![ANALOG DEVICES]

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

## FEATURES

- Ultralow noise density:
  - 20 µg/√Hz (XY), 27 µg/√Hz (Z)
- Low power consumption
  - High performance: 340 µA
  - Ultra low power: 33 µA
- Wide bandwidth: 4 kHz
  - Relative flatness with equalization: <0.6 dB
- Low latency
  - Group delay: <110 µs
- Digital features
  - 16-bit ADC
  - Multiprotocol serial interfaces: SPI or I2C
  - Multiprotocol audio data output: I$^2$S, TDM, and PDM
  - Programmable low-pass filter and high-pass filter
  - Data synchronous or asynchronous sampling
  - Output FIFO: 320 word
- Built-in features for system-level power savings
  - Single tap, double tap, and triple tap detection
  - Activity and inactivity detection
  - Configurable interrupt modes
- Integrated temperature sensor
- Voltage range options
  - $V_{SUPPLY}$ with internal regulators: 2.25 V to 3.6 V (or $V_{1P8}$ at 1.8 V)
  - $V_{DDIO}$: 1.14 V to 3.6 V (1.62 V to 3.6 V for full temperature range)
- Electromechanical self test
- 20,000 $g$ shock survival
- RoHS compliant
- Operating temperature range: −40°C to +85°C
- 14-terminal, 2.9 mm × 2.8 mm × 0.87 mm, LGA plastic package

## APPLICATIONS

- Audio and active noise cancellation (ANC)
- Wearables and low power motion detection
- Robotics
- Structural health monitoring
- Seismic Imaging

## GENERAL DESCRIPTION

The ADXL380 is a low noise density, low power, 3-axis accelerometer with selectable measurement ranges. The ADXL380 supports the ±4 g, ±8 g, and ±16 $g$ range options.

The ADXL380 offers industry leading noise, enabling precision applications with minimal calibration. The low noise and low power ADXL380 enables accurate measurement in high vibration environments.

The ADXL380 multifunction pin names can be referenced only by their relevant function for either the serial peripheral interface (SPI) or I$^2$C interface, or these pin names can be referenced by their audio function (PDM, I$^2$S, or TDM).

In addition to its low power consumption, the ADXL380 has many features to enable true system level performance. These features include a built-in micropower temperature sensor; single, double, and triple tap detection; and a state machine to prevent false triggering. In addition, the ADXL380 has provisions for external control of the sampling time and/or an external clock.

The ADXL380 operates on a wide, 2.25 V to 3.6 V supply range (or 1.8 V supply) and can interface, if necessary, to a host operating on a separate supply voltage. The ADXL380 is available in a 14-lead, 2.9 mm × 2.8 mm × 0.87 mm, LGA plastic package.
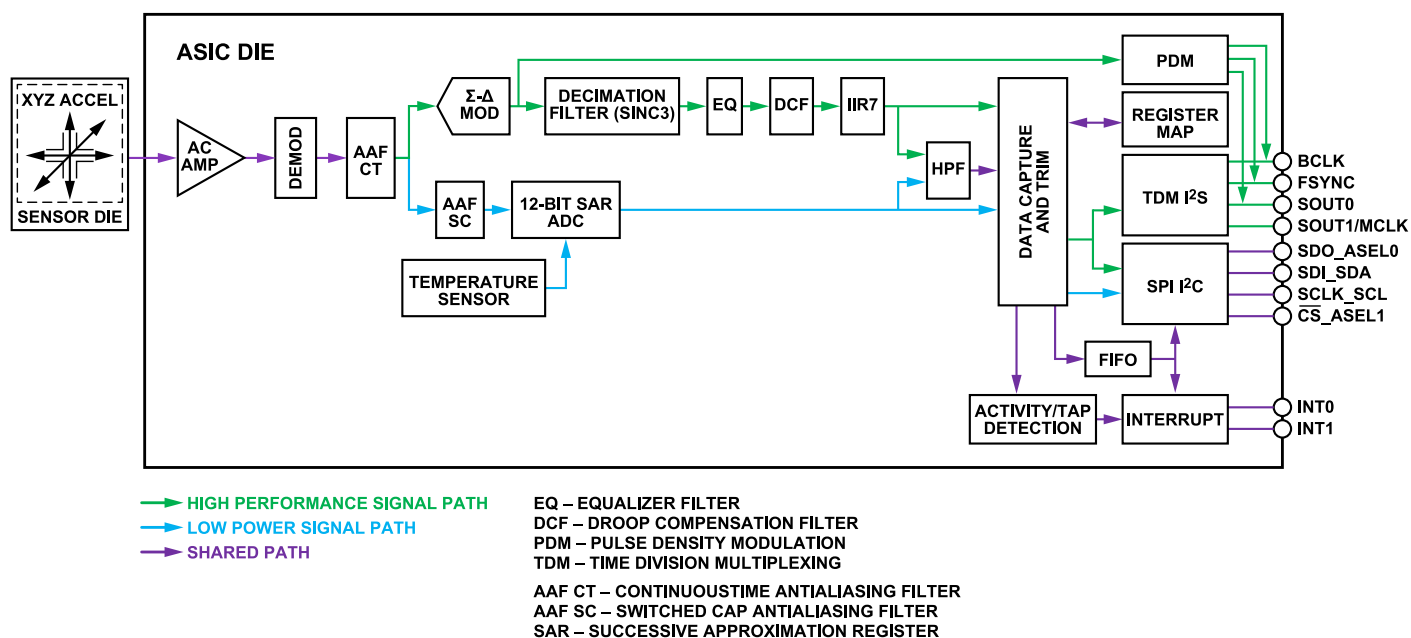
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## FUNCTIONAL BLOCK DIAGRAM



*Figure 1. Functional Block Diagram*