

LMP2012WGLQMLV Dual Channel, High Precision, Rail-to-Rail Output Operational Amplifier

Ultra Low Input Offset Voltage, No 1/f Noise, Unparalleled Levels of Accuracy and Stability over Time and Temperature



Description

The LMP2012WGLQMLV is a dual channel, high precision, rail-to-rail output operational amplifier which uses a patented design to measure and continually correct the input offset error voltage and eliminates unwanted 1/f voltage and current noise found in traditional amplifiers. The result is an ultra high-precision amplifier with unparalleled accuracy and stability over time and temperature. Operating from a supply of 2.7V to 5V, the LMP2012WGLQMLV consumes a low 920 μA of current per channel. The superior performance makes it ideal for use in transducer amplifiers, high-gain configurations, Analog-to-Digital Converter (ADC) buffer amplifiers and Digital-to-Analog Converter (DAC) current-to-voltage conversion, which are used in many satellite applications.

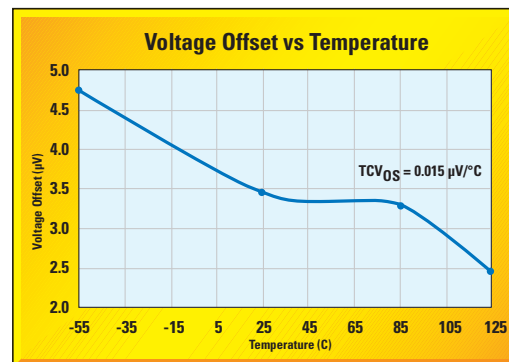
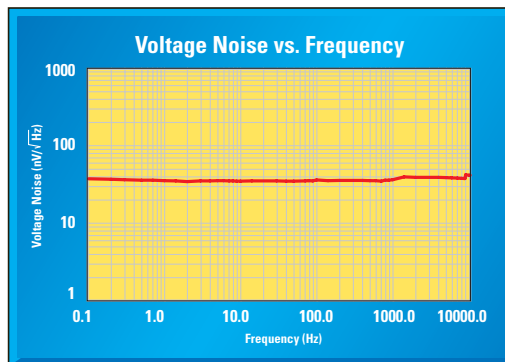
By employing patented techniques to continuously monitor the input offset and correcting this error, the LMP2012WGLQMLV achieves a low input offset voltage of 60 μV over time and temperature. The device displays an excellent Common-Mode Rejection Ratio (CMRR) of 130 dB, thereby reducing common mode errors, and a power supply rejection ratio (PSRR) of 120 dB. In addition, the amplifier yields a slew rate of 4 V/ μs , a wide gain-bandwidth product of 3 MHz for accurate signal amplification, an input-referred voltage noise of 35 nV/ $\sqrt{\text{Hz}}$ and an open loop gain greater than 130 dB.

The LMP2012WGLQMLV is available in a 10-pin ceramic gullwing flat package and is space-grade qualified to MIL-STD-38535 QML level V. In addition, the LMP2012WGLQMLV is radiation tested to 50 krad(Si) for Total Ionizing Dose (TID) and operates over the extended operating temperature range of -55°C to $+125^{\circ}\text{C}$.

Features

- No 1/f noise
- Dual channel
- Rail-to-rail output
- 2.7V to 5V supply
- Fast overload recovery
- No external capacitors required
- Hermetic 10-pin ceramic gullwing flat package
- 50 krad(Si) for TID
- Operating temperature: -55°C to 125°C

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Benefits

1/f noise increases as frequency decreases – a major source of measurement error in all DC-coupled measurements. This low frequency noise appears as a constantly-changing signal in series with any measurement, and therefore corrupts the result. The LMP2012WGLQMLV uses patented methods to eliminate this 1/f noise present in other amps. The result is an amplifier with unsurpassed data accuracy over any measurement period of time. It is ideal for slow varying transient signals found in satellite sensing applications such as attitude and orbital controls, sun and inertial sensors, gyroscopes, pressure sensors, static earth sensing, bolometers, and earth observation systems. Another feature is a high DC accuracy typically associated with chopper-stabilized amplifiers; however the LMP2012WGLQMLV does not have the major drawbacks produced by chopping. Chopping-stabilized amps produce many mixing products and therefore large amounts of distortion when the signal frequency approaches the chopping frequency. This error is corrected in the LMP2012WGLQMLV by using a continuously monitored input offset. Additionally, chopper-stabilized amplifiers use large capacitors to store the unadjusted offset voltage which can result in 250 ms to several seconds of recovery time from an overload. Recovery from driving the LMP2012WGLQMLV to 2X the full scale output only requires about 40 ms. Additionally, this amplifier does not require any external capacitors.

Performance

- Input offset voltage of 60 μV over time and temperature
- CMRR of 130 dB
- PSRR of 120 dB
- Supply current per channel of 920 μA
- Open loop voltage gain of 130 dB
- Gain bandwidth product of 3 MHz
- Slew rate of 4 V/μs
- Input-referred voltage noise of 35 nV/√Hz

Application

- Attitude and orbital control systems
- Sun and inertial sensors
- Gyroscopes
- Pressure sensors
- Static earth sensing
- Bolometers and earth observation systems
- Applications requiring precision and long term stability

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The Sight & Sound of Information

For more information on the LMP2012WGLQMLV, and National's full space portfolio, visit:
www.national.com/appinfo/space