



# AH102

Medium Power, High Linearity Amplifier

The Communications Edge™

Preliminary Product Information

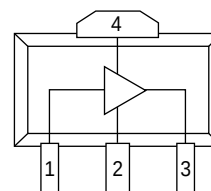
## Product Features

- 350-3000 MHz Bandwidth
- +45 dBm Output IP3
- 13 dB Gain
- +27 dBm P1dB
- MTBF >10<sup>7</sup> 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<sup>7</sup> 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

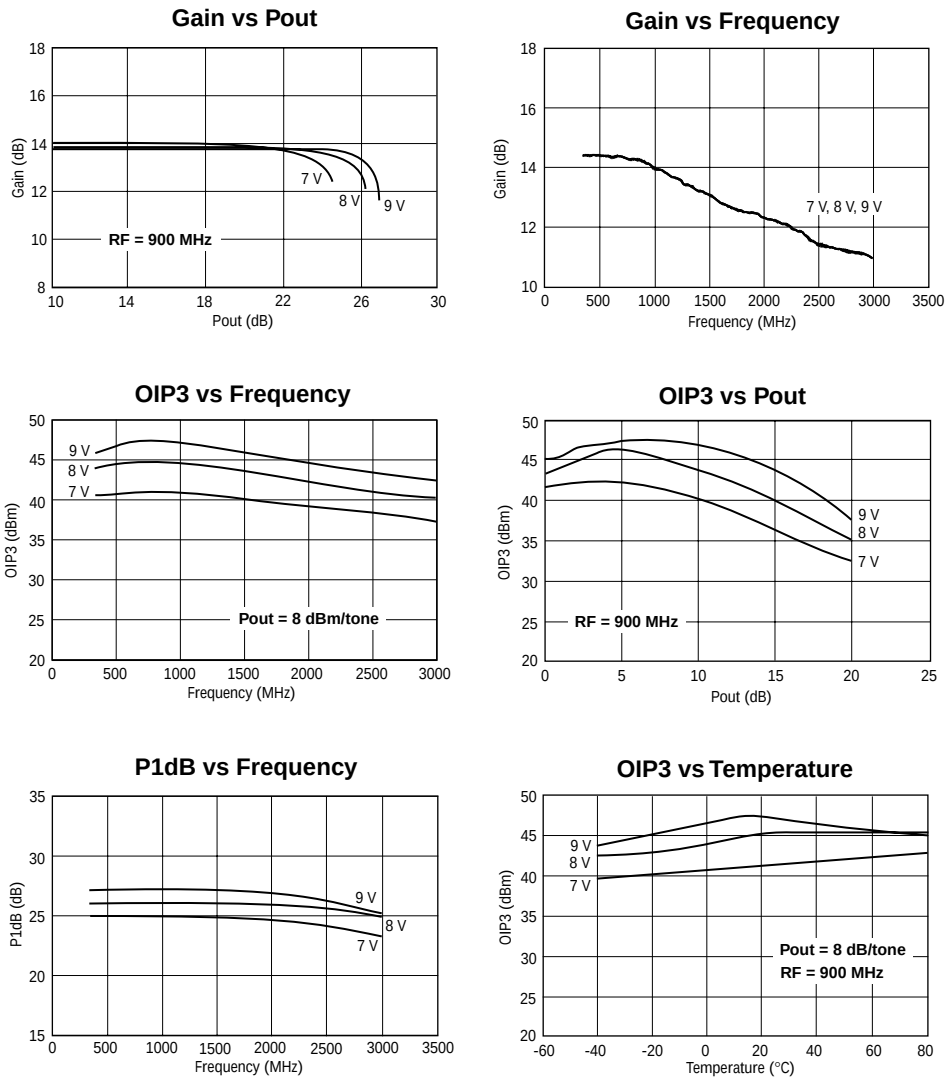
| Part No.       | Description                                                        |
|----------------|--------------------------------------------------------------------|
| AH102          | Medium Power High Linearity Amplifier (Available in tape and reel) |
| AH102-PCB Cell | Cellular Application 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.

# AH102

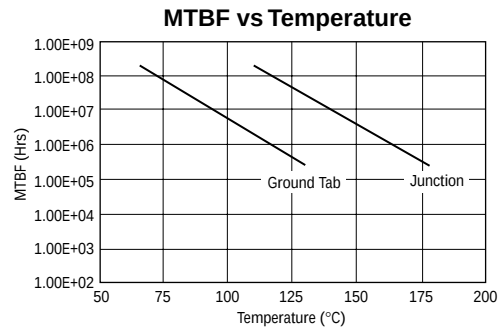
Preliminary Product Information

## Performance Charts (V<sub>ds</sub> = 9 V, I<sub>ds</sub> = 200 mA, T = 22°C, unmatched device in a 50 ohm system)



## Thermal Data

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

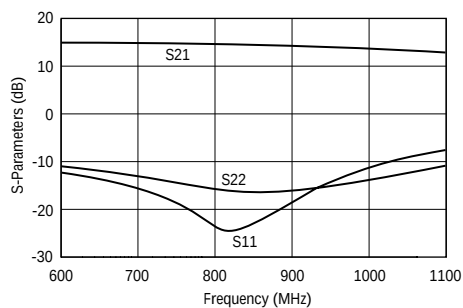


## Application Circuit: 900 MHz

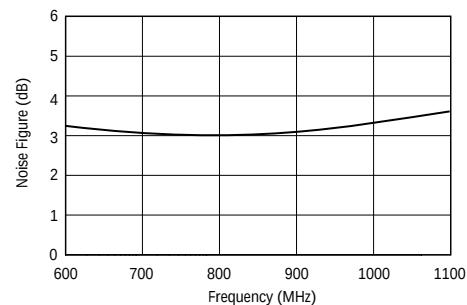
### Typical Specifications

|              |          |
|--------------|----------|
| 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    |

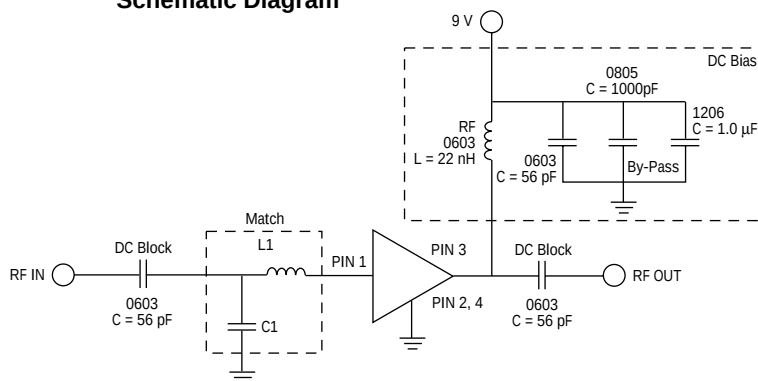
### S-Parameters vs Frequency



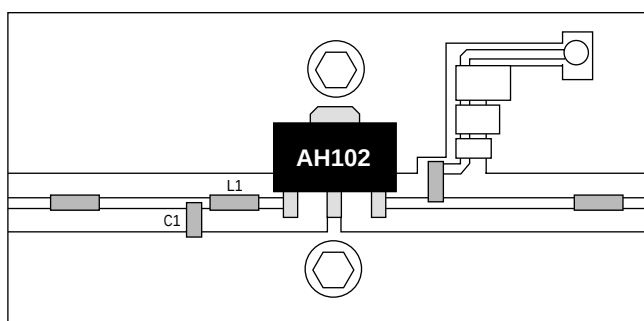
### Noise Figure vs Frequency



### Schematic Diagram



### GETEK Board Layout



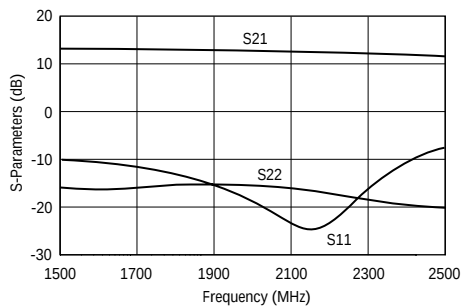
C1 = 3.3 pF L1 = 6.8 nH

## Application Circuit: 1900 MHz

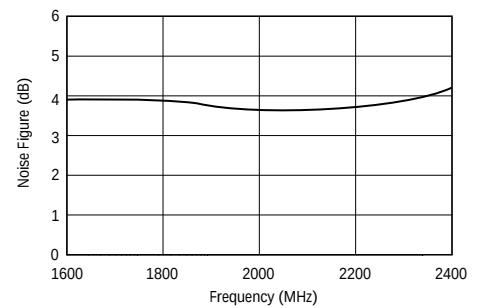
### Typical Specifications

|              |          |
|--------------|----------|
| 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    |

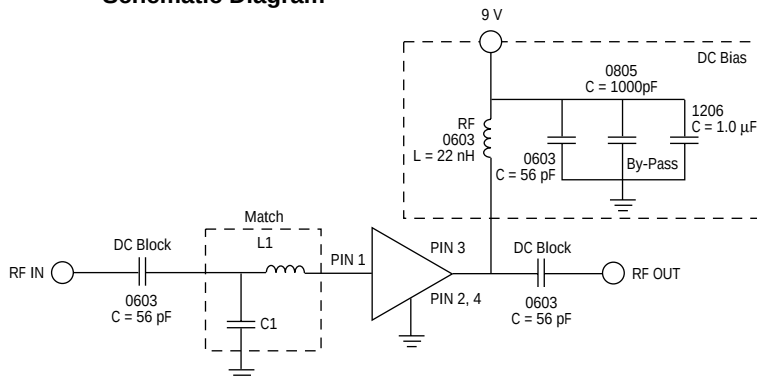
### S-Parameters vs Frequency



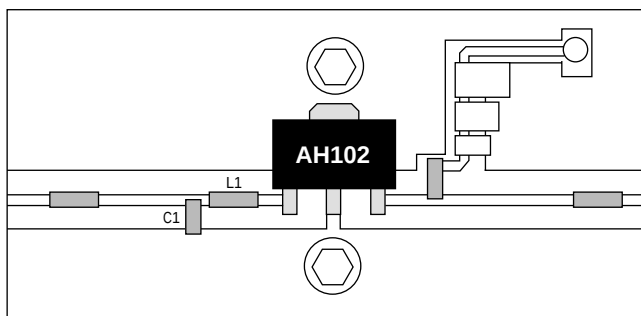
### Noise Figure vs Frequency



### Schematic Diagram

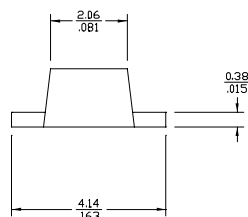
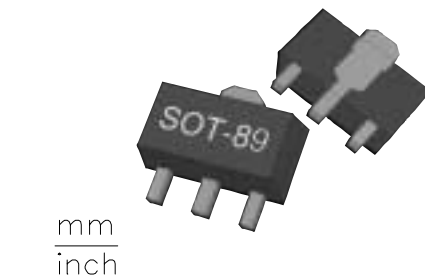
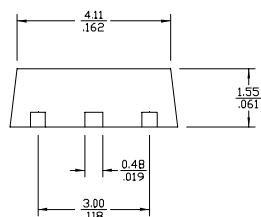
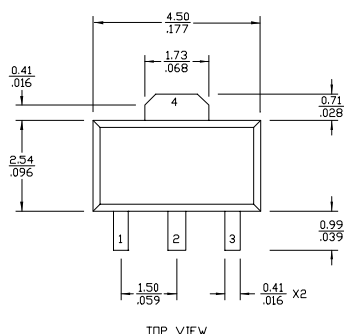


### GETEK Board Layout

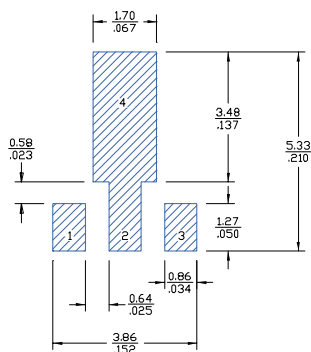


C1 = 1.5 pF L1 = 1.5 nH

## Outline Drawing



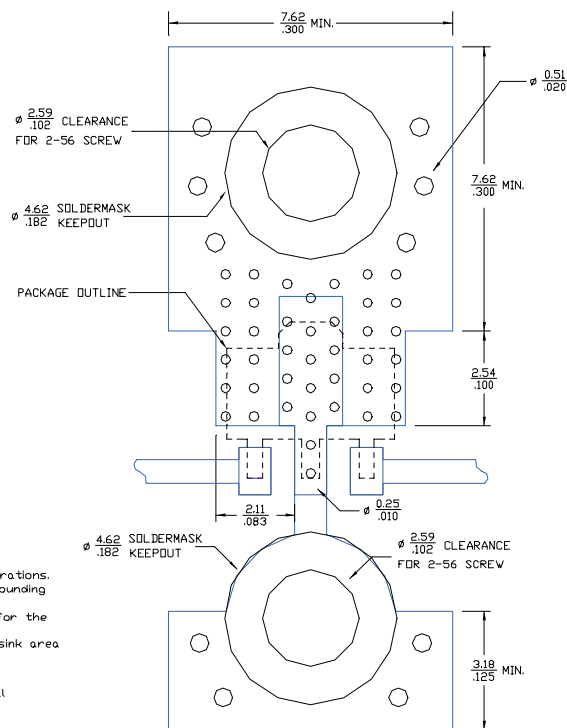
## Land Pattern



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

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

## Mounting Configuration



## 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 |