



## ADA4817

### Low-Noise 1 GHz FastFET Op Amps

The ADA4817-1 (single) and ADA4817-2 (dual) FastFET™ amplifiers are unity-gain stable, ultra high-speed voltage feedback amplifiers with FET inputs. These amplifiers were developed with the Analog Devices, Inc., proprietary eXtra Fast Complementary Bipolar (XFCB) process, which allows the amplifiers to achieve ultra low-noise ( $4 \text{ nV}/\sqrt{\text{Hz}}$ ;  $2.5 \text{ fA}/\sqrt{\text{Hz}}$ ) as well as very high input impedances.

With 1.3 pF of input capacitance, low-noise ( $4 \text{ nV}/\sqrt{\text{Hz}}$ ), low offset voltage (2 mV maximum), and 1050 MHz -3 dB bandwidth, the ADA4817-1/ADA4817-2 are ideal for data acquisition front ends as well as wideband transimpedance applications, such as photodiode preamps.

With a wide supply voltage range from 5V to 10V, and the ability to operate on either single or dual supplies, the ADA4817-1/ADA4817-2 are designed to work in a variety of applications including active filtering and A/D converter driving.

The ADA4817-1 is available in a 3 mm x 3 mm, 8-lead LFCSP and 8-lead SOIC, and the ADA4817-2 is available in a 4 mm x 4 mm, 16-lead LFCSP. These packages feature a low distortion pinout that improves second harmonic distortion and simplifies circuit board layout. These products are rated to work over the extended industrial temperature range (-40°C to +105°C).

#### Applications

- Photodiode amplifiers
- Data acquisition front ends
- Instrumentation
- Filters
- A/D converter drivers
- CCD output buffers

#### Features

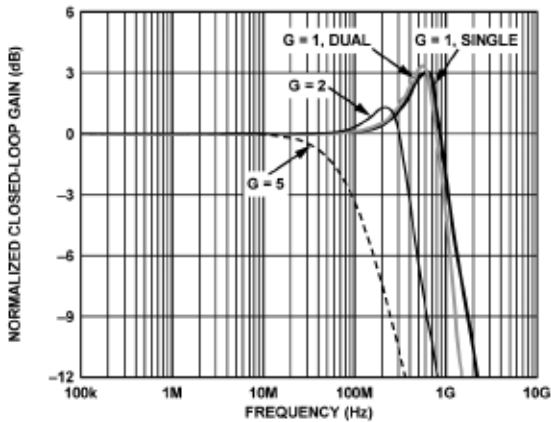
- High speed
  - -3 dB bandwidth ( $G = 1$ ,  $R_L = 100\Omega$ ): 1050 MHz
  - Slew rate:  $870 \text{ V}/\mu\text{s}$
  - 0.1% settling time: 9 ns
- Low input bias current: 2 pA
- Low input capacitance
  - Common-mode capacitance: 1.3 pF
  - Differential-mode capacitance: 0.1 pF
- Low noise
  - $4 \text{ nV}/\sqrt{\text{Hz}}$  at 100 kHz
  - $2.5 \text{ fA}/\sqrt{\text{Hz}}$  at 100 kHz
- Low distortion
  - -90 dBc at 10 MHz ( $G = 1$ ,  $R_L = 1 \text{ k}\Omega$ )
- Offset voltage: 2 mV maximum
- High output current: 40 mA
- Supply current per amplifier: 19 mA
- Power-down supply current per amplifier: 1.5 mA

#### Theory of Operation

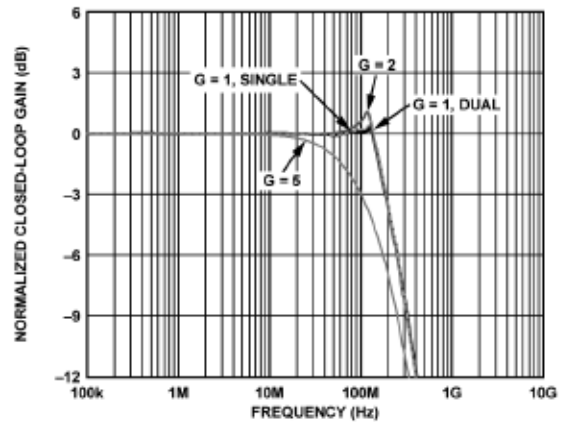
The ADA4817-1/ADA4817-2 are voltage feedback operational amplifiers that combine new architecture for FET input operational amplifiers with the eXtra Fast Complementary Bipolar (XFCB) process from Analog Devices, resulting in an outstanding combination of speed and low noise. The innovative high-speed FET input stage handles common-mode signals from the negative supply to within 2.7V of the positive rail. This stage is combined with an H-bridge to attain a  $870 \text{ V}/\mu\text{s}$  slew rate and low distortion, in addition to  $4 \text{ nV}/\sqrt{\text{Hz}}$  input voltage noise. The amplifier features a high-speed output stage capable of driving heavy loads sourcing and sinking up to 40 mA of linear current. Supply current and offset current are laser trimmed for optimum performance. These specifications make the ADA4817-1/ADA4817-2 a great choice for high speed instrumentation and high resolution data acquisition systems. Its low-noise, picoamp input current, precision offset, and high-speed make them superb preamps for fast photo-diode applications.

## Typical Performance Characteristics

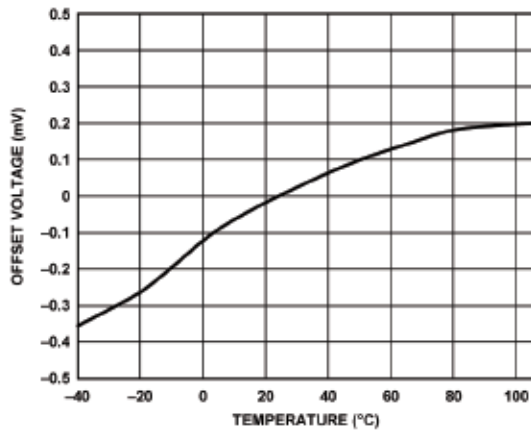
$T_A = 25^\circ\text{C}$ ,  $V_S = \pm 5\text{ V}$ ,  $G = 1$ , ( $R_F = 348\ \Omega$  for  $G > 1$ ),  $R_L = 100\ \Omega$  to ground, small signal  $V_{OUT} = 100\text{ mV p-p}$ , large signal  $V_{OUT} = 2\text{ V p-p}$ , unless noted otherwise.



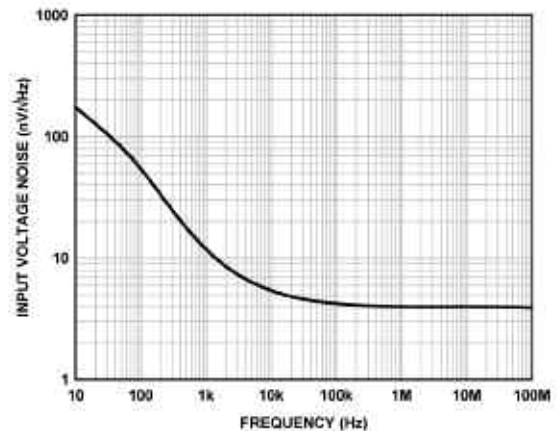
Small Signal Frequency Response for Various Gains (LFCSP)



Large Signal Frequency Response for Various Gains



Offset Voltage vs. Temperature



Input Voltage Noise

## Ordering Guide

Model	Temperature Range	Package Description	Package Option
ADA4817-1ACPZ-R2 <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	8-lead LFCSP_VD	CP-8-2
ADA4817-1ACPZ-RL <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	8-lead LFCSP_VD	CP-8-2
ADA4817-1ACPZ-R7 <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	8-lead LFCSP_VD	CP-8-2
ADA4817-1ARDZ <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	8-lead SOIC_N_EP	RD-8-1
ADA4817-1ARDZ-RL <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	8-lead SOIC_N_EP	RD-8-1
ADA4817-1ARDZ-R7 <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	8-lead SOIC_N_EP	RD-8-1
ADA4817-2ACPZ-R2 <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	16-lead LFCSP_VQ	CP-16-4
ADA4817-2ACPZ-RL <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	16-lead LFCSP_VQ	CP-16-4
ADA4817-2ACPZ-R7 <sup>1</sup>	-40 $^\circ\text{C}$ to +105 $^\circ\text{C}$	16-lead LFCSP_VQ	CP-16-4

Notes

<sup>1</sup> Z = RoHS compliant part.

For more information, such as datasheets and app notes, visit [www.arrow.com/arrowedge](http://www.arrow.com/arrowedge).