

MMA Series Acceleration Sensors

Freescale Semiconductor's micromachined accelerometer (MMA) series acceleration sensors are designed for end products or embedded systems that require measurement of forces resulting from fall, tilt, motion, positioning, shock or vibration. We offer a broad portfolio of acceleration sensors from 1.5g to 250g for applications ranging from highly sensitive seismic detection to robust collision detection.

Freescale's MMA series acceleration sensing capabilities derive from micro-electromechanical systems (MEMS) technology. The acceleration sensors incorporate a surface micromachined structure. The g-cell is coupled with an ASIC, which provides the accelerometer with amplification, signal conditioning, low-pass filter and temperature compensation. This two-chip solution serves as a system-in-a-package (SIP).

Device	Acceleration (g)	Sensing Axis	Sensitivity (mV/g)	Frequency (Hz)	VDD Supply Voltage (Typ) (V)	Zero g Output (Typ) (V)	Packaging
MMA7260Q*	1.5	XYZ	800	350/150	3.3	1.65	Quad Flat No-Lead (QFN)
MMA7260Q*	2	XYZ	600	350/150	3.3	1.65	Quad Flat No-Lead (QFN)
MMA7260Q*	4	XYZ	300	350/150	3.3	1.65	Quad Flat No-Lead (QFN)
MMA7260Q*	6	XYZ	200	350/150	3.3	1.65	Quad Flat No-Lead (QFN)
MMA6261Q	1.5	XY	800	300	3.3	1.65	Quad Flat No-Lead (QFN)
MMA6262Q	1.5	XY	800	150	3.3	1.65	Quad Flat No-Lead (QFN)
MMA6263Q	1.5	XY	800	900	3.3	1.65	Quad Flat No-Lead (QFN)
MMA2260D	1.5	X	1200	50	5.0	2.5	16-pin SOIC
MMA1260D	1.5	Z	1200	50	5.0	2.5	16-pin SOIC
MMA1270D	2.5	Z	750	50	5.0	2.5	16-pin SOIC
MMA1250D	5	Z	400	50	5.0	2.5	16-pin SOIC
MMA1220D	8	Z	250	250	5.0	2.5	16-pin SOIC
MMA6231Q	10	XY	120	300	3.3	1.65	Quad Flat No-Lead (QFN)
MMA6233Q	10	XY	120	900	3.3	1.65	Quad Flat No-Lead (QFN)
MMA3201D	40	XY	50	400	5.0	2.5	20-pin SOIC
MMA2201D	40	X	50	400	5.0	2.5	16-pin SOIC
MMA2202D	50	X	40	400	5.0	2.5	16-pin SOIC
MMA1213D	50	Z	40	400	5.0	2.5	16-pin SOIC
MMA2204D	100	X	20	400	5.0	2.5	16-pin SOIC
MMA1210D	100	Z	20	400	5.0	2.5	16-pin SOIC
MMA1211D	150	Z	13	400	5.0	2.5	16-pin SOIC
MMA1212D	200	Z	10	400	5.0	2.5	16-pin SOIC
MMA2300D	250	X	8	400	5.0	2.5	16-pin SOIC
MMA1200D	250	Z	8	400	5.0	2.5	16-pin SOIC

*This device has selectable sensitivity (1.5g, 2g, 4g and 6g)

Features

- > X, XY, XYZ and Z axis of sensitivity
- > 1.5g–250g for a wide variety of applications
- > Sensitivity as high as $\pm 1,200$ mV/g
- > Signal conditioned with internal filter
- > Calibrated self-test for functional verification
- > Linear output
- > Ratiometric, ideally suited to interface with analog-to-digital converters
- > Hermetically sealed g-cell
- > Cost-effective plastic packages in low-dimension quad flat no-lead (QFN) Pb-free package (6 mm x 6 mm x 1.45 mm) or SOIC-16 or 20 with through hole or surface mount available

**SUGGESTED g LEVELS
FOR VARIOUS APPLICATIONS**

Freefall Detection: 1g–2g
Mobile HDD, Cell Phone,
PC Notebook, MP3 Player



Tilt Control: 1g–2g
Movement Recognition, User
Interface, Scrolling, Gaming



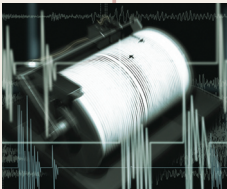
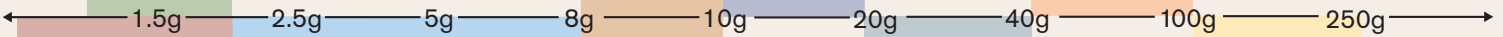
Vibration: 8g–10g
Motor Stability



Pedometer: 10g–20g
Pace, Physiology



Occupant Safety: 100g
Airbag Deployment



Seismometry: 0.002g–2g
Geophones,
Seismic Switches



Roll Over: 2g–8g
Axial, Skew



Shock Detection: 8g–10g
Shipping/Handling



Motion Recorder: 40g
Event Recorder, Black Box



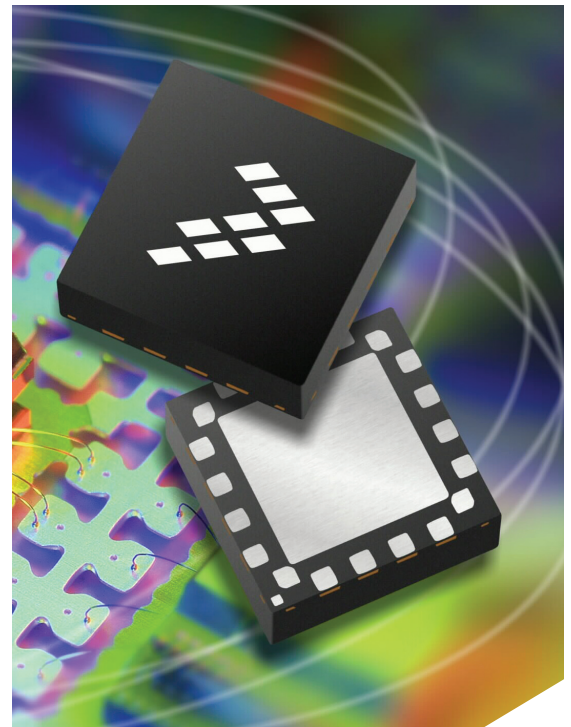
High Shock Detection: 250g
Side Airbags

Typical Applications

- > Anti-theft devices
- > Appliance balance/monitoring
- > Automobile rollover detection
- > Automotive crash detection and suspension control
- > Back-up GPS
- > Exercise equipment
- > Fall detection
- > HDD protection
- > Health care applications
- > Image stability
- > Motion control
- > Physical therapy
- > Portable electronics
- > Robotics
- > Seismic monitoring
- > Shipping/handling monitor
- > Smart motor maintenance
- > Sports diagnostic systems
- > Vehicle dynamic control
- > Vibration monitoring

Benefits

- > Single board 3-D sensing
- > Bidirectional multi-axis sensing
- > Design flexibility
- > Small package



Learn More: For more information about Freescale products, please visit www.freescale.com/sensors.