life.augmented

Motion MEMS sensors for industrial and multi-segment solutions

Content

Industrial system designs

Recent MEMS sensor technology developments are enabling revolutionary changes in industrial system designs.

Applications where MEMS inertial sensors have started improving system performance or enabling new functionalities includes motion control for industrial machinery, robotics and unmanned aerial vehicles, anti-tamper and security/surveillance devices, vehicle navigation and black boxes, condition monitoring of transportation and equipment, platform stabilization.

The motion information provided by inertial sensors can be invaluable in improving not only performance and accuracy but also reliability, safety, and total cost of ownership of the end system.

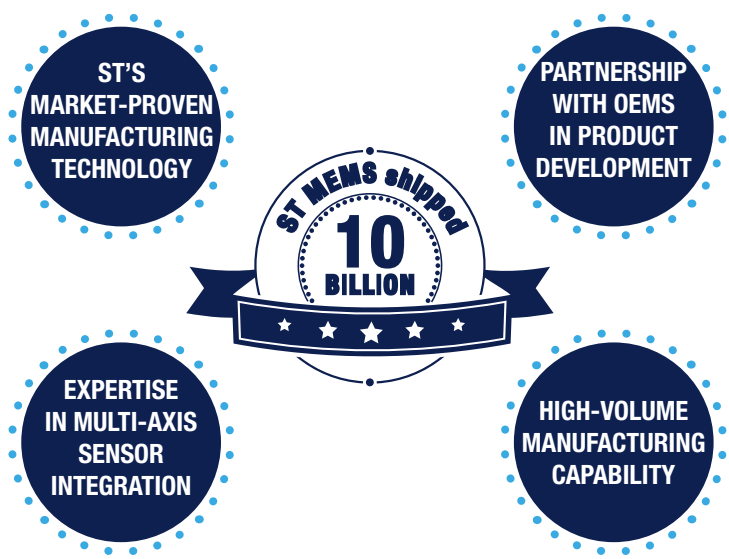
ST's industrial MEMS sensor have been conceived to offer the high performance and high quality required by the industrial environments.

Each sensor is uniquely and precisely factory calibrated, resulting in highly stable outputs under all conditions and in most cases eliminating the need of re-calibration at customer side.

ST's sensing solutions

ST's new series of sensors is specifically designed for industrial environments

In every industrial application, sensors must fulfill increasingly high requirements regarding precision and reliability. Sensor from ST, one of the world leaders in sensor systems, are capable of fulfilling such highly functional requirements.
Our broad and deep sensor offering provides the perfect fit for various industrial applications, including robotics, condition monitoring, industrial vehicle guidance and stabilization, power tools, building and industrial automation, navigation, medical and defense systems.
ST has shipped 10 billion MEMS sensors to customers and has a unique sensor portfolio, from discrete to fully-integrated solutions. Dedicated 8-inch wafer production lines with high-volume manufacturing and full in-house dual sourcing guarantee fast time-to-market, cost-effectiveness and 100% security of supply.



The 10 years longevity program

ST has recently launched a new series of MEMS sensors that will stay in production for ten years starting from their date of introduction. These products take part in the 10 years longevity commitment program, which assures, on selected parts, continuity and stability of supply for ST customers, especially those that design industrial applications and require long-term product availability.
The first three sensors joining the program are two new 3-axis accelerometers (IIS328DQ and IIS2DH) and a 3-axis gyroscope (I3G4250D) specifically intended for harsh industrial environments often characterized by extended temperature ranges and a high level of shocks and vibrations.
For more information about the 10 years longevity commitment program, visit www.st.com/web/en/support/product_longevity.html

ST's Product Longevity Program adresses customer needs to:
- Protect their design investments by ensuring a minimum of 10 years of availability on selected sensor devices

ST's full product portfolio supported via normal roadmaps:
- No change to standard products
- Longevity products are a subset of the ST MEMS portfolio

ST's customers now have a choice:
- Buy standard products with existing service and support
- Buy products with longevity commitment to obtain an extended life and increased stability

ST IS FOCUSED ON MARKETS REQUIRING LONG LIFECYCLES


Robotics


Appliances


Transportation


Defense


Navigation

ST'S LONGEVITY PROGRAM

- 10 years longevity from product introduction date
- High performance and high quality even in harsh industrial environments (extended temperature ranges, shocks and vibrations)

IIS328DQ

High-performance, low-power, 3-axis accelerometer with digital output for industrial applications

Recommended for industrial applications requiring an extended temperature range and long lifespan, the IIS328DQ has dynamic user-selectable full-scales of ±2g/±4g/±8g and is capable of measuring accelerations with output data rates from 0.5 Hz to 1 kHz. Available in a small, quad, flat pack no-lead package (QFPN) with a 4x4 mm footprint, the IIS328DQ is guaranteed to operate over a temperature range from -40 to +105 °C.

Features	Benefits
10 years longevity commitment	Continuity and stability of supply
Operating temperature: -40 to 105 °C	Extended temperature range matching harsh environment conditions
3-axis and dynamically user-selectable full scales (±2g/±4g/±8g)	Flexibility to cover a broad range of applications

IIS2DH

Ultra-low-power, high-performance, 3-axis accelerometer with digital output for industrial applications

The IIS2DH has user-selectable full scales of ±2g/±4g/±8g/±16g and is capable of measuring accelerations with output data rates from 1 Hz to 5.3 kHz. The device features ultra-low power consumption and may be configured to generate interrupt signals triggered by inertial events. The smart interrupt generator and the embedded FIFO enable system level power consumption reduction strategies. The IIS2DH is available in a small, thin, plastic, land grid array package (LGA) and is guaranteed to operate over an extended temperature range from -40 °C to +85 °C

Features	Benefits
10 years longevity commitment	Continuity and stability of supply
3-axis and dynamically user-selectable full scales (±2g/±4g/±8g/±16g)	Flexibility to cover a broad range of applications
Ultra-low power consumption - down to 2 µA	Minimize power consumption
Embedded FIFO	Enable smart power management at system level
Programmable interrupt	
2x2x1 mm, LGA package with 12 leads (0.5 mm pitch)	Ultra-small footprint but with easy handling in the assembly line

I3G4250D

3-axis, digital output gyroscope

The I3G4250D is a low-power, 3-axis, angular rate sensor able to provide unprecedented stability at zero-rate level and sensitivity over temperature and time. The I3G4250D has user-selectable full scales (±245/±500/±2000 dps) and is capable of measuring rates with a user-selectable bandwidth. It is available in a plastic, land grid array (LGA) package and can operate within a temperature range of -40 to +85 °C.

Features	Benefits
10 years longevity commitment	Continuity and stability of supply
3-axis gyro: 245/500/2000 dps full-scale	Flexibility to cover a broad range of applications
16-bit data output, low noise and high-stability over temperature	High precision and accuracy for demanding applications
Embedded FIFO	Enable smart power management at system level
Programmable interrupt	

Low power, High-g accelerometers

High-g MEMS accelerometers have been traditionally used for automotive applications and are usually single- or dual-axis and power hungry. ST has introduced the world's first 3-axis, low-power, digital accelerometer to enable a number of new industrial, healthcare, sport and consumer applications and is now offering an entire family of high-g devices tailored to the needs of specific applications.
H3LISxxxDL sensors are the answer for developers that require precise shock detection in space- and power-constrained applications: wireless nodes for industrial equipment condition monitoring, wireless vibration monitoring, shock detection in tools, equipment and portable instrumentation, car black boxes, parcel-monitoring, concussion detection in sports, blast detection for soldiers and firefighters, and sensors for augmented sports.

H3LISXXXDL FAMILY

Low power, high-g, 3-axis digital output accelerometers

The H3LISxxxDL family of devices offer selectable full scales from 100 up to 400 g to measure very high accelerations along three axes with ultra-low current consumption (300 µA in Active mode and just 10 µA in low-power mode) and with output data rates up to 1 kHz.
Programmable interrupts triggered by inertial events and advanced power-saving and smart sleep-to-wakeup functions further increase the device's versatility and the possibility to implement power reduction strategies at the system level.
All H3LISxxxDL devices are delivered in the same small, thin, plastic, land grid array package (LGA) 3x3x1 mm, are pin-to-pin compatible and software compatible and guaranteed to operate over an extended temperature range from -40 to +85 °C.

Features	Benefits
3 axis, High-g Full Scale (100g/200g/400g)	Enables a broad range of applications
Low power consumption - 300 µA in Active mode - 10 µA in low-power mod	Ideal for battery operated applications
Programmable interrupt	Enable system level power consumption reduction
3x3x1 mm, LGA package with 16 lead	Small footprint and pin-to-pin compatible with all H3LISxxxDL devices

HIGH-G SENSORS COMPARISON

Feature	Full scale	data output	ODR (Hz)	Power consumption	Programmable interrupt & Smart power features	Digital interface	Supply voltage	Temperature range	Package
H3LIS100DL	± 100 g	8 bits	From 0.5 to 400	300 µA in Normal mode; 10 µA in Low-power mode	✔	I²C / SPI	2.16 to 3.6 V	-40 +85°C	3x3x1.0mm, LGA package with 16 leads
H3LIS200DL	± 100 g/ ± 200 g	8 bits	From 0.5 to 1000						
H3LIS331DL	± 100 g/ ± 200 g /± 400 g	16 bits	From 0.5 to 1000						

Analog sensors

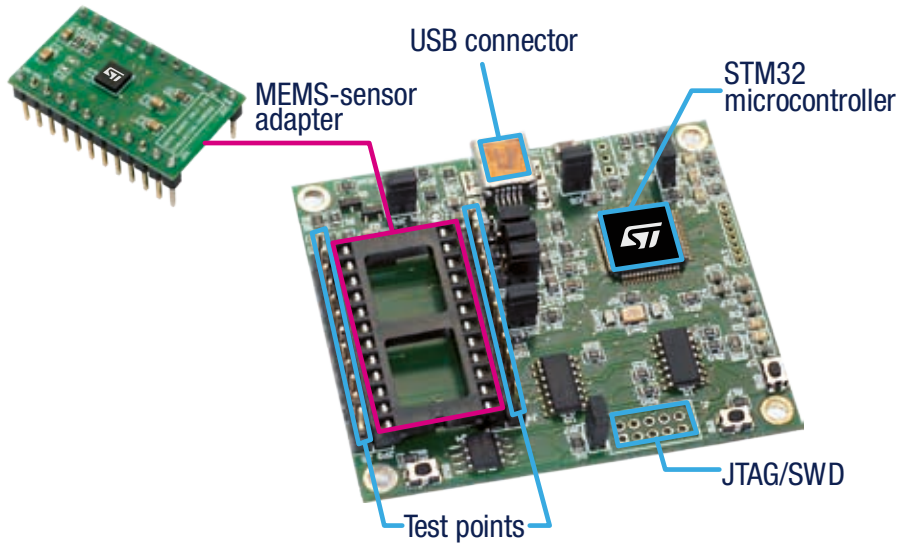
LIS344ALH

High-performance, ultra-low noise, 3-axis ±2/ ±6g analog output accelerometer

The LIS344ALH is an analog output accelerometer with a dynamically user selectable full-scale of ±2 g/±6g and capable of measuring accelerations with ultra-low noise over a maximum bandwidth of 1.8 kHz.
Available in land grid array package (LGA), the LIS344ALH is guaranteed to operate over an extended temperature range of -40 to +85 °C.

Features	Benefits
3-axis, analog output	Ideal for applications where synchronization and data acquisition should be under full control
Ultra-low noise – 50 µg/√Hz	Able to measure very small acceleration levels
Wide bandwidth – up to 1.8 kHz	Able to detect high frequency acceleration variations

Design resources and tools



STMicroelectronics has extensive expertise in sensor integration and new application development and can assist customers in their design-in process. ST's evaluation kits and firmware allow real-time evaluation of sensor performance in customer applications.
ST offers a complete evaluation solution including:

- A full set of DIL24 MEMS sensor adapters supporting fast prototyping
- eMotion motherboard compatible with all adapters and based on an STM32 microcontroller
- UNICO graphic user interface for direct and real-time access to the sensor outputs and configuration registers

Board	Description	Order code
Motherboard	ST MEMS motherboard is based on the high-performance STM32F103 32-bit ARM Cortex™-M3 MCU Interfaces: USB connector and JTAG/SWD for debugging DFU-compatible for USB microprocessor firmware updates Compatible with all ST MEMS adapters	STEVAL-MKI109V2
Adapter boards	Evaluation board for H3LIS100DL	STEVAL-MKI166V1
	Evaluation board for H3LIS200DL	STEVAL-MKI167V1
	Evaluation board for H3LIS331DL	STEVAL-MKI153V1
	Evaluation board for IIS2DH	STEVAL-MKI168V1(*)
	Evaluation board for I3G4250D	STEVAL-MKI169V1(*)
	Evaluation board for IIS328DQ	STEVAL-MKI170V1(*)
	Evaluation board for LIS344ALH	STEVAL-MKI015V1

Note (*): In development

Technical documents

To see all technical documents and files for a specific product, go to www.st.com/sensors and select the product you are interested in through our product catalog. Each part number has a corresponding web page where you can easily find all associated technical documents and resources.

Developer links

- For more information about MEMS sensors: www.st.com/mems
- For more information about MEMS evaluation boards: www.st.com/mems-boards
- For more information about the 10 years longevity program: www.st.com/web/en/support/product_longevity.html
- To take part in our forums: www.st.com/e2e

Online support

For technical support or questions about product availability, pricing, where-to-buy, or other related issues, visit www.st.com/onlinesupport

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Order code: BRMEMSIND1015

For more information on ST products and solutions, visit www.st.com