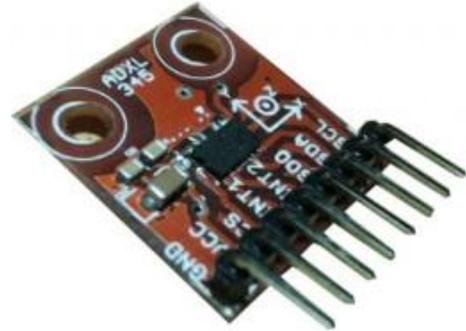


3 Axis Accelerometer ADXL345

The ADXL345 is a small, thin, low power, 3-axis accelerometer with high resolution (13-bit) measurement at up to ± 16 g. Digital output data is formatted as 16-bit twos complement and is accessible through either a SPI (3- or 4-wire) or I2C digital interface. The ADXL345 is well suited for mobile device applications. It measures the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion or shock. Its high resolution (4 mg/LSB) enables measurement of inclination changes less than 1.0° . Several special sensing functions are provided. Activity and inactivity sensing detect the presence or lack of motion and if the acceleration on any axis exceeds a user-set level. Tap sensing detects single and double taps. Free-fall sensing detects if the device is falling. These functions can be mapped to one of two interrupt output pins. An integrated, patent pending 32-level first in, first out (FIFO) buffer can be used to store data to minimize host processor intervention. Low power modes enable intelligent motion-based power management with threshold sensing and active acceleration measurement at extremely low power dissipation.



Features

- Ultralow power: as low as $40\mu\text{A}$ in measurement mode and μA in stand by mode.
- Power consumption scales automatically with bandwidth user selectable resolution.
- Embedded, patent pending FIFO technology minimizes host processor load tap/double tap detection.
- Activity/inactivity monitoring.
- Free fall detection.
- SPI and I2C digital interfaces.
- Measurement ranges selectable via serial command.

- Bandwidth selectable via serial command.
- Pb free/RoHS compliant.
- 10,000g shock survival.

Applications

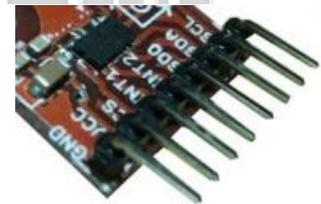
- Handsets.
- Medical instrumentation.
- Gaming and pointing devices.

Specifications

Parameter	Value
Supply voltage	2v to 3.6v
IO voltage range	1.7v to VS
Temperature range	-40C to +85C

Pin Details

Pin	Name	Details
1	GND	Power supply gnd
2	vcc	Power supply
3	CS	Chip select
4	INT1	Interrupt 1 output
5	INT2	Interrupt 2 output
6	SDO	Serial data output
7	SDA	Serial data
8	SCL	Serial clock



Working

The ADXL345 is a complete 3-axis acceleration measurement system with a selectable measurement range of ± 2 g, ± 4 g, ± 8 g, or ± 16 g. It measures both dynamic acceleration resulting from motion or shock and static acceleration, such as gravity, that allows the device to be used as a tilt sensor.

The sensor is a polysilicon surface-micro machined structure built on top of a silicon wafer. Polysilicon springs suspend the structure over the surface of the wafer and provide a resistance against forces due to applied acceleration.

Deflection of the structure is measured using differential capacitors that consist of independent fixed plates and plates attached to the moving mass. Acceleration deflects the proof mass and unbalances the differential capacitor, resulting in a sensor output whose amplitude is proportional to acceleration. Phase-sensitive demodulation is used to determine the magnitude and polarity of the acceleration.

Power can be applied to VS or VDD I/O in any sequence without damaging the ADXL345. The interface voltage level is set with the interface supply voltage, VDD I/O, which must be present to ensure that the ADXL345 does not create a conflict on the communication bus. For single-supply operation, VDD I/O can be the same as the main supply, VS. In a dual-supply application, however, VDD I/O can differ from VS to accommodate the desired interface voltage, as long as VS is greater than or equal to VDD I/O.

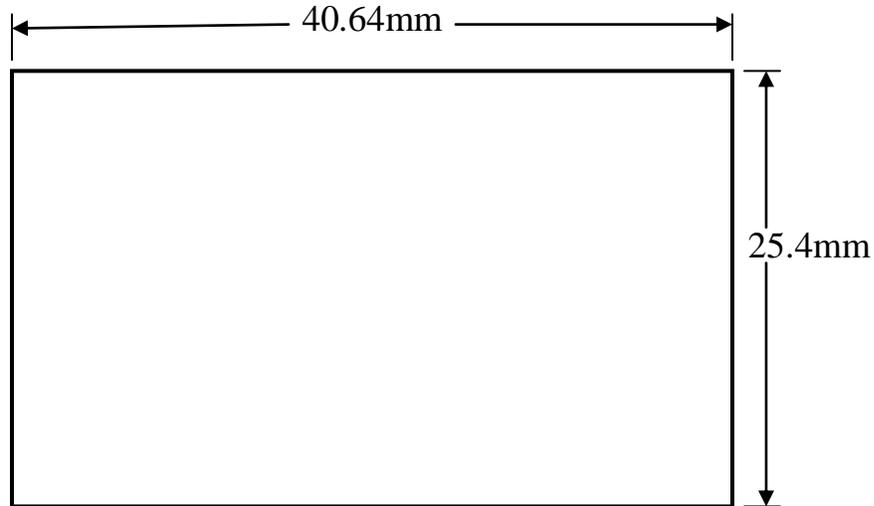
After VS is applied, the device enters standby mode, where power consumption is minimized and the device waits for VDD I/O to be applied and for the command to enter measurement mode to be received. In addition, while the device is in standby mode, any register can be written to or read from to configure the part. It is recommended to configure the device in standby mode and then to enable measurement mode. Clearing the measure bit returns the device to the standby mode.

Sample Application

To view sample code and schematic click the below link:

<http://researchdesignlab.com/index.php/sensors/3-axis-accelerometer-adxl345.html>

Board Dimensions



To buy this product click the below link

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