		dB
	0.1		12		
	1.0		18		
	2.0		18		
	3.0		12		
	4.0		8		
Output Return Loss	0.01		20		dB
	0.1		19		
	1.0		7		
	2.0		9		
	3.0		16		
	4.0		9		
P1dB	0.01		12.1		dBm
	0.1		12.8		
	1.0		11.9		
	2.0		9.6		
	3.0		6.5		
	4.0		3.1		
OIP3 (Pout = -5dBm/Tone)	0.01		26.1		dBm
	0.1		25.8		
	1.0		23.2		
	2.0		20		
	3.0		16.2		
	4.0		11.3		
Noise Figure	0.01		3.1		dB
	0.1		3		
	1.0		3.7		
	2.0		4		
	3.0		4.4		
	4.0		4.8		
Supply Voltage (Vs)	DC	4.75	5	5.25	V
Device Operating Current (Is)	DC		36	39	mA
Device Current Variation vs. Voltage[2]			0.024		mA/mV
Device Current Variation vs. Temperature[3]			7.7		µA/°C
Thermal Resistance, Junction to ground lead			140		°C/W

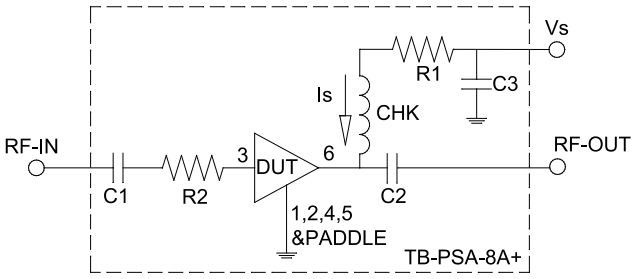
1. Measured on Mini-Circuits Characterization Test Board TB-PSA-8A+. See Characterization Test Circuit (Fig. 1)
2. Device Current Variation vs. Voltage = (Current at 5.25V - Current at 4.75V)/(5.25V-4.75V)*1000)
3. Device Current Variation vs. Temperature = (Current at 85°C - Current at -45°C)/130
4. Guaranteed specifications DC to 4 GHz. Low frequency cut-off determined by external coupling capacitor.

Absolute Maximum Ratings[5]

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Input Power (CW)	13 dBm
Operating Current on Pin 6	65mA

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

Characterization Test / Application Circuit

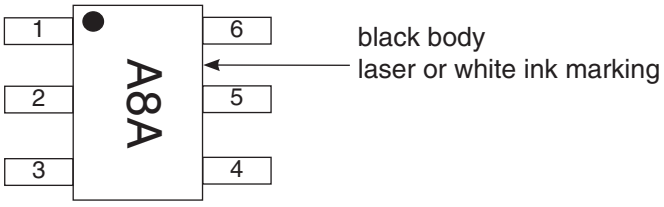


Component	Size	Value	Part Number	Manufacturer
DUT	SOT-363	--	PSA-8A+	MCL
C1,C2	0402	2400pF	GRM155R71H242JA01D	Murata
C3	0603	0.1uF	GCJ188R71H104KA12D	Murata
R1	0805	36.5Ohms	RK73H2ATTD36R5F	KOA
CHK	0.15x0.15	--	TCCH-80+	MCL
R2	402	10Ohms	RK73H1ETTP10R0F	KOA

Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization Test Board TB-PSA-8A+) 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: Pin= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5 dBm/tone at output.

Product Marking



Marking may contain other features or characters for internal lot control

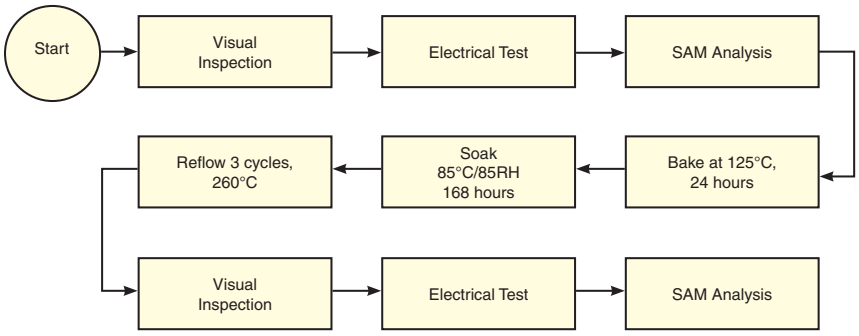
Additional Detailed Technical Information *additional information is available on our dash board. To access this information click here*	
Performance Data	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	CA1389 *Plastic molded SOT-363 package, lead finishi: Matte-Tin*
Tape & Reel **Standard quantities available on reel**	F101 *7" reels with 20, 50, 100, 200, 500,1K, 2K devices.*
Suggested Layout for PCB Design	PL-643
Evaluation Board	TB-PSA-8A+
Environmental Ratings	ENV08T2

ESD Rating

Human Body Model (HBM): Class 1B (500 v to < 1,000 v) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M1 (< 100 v) in accordance with ANSI/ESD STM 5.2 - 1999

MSL Test Flow Chart



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