



Ultra High Performance ±1g Dual Axis Accelerometer with Digital Outputs

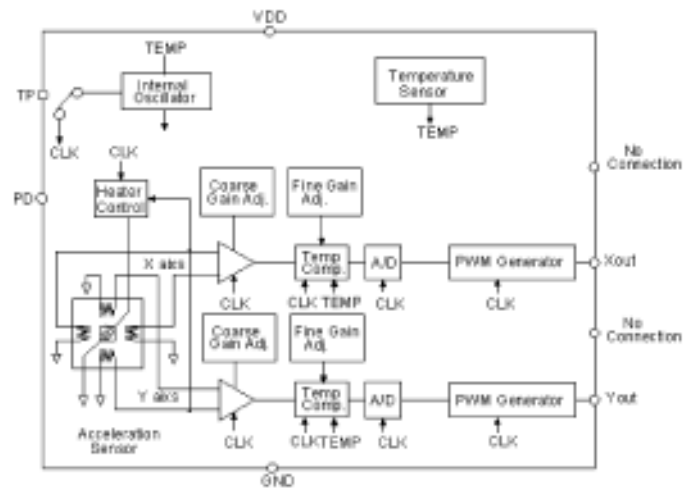
MXD6235Q

FEATURES

- Ultra Low Noise 0.13 mg/√Hz typical
- RoHS compliant
- Ultra Low Offset Drift 0.1 mg/°C typical
- Resolution better than 1 mg
- Monolithic CMOS IC
- On chip mixed signal processing
- 50,000 g shock survival rating
- Low profile LCC package
- 2.7V to 3.6V single supply
- No adjustment needed outside

APPLICATIONS

- Automotive** – Vehicle Security/Active Suspension/ABS
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing
- Office Equipment** – Computer Peripherals/PDA's/Cell Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing



MXD6235Q FUNCTIONAL BLOCK DIAGRAM

GENERAL DESCRIPTION

The MXD6235Q is a low noise, low profile, dual axis accelerometer fabricated on a standard CMOS process. It is a complete sensing system with on-chip mixed mode signal processing. The MXD6235Q measures acceleration with a full-scale range of ±1 g and a sensitivity of 12.5%/g @3V at 25°C. It can measure both dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The MXD6235Q design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle issues normally found with capacitive based technology, and significantly lowers field failure rate and in-line loss due to handling during assembly.

The MXD6235Q provides two digital outputs that are set to 50% duty cycle at zero g acceleration. The maximum noise floor is 0.18 mg/√Hz allowing signals below 0.5 mg to be resolved at 1 Hz bandwidth and the 3dB rolloff of the device occurs at 8 Hz. The MXD6235Q is available in a hermetically sealed low profile LCC surface mount package measuring 5mm x 5mm x 1.55mm.

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Features

- ◆ Fully Integrated Thermal Accelerometer
- ◆ X/Y Axis, 8 bit, Acceleration A/D Output ($\pm 2g$)
- ◆ Absolute 0G offset less than $\pm 50mg$
- ◆ 4-position Orientation Detection
- ◆ Shake Detection with Interrupt
- ◆ Programmable Shake Threshold
- ◆ Shake Direction Detection
- ◆ I²C Interface
- ◆ Power Down Mode
- ◆ Shock Survival Greater than 50,000 g
- ◆ Operating Supply Voltage from 2.5V to 5.5V with 1.8V compatible I/O
- ◆ Produces no Mechanical Sounds ("click")
- ◆ Package Size 3x3x1mm

Applications

- ◆ **Consumer:**
 - Cell Phones
 - Digital Still Cameras (DSC)
 - Digital Video Cameras (DVC)
 - LCD TV
 - Toys
 - MP3, MP4 Players
- ◆ **Household Safety:**
 - Fan Heaters
 - Halogen Lamps
 - Iron
 - Cooling Fans

General Description

The MEMSIC Digital Thermal Orientation Sensor (DTOS) is the world's first fully-integrated orientation sensor. Its operation is based on our patented MEMS-thermal technology and is built using a standard 0.18um CMOS process. DTOS contains no moving parts (such as a ball) and thus eliminates field-reliability and repeatability issues associated with competitive products. It also eliminates the "click" sounds typically heard in ball based orientation sensors. Shock survival is greater than 50,000g. DTOS detects four orientations, shake and shake direction. In addition, it provides X/Y axis acceleration signals with very low 0g offset. An I²C interface is used to communicate with this device and an interrupt pin (INT) is provided for shake and orientation. The DTOS also has a power down enabled through the I²C interface.

Functional Block Diagram

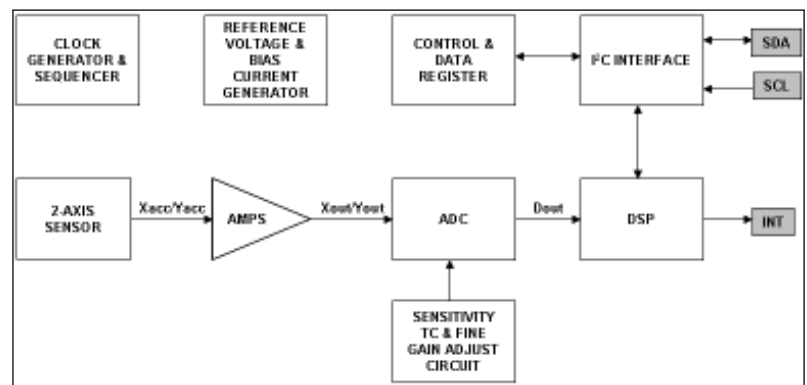


Figure 1

The DTOS is packaged in a hermetically sealed 6-pin surface mount package (3 mm x 3 mm x 1mm); the product is RoHS compatible and operates over -20~70°C temperature range.





Ultra Low Noise, Low offset Drift ± 1 g Dual Axis Accelerometer with Digital Outputs

MXD2020E/F

FEATURES

- Resolution better than 1 mg at 1 Hz
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On-chip mixed mode signal processing
- 50,000 g shock survival rating
- 17 Hz bandwidth
- 3.00V to 5.25V single supply operation
- Small (5mm x 5mm x 2mm) surface mount package
- Continuous self-test
- Independent axis programmability (special order)

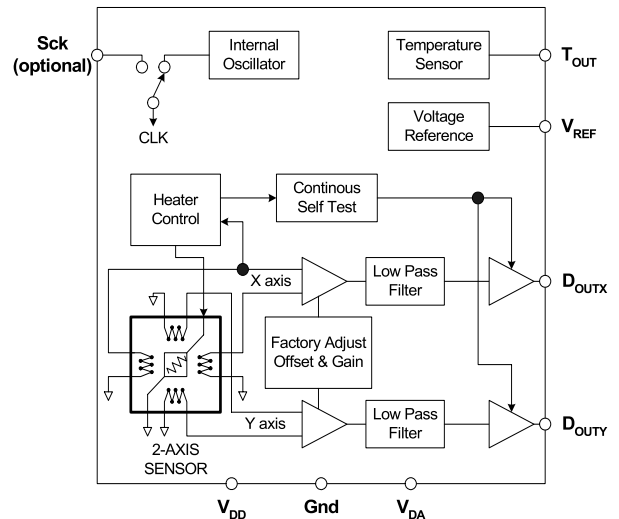
APPLICATIONS

- Automotive** – Vehicle Security/Active Suspension/ABS
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing
- Office Equipment** – Computer Peripherals/PDA's/Cell Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing
- Projectors - Leveling** and Keystoning
- White Goods** – Spin/Vibration Control

GENERAL DESCRIPTION

The MXD2020E/F is an ultra low noise and low cost, dual axis accelerometer built on a standard, submicron CMOS process. The MXD2020E/F measures acceleration with a full-scale range of ± 1 g and a sensitivity of 20%/g @5V at 25°C. It can measure both dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The MXD2020E/F design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival up to 50,000 g, leading to significantly lower failure rates and lower losses due to handling during assembly.

The MXD2020E/F provides two digital outputs. The outputs are digital signals with duty cycles (ratio of pulse width to period) that are proportional to acceleration. The duty cycles outputs can be directly interfaced to a micro-processor.



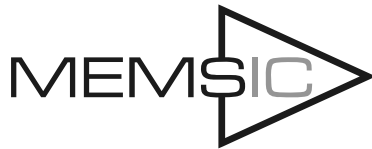
MXD2020E/F FUNCTIONAL BLOCK DIAGRAM

The typical noise floor is $0.2\text{mg} / \sqrt{\text{Hz}}$ allowing signals below 1mg to be resolved at 1 Hz bandwidth. The MXD2020E/F is available in a LCC surface mount package (5mm x 5mm x 2mm height). It is hermetically sealed and operational over a -40°C to $+105^{\circ}\text{C}$ temperature range.

Due to the standard CMOS structure of the MXD2020E/F, additional circuitry can easily be incorporated into custom versions for high volume applications. Contact the factory for more information.

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Improved, Ultra Low Noise $\pm 1.7 g$ Dual Axis Accelerometer with Digital Outputs

MXD2020G/H
MXD2020M/N

FEATURES

- Resolution better than 1 mg
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On chip mixed mode signal processing
- No moving parts
- 50,000 g shock survival rating
- 17 Hz bandwidth expandable to >160 Hz
- 3.0V to 5.25V single supply continuous operation
- Continuous self test
- Independent axis programmability (special order)
- Ultra low initial Zero-g Offset

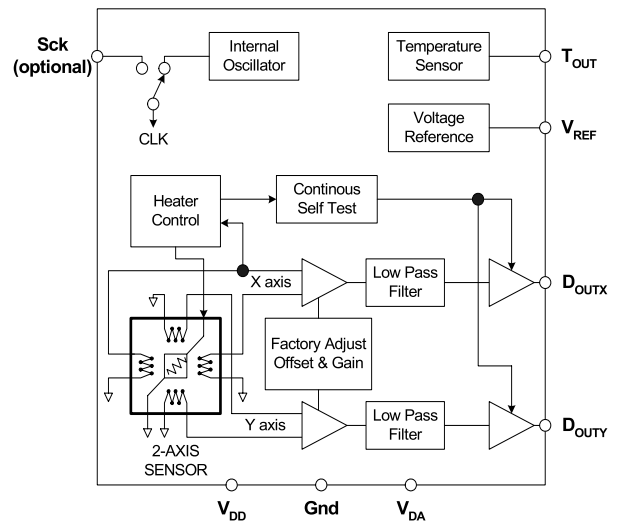
APPLICATIONS

- Automotive** – Vehicle Security/Vehicle stability control/
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing
- Information Appliances** – Computer Peripherals/PDA's/Cell
Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing
- GPS** – electronic Compass tilt Correction
- Consumer** – LCD projectors, pedometers, blood pressure
Monitor, digital cameras

GENERAL DESCRIPTION

The MXD2020G/H/M/N is a low cost, dual axis accelerometer fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed mode signal processing. The MXD2020G/H/M/N measures acceleration with a full-scale range of $\pm 1.7 g$ and a sensitivity of 20%/g @5V at 25°C. It can measure both dynamic acceleration (e.g. vibration) and static acceleration (e.g. gravity).

The MXD2020G/H/M/N design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival of 50,000 g, leading to significantly lower failure rate and lower loss due to handling during assembly.



MXD2020G/H/M/N FUNCTIONAL BLOCK DIAGRAM

The MXD2020G/H/M/N provides two digital outputs that are set to 50% duty cycle at zero g acceleration. The outputs are digital with duty cycles (ratio of pulse width to period) that are proportional to acceleration. The duty cycle outputs can be directly interfaced to a micro-processor.

The typical noise floor is $0.2 \text{ mg}/\sqrt{\text{Hz}}$ allowing signals below 1 mg to be resolved at 1 Hz bandwidth. The MXD2020G/H/M/N is packaged in a hermetically sealed LCC surface mount package (5 mm x 5 mm x 2 mm height) and is operational over a -40°C to 105°C(M/N) and 0°C to 70°C(G/H) temperature range.

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MEMSIC MXD2020G/H/M/N Rev.G



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Ultra Low Noise, ±1 g Dual Axis Accelerometer with Digital Outputs

MXD2020U/W

FEATURES

- Resolution better than 1 mg
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On-chip mixed mode signal processing
- 50,000 g shock survival rating
- 25 Hz bandwidth
- 2.70V to 5.25V single supply operation
- Small (5mm x 5mm x 2mm) surface mount package
- Continuous self-test
- Independent axis programmability (special order)

APPLICATIONS

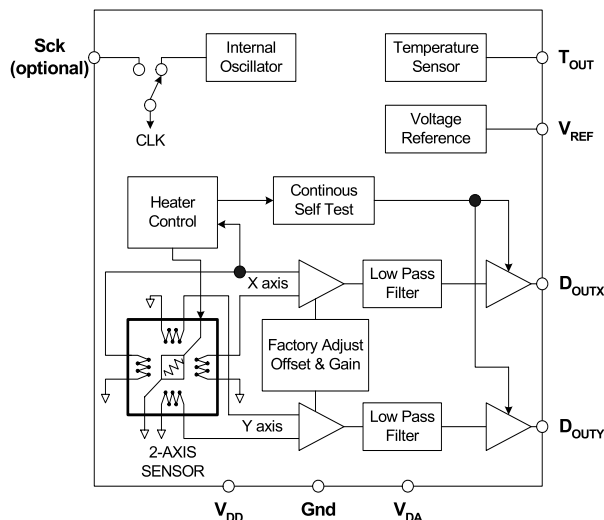
- Automotive** – Vehicle Security/Active Suspension/ABS
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing
- Office Equipment** – Computer Peripherals/PDA's/Cell Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing

White Goods – Spin/Vibration Control

GENERAL DESCRIPTION

The MXD2020U/W is an ultra low noise and low cost, dual axis accelerometer built on a standard, submicron CMOS process. The MXD2020U/W measures acceleration with a full-scale range of ± 1 g and a sensitivity of 20%/g @5V at 25°C. It can measure both dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The MXD2020U/W design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival up to 50,000 g, leading to significantly lower failure rates and lower losses due to handling during assembly.

The MXD2020U/W provides two digital outputs. The outputs are digital signals with duty cycles (ratio of pulse width to period) that are proportional to acceleration. The duty cycles outputs can be directly interfaced to a micro-processor.



MXD2020U/W FUNCTIONAL BLOCK DIAGRAM

The typical noise floor is $0.2\text{mg} / \sqrt{\text{Hz}}$ allowing signals below 1mg to be resolved at 1 Hz bandwidth. The MXD2020U/W is available in a LCC surface mount package (5mm x 5mm x 2mm height). It is hermetically sealed and operational over a -40°C to +105°C temperature range.

Due to the standard CMOS structure of the MXD2020U/W, additional circuitry can easily be incorporated into custom versions for high volume applications. Contact the factory for more information.

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Low Offset drift, $\pm 0.5g$ Dual Axis Accelerometer with Ratiometric Output

MXR2999E

FEATURES

- Better than 1 mg resolution
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On-chip mixed mode signal processing
- No moving parts
- 50,000 g shock survival rating
- $\pm 0.4mg/^\circ C$ offset drift over temperature
- 3V to 5.25V single supply continuous operation
- Small (5mm x 5mm x 2mm) surface mount package
- Continuous self test
- Custom programmable specifications
- Independently axis programmable axes (special order)

APPLICATIONS

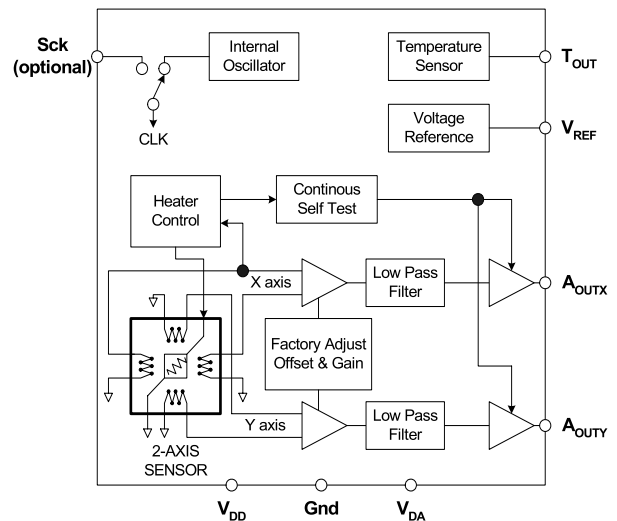
- Automotive** – Vehicle Security/Active Suspension/ABS
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing
- Office Equipment** – Computer Peripherals/PDA/Cell Phones/Digital Projectors
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing
- White Goods** – Spin/Vibration Control

GENERAL DESCRIPTION

The MXR2999E is a low noise and low cost, dual axis accelerometer fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed mode signal processing. The MXR2999E measures acceleration with a full-scale range of $\pm 0.5 g$ and a sensitivity of $1000mV/g @ 5V$ at $25^\circ C$. It can measure both dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The MXR2999E design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival up to 50,000 g, leading to significantly lower failure rates and lower loss due to handling during assembly.

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MEMSIC MXR2999E Rev.G



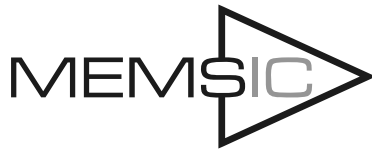
MXR2999E FUNCTIONAL BLOCK DIAGRAM

The MXR2999E provides two ratiometric analog outputs. The typical noise floor is $0.2 mg/\sqrt{Hz}$ allowing signals below 1mg to be resolved at 1 Hz bandwidth. The 3dB rolloff of the device occurs at 17 Hz. The offset drift over temperature is $\pm 0.4mg/^\circ C$. The MXR2999E is available in a small surface mount package (5mm x 5mm x 2mm). It is hermetically sealed and is operational over a $-40^\circ C$ to $+105^\circ C$ temperature range. It also contains an on-chip temperature sensor and a bandgap voltage reference.

Due to the standard CMOS structure of the MXR2999E, additional circuitry can easily be incorporated into custom versions for high volume applications. Contact the factory for more information.



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Improved ± 1 g Dual Axis Accelerometer with Ratiometric Outputs

MXR2999G/M

FEATURES

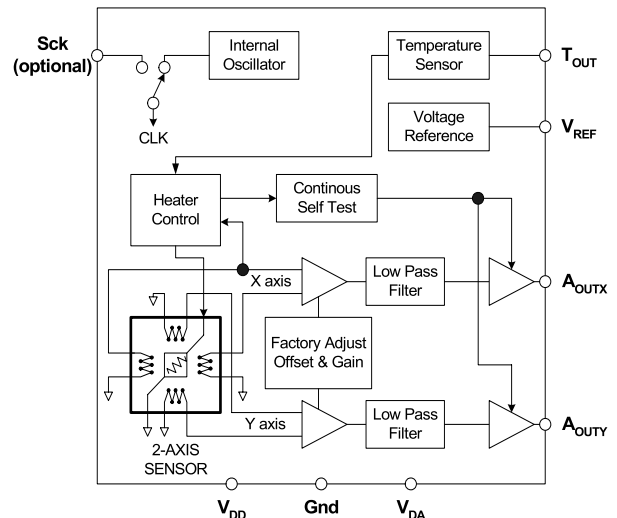
- Resolution better than 1 mg
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On chip mixed mode signal processing
- No moving parts
- 50,000 g shock survival rating
- 17 Hz bandwidth expandable to >160 Hz
- 3.0V to 5.25V single supply continuous operation
- Continuous self test
- Independent axis programmability (special order)
- Ultra low initial Zero-g Offset

APPLICATIONS

- Automotive** – Vehicle Security/Vehicle Stability control/ Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing/Computer Security
- Information Appliances** – Computer Peripherals/PDA's/Cell Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing
- GPS** – Electronic compass tilt correction
- Consumer** – LCD projectors, pedometers, blood pressure Monitor, digital cameras

GENERAL DESCRIPTION

The MXR2999G/M is a low cost, dual axis accelerometer fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed mode signal processing. The MXR2999G/M measures acceleration with a full-scale range of ± 1 g and a sensitivity of 1000mV/g @5V. It can measure both dynamic acceleration (e.g. vibration) and static acceleration (e.g. gravity). The MXR2999G/M design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival of 50,000 g, leading to significantly lower failure rate and lower loss due to handling during assembly.



MXR2999G/M FUNCTIONAL BLOCK DIAGRAM

The MXR2999G/M provides two ratiometric analog outputs proportional to 50% of the supply voltage at zero g acceleration. The typical noise floor is $0.2 \text{ mg}/\sqrt{\text{Hz}}$ allowing signals below 1 mg to be resolved at 1 Hz bandwidth. The 3dB rolloff of the device occurs at 17 Hz but is expandable to >160 Hz (reference Application Note AN-00MX-003). The MXR2999G/M is packaged in a hermetically sealed LCC surface mount package (5 mm x 5 mm x 2 mm height) and is operational over a -40°C to 105°C (M) and 0°C to 70°C (G) temperature range.

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Ultra Low Noise, Offset Drift ± 1 g Dual Axis Accelerometer with Analog Outputs

MXA2500E

FEATURES

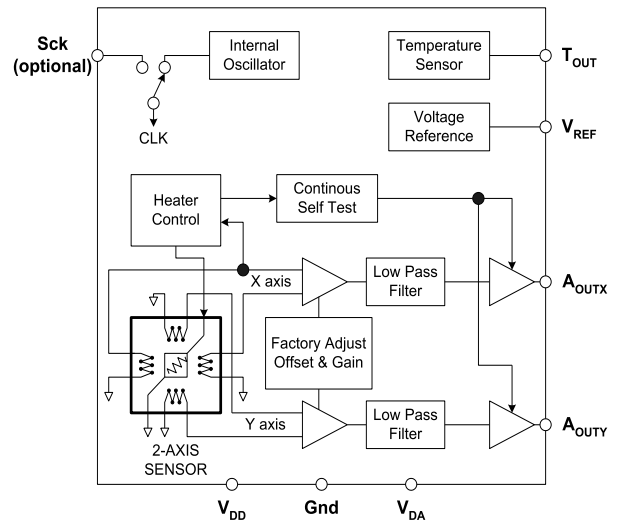
- Better than 1 mg resolution
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On-chip mixed mode signal processing
- No moving parts
- 50,000 g shock survival rating
- 17 Hz bandwidth expandable to >160 Hz
- 3V to 5.25V single supply continuous operation
- Small (5mm x 5mm x 2mm) surface mount package
- Continuous self test
- Custom programmable specifications
- Independent axis programmability (special order)

APPLICATIONS

- Automotive** – Vehicle Security/Active Suspension/ABS
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing
- Office Equipment** – Computer Peripherals/PDA's/
Cell Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing
- White Goods** – Spin/Vibration Control

GENERAL DESCRIPTION

The MXA2500E is an ultra low noise and low cost, dual axis accelerometer fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed mode signal processing. The MXA2500E measures acceleration with a full-scale range of ± 1 g and a sensitivity of 500mV/g @5V at 25°C. It can measure both dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The MXA2500E design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival of 50,000 g, leading to significantly lower failure rates and lower loss due to handling during assembly.



MXA2500E FUNCTIONAL BLOCK DIAGRAM

The MXA2500E provides two absolute analog outputs. The typical noise floor is $0.2 \text{ mg}/\sqrt{\text{Hz}}$ allowing signals below 1 mg to be resolved at 1 Hz bandwidth. The 3dB rolloff of the device occurs at 17 Hz but is expandable to >160 Hz. The MXA2500E is available in a LCC surface mount package (5 mm x 5 mm x 2 mm). It is hermetically sealed and is operational over a -40°C to +105°C temperature range. It also contains an on-chip temperature sensor and a bandgap voltage reference.

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Improved, Ultra Low Noise $\pm 1.7 g$ Dual Axis Accelerometer with Absolute Outputs

MXA2500G/M

FEATURES

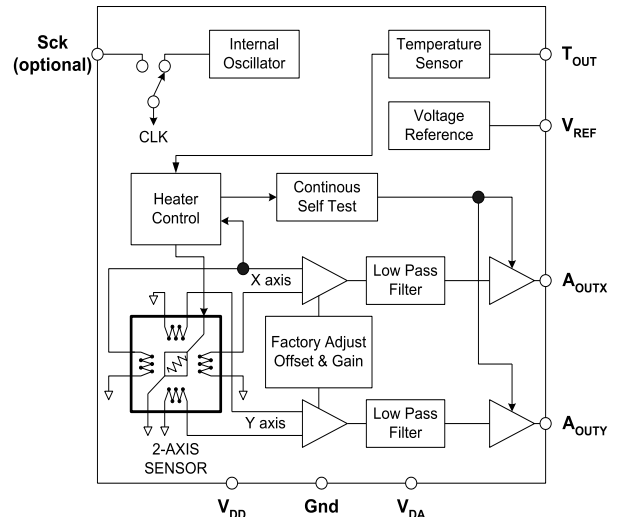
- Resolution better than 1 mg
- Dual axis accelerometer fabricated on a monolithic CMOS IC
- RoHS compliant
- On chip mixed mode signal processing
- No moving parts
- 50,000 g shock survival rating
- 17 Hz bandwidth expandable to >160 Hz
- 3.0V to 5.25V single supply continuous operation
- Continuous self test
- Independent axis programmability (special order)

APPLICATIONS

- Automotive** – Vehicle Security/Vehicle Stability control/
Headlight Angle Control/Tilt Sensing
- Security** – Gas Line/Elevator/Fatigue Sensing/Computer Security
- Information Appliances** – Computer Peripherals/PDA's/ Cell
Phones
- Gaming** – Joystick/RF Interface/Menu Selection/Tilt Sensing
- GPS** – Electronic compass tilt correction
- Consumer** – LCD projectors, pedometers, blood pressure
Monitor, digital cameras

GENERAL DESCRIPTION

The MXA2500G/M is a low cost, dual axis accelerometer fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed mode signal processing. The MXA2500G/M measures acceleration with a full-scale range of $\pm 1.7g$ and a sensitivity of 500mV/g @5V at 25°C. It can measure both dynamic acceleration (e.g. vibration) and static acceleration (e.g. gravity). The MXA2500G/M design is based on heat convection and requires no solid proof mass. This eliminates stiction and particle problems associated with competitive devices and provides shock survival of 50,000 g, leading to significantly lower failure rate and lower loss due to handling during assembly.



MXA2500G/M FUNCTIONAL BLOCK DIAGRAM

The MXA2500G/M provides two absolute analog outputs.

The typical noise floor is $0.2 \text{ mg}/\sqrt{\text{Hz}}$ allowing signals below 1 mg to be resolved at 1 Hz bandwidth. The 3dB rolloff of the device occurs at 17 Hz but is expandable to >160 Hz.

The MXA2500G/M is packaged in a hermetically sealed LCC surface mount package (5 mm x 5 mm x 2 mm height) and is operational over a -40°C to 105°C (M) and 0°C to 70°C (G) temperature range.

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MEMSIC MXA2500G/M SPEC v1.0



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Ultra High Performance $\pm 1.5 g$ Dual Axis Accelerometer with I²C Interface

MXC6235xQ

FEATURES

RoHS compliant

I²C Slave, FAST (≤ 400 KHz) mode interface

1.8V compatible I/O

Ultra Low Noise and initial offset

Embedded Power up/down function

On-chip temperature sensor available

Eight, customer defined 7-bit addresses

2.7 V to 3.6 V single supply continuous operation

Monolithic CMOS IC

Low power consumption: typically < 2 mA @ 3.0 V

Resolution better than 1 mg

On chip mixed signal processing

$> 50,000 g$ shock survival rating

Low profile LCC package: 5mm X 5mm X 1.55mm

APPLICATIONS

Security – Gas Line, Elevator, Fatigue Sensing

Gaming – Joystick, RF Interface, Menu Selection,
Tilt Sensing

GPS – Electronic Compass Tilt Correction, Dead Reckoning

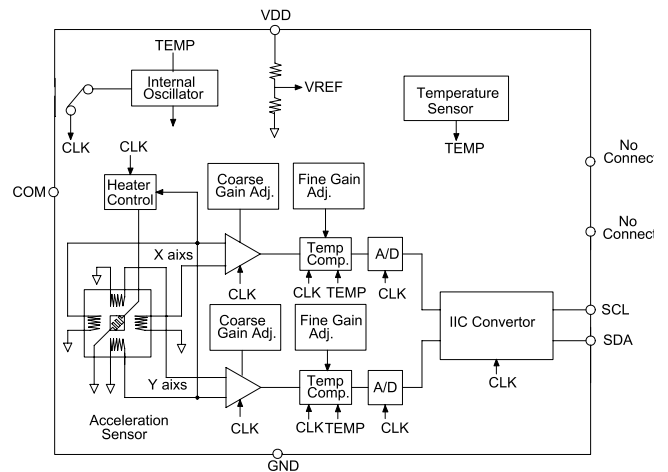
Consumer – LCD Projectors, Pedometers, Blood Pressure
Monitor, Digital Cameras

Information Appliances – Computer Peripherals, PDA's,
Mouse Smart Pens, Cell Phones

GENERAL DESCRIPTION

The MXC6235xQ is a low cost, dual axis accelerometer fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed signal processing. The MXC6235xQ measures acceleration with a full-scale range of $\pm 1.5 g$ and a sensitivity of 512counts/g at ≈ 3.0 V at 25°C. It can measure both dynamic acceleration (e.g. vibration) and static acceleration (e.g. gravity). The MXC6235xQ design is based on heat convection and requires no solid proof mass.

This design eliminates the stiction problems associated with legacy technologies and provides shock survival greater than 50,000g's.



MXC6235xQ FUNCTIONAL BLOCK DIAGRAM

Memsic's solid state design leads to significantly lower failure rates in customer applications and lower loss due to handling during manufacturing and assembly processes

The MXC6235xQ provides I²C digital output with 400 KHz. fast mode operation.

The typical noise floor is $0.13 \text{ mg}/\sqrt{\text{Hz}}$ allowing signals below 0.5mg to be resolved at 1 Hz bandwidth.

The MXC6235xQ is packaged in a hermetically sealed, low profile LCC surface mount package (5 mm x 5 mm x 1.55 mm) and is available in operating temperature ranges of -40°C to +105°C (MXC6235xQB) or -20°C to +105°C (MXC6235xQP)

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MEMSIC MXC6235xQ Rev.C



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Low Power, Low Profile ± 2 g Dual Axis Accelerometer with I²C Interface

MXC6232xG/H/M/N

FEATURES

- RoHS compliant
- I²C Slave, FAST (≤ 400 KHz.) mode interface
- 1.8V compatible IO
- Embedded Power up/down and self-test function
- On-chip temperature sensor available
- Eight customer defined 7-bit addresses
- 2.7 V to 3.6 V single supply continuous operation
- Monolithic CMOS IC
- Low power consumption: typically < 2 mA @ 3.0 V
- Resolution better than 1 mg
- On chip mixed signal processing
- $> 50,000$ g shock survival rating
- Low profile LCC package: 5mm X 5mm X 1.55mm

APPLICATIONS

Information Appliances – Cell Phones, PDA's, Computer Peripherals

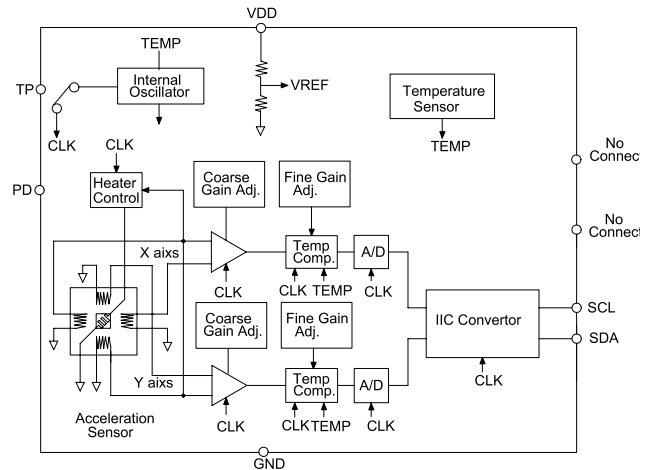
Consumer – LCD Projectors, Pedometers, Blood Pressure Monitor, Digital Cameras

Gaming – Joystick/RF Interface/Menu Selection/Tilt Sensing

GPS – Electronic Compass Tilt Correction, Dead Reckoning Assist

GENERAL DESCRIPTION

The MXC6232xG/H/M/N is low cost, dual axis accelerometers fabricated on a standard, submicron CMOS process. It is a complete sensing system with on-chip mixed signal processing and integrated I²C bus, allowing the device to be connected directly to a microprocessor eliminating the need for A/D converters or timing resources. The MXC6232xG/H/M/N measures acceleration with a full-scale range of ± 2 g and a sensitivity of 512counts/g (G/M) or 128counts/g (H/N) @3.0 V at 25°C. It can measure both dynamic acceleration (e.g. vibration) and static acceleration (e.g. gravity). The MXC6232xG/H/M/N design is based on heat convection and requires no solid proof mass.



MXC6232xG/H/M/N FUNCTIONAL BLOCK DIAGRAM

This design eliminates the stiction problems associated with legacy technologies and provides shock survival greater than 50,000g's. Memsic's solid state design leads to significantly lower failure rates in customer applications and lower loss due to handling during manufacturing and assembly processes

The MXC6232xG/H/M/N is packaged in a hermetically sealed, low profile LCC surface mount package (5 mm x 5 mm x 1.55 mm) and is available in operating temperature ranges of 0°C to +70°C (G/H) and -40°C to +85°C (M/N).

The MXC6232xG/H/M/N provides I²C digital output with 400 KHz, fast mode operation.

The maximum noise floor is $1 \text{ mg}/\sqrt{\text{Hz}}$ allowing signals below 1mg to be resolved at 1 Hz bandwidth

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±8g 2 Axis Accelerometer with Programmable Vibration Filter

MXC6244AU

FEATURES

- High accuracy 2-axis accelerometer:
 - 8g FSR, 1mg/LSB resolution
 - 0.3 mg/C offset drift over temperature
 - 0.5% Sensitivity matching over temperature
- Programmable anti-vibration filter
 - Attenuation >60dB @ 50Hz
 - No sensor resonance
- Internal angle detection circuit with 8 programmable thresholds and INT output
- 400kHz I2C Interface (1.8V compatible)
- Built-in self-test functionality
- Small, 6-pin 3 x 3 x 1 mm LCC package
- Operates from 2.7 V to 5.5 V Supply
- High reliability automotive process and package
- RoHS compliant
- Operates from -40C to +125C

APPLICATIONS

- Inclination Sensing in High Vibration Environments
- Motorcycle Fall-Down Detection
- Off-Road Vehicle Roll Detection
- Jet Ski Roll Detection
- General Purpose Acceleration Measurements

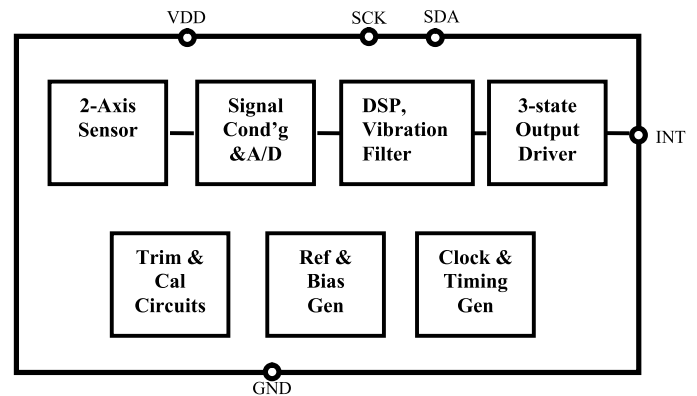


FIGURE 1. FUNCTIONAL BLOCK DIAGRAM

DESCRIPTION

The MXC6244AU is a complete 2 axis accelerometer system with a programmable internal anti-vibration filter. This filter can provide as much as 45dB attenuation above 25Hz, and 60dB attenuation above 50Hz (see "Response to Vibration" section). In addition, the device has 8 built in, I2C programmable angle thresholds. If the device orientation with respect to vertical exceeds the programmed threshold angle, the INT output changes state to alert the system to a tip-over or fall down event. This feature can offload the processor from the burden of continuously calculating angles. In the case of an INT, the processor can begin calculating angles to allow for user-defined algorithms to be implemented.

A built-in self-test function can detect a fault in the internal sensor, and if triggered will cause the INT output to go to a high impedance state. The internal status of the sensor can be read via the I2C interface.

The MXC6244AU uses MEMSIC's proprietary thermal accelerometer technology. Because the sensing element uses heated gas molecules instead of a mechanical beam structure, the device is extremely robust and reliable, with 50,000g shock tolerance, no possibility of "stiction," virtually no mechanical resonance, and very high accuracy over temperature. This makes the device extremely well suited to harsh or high vibration environments, where other sensors can exhibit false readings due to resonance or other errors.

The MXC6244AU runs from a single 2.7V to 5.5V supply, and is packaged in a small 6-pin, 3 x 3 x 1 mm LCC package.

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MEMSIC MXC6244AU Rev.A (6/27/2016)



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Autonomous 8-Angle Tip-Over Sensor with High Vibration Immunity

MXD6240/6241AU

FEATURES

- 8 Pin-programmable angle thresholds
- Single-wire digital output
- Fully autonomous- no uC required
- Built-in self-test functionality
- Small, 6-pin 3 x 3mm LCC package
- Operates from 2.7V to 5.5V Supply
- No sensor resonance
- Vibration filter: tolerates 20 g p-p @ 50Hz vibration with < 1° incremental angle error
- High reliability automotive process
- RoHS compliant
- Operates from -40 C to +125 C

APPLICATIONS :

Motorcycle Fall-Down Detection
Off-Road Vehicles
Jetski, watercraft
Other Tip-Over Detection (Space heaters, Irons, etc)

DESCRIPTION:

The MXD6240/6241AU is an inclination sensor with 8 built-in, pin-programmable angle thresholds. If the device orientation with respect to vertical exceeds the programmed threshold angle, the digital output changes state to alert the system to a tip-over or fall-down event. An internal anti-vibration filter provides >45dB attenuation above 25Hz, and >60dB attenuation above 50Hz.

The MXD6240/6241AU is designed to run autonomously, making it ideal for systems where there is no uC available. One of eight threshold angles (40, 42.5, 45, 50, 55, 60, 65, and 70 degrees) is selected by connecting each of three programming pins to Vdd or Gnd. The threshold accuracy is guaranteed to meet +/-5 degrees (max) over a temperature range of -20C to +80C (Operation is guaranteed over -40C to +125C).

A built-in self-test function can detect a fault in the internal sensor, and if triggered will cause the output to go to a high impedance state.

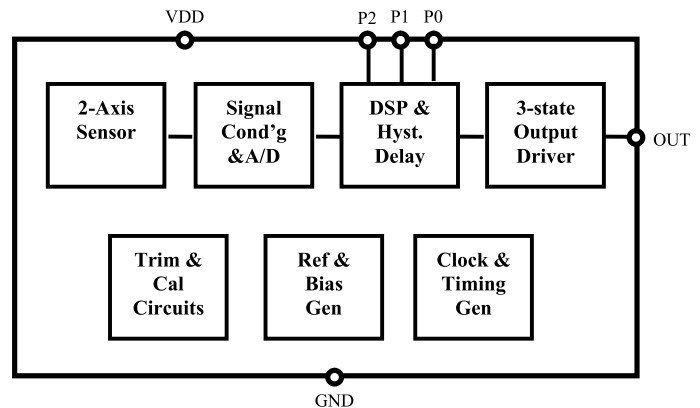


Figure 1. FUNCTIONAL BLOCK DIAGRAM

The MXD6240/6241AU uses MEMSIC's proprietary thermal accelerometer technology. Because the sensing element uses heated gas molecules instead of a mechanical beam structure, the device is extremely robust and reliable, with 50,000g shock tolerance, no possibility of "stiction", virtually no mechanical resonance, and extremely high accuracy over temperature. This makes the device extremely well suited to harsh or high vibration environments, where other sensors can exhibit false readings due to resonance or other errors.

The MXD6240AU output is a logic low under normal operation, and logic high during tip-over; the MXD6241AU uses the opposite output polarity (normally high, low during tip-over). A high-Z output state signifies an internal self-test failure.

Both devices operate from a single 2.7V to 5.5V supply, and are packaged in a small 6-pin, 3x3x1 mm LCC package.

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±2g Dual Axis Accelerometer with I2C Interface and 1mg Resolution

MXC6245XU

FEATURES

- High accuracy 2-axis accelerometer:
 - 2g Full Scale Range
 - 1 mg/LSB resolution
 - 0.3 mg/C offset drift over temperature
 - 0.5% Sensitivity matching
 - 12 Bit A/D Converter
 - No sensor resonance
- 400kHz I2C Interface (1.8V compatible)
- Small, 6-pin 3 x 3mm Ceramic LCC package
- Operates from 2.7V to 5.5V Supply
- High reliability Automotive Process and Package
- 50,000g shock survivability
- RoHS Compliant
- Operates from -40C to +85C

DESCRIPTION

The MXC6245XU is a complete 2 axis accelerometer system with 1mg resolution, very low 0g offset drift, and excellent sensitivity matching. The internal status of the sensor can be read via the I2C interface.

The MXC6245XU uses MEMSIC's proprietary thermal accelerometer technology. Because the sensing element uses heated gas molecules instead of a mechanical beam structure, the device is extremely robust and reliable, with 50000g shock tolerance, no possibility of "stiction," virtually no mechanical resonance, and very high accuracy over temperature. This makes the device extremely well suited to harsh

APPLICATIONS

- Car Navigation System
- Projector Auto Keystone Correction
- DSC horizontal position detect
- Inclination sensing
- General purpose accelerometer

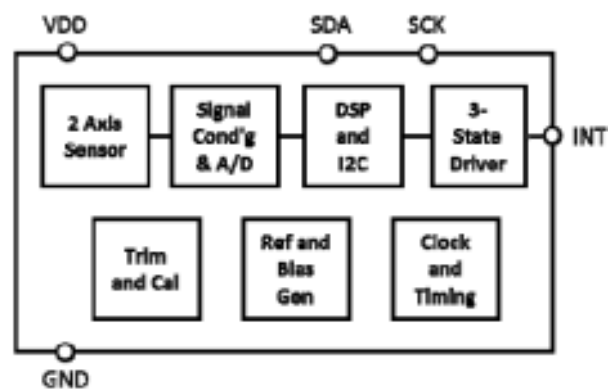


FIGURE 1: FUNCTIONAL BLOCK DIAGRAM

or high-vibration environments, where other sensors can exhibit false readings due to resonance or other errors.

The MXC6245XU has built in orientation detection. The device can be set to generate an interrupt if the orientation of the device changes with respect to gravity. See register \$06 description for more detailed information.

The MXC6245XU runs from a single 2.7V to 5.5V supply over the industrial temperature range of -40 to 85C, and is packaged in a small 6-pin, 3 x 3 x 1 mm ceramic LCC package.

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Features

- ◆ **Fully Integrated Thermal Accelerometer**
- ◆ **X/Y Axis, 8 bit, Acceleration A/D Output ($\pm 2g$)**
- ◆ **Absolute 0G offset less than $\pm 50mg$**
- ◆ **4-position Orientation Detection**
- ◆ **Shake Detection with Interrupt**
- ◆ **Programmable Shake Threshold**
- ◆ **Shake Direction Detection**
- ◆ **I²C Interface**
- ◆ **Power Down Mode**
- ◆ **Shock Survival Greater than 50,000 g**
- ◆ **Operating Supply Voltage from 2.5V to 5.5V with 1.8V compatible I/O**
- ◆ **Produces no Mechanical Sounds ("click")**
- ◆ **Package Size 3x3x1mm**

Applications

- ◆ **Consumer:**
 - Cell Phones
 - Digital Still Cameras (DSC)
 - Digital Video Cameras (DVC)
 - LCD TV
 - Toys
 - MP3, MP4 Players
- ◆ **Household Safety:**
 - Fan Heaters
 - Halogen Lamps
 - Iron
 - Cooling Fans

General Description

The MEMSIC Digital Thermal Orientation Sensor (DTOS) is the world's first fully-integrated orientation sensor. Its operation is based on our patented MEMS-thermal technology and is built using a standard 0.18um CMOS process. DTOS contains no moving parts (such as a ball) and thus eliminates field-reliability and repeatability issues associated with competitive products. It also eliminates the "click" sounds typically heard in ball based orientation sensors. Shock survival is greater than 50,000g. DTOS detects four orientations, shake and shake direction. In addition, it provides X/Y axis acceleration signals with very low 0g offset. An I²C interface is used to communicate with this device and an interrupt pin (INT) is provided for shake and orientation. The DTOS also has a power down enabled through the I²C interface.

Functional Block Diagram

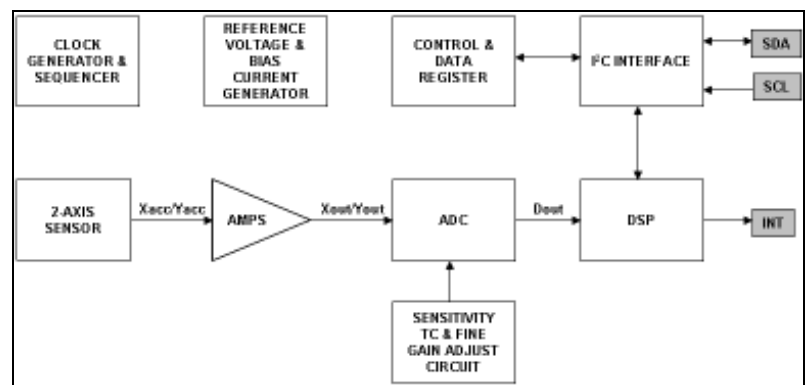


Figure 1

The DTOS is packaged in a hermetically sealed 6-pin surface mount package (3 mm x 3 mm x 1mm); the product is RoHS compatible and operates over -20~70°C temperature range.



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MXC6255XU - DTOS Accelerometer

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