



AH102

Medium Power, High Linearity Amplifier

The Communications Edge™

Product Information

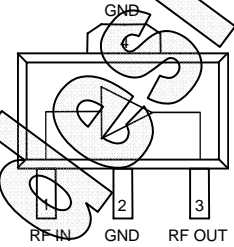
Product Features

- 350 – 3000 MHz
- +46 dBm Output IP3
- 14 dB Gain
- +27 dBm P1dB
- MTTF > 10⁷ Hours
- Internally Matched
- Single Supply Voltage (+9V)

Product Description

The AH102 is a medium power gain block that offers excellent dynamic range in a low-cost surface mount package. The combination of a single supply voltage and an internally matched device makes it ideal for both narrow and broadband applications. Superior thermal design allows the product to achieve +46 dBm IP3 performance at a mounting temperature of +85°C with an associated MTTF of greater than 10⁷ hours and is available in the industry-standard SOT-89 package.

Functional Diagram



Function	Pin No.
Input	1
Ground	2
Output / Bias	3
Ground	4

Applications

- Mobile Infrastructure
- W-LAN / ISM / WLL / RFID
- Defense / Homeland Security
- Fixed Wireless

Specifications

Parameter	Units	Min	Typ	Max
Frequency Range	MHz	350	800	3000
S21 - Gain	dB	12.5	13.9	
S11 - Input Return Loss	dB		-15	
S22 - Output Return Loss	dB		-15	
Output IP3 (800 MHz)	dBm	+43	+46	
Output IP3 (1900 MHz)	dBm	+42	+45	
Output P1dB	dBm		+27	
Noise Figure	dB		3.1	
Operating Current Range	mA	170	200	250
Supply Voltage	V		+9	
Thermal Resistance	°C/W			25
Junction Temperature ⁽³⁾	°C			160

Typical Performance

Parameter	Units	Typical
Frequency	MHz	900
S21	dB	13.5
S11	dB	-13.4
S22	dB	-16.5
Output IP3	dBm	+46.2
Noise Figure	dB	3.1

Parameters reflect performance in an AH102 application circuit.

Test conditions unless otherwise noted.

1. T = 25°C, Vdd = +9.0 V in a tuned application circuit.
2. OIP3 is measured with two tones at an output power of +3 dBm/tones separated by 10 MHz. The suppression on the largest IM3 product is used to calculate the OIP3 using a 3:1 rule.
3. The junction temperature ensures a minimum MTTF rating of 4 million hours of usage.

Absolute Maximum Rating

Parameter	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-55 to +125 °C
DC Voltage	+9 V
RF Input Power (continuous)	+17 dBm
Junction Temperature	220 °C

Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

Part No.	Description
AH102	Med. Power High Linearity Amplifier

Specifications and information are subject to change without notice



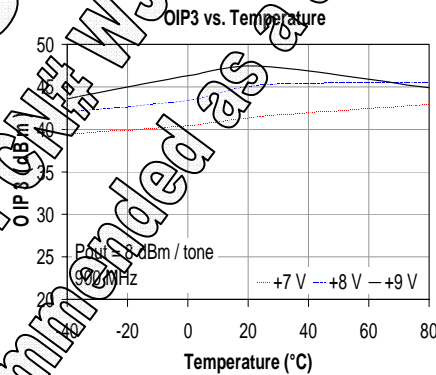
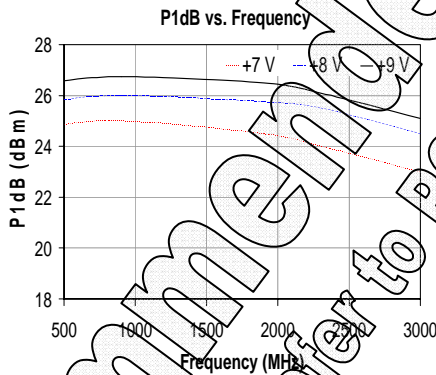
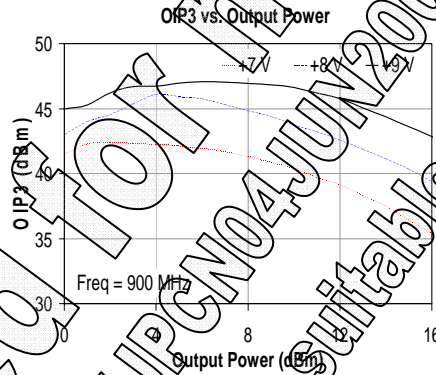
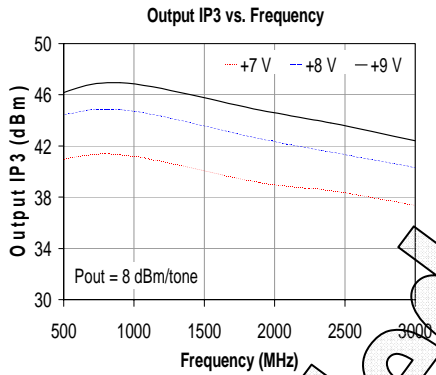
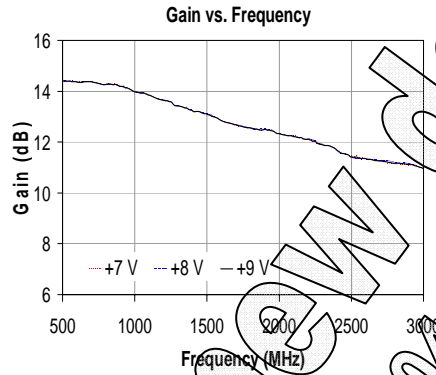
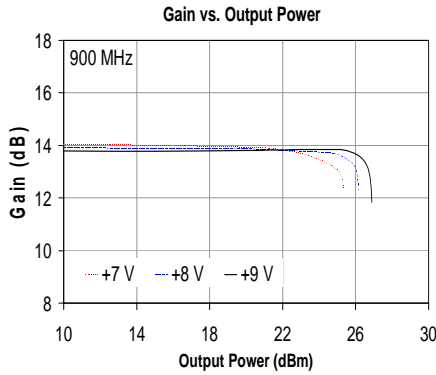
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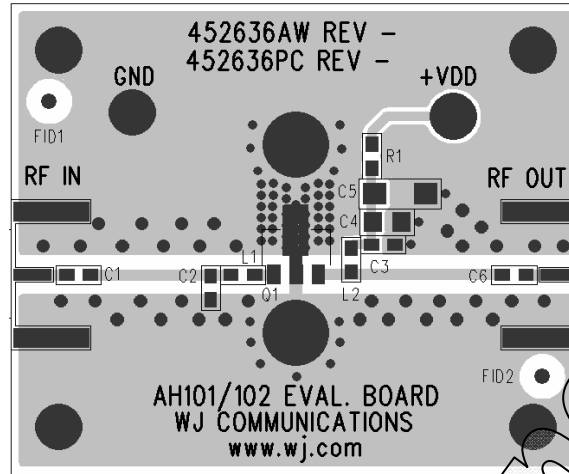
Performance Charts (Vds= +9.0 V, Ids = 200 mA, unmatched device in a 50 ohm system)



Not recommended for new designs. Please refer to PWT WUPCNO4JUN2004. The AH102A is recommended as a suitable replacement.



Application Circuit PC Board Layout

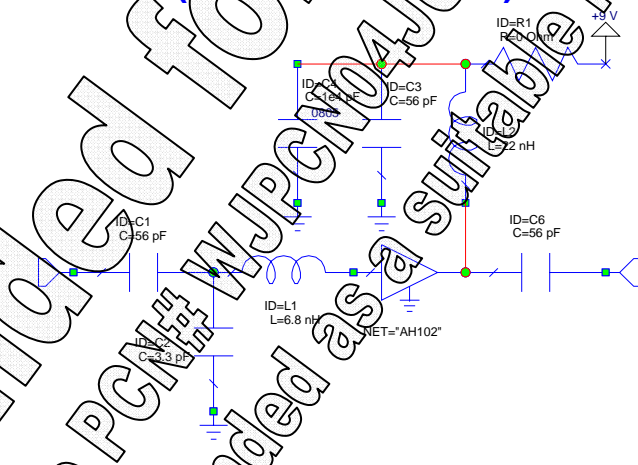


Circuit Board Material: .014" Getek ($\epsilon_r=4.2$), four layer, 1 oz copper
Microstrip line details: width = .026", spacing = .026"

Application Circuit: 900 MHz (AH102-PCB CELL)

Typical RF Performance at 25°C

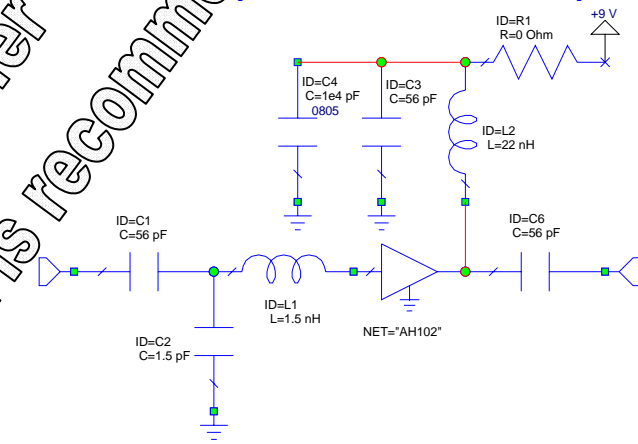
Frequency	900 MHz
S21 - Gain	13.9 dBm
S11	-17.4 dB
S22	-16.5 dB
Output IP3	+46.2 dBm
Noise Figure	3.1 dB
Supply Voltage	+9 V
Supply Current	200 mA



Application Circuit: 1900/2140 MHz (AH102-PCB PCS/U)

Typical RF Performance at 25°C

Frequency	1900 MHz
S21 - Gain	13.5 dBm
S11	-15.2 dB
S22	-15.0 dB
Output IP3	+45 dBm
Noise Figure	3.8 dB
Supply Voltage	+9 V
Supply Current	200 mA



Notes:

1. The amplifier should be connected directly to a +9 V regulator; no dropping resistor is required.
 2. If no DC signal is present at the input (pin 1), C1 can be removed. The gate (input pin) is internally grounded in the amplifier.
 3. R1 is used as a placeholder for a different application circuit. It can be removed from the circuit.
3. Component sizes are 0603 unless otherwise noted.

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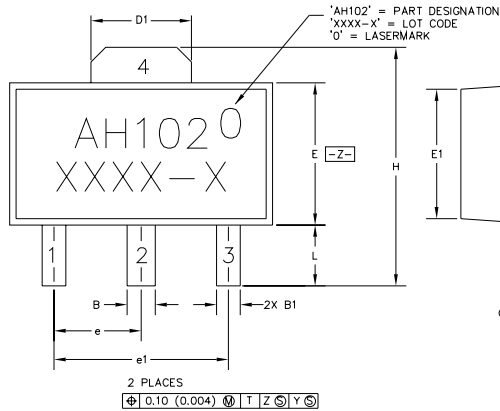
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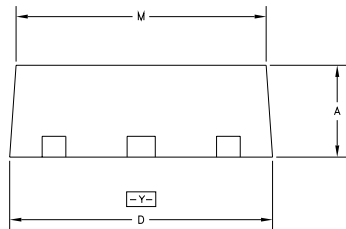
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Product Information

Outline Drawing

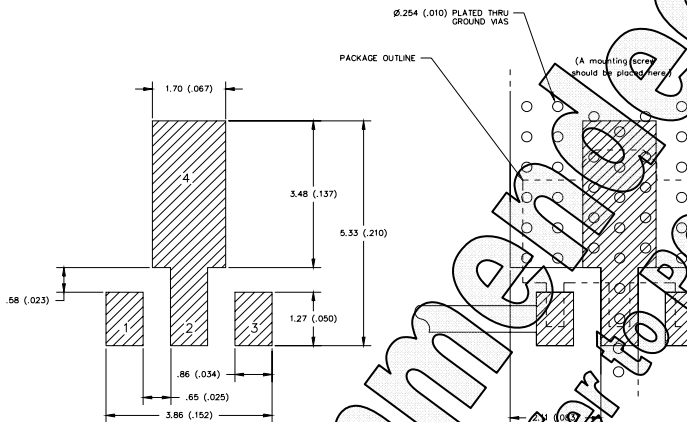


SYMBOL	MIN	MAX
A	1.40 (.055)	1.60 (.063)
B	.44 (.017)	.56 (.022)
B1	.36 (.014)	.48 (.019)
C	.35 (.014)	.44 (.017)
D	4.40 (.173)	4.60 (.181)
D1	1.62 (.064)	1.83 (.072)
E	2.29 (.090)	2.60 (.102)
E1	2.01 (.079)	2.29 (.090)
e	1.50 BSC (.059)	
e1	3.00 BSC (.118)	
H	3.94 (.155)	4.25 (.167)
L	.89 (.035)	1.20 (.047)
M	4.04 (.159)	4.19 (.165)



- NOTES:
1. DIMENSIONS CONFORM WITH JEDEC TO-243C EXCEPT WHERE INDICATED.
 2. DIMENSIONS ARE EXPRESSED IN MILLIMETERS(INCHES).
 3. DIMENSIONING AND TOLERANCING IAW ANSI Y14.5M

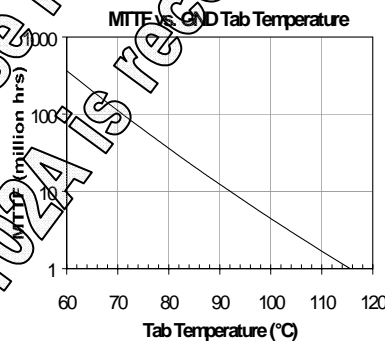
Land Pattern



Thermal Specifications

Parameter	Rating
Operating Case Temperature	-40 to +85°C
Thermal Resistance ¹ , R _{th}	25°C/W
Junction Temperature ² , T _j	130°C

1. The thermal resistance is referenced from the hottest part of the junction to the ground tab (pin 4).
2. This corresponds to the typical biasing condition of +9V, 200 mA at an 85°C case temperature. A minimum MTF of 1 million hours is achieved for junction temperatures below 160°C.



Product Marking

The AH102 will be marked with an "AH102" designator. An alphanumeric lot code ("XXXX-X") is also marked below the part designator on the top surface of the package. A "0" will be lasermarked in the upper right-hand corner.

Tape and reel specifications for this part are located on the website in the "Application Notes" section.

ESD / MSL Information

- ESD Rating: Class 1C
 Value: Passes > 1000V min.
 Test: Human Body Model (HBM)
 Standard: JEDEC Standard JESD22-A114
- ESD Rating: Class 1W
 Value: Passes > 1000V min.
 Test: Charged Device Model (CDM)
 Standard: JEDEC Standard JESD22-C101

- MSL Rating: Level 3
 Rate: 3.01 - 3.35 °C convection reflow
 Standard: JEDEC Standard J-STD-020

Mounting Config. Notes

1. A heatsink underneath the area of the PCB for the mounted device is strictly required for proper thermal operation. Damage to the device can occur without the use of one.
2. Ground/thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25mm (.010").
3. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
4. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via region contacts the heatsink.
5. Do not put solder mask on the backside of the PC board in the region where the board contacts the heatsink.
6. RF trace width depends upon the PC board material and construction.
7. Use 1 oz. Copper minimum.
8. All dimensions are in millimeters (inches). Angles are in degrees.

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