



# Thin-Film Cascadable Amplifier 1000 to 4000 MHz

## Technical Data

### PSA 4132 Series

#### Features

- **Frequency Range: 1000 to 4000 MHz**
- **High Gain: 22 dB (Typ)**
- **Noise Figure: 4.5 dB (Typ)**

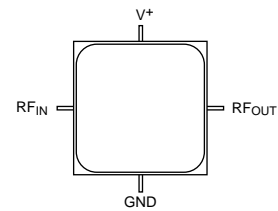
#### Applications

- **IF/RF Amplification**
- **Input or Driver Stage**
- **Instrumentation**

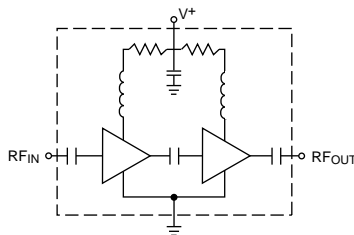
#### Description

The 4132 Series is a two stage thin-film GaAs FET RF amplifier for high gain and low noise applications up to 4000 MHz. Low VSWR is maintained by resistive feedback and inductive tuning while the RF is coupled through the amplifier by internal blocking capacitors. The bias port is reverse polarity protected and bypassed with 6800 pF.

#### Pin Configuration PSA—SM-38



#### Schematic



#### Maximum Ratings

| Parameter                      | Maximum       |
|--------------------------------|---------------|
| DC Voltage                     | +9 Volts      |
| Continuous RF Input Power      | +17 dBm       |
| Operating Case Temperature     | -55 to +85°C  |
| Storage Temperature            | -62 to +150°C |
| "R" Series Burn-In Temperature | +100°C        |

#### Thermal Characteristics

|  |             |
|--|-------------|
| $\theta_{JC}^1$  | 168/86°C/W  |
| Active Transistor Power Dissipation <sup>1</sup>         | 0.13/0.53 W |
| Junction Temperature Above Case Temperature <sup>1</sup> | 22/46°C     |
| T <sub>CH</sub> Max.                                     | 175°C       |

**Note 1:** Values refer to stage 1 and stage 2 devices resp.

**Weight:** (typical) SM-38—1.3 grams

### Electrical Specifications

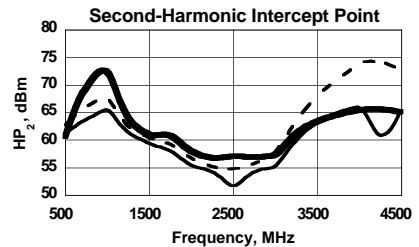
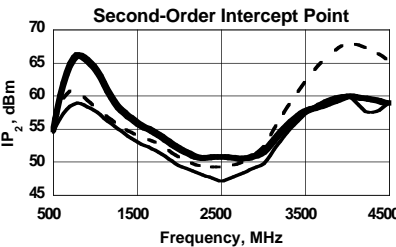
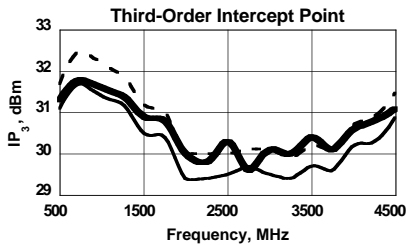
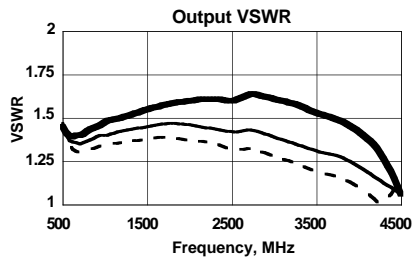
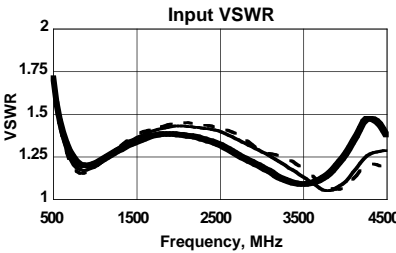
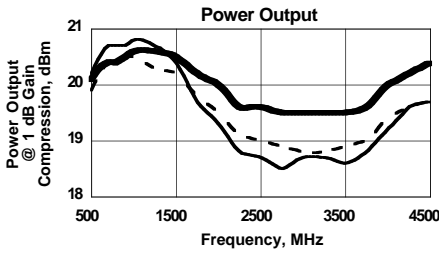
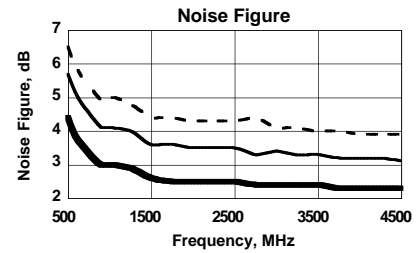
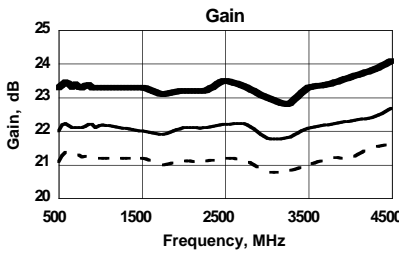
(Measured in 50 Ω system @ +8 VDC nominal unless otherwise noted)

| Symbol           | Characteristic                        | Typical<br>T <sub>C</sub> = 25°C | Guaranteed Specifications  |                               | Unit |
|------------------|---------------------------------------|----------------------------------|----------------------------|-------------------------------|------|
|                  |                                       |                                  | T <sub>C</sub> = 0 to 50°C | T <sub>C</sub> = -55 to +85°C |      |
| BW               | Frequency Range                       | .5–4.5                           | 1.0–4.0                    | 1.0–4.0                       | GHz  |
| GP               | Small Signal Gain (Min.)              | 22.0                             | 20.0                       | 19.0                          | dB   |
| —                | Gain Flatness (Max.)                  | ±0.3                             | ±1.0                       | ±1.0                          | dB   |
| NF               | Noise Figure (Max.)                   | 4.5*                             | 5.5                        | 6.5                           | dB   |
| P <sub>1dB</sub> | Power Output @ +1 dB Comp. (Min.)     | +18.5                            | +17.0                      | +16.0                         | dBm  |
| —                | Input VSWR (Max.)                     | 1.5:1                            | 2.0:1                      | 2.0:1                         | —    |
| —                | Output VSWR (Max.)                    | 1.5:1                            | 2.0:1                      | 2.0:1                         | —    |
| IP <sub>3</sub>  | Two Tone 3rd Order Intercept Point    | +29.0                            | —                          | —                             | dBm  |
| IP <sub>2</sub>  | Two Tone 2nd Order Intercept Point    | +50.0                            | —                          | —                             | dBm  |
| HP <sub>2</sub>  | One Tone 2nd Harmonic Intercept Point | +55.0                            | —                          | —                             | dBm  |
| I <sub>D</sub>   | DC Current                            | 150                              | —                          | —                             | mA   |

\* Specification applies at F greater than 1.0 GHz, NF @ 500 MHz = 6 dB typical.

### Typical Performance Over Temperature (@ +8 VDC unless otherwise noted)

Key: +25°C ———  
 +85°C - - - -  
 -55°C ———

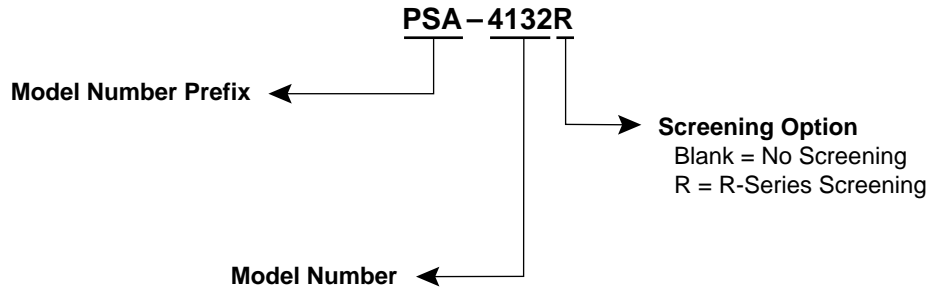


**Automatic Network Analyzer Measurements** (Typical production unit @ 25°C ambient)**S-Parameters****Bias = 8.00 Volts**

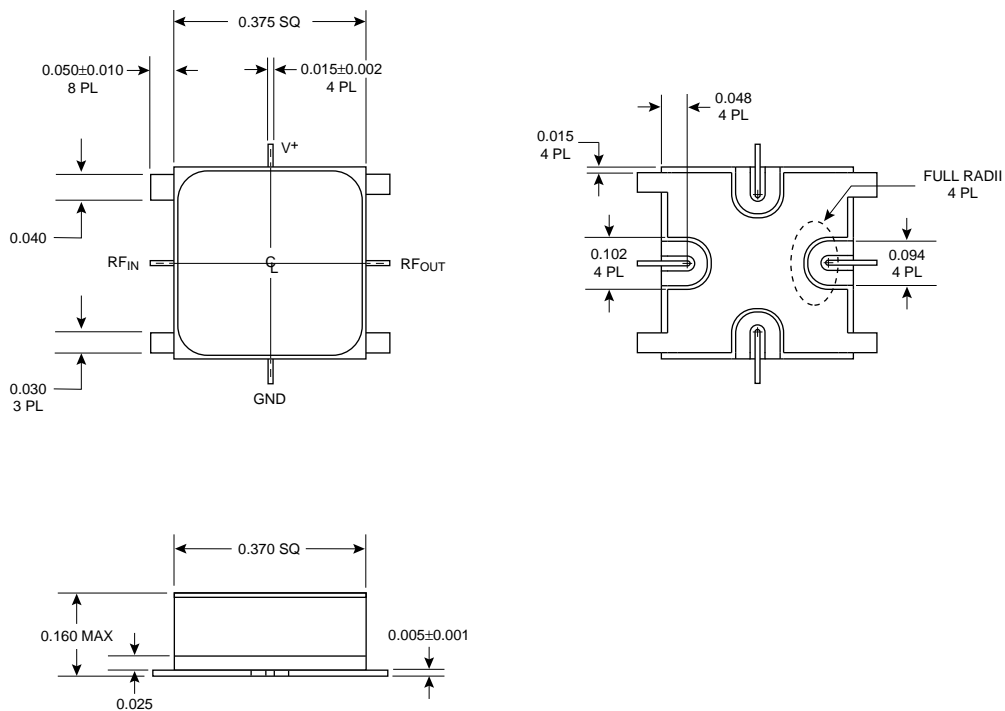
| FREQ<br>MHz | S <sub>11</sub> |        | S <sub>21</sub> |        | S <sub>12</sub> |        | S <sub>22</sub> |        | GPDEL<br>ns | PHASE<br>DEV |
|-------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|-------------|--------------|
|             | Mag             | Ang    | dB              | Ang    | dB              | Ang    | Mag             | Ang    |             |              |
| 250         | 0.62            | -46.1  | 8.6             | -171.9 | -46.6           | -138.7 | 0.71            | -152.9 |             |              |
| 300         | 0.58            | -66.8  | 15.9            | 167.8  | -49.2           | 160.4  | 0.6             | 178.7  | 1.13        |              |
| 350         | 0.51            | -86.5  | 19.4            | 143.8  | -41.5           | 121.6  | 0.45            | 155.6  | 1.33        |              |
| 400         | 0.41            | -102.2 | 21.1            | 126.2  | -39.8           | 108.6  | 0.32            | 141.8  | 0.98        |              |
| 450         | 0.32            | -114.4 | 21.8            | 111.1  | -37.5           | 97.4   | 0.24            | 135.2  | 0.84        |              |
| 500         | 0.25            | -125.3 | 22              | 102.7  | -37.8           | 86.6   | 0.19            | 135.2  | 0.47        |              |
| 550         | 0.2             | -135.8 | 22.2            | 95.9   | -36.7           | 88.5   | 0.17            | 138.1  | 0.38        |              |
| 600         | 0.16            | -145.6 | 22.2            | 91.7   | -36.2           | 88.2   | 0.15            | 140.3  | 0.23        |              |
| 650         | 0.13            | -156.2 | 22.1            | 89     | -35.9           | 87.6   | 0.15            | 141.8  | 0.15        |              |
| 700         | 0.11            | -170.1 | 22.1            | 87     | -35.4           | 87.6   | 0.15            | 142.3  | 0.11        |              |
| 750         | 0.09            | 174.3  | 22.1            | 85.2   | -35.3           | 90.3   | 0.15            | 143.1  | 0.1         |              |
| 800         | 0.08            | 156.7  | 22.1            | 85.3   | -35.5           | 92     | 0.16            | 142.7  | 0.01        |              |
| 850         | 0.08            | 139.7  | 22.2            | 85.1   | -35.5           | 93.5   | 0.16            | 140.9  | 0.01        |              |
| 900         | 0.08            | 122.1  | 22.2            | 85     | -35.7           | 95.4   | 0.16            | 139.6  | 0.01        |              |
| 950         | 0.08            | 107.9  | 22.1            | 86.1   | -35.4           | 97.6   | 0.17            | 137.1  | 0.06        |              |
| 1000        | 0.09            | 95.6   | 22.2            | 87.3   | -35.2           | 99.3   | 0.17            | 136    | 0.07        | 4.5          |
| 1250        | 0.13            | 56.2   | 22.1            | 92.6   | -35             | 113.8  | 0.18            | 126.3  | 0.06        | -1           |
| 1500        | 0.15            | 30.9   | 22              | 100.8  | -34.9           | 129.3  | 0.18            | 117.5  | 0.09        | -3.7         |
| 1750        | 0.17            | 10.2   | 21.9            | 111.3  | -35.2           | 146.3  | 0.19            | 110.8  | 0.12        | -4           |
| 2000        | 0.18            | -9.5   | 22.1            | 122    | -35.3           | 165.2  | 0.19            | 106    | 0.12        | -4.2         |
| 2250        | 0.17            | -30.1  | 22.1            | 133.4  | -35.2           | 177.1  | 0.18            | 103    | 0.13        | -3.6         |
| 2500        | 0.17            | -51.3  | 22.2            | 144.1  | -35.3           | -162.1 | 0.17            | 100.4  | 0.12        | -3.8         |
| 2750        | 0.15            | -68.3  | 22.2            | 154.2  | -35.4           | -145.1 | 0.18            | 94.7   | 0.11        | -4.5         |
| 3000        | 0.12            | -86.6  | 21.8            | 165.6  | -35.3           | -127.4 | 0.16            | 89.9   | 0.13        | -4           |
| 3250        | 0.1             | -102.3 | 21.8            | 178.8  | -35.6           | -112.8 | 0.15            | 84.5   | 0.15        | -1.6         |
| 3500        | 0.06            | -108.6 | 22.1            | -168.3 | -35.5           | -97.3  | 0.14            | 76.4   | 0.14        | 0.4          |
| 3750        | 0.02            | -94.8  | 22.2            | -158.4 | -35             | -79.6  | 0.12            | 68.4   | 0.11        | -0.5         |
| 4000        | 0.05            | -18.8  | 22.3            | -147.1 | -34.7           | -63.8  | 0.1             | 54.9   | 0.13        | 0            |
| 4250        | 0.11            | -34.1  | 22.4            | -137.8 | -34.1           | -52.8  | 0.07            | 32.1   | 0.1         |              |
| 4500        | 0.13            | -65.8  | 22.7            | -131.7 | -34.5           | -43.2  | 0.03            | 120.6  | 0.07        |              |
| 4750        | 0.14            | -62.1  | 22.2            | -124   | -35.6           | -24.9  | 0.09            | 95.6   | 0.09        |              |
| 5000        | 0.19            | -79.6  | 22.3            | -116.9 | -35.1           | -7.7   | 0.13            | 82.4   | 0.08        |              |
| 5250        | 0.23            | -109.1 | 22.3            | -111.1 | -34.6           | 2.9    | 0.17            | 72.8   | 0.06        |              |
| 5500        | 0.26            | -146.9 | 22.1            | -110.2 | -33.9           | 13.6   | 0.24            | 59.7   | 0.01        |              |
| 5750        | 0.28            | 165.5  | 21.1            | -112   | -34.1           | 22.3   | 0.32            | 40.9   | 0.02        |              |
| 6000        | 0.32            | 113.4  | 19.3            | -113.2 | -35             | 23.4   | 0.36            | 17.5   | 0.01        |              |
| 6250        | 0.37            | 65.9   | 16.9            | -113.8 | -36.8           | 29.3   | 0.36            | -3.9   | 0.01        |              |
| 6500        | 0.45            | 28.2   | 13.4            | -112.4 | -38.5           | 36.9   | 0.32            | -22.7  | 0.02        |              |
| 6750        | 0.52            | -1.9   | 9               | -107.7 | -42.1           | 52     | 0.28            | -39.6  | 0.05        |              |
| 7000        | 0.57            | -25.3  | 4               | -97.7  | -46.2           | 51.2   | 0.23            | -56.6  | 0.11        |              |
| 7250        | 0.61            | -46.6  | -3.5            | -79.9  | -43.1           | 94.3   | 0.19            | -76    | 0.2         |              |
| 7500        | 0.63            | -64.9  | -15.7           | 8.9    | -40.8           | 81.4   | 0.16            | -95.1  | 0.99        |              |
| 7750        | 0.64            | -81.1  | -5.9            | 86.2   | -37.7           | 37.6   | 0.14            | -114.5 | 0.86        |              |
| 8000        | 0.66            | -94.8  | -1.8            | 106.8  | -37.7           | 10.6   | 0.13            | -128.5 | 0.23        |              |

LINEARIZATION RANGE: 1.0 to 4.0 GHz

## Product Options



## Case Drawing SM-38



### NOTES (UNLESS OTHERWISE SPECIFIED):

1. MAXIMUM TEMPERATURE EXPOSURE IS 260°C FOR 10 SECONDS.
2. LEADS ARE FOR TESTING ONLY AND MAY BE TRIMMED FLUSH.
3. DIMENSIONS ARE SPECIFIED IN INCHES
4. TOLERANCES: xx ±.01  
xxx ±.005

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