

AIS326DQ: 3-axis accelerometer for automotive applications

High-resolution, SPI interface, wake-up interrupt, selectable g-range, operation from -40 to +105 °C



The AIS326DQ is the first automotive qualified low-g accelerometer from **STMicroelectronics** for non-safety applications.

This highly-efficient device is a robust motion sensor that measures accelerations of up to +/-2 g or +/-6 g in all 3 axes, and can survive shocks up to 10,000 g. Powered by a single 3.3 V supply, it is able to communicate via an SPI digital interface with common microcontrollers.

This product is based on STMicroelectronics' technology for high-volume MEMS motion sensors and is qualified according to AEC-Q100.

Applications

- In anti-theft systems, the 3-axis accelerometer can sense the inclination of a car or motorbike. If a tow truck is used to steal a vehicle, the accelerometer detects small changes in inclination and activates the security system.
- The accelerometer signal can be used to identify a severe accident. The doors can be unlocked to allow rescuers to enter the car and save the passengers.
- In crash recording, the accelerometer detects a collision, and all relevant data can be recorded for later analysis.
- In car navigation, the accelerometer can assist the GPS if the signal is lost. A dead reckoning system continues tracking movements while the satellite signals are not being received or where they are not sufficiently accurate.

In general, the accelerometer can be used for non-safety automotive applications such as:

- Car alarms
- Vehicle tracking
- Black boxes
- Trailer tracking
- Abuse monitoring
- Seat controls
- Navigation support (dead reckoning)
- Antenna positioning

In the industrial field:

- Vibration in heavy duty and special machinery
- Container black boxes

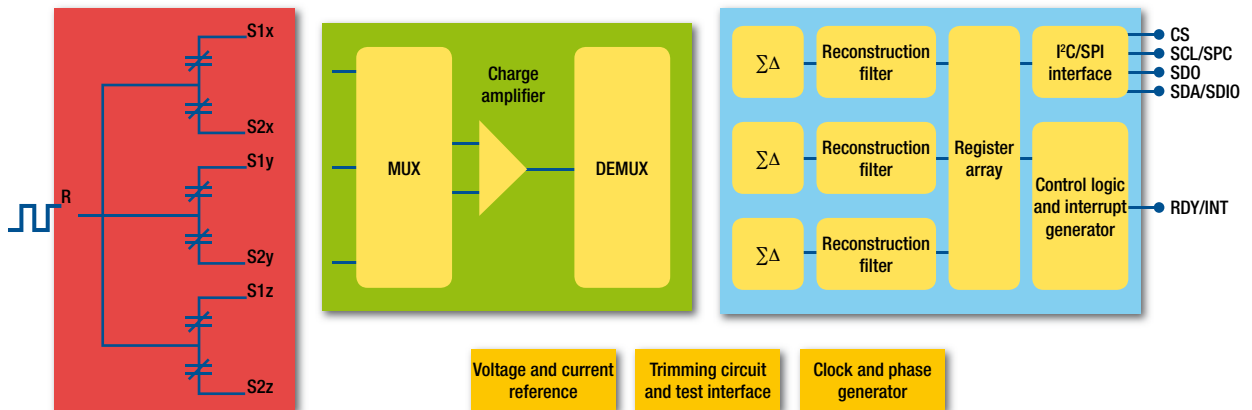
Key features

The AIS326DQ converts acceleration signals coming from motion or tilting of the sensor into a high-resolution digital signal that can be transmitted with high reliability in the automotive environment via the SPI to a microcontroller.

- Motion sensor +/-2 g and +/-6 g full scale range, user selectable.
- High resolution of up to 12 bits: can detect small changes in inclination of less than 1/10 of a degree of tilt.
- The extended temperature range from -40 to 105 °C allows use of the sensor inside the cabin and inside modules that have self-heating components such as power stages.

- The SPI digital output allows trouble-free transport of sensor data to the microcontroller – I²C is also supported.
- An embedded programmable high- and low-pass filter helps look at the band of interest of the application.
- With the embedded self-test, the user can verify at any time that the sensor is working.
- Wake-up interrupt generation.
- ECO-PACK compliant, state-of-the-art packaging.
- Robust sensor: 10,000 g shock survivability.

Product block diagram



The AIS326DQ 3-axis digital accelerometer includes a MEMS sensor chip that changes capacitance in response to movement or inclination. In the same package, there is a trimmed interface with an embedded 12-bit A/D converter that translates this capacitance change into a digital word that can be read by the serial interface.



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