Low Noise, Low Power, Wide Bandwidth, 3-Axis MEMS Accelerometer

FEATURES

- Ultralow noise density: 20µg/√Hz (XY) and 27µg/√Hz (Z)
- Low power consumption: 340µA
- Wide bandwidth: 4kHz
  - Relative flatness with digital correction (<3.8kHz): 0.5dB
  - Relative flatness without digital correction (<2.5kHz) : 2dB
- Low latency
  - Group delay <110µs for I^{2}S/TDM
  - Group delay <50µs for PDM
- Digital features
  - 16-bit ADC
  - Multiprotocol serial interfaces: SPI or I^{2}C
  - Multiprotocol audio data output: I^{2}S, TDM, and PDM
  - Programmable LPF and HPF
  - Data synchronous or asynchronous sampling
  - Output FIFO: 320 word
- Built-in features for system-level power savings
  - Configurable interrupt modes
- Integrated temperature sensor
- Voltage range options
  - V_S with internal regulators: 2.25V to 3.6V (or V_{1P8} at 1.8V)
  - V_{DDIO}: 1.14V to 3.6V (1.62V to 3.6V for full temperature range)
- Electromechanical self test
- 10,000g mechanical shock
- RoHS compliant
- Operating temperature range: −40°C to +125°C
- 14-terminal, 2.9mm × 2.8mm × 0.87mm, LGA package
- AEC-Q100 qualified for automotive applications
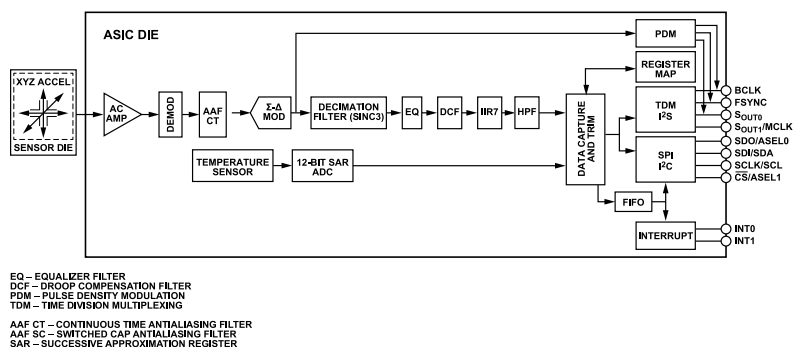
GENERAL DESCRIPTION

The ADXL318 is a low noise density, low power, 3-axis accelerometer with selectable measurement ranges. The ADXL318 supports the ±4g, ±8g, and ±16g ranges.

The ADXL318 offers industry leading noise, enabling precision applications with minimal calibration. The low noise and low power ADXL318 enables accurate measurements of audio signals even in high vibration environments.

The ADXL318 multifunction pin names may be referenced only by their relevant function for either the serial peripheral interface (SPI) or inter-IC (I^{2}C) interface, or these pin names can be referenced by their audio function (pulse density modulation (PDM), inter-IC sound (I^{2}S), or time division multiplexing (TDM)).

In addition to its low power consumption, the ADXL318 has many features to enable true system level performance. These features include a built-in micropower temperature sensor, interrupts, and first in, first out (FIFO). In addition, the ADXL318 has provisions for external control of the sampling time and/or an external clock.

The ADXL318 operates on a wide, 2.25V to 3.6V supply range (or 1.8V supply) and can interface, if necessary, to a host operating on a separate supply voltage. The ADXL318 is available in a 14-terminal, 2.9mm × 2.8mm × 0.87mm, LGA package, and it is specified to operate over the full Grade 1 automotive temperature range.

APPLICATIONS

- Automotive road noise cancellation (RNC)
- Condition-based monitoring
- Robotics

FUNCTIONAL BLOCK DIAGRAM

EQ – EQUALIZER FILTER
DCF – DROOP COMPENSATION FILTER
PDM – PULSE DENSITY MODULATION
TDM – TIME DIVISION MULTIPLEXING

AAF CT – CONTINUOUS TIME ANTIALIASING FILTER
AAF SC – SWITCHED CAP ANTIALIASING FILTER
SAR – SUCCESSIVE APPROXIMATION REGISTER

Figure 1. Functional Block Diagram

For more information on the ADXL318, contact your local Analog Devices, Inc., sales office or contact mems_support@analog.com.

DOCUMENT FEEDBACK

TECHNICAL SUPPORT

NOTES