

## FEATURES

- ζ 16/19 dBm P1dB/PSAT
- ζ Full E-band coverage
- ζ 27 dBm OIP3
- ζ 23 dB gain

## TYPICAL APPLICATIONS

- ζ Point-to-point communication
- ζ Instrumentation
- ζ Fiber over radio
- ζ 77 GHz radar

## DESCRIPTION

gAPZ0033 is a Medium Power Amplifier (MPA) in the E-band suitable for point-to-point communication. The MPA features 16 dB P1dB and very flat frequency response. Furthermore, the MPA has high gain, high linearity and low input/output return loss.

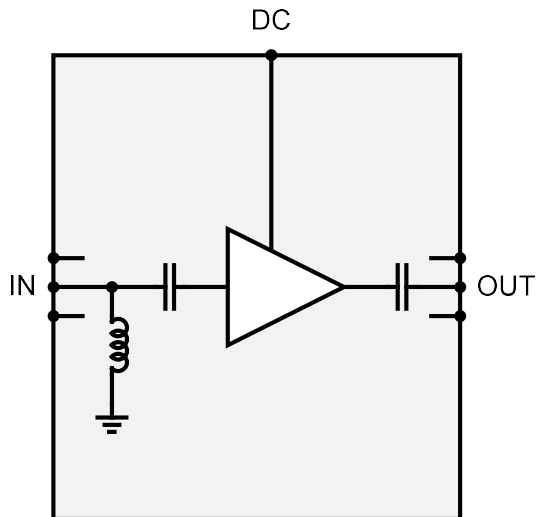


Figure 1. Block diagram of the LNA.

## ELECTRICAL PERFORMANCE

Table 1. Electrical performance  $T_A=25^\circ\text{C}$

| Parameter          | Min     | Typ | Max     | Unit |
|--------------------|---------|-----|---------|------|
| Frequency          | 71 (68) |     | 86 (89) | GHz  |
| Gain               |         | 25  |         | dB   |
| NF                 |         | -   |         | dB   |
| P1dB               |         | 17  |         | dBm  |
| PSAT               |         | -   |         | dBm  |
| OIP3               |         | 27  |         | dBm  |
| PAE                |         |     |         | %    |
| Input return loss  |         | 10  |         | dB   |
| Output return loss |         | 10  |         | dB   |
| Power consumption  |         | 700 |         | mW   |

## MEASURED PERFORMANCE

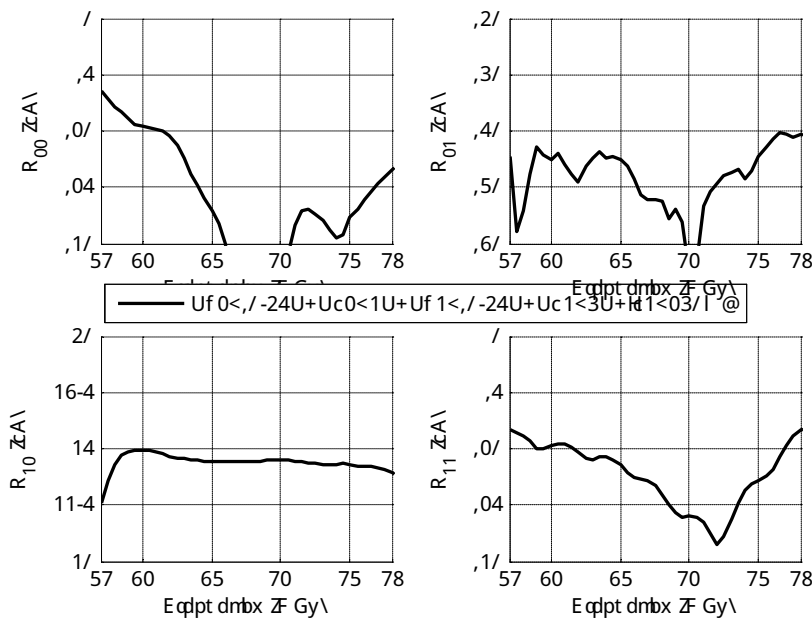


Figure 2. Small signal response within the E-band at nominal bias. (Upper left): Input matching. (Upper right): Reverse isolation. (Lower left): Small-signal gain. (Lower right): Output matching.

## RECOMMENDED OPERATING CONDITIONS

Bias should first be applied to the gates (VG...) followed by the drains (VD...). The gate voltages must be adjusted within the min/max range indicated in Table 2-Table 4 to obtain the specified drain currents. The drain currents are stated with no input signal.

Table 2. Electrical settings on connector P1

| Connector P1 | Pad No. | Interface                           | I/O    |
|--------------|---------|-------------------------------------|--------|
| GND          | 1       |                                     | Ground |
| RF_IN        | 2       | $Z_0 = 50 \text{ Ohm}$ , AC coupled | Input  |
| GND          | 3       |                                     | Ground |

Table 3. Electrical settings on connector P2

| Connector P2 | Pad No. | Bias settings (V/mA) |           |      | I/O    |
|--------------|---------|----------------------|-----------|------|--------|
|              |         | Min                  | Typ       | Max  |        |
| VD2          | 1       | 3.2                  | 3.3 / 100 | 3.4  | Input  |
| VG2          | 2       | -0.7                 | -0.5      | -0.3 | Input  |
| GND          | 3       |                      |           |      | Ground |
| VG1          | 4       | -0.7                 | -0.5      | -0.3 | Input  |
| VD1          | 5       | 2.4                  | 2.5 / 138 | 2.6  | Input  |

Table 4. Electrical settings on connector P3

| Connector P3 | Pad No. | Interface                           | I/O    |
|--------------|---------|-------------------------------------|--------|
| GND          | 1       |                                     | Ground |
| RF_OUT       | 2       | $Z_0 = 50 \text{ Ohm}$ , AC coupled | Output |
| GND          | 3       |                                     | Ground |

## ABSOLUTE MAXIMUM RATINGS

Table 5. Absolute maximum ratings

|                              |               |
|------------------------------|---------------|
| Gate-source voltage          | -2 to +0.7 V  |
| Drain-source voltage         | 4.5 V         |
| Gate-drain breakdown voltage | 8 V           |
| ID2                          | 240 mA        |
| ID1                          | 240 mA        |
| RF input power               | +15 dBm       |
| Operating temperature        | -40 to + 85°C |
| Storage temperature          | -65 to +150°C |

## OUTLINE DRAWING

Mechanical drawing with pad locations is also available in dxf-file format on the web. The substrate thickness is 50 µm (GaAs).

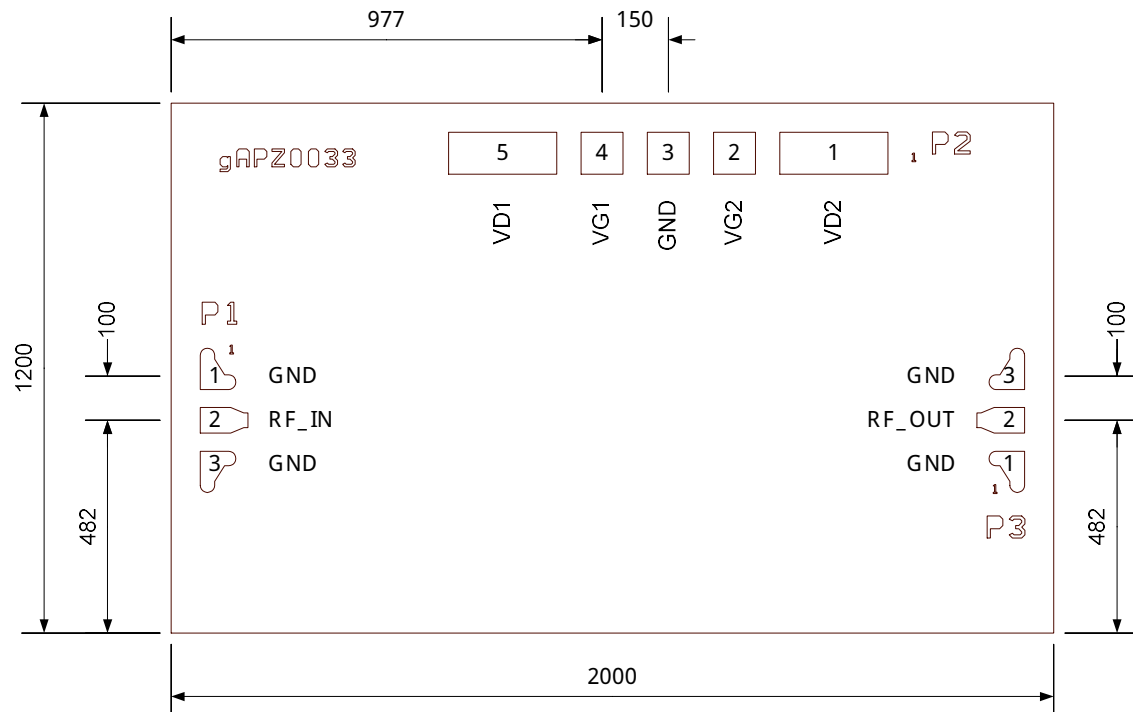


Figure 3. Outline drawing of the MMIC. Dimensions are in µm.