

High Performance Accelerometer with Dual Spectrum Signal Processing

Data Sheet

ADXL195/ADXL295

FEATURES

Single-axis (ADXL195) and dual-axis (ADXL295) configurations ±120 g baseband acceleration channel 12-bit resolution at 62.5 mg/LSB 512 kHz data interpolation rate 40 g_{AVG} high frequency signal processing channel 10-bit resolution at 83.3 mg avg/LSB 128 kHz data interpolation rate Sensor frequency response down to dc **On-demand electromechanical self-test On-demand HF signal injection self-test** Fully differential circuitry for high resistance to EMI/RFI Independent x- and y-axis sense structures for robust **FMEA** performance Independent x- and y-axis arming thresholds Low noise 1 LSB rms (12-bit baseband acceleration channel) 2 LSB rms (10-bit high frequency acceleration channel) **Qualified for automotive applications**

Temperature range: -40°C to +105°C

3.3 V and 5 V operation

APPLICATIONS

Enhanced crash sensing Shock detection

FUNCTIONAL BLOCK DIAGRAM ARM X SELF STATE MACHINE ARM) ARMING FUNCTION/ ŧ HF SELF-TEST GND EPAD NTERPOLATION OFFSET/ NC³ + FIR FILTE OFFSET CANCELLATIO ┥┨┨┝ REGISTERS/MEMORY SPI INTERFACE IIR. SINC. FIF AND-PAS MOS LOW-PASS FILTERS ERPOLATIC X-AXIS ΤO 23kHz 3dB AT 393H SCLK MUX TERPOLATION OFFSET/ ENSITIVITY Σ-Δ MOD SINC³ + FIR FILTEF -3dB AT 408Hz OFFSET ANCELLATIO DEVICE ID VOLTAGE OTP TRIM Y-AXIS VREG SENSOE CONFIGURATION TIMING

Figure 1.

For more information about the ADXL195/ADXL295, please contact the Analog Devices, Inc., Customer Interaction Center at http://www.analog.com/en/content/technical_support_page/fca.html to connect with a technical support specialist.

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GENERAL DESCRIPTION

The ADXL195/ADXL295 are dual spectrum accelerometers that measure baseband acceleration in up to two axes (XL-X and XL-Y), as well as high frequency (HF) acceleration energy. Identical, independent X and Y sense structures are implemented to achieve the best possible fail-safe performance.

The XL-X and XL-Y channels output baseband acceleration information with a nominal full-scale range of $\pm 120 g$ and a bandwidth of 408 Hz. The acceleration data is provided as a 12-bit, twos complement word with a resolution of 62.5 mg/LSB.

HF acceleration within the frequency band of 15.5 kHz to 23 kHz is rectified and filtered to generate an average g (g_{AVG}) energy measurement. The HF channel has a nominal full-scale range of 40 g_{AVG} and a bandwidth of 393 Hz. When combined with the XL-X and XL-Y information, HF acceleration information allows for enhanced vehicle impact detection and discrimination.

The ADXL195/ADXL295 are available in a 16-lead, narrow-body SOIC package with an exposed pad. The ADXL195/ADXL295 can operate at 3.3 V and 5 V and are specified for operation from -40° C to $+105^{\circ}$ C.

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ADXL195/ADXL295

NOTES

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