



400 MHz – 4 GHz Low Noise Amplifier

Preliminary Technical Data

ADL5521

FEATURES

Gain of 15.3dB at 1950MHz

Matched 50- Ω input and output

Noise Figure of 0.8dB at 1950MHz

OIP3 of 35.3dBm typ at 1950MHz

Single 5V Supply Operation

Operating current of 65ma at +5V

LFCSP 3x3 mm Package

GENERAL DESCRIPTION

The ADL5521 is a high performance GaAs pHEMT low-noise amplifier. It provides high gain and low noise figure for single down-conversion IF sampling receiver architectures as well as direct down conversion receivers.

The ADL5521 amplifier comes in a compact, thermally enhanced 3x3mm LFCSP package and operates over the temperature range of -40°C to $+85^{\circ}\text{C}$.

FUNCTIONAL BLOCK DIAGRAM

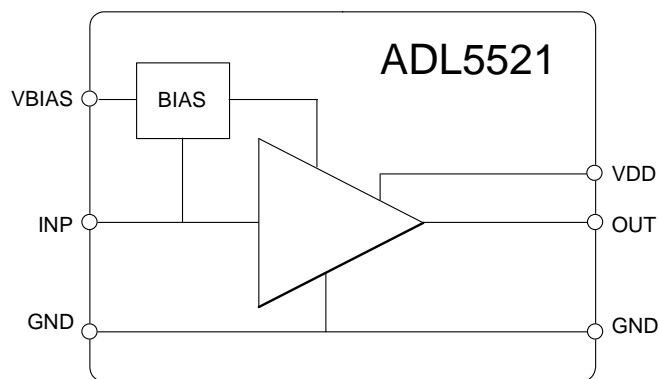


Figure 1.

Rev. PrA

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SPECIFICATIONS

$V_s = 5\text{ V}$, $T = 25^\circ\text{C}$, $f_c = 1950\text{MHz}$

Table 1.

| Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------------|-------------------------------------|-----|-------|-----|---------|
| Input return loss | External match | | 12 | | dB |
| Output return loss | External match | | 20.7 | | dB |
| Gain | | | 15.3 | | dB |
| Gain Flatness | In the [1920 – 1980] frequency band | | 0.015 | | dB/MHz |
| Gain vs. Temperature | In the [1920 – 1980] frequency band | | 0.018 | | dB/degC |
| Noise Figure | | | 0.8 | | dB |
| Output IP3 | | | 35.3 | | dBm |
| Output 1 dB Compression Point | | | 22.5 | | dBm |
| S12 Isolation | | | 21.4 | | dB |
| POWER-INTERFACE | | | | | |
| Supply Voltage | | 4.5 | 5 | 5.5 | V |
| Current Consumption | | | 65 | TBD | mA |

ABSOLUTE MAXIMUM RATINGS

Table 2.

| Parameter | Rating |
|--|-----------------|
| Supply Voltage, V_{POS} | 5.5 V |
| Max RF Input Level | TBD |
| Internal Power Dissipation | TBD mW |
| θ_{JA} (Exposed paddle soldered down) | TBD mW |
| θ_{JA} (Exposed paddle not soldered down) | TBD°C/W |
| θ_{JC} (At exposed paddle) | TBD°C/W |
| Maximum Junction Temperature | TBD°C/W |
| Operating Temperature Range | TBD°C |
| Storage Temperature Range | -40°C to +85°C |
| Lead Temperature Range (Soldering 60 sec) | -65°C to +150°C |

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



PIN CONFIGURATION AND FUNCTIONAL DESCRIPTIONS

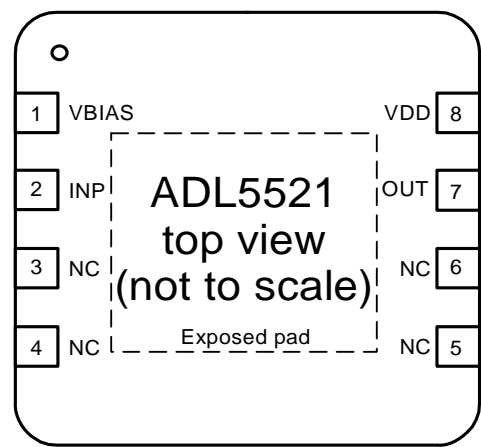


Figure 2. 8-Lead LFCSP

Table 3. Pin Function Descriptions- 8Lead CSP

| Pin No. | Mnemonic | Description |
|-------------|----------|---|
| 1 | VBIAS | Bias: Internal DC bias |
| 2 | INP | RF Input: Must be AC-coupled. |
| 3,4,5,6 | NC | NC: No internal connection |
| 7 | OUT | RF Output: Must be AC-coupled. |
| 8 | VDD | Supply: VDD bias needs to be bypassed to ground using low-inductance capacitors. |
| Exposed pad | EP | Exposed Paddle: Connect to a low impedance ground plane |

TYPICAL PERFORMANCE CHARACTERISTICS

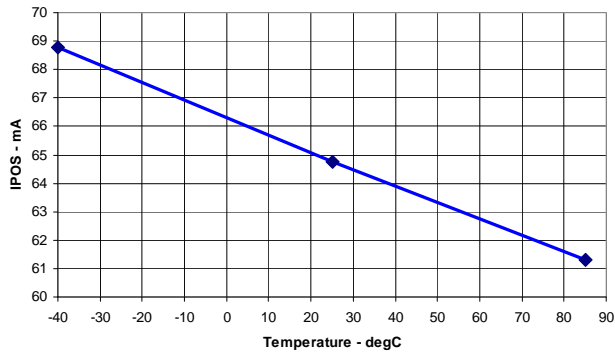


Figure 3. ADL5521 Current vs. Temperature

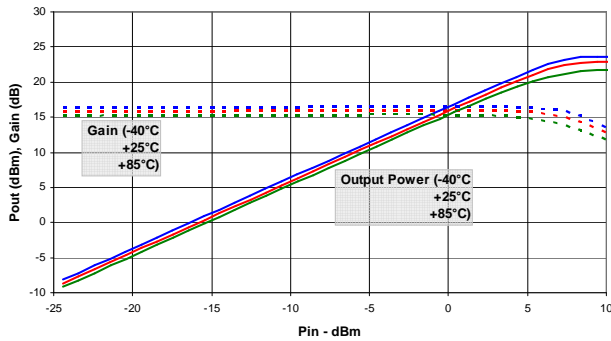


Figure 4. Output Power and Gain vs. Temperature

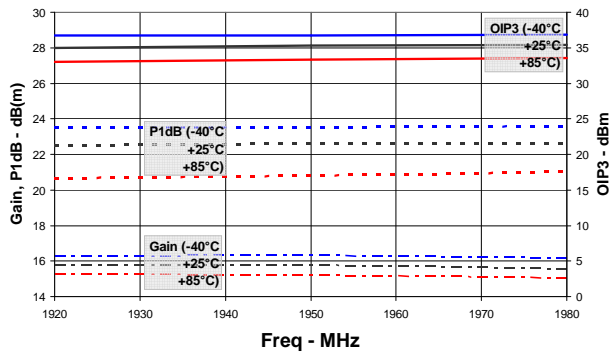


Figure 5. Gain, P1dB, OIP3 vs. Frequency

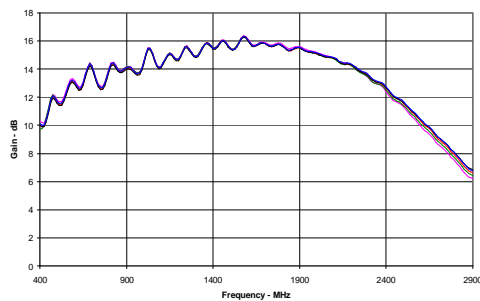


Figure 6. Gain vs. Frequency, Complete Frequency Range, 5 Parts

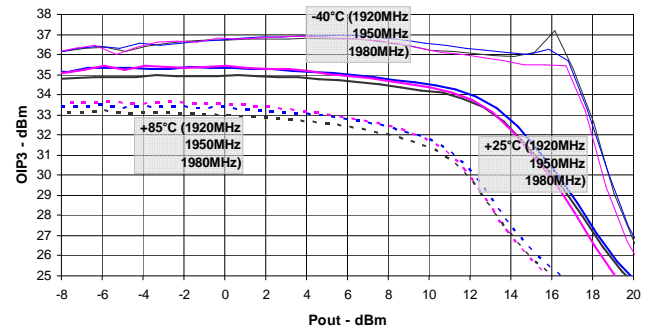


Figure 7. OIP3 vs. Output Power, Temperature and Frequency

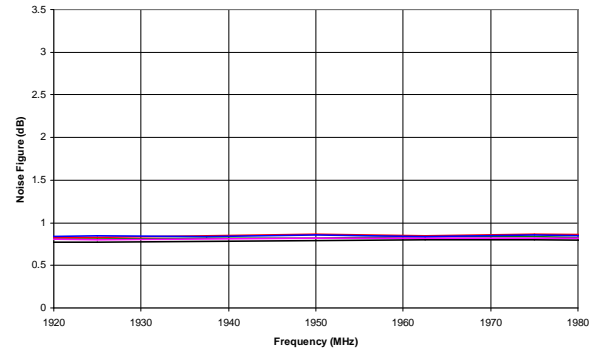


Figure 8. Distribution of Noise Figure for Five Parts, 1920 to 1980 MHz

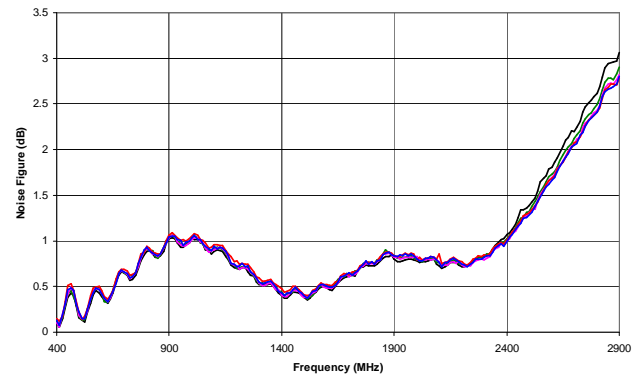


Figure 9. Distribution of Noise Figure for Five Parts, Complete Frequency Range

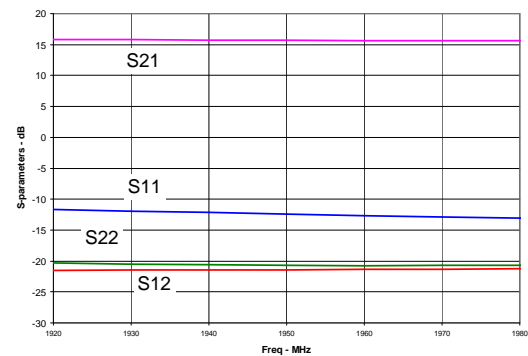


Figure 10. Typical S Parameters, 1920 to 1980 MHz

OUTLINE DIMENSIONS

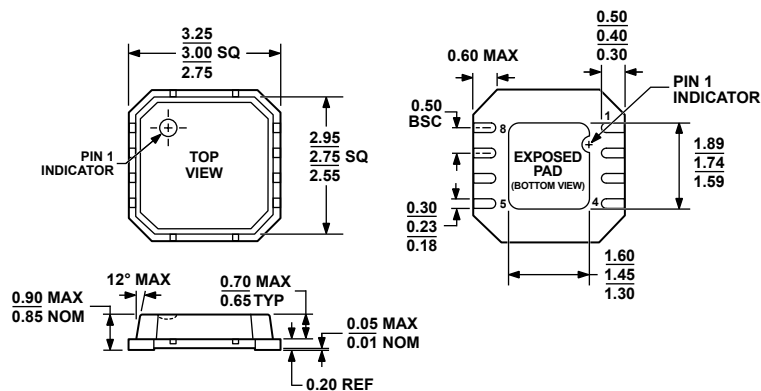


Figure 11. 8-Lead Lead Frame Chip Scale Package [LFCSF_VD]
 3mm × 3 mm Body, Very Thin, Dual Lead
 CP-8-2
 Dimensions shown in millimeters

ORDERING GUIDE

| Model | Temperature Range | Package Description | Package Option |
|-----------------------------|-------------------|---------------------|----------------|
| ADL5521ACPZ-R7 ¹ | −40°C to +85°C | 7" Tape and Reel | CP-8-2 |
| ADL5521ACPZ-WP ¹ | −40°C to +85°C | Waffle Pack | CP-8-2 |
| ADL5521-EVALZ | | Evaluation Board | |

¹ Z = Pb free part