ANALOG DEVICES
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ADA4177 FAMILY

Robust, Precision Op Amps: Single, Dual, and Quad Versions

Setting Industry Standards for Robustness

On-Chip Protection ...

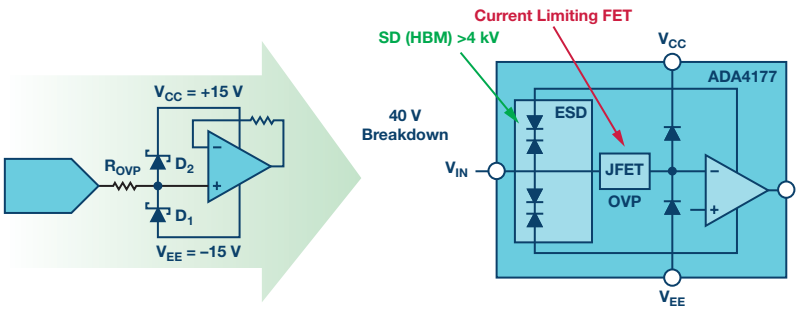
Means less external circuitry leading to smaller end systems.

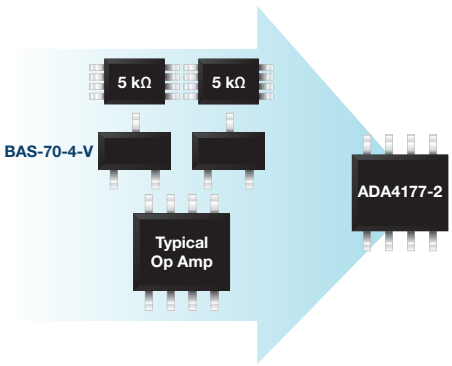
Improved Dynamic Range ....

Measures smaller signals and improves system precision.

Ease of Operation ...

Integrated rail-to-rail output enables quick and easy sensor interfacing, reducing design complexity.





Performance Efficiency

Performance Leadership

- Rail-to-rail output swing
- Low offset voltage: 60 µV max
- Low offset voltage drift: 1 µV/°C max

Fast and Power Efficient

- 3.5 MHz gain bandwidth
- Low voltage noise density: 8 nV/√Hz typical at 1 kHz
- 560 µA max at 25°C

Protection Leadership

- ±32 V overvoltage protection (above and below the supply voltage rail)
- Integrated EMI filter: 70 dB typical rejection at 1 GHz and 90 dB typical rejection at 2.4 GHz

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Overview

The ADA4177 family is composed of low noise, low bias current op amps with overvoltage and electromagnetic interference (EMI) protection. With single, dual, and quad versions, they all offer ±32 V input over voltage protection (OVP) on-chip, leading to a reduced bill of materials cost and board space by eliminating the need for external OVP discretes.

With the dual advantage of simplifying system design and making the end system easier to pass EMI susceptibility testing by including integrated EMI filtering on inputs, the parts meet an impressive 70 dB of rejection at 1000 MHz.

For precision instrumentation, end systems can be made smaller due to the integrated OVP and EMI. There is no need to calibrate the system over time or temperature change leading to increased uptime and reduced cost of ownership. This is due to the ultralow offset voltage and drift specifications.

For the ultimate end system precision and linearity, features such as the rail-to-rail output adds value for designers that need additional dynamic range to measure the smallest level signals. Low noise performance complemented by excellent dc precision and ac accuracy specifications minimize the need for design trade-offs, especially for small form factor end systems where low power dissipation is needed.

For process control sensor interfaces such as thermocouples, RTDs, and strain gages, the sensor may be off board exposing the op amp inputs to overvoltage and EMI. Therefore, the on-chip robust protection is a key advantage in space constrained modules. The ADA4177 family robust inputs combined with low supply current and consistent specification over a wide range allows them to be used as input module front-end amplifiers with signal swings compatible to industry standards, and especially for small form factor, USB-powered applications where low power and small packages are critical.

The drive for increased productivity within all industrial environments is driving PCL and DCS systems to incorporate more and more channels to facilitate more process node monitoring. The multichannel versions lead to greater efficiencies within the end system, which ultimately lower the cost of the system and simplify design.

The ADA4177 Family Advantages

- Single, dual, and quad models available (ADA4177-2, ADA4177-2, ADA4177-4)
- Reduces design and layout complexity; removes the complexity of developing protection circuitry
- Reduces PCB system board area
- Reduces design time and ultimately time to market.

Robust, Precision Op Amps

- Gain bandwidth product (A_V = +100): 3.5 MHz typical
- Unity-gain crossover (A_V = +1): 3.5 MHz typical
- –3 dB bandwidth (A_V = +1): 6 MHz typical
- Overvoltage protection to 32 V above and below the supply voltage rail
- Integrated EMI filters
- 70 dB typical rejection at 1000 MHz
- 90 dB typical rejection at 2400 MHz
- Offset voltage (max): 60 µV
- Offset voltage drift (max) : 1 µV/°C
- Voltage noise(typ): 8 nV/$\sqrt{Hz}$
- Input bias current (max): 1 nA
- Signal voltage gain (AVO): 100 dB minimum over full supply

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