AH102

Medium Power, High Linearity Amplifier

The Communications Edge™

Preliminary Product Information

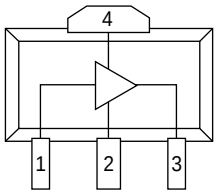
Product Features

- 350-3000 MHz Bandwidth
- +45 dBm Output IP3
- 13 dB Gain
- +27 dBm P1dB
- MTBF >10^7 Hours
- Internally Matched
- Multiple Bias Voltages (+7.0 to +9.0 V)

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 signal supply voltage and an internally matched device makes it ideal for both narrow band and broadband applications. Superior thermal design allows the product to achieve +45 dBm IP3 performance at a mounting temperature of +85°C with an associated MTBF of >10^7 hours.

Functional Diagram



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

Specifications

Parameter	Units	Min.	Typical	Max.
Frequency Range	MHz		350-3000	
S21 - Gain	dB	12.5	13	
S11 - Input Return Loss	dB		-10	
S22 - Output Return Loss	dB		-10	
Noise Figure	dB		4.5	
Output P1dB	dBm		+27	
Output IP3	dBm	43	+45	
Operating Current Range	mA	170	200	230
Supply Voltage	V		9.0	

Test conditions unless otherwise noted.
1. T = 25°C, Vdd = 9.0 V, Freq = 800 MHz, 50 ohm system.
2. 3OIP Measured with two tones at an output power of 8 dBm/tone separated by 10 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 slope rule.

Typical Parameters

Parameter	Units	Typical	
Frequency	MHz	900	1900
S21	dB	13.9	13.5
S11	dB	-17.4	-15.2
S22	dB	-16.5	-15.0
Output IP3	dBm	46.2	46.0
Noise Figure	dB	3.1	3.8

Typical parameters reflect AH102 application circuit.

Absolute Maximum Ratings

Parameter	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-55 to +125 °C
DC Voltage	+11 V
RF Input Power (continuous)	+17 dBm

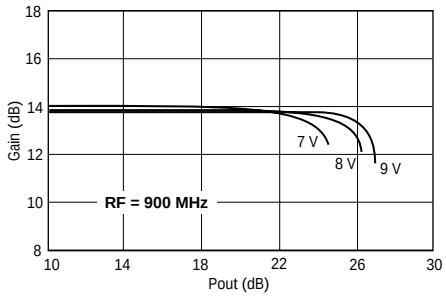
Ordering Information

Part No.	Description
AH102	Medium Power High Linearity Amplifier (Available in tape and reel)
AH102-PCB Cell	Cellular Application Circuit
AH102-PCS/u	PCS/UMTS Application Circuit

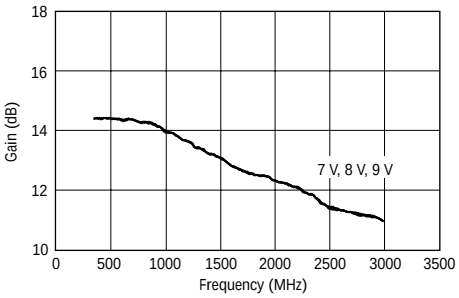
This document contains information on a new product.
Specifications and information are subject to change without notice.

Performance Charts (Vds = 9 V, Ids = 200 mA, T = 22°C, unmatched device in a 50 ohm system)

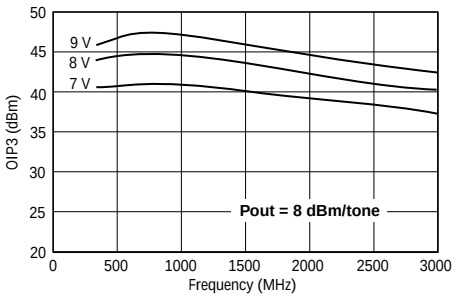
Gain vs Pout



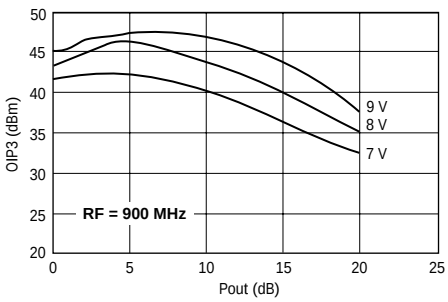
Gain vs Frequency



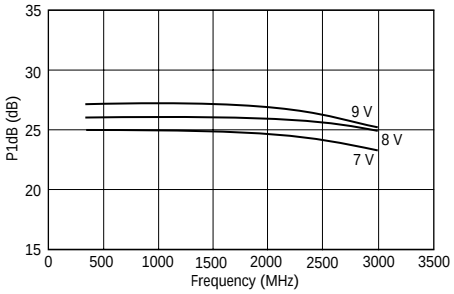
OIP3 vs Frequency



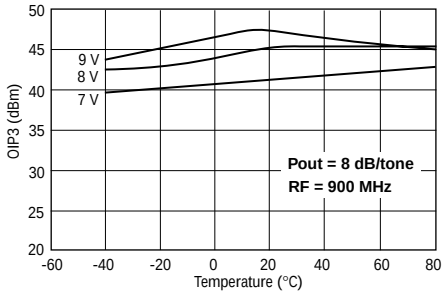
OIP3 vs Pout



P1dB vs Frequency



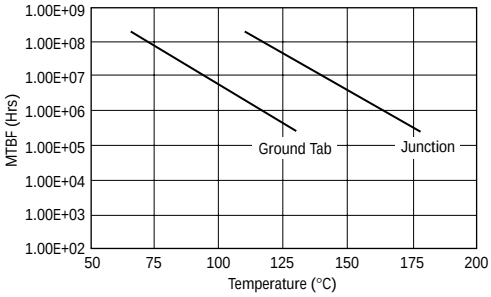
OIP3 vs Temperature



Thermal Data

Parameter	Rating
Operating Case Temperature	-40 to +85°C
Thermal Resistance (Maximum)	25°C/W
Junction Temperature (Recommended Maximum)	+155°C

MTBF vs Temperature

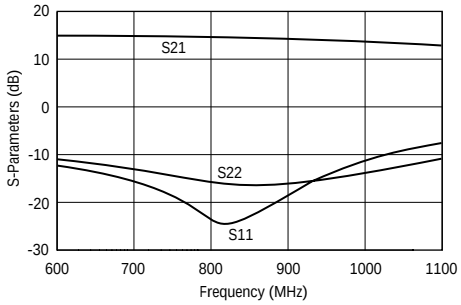


Application Circuit: 900 MHz

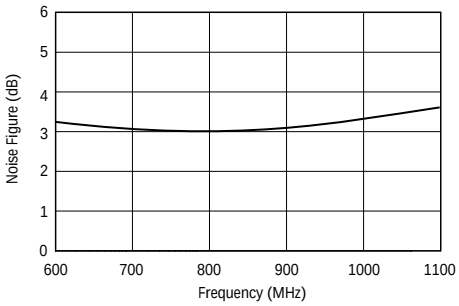
Typical Specifications

Frequency	900 MHz
S21 (dB)	13.9 dB
S11 (dB)	-17.4 dB
S22 (dB)	-16.5 dB
IP3	46.2 dBm
Noise Figure	3.1 dB
Bias	9.0 V

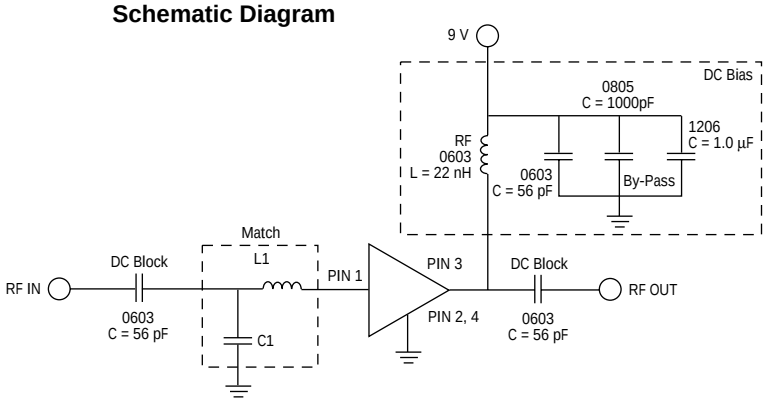
S-Parameters vs Frequency



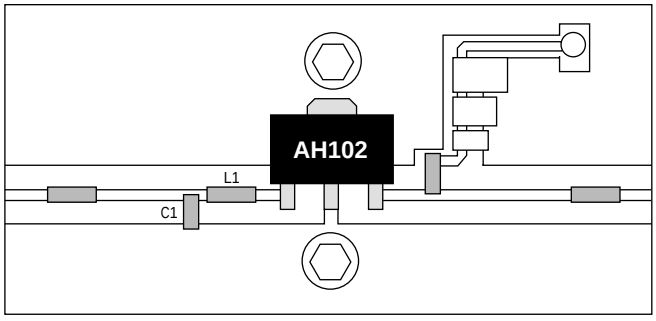
Noise Figure vs Frequency



Schematic Diagram



GETEK Board Layout



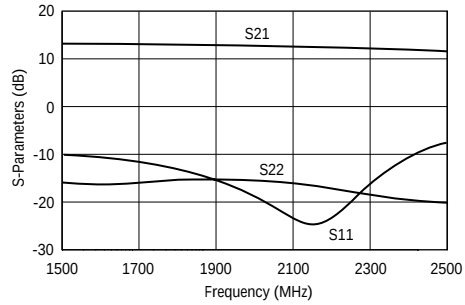
C1 = 3.3 pF L1 = 6.8 nH

Application Circuit: 1900 MHz

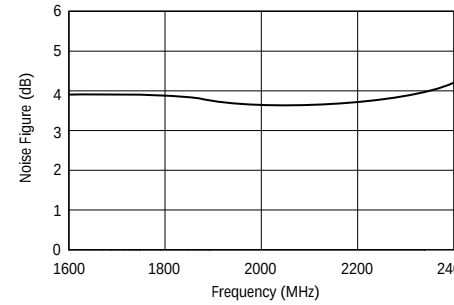
Typical Specifications

Frequency	1900 MHz
S21 (dB)	13.5 dB
S11 (dB)	-15.2 dB
S22 (dB)	-15.0 dB
IP3	46.0 dBm
Noise Figure	3.8 dB
Bias	9.0 V

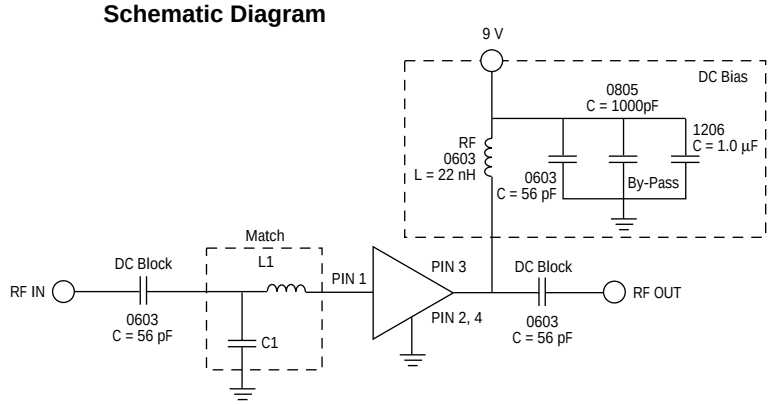
S-Parameters vs Frequency



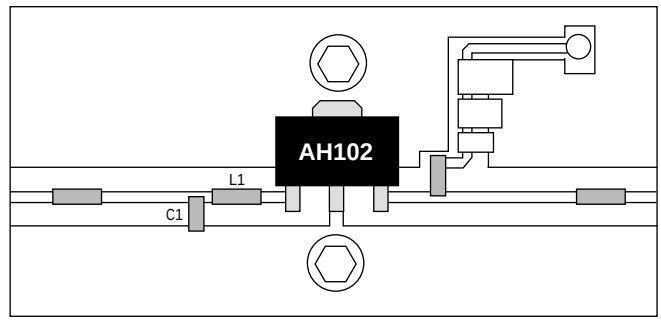
Noise Figure vs Frequency



Schematic Diagram

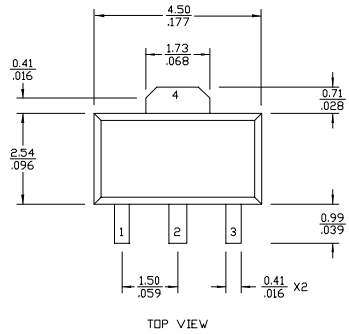


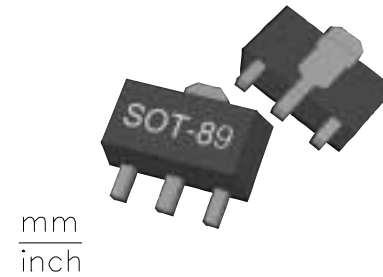
GETEK Board Layout



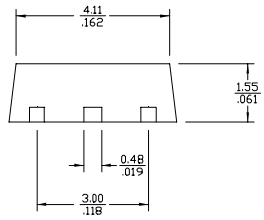
C1 = 1.5 pF L1 = 1.5 nH

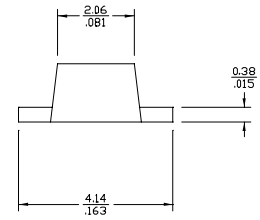
Outline Drawing



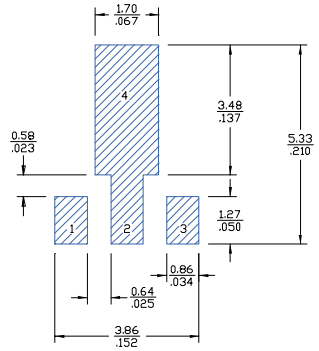


mm
inch



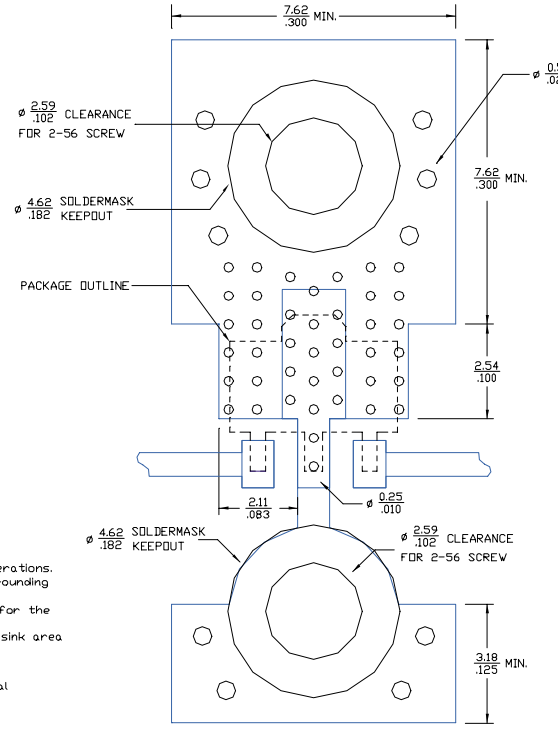


Land Pattern



FUNCTION	PIN NO.
INPUT	1
GROUND	2
OUTPUT (BIAS)	3
GROUND	4

Mounting Configuration



Notes:
1. Ground vias are critical for thermal and RF grounding considerations.
2. Two 2-56 screws with washers should be used for thermal grounding to the main chassis.
3. Ground plane on the backside should extend past the holes for the 2-56 screws as a minimum.
4. No soldermask should be applied to the backside where heat sink area contacts the main chassis.
5. Holes for the 2-56 screws should be plated through.
6. Keepout diameter for the 2-56 screw is to allow good thermal contact for the screw and washer.
7. Trace width depends on PC board.
8. A minimum of 1 oz. / 1 oz. copper should be used.

Typical Test Data

S-Parameters (Ids = 210 mA, Vds = +9 V, T = 22°C, Z = 50 ohms)

Freq (MHz)	S11 (dB)	S11 Ang	S21 (dB)	S21 Ang	S12 (dB)	S12 Ang	S22 (dB)	S22 Ang
50	-15.59	-100.98	16.33	166.81	-19.74	7.05	-18.05	-135.12
100	-18.63	-116.61	16.03	167.36	-19.65	0.63	-20.51	-172.09
200	-18.83	-127.49	15.85	162.42	-19.61	-6.29	-19.69	148.08
400	-14.97	-134.01	15.57	149.21	-19.81	-16.37	-18.95	118.13
600	-12.41	-144.26	15.25	135.43	-20.08	-25.16	-17.88	93.57
800	-10.59	-154.97	14.86	122.33	-20.47	-33.19	-17.21	72.66
1000	-9.28	-164.57	14.41	109.51	-20.79	-41.09	-16.97	52.59
1200	-8.27	-172.64	14.06	97.75	-21.31	-48.47	-16.81	30.96
1400	-7.51	-179.56	13.66	86.16	-21.74	-55.63	-16.46	7.77
1600	-6.92	-174.92	13.31	74.79	-22.22	-62.49	-15.71	-15.23
1800	-6.44	-170.01	12.99	63.61	-22.27	-69.31	-14.55	-36.49
2000	-5.91	-166.13	12.63	52.63	-23.44	-76.13	-13.56	-57.58
2200	-5.36	-160.87	12.29	41.29	-24.21	-83.19	-11.95	-75.38
2400	-4.91	-155.59	11.92	30.04	-25.07	-89.85	-10.45	-88.56
2600	-4.51	-150.21	11.57	18.85	-25.89	-96.21	-9.31	-98.65
2800	-4.16	-145.21	11.29	8.09	-26.98	-102.46	-8.48	-107.36
3000	-3.89	-139.81	11.03	-2.68	-28.01	-107.53	-7.95	-114.99
3200	-3.68	-134.22	10.81	-13.65	-29.14	-112.71	-7.77	-121.98
3400	-3.51	-129.04	10.59	-24.79	-30.39	-116.88	-7.87	-128.04
3600	-3.34	-121.85	10.41	-36.19	-31.93	-119.08	-8.32	-136.52
3800	-3.18	-115.02	10.18	-47.95	-33.69	-121.76	-9.03	-144.89
4000	-3.01	-107.46	9.91	-60.13	-35.41	-120.73	-10.07	-154.36

Typical Test Data

S-Parameters (Ids = 215 mA, Vds = +10 V, T = 22°C, Z = 50 ohms)

Freq (MHz)	S11 (dB)	S11 Ang	S21 (dB)	S21 Ang	S12 (dB)	S12 Ang	S22 (dB)	S22 Ang
50	-15.63	-100.64	16.36	166.87	-19.73	7.13	-18.29	-132.65
100	-18.66	-116.35	16.06	167.37	-19.62	0.58	-21.21	-170.52
200	-18.84	-127.07	15.85	162.40	-19.56	-6.39	-20.22	145.92
400	-14.99	-133.65	15.59	149.16	-19.77	-16.27	-19.23	114.71
600	-12.41	-144.11	15.27	135.36	-20.07	-25.37	-17.95	90.15
800	-10.59	-154.93	14.89	122.21	-20.42	-33.40	-17.12	69.05
1000	-9.27	-164.45	14.44	109.37	-20.78	-41.06	-16.68	48.98
1200	-8.29	-172.63	14.08	97.61	-21.28	-48.47	-16.39	27.89
1400	-7.52	-179.57	13.69	85.99	-21.76	-55.85	-15.97	5.59
1600	-6.96	-174.98	13.34	74.57	-22.27	-62.91	-15.12	-16.74
1800	-6.45	-170.11	13.02	63.35	-22.77	-69.85	-13.94	-36.97
2000	-5.91	-166.25	12.67	52.34	-23.45	-76.92	-12.98	-57.46
2200	-5.36	-160.97	12.31	40.98	-24.16	-84.02	-11.45	-74.92
2400	-4.92	-155.69	11.95	29.68	-24.99	-90.61	-10.01	-87.90
2600	-4.52	-150.33	11.60	18.46	-25.81	-97.22	-8.91	-98.24
2800	-4.16	-145.21	11.31	7.69	-26.93	-103.38	-8.11	-106.73
3000	-3.89	-139.90	11.06	-3.10	-27.89	-109.00	-7.59	-114.56
3200	-3.67	-134.31	10.84	-14.07	-29.07	-114.73	-7.42	-121.70
3400	-3.50	-129.11	10.63	-25.26	-30.57	-119.32	-7.49	-127.90
3600	-3.33	-121.90	10.44	-36.68	-31.74	-122.19	-7.91	-136.49
3800	-3.18	-115.01	10.23	-48.49	-33.93	-123.59	-8.58	-145.17
4000	-3.00	-107.56	9.96	-60.72	-35.83	-123.86	-9.55	-154.83