Dual-Axis, 60 *g* to 480 *g* Sensor with SPI and PSI5

ADXL251

FEATURES

User selectable sensor *g* ranges: ±60 *g*, ±120 *g*, ±240 *g*, ±480 *g*
Dual x-axis and y-axis sensor
Compliant to PSI5 Version 2.1 airbag substandard
  Synchronous operation
    PSI5-P10P-500/3L and others
  Daisy-chain operation with bidirectional communication
Application level serial peripheral interface (SPI)
  communication
Selectable 16-bit or 10-bit sensor data
Independently programmable *g* range and time slot for each
  axis
Independent fault discrimination for each axis
Fully differential analog signal chain
0.25 µs data interpolation routine
User selectable, continuous auto-zero operation
High resistance to electromagnetic interference (EMI) and
  radio frequency interference (RFI)
SPI mode supply voltage: 3.3 V and 5 V, +5%
PSI5 mode supply voltage range: 4.5 V to 11.0 V
Qualified for automotive applications

APPLICATIONS

Front impact crash sensing
Side impact crash sensing

GENERAL DESCRIPTION

The ADXL251 is a dual-axis, integrated satellite sensor with user selectable *g* ranges, compliant to the PSI5 Version 2.1 airbag substandard, and backwards compliant to PSI5 Version 1.3. The ADXL251 (x-axis/y-axis) enables low cost solutions for front impact and side impact airbags, as well as satellite sensor and electronic control unit (ECU) main sensor applications. Acceleration data is sent to the control module via a digital, 2-wire current loop PSI5 bus. Communication via the SPI bus is also available for ECU applications.

The device uses an ECC protected one time programmable (OTP) memory. The sensor *g* range is configurable to provide full-scale measurement of ±60 *g*, ±120 *g*, ±240 *g*, or ±480 *g* acceleration. The user can program each axis independently with multiple *g* ranges in different time slots. In PSI5 mode, there are four programmable time slots available. The device transmits 16-bit or 10-bit acceleration data to the control module, and can be configured to include either a 1-bit parity check, or a 3-bit cyclic redundancy check (CRC).

The ADXL251 is available in a 4 mm × 4 mm LFCSP package and is specified to operate over the full automotive temperature range, −40°C to +125°C.
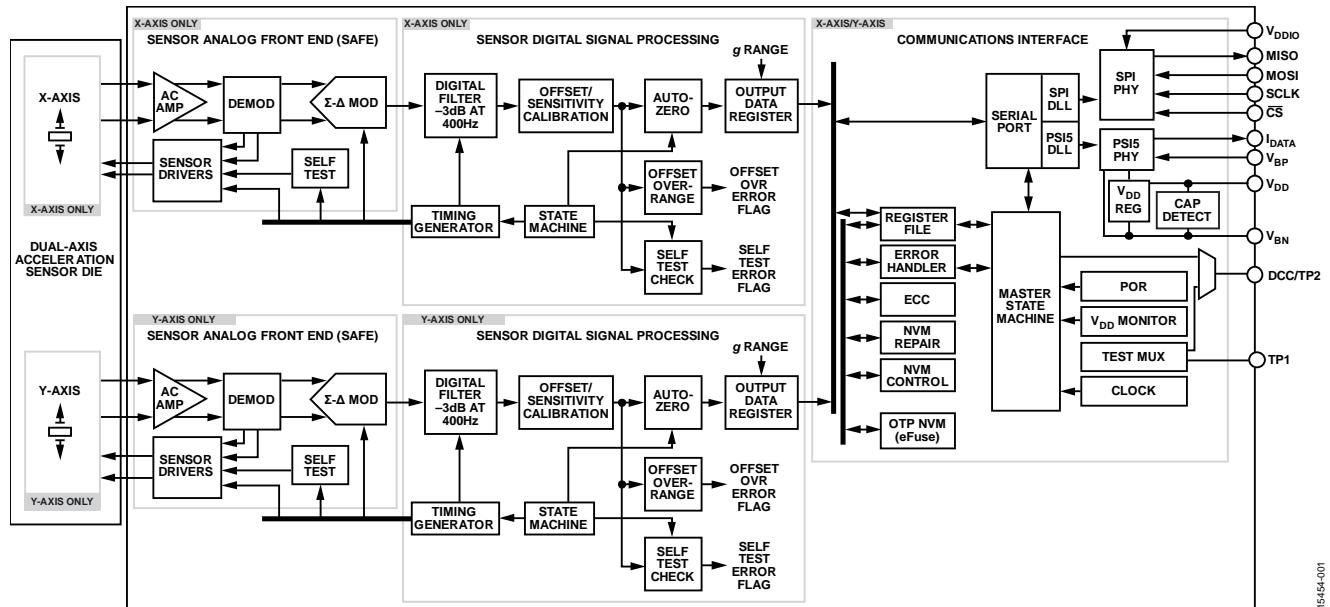
FUNCTIONAL BLOCK DIAGRAM

Figure 1.

For more information about the ADXL251, contact the Analog Devices, Inc., Customer Interaction Center at http://www.analog.com/technical_support to connect with a technical support specialist.

One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.
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COMPARABLE PARTS 🗖

View a parametric search of comparable parts.

DOCUMENTATION 🗖

Data Sheet

- ADXL251: Dual-Axis, 60 g to 480 g Sensor with SPI and PSI5 Data Sheet

DESIGN RESOURCES 🗖

- ADXL251 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

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