Sensors

MMA73xxL
XYZ three-axis low g analog acceleration sensor family

Overview

Freescale's MMA73xxL series is intended for any type of low g motion sensing in portable applications ranging from freefall detection for hard disk drives to user interfaces for portable electronics. For consumer electronics that require a fast response time, low current consumption, low voltage operation and a sleep mode in a small profile package, the MMA736xL, MMA734xL and MMA733xL are ideal solutions.

Freescale's MMA73xxL XYZ three-axis low g acceleration sensors are designed to detect on three axes, allowing your end application the freedom of movement and detection it needs. In addition, for multi-functional applications, these three-dimensional sensing devices allow you to select between 1.5g/6g, 3g/11g or 4g/12g levels of acceleration. This solution is ideal for end products or embedded systems requiring measurement of low g forces resulting from fall, tilt, motion, positioning, shock or vibration. Target markets include consumer, appliance, industrial, health care and computer peripherals. Freescale offers a broad portfolio of acceleration sensors for products ranging from cell phones and handheld devices to hard disk drives.

Key Features and Specifications

- Package: low-profile 14-pin 3 mm x 5 mm x 1 mm LGA
  - LGA volume is 71 percent smaller than quad flat no-lead (QFN) package
- XYZ: three axes of sensitivity in one device
- Selectable sensitivity for any of these values: 1.5g/6g, 3g/11g or 4g/12g
- Low current consumption: 400 μA
- Sleep mode: 3 μA
- Low-voltage operation: 2.2V–3.6V
- 0g-detect for freefall protection
- Self-test function
- Fast turn-on time: 1 ms

- Enable response time: 0.5 ms
- High sensitivity (800 mV/g @ 1.5g)
- Integrated signal conditioning with low pass filter
- High shock survivability up to 5,000g
- Restriction of Hazardous Substances (RoHS) compliant
- Environmentally preferable purchasing (EPP)
- Wide operating temperature range from -40°C to +85°C
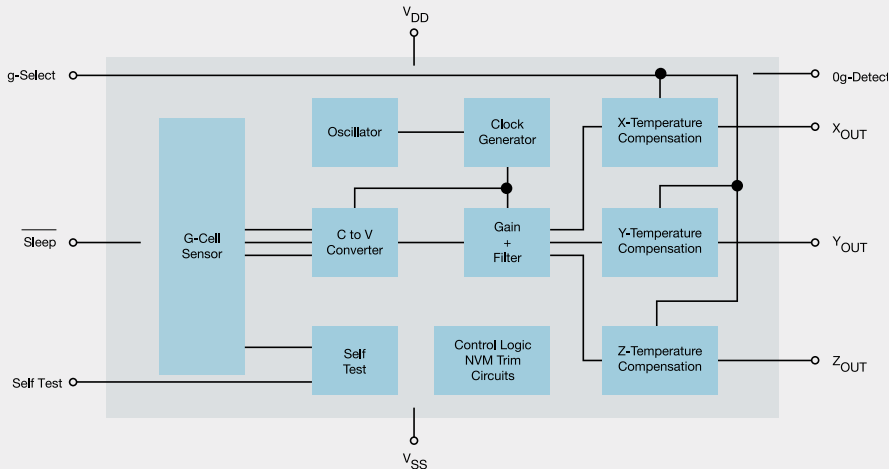- Cost effective

Benefits

- Smaller package size enables motion in handheld products
- Flexibility to select 1.5g or 6g, 3g or 11g and 4g or 12g of acceleration for multifunctional applications
- Low-power operation for extended battery life
- Fast power-up response time
- Sleep mode is ideal for handheld battery-powered electronics

- Freefall interrupt output—reduces the processing requirements of freefall detection
- Low component count—saves cost and space
- Highly sensitive with low noise
- Adaptable functionality
- High frequency and resolution for accurate fall, tilt, motion, positioning, shock and vibration sensing

Selector Guide

Part Number	Acceleration (g)	Sensitivity (mV/g)	Zero g Output (Typ) (V)	VDD Supply Voltage (Typical) (V)	I_{DD} (Typ) (μA)	Rolloff Frequency (Hz)	0g-Detect	Package
MMA7368L	1.5	800	1.65	3.3	400	400/300	No	LGA
MMA7360L / MMA736IL	1.5 or 6	800 or 200	1.65	3.3	400	400/300	Yes	LGA
MMA7340L / MMA734IL	3 or 11	440 or 118	1.65	3.3	400	400/300	No	LGA
MMA7330L / MMA733IL	4 or 12	308 or 84	1.4	2.8	400	400/300	No	LGA

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MMA73xxL Block Diagram

g-Levels Diagram

Freefall Detection: 1g–2g
Mobile HDD, Cell Phone,
PC Notebook, MP3 Player
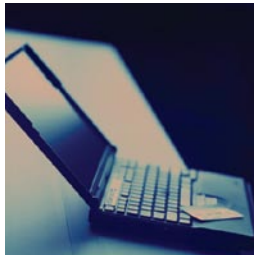
Tilt Control: 1g–2g
Movement Recognition,
User Interface,
Scrolling, Gaming
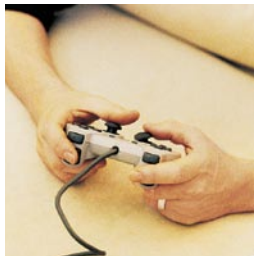
Vibration: 8g–10g
Motor Stability

1.5g   2.5g   5g   10g   20g
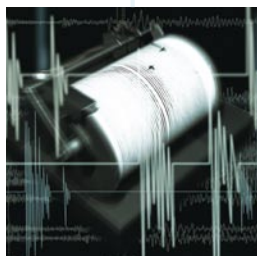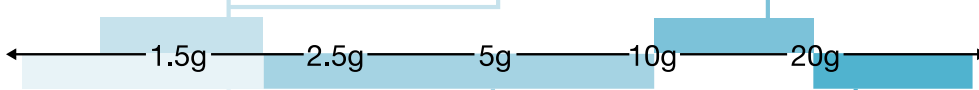
Seismometry: 0.002g–2g
Geophones,
Seismic Switches

Roll Over: 2g–8g
Axial, Skew

Pedometer: 10g–20g
Pace, Physiology

Target Applications

- Gaming
- Tilt and motion sensing
- Freefall detection for hard disk drives
- Anti-theft security for laptop PCs
- Warranty purpose recording
- MP3 players
- Image stability, text scroll and motion dialing for cell phones
- Pedometers
- Navigation and dead reckoning
- E-Compass tilt compensation
- Robotics
- Virtual reality input devices

Evaluation Kits

KIT3376MMA7361L
Evaluation board to demonstrate key accelerometer features

KIT3376MMA7341L
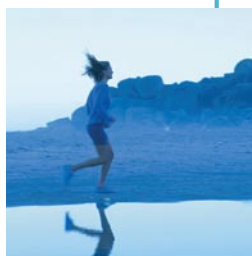Evaluation board to demonstrate key accelerometer features

KIT3376MMA7331L
Evaluation board to demonstrate key accelerometer features

Sensing Triple Axis Reference Design (STAR) Family of Development Tools

RD3172MMA7456L MMA7456L Accelerometer
ZigBee Sensing Triple Axis Reference Design (ZSTAR3)

RD3473MMA7360L MMA7360L Accelerometer
Wireless Sensing Triple Axis Reference Design (ZSTAR2)

RD3152MMA7260Q MMA7260Q Accelerometer
Wireless Sensing Triple Axis Reference Design (ZSTAR)

RD3112MMA7260Q MMA7260Q Accelerometer
Sensing Triple Axis Reference Design (STAR)

Learn More: For current information about Freescale products and documentation, please visit **www.freescale.com/sensors** or **www.freescale.com/xyz**

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