



Delivering trusted sensor information for a secure and connected IoT

Sensor Solutions

Overview

With successful experiences over 30 years and over 3 billion units shipped worldwide, NXP is a leader serving applications in the automotive, medical and industrial market spaces. NXP's Sensor solutions include a breadth of accelerometers, gyroscopes, magneto-resistive and pressure solutions covering different performance, sensing ranges and form factors. The portfolio is complemented with class leading development and enablement support spanning hardware tools, software tools and use case algorithms. It leverages secure computing and connectivity from the greater NXP portfolio to facilitate speedy sensor system development for the IoT.

Table of Contents

- 1 Overview
- 2 A Preferred Partner when the Information from Sensors Matters
- 2 Sensor Technologies
- 3 Easy to Use
- 4 Next Generation of Trusted Innovation



A Preferred Partner when the Information from Sensors Matters

NXP sensing solutions are trusted in use cases where value, accuracy, data integrity, functional reliability, power conservation and an assurance of long term supply continuity must come together to create an overall robust system solution. Our products, like tire pressure monitor sensors and central and peripheral airbag crash sensors, are key contributors to improving automotive safety by preventing accidents and reducing fatalities. Our precision pressure sensors are deployed in medical applications and hospital equipment. Our high-performance, low powered accelerometer sensors are designed into quantified health applications and security applications.

With the advent of sensor data analytics and the industrial Internet of Things (IOT), NXP sensing solutions are at the forefront supporting new applications in metering and conservation, quantified wellness, security and surveillance, as well as other wearable and home convenience applications.

Sensor Technologies

Motion Sensors

- ▶ NXP's MEMs automotive accelerometer portfolio includes low, medium, and high g ranges with Peripheral Sensor Interface, Distributed System Interface, Serial Peripheral Interface, and Inter-Integrated Circuit communication protocol support to use in modern airbag systems. Our ongoing efforts to extend the capabilities of these systems include addressing the needs of system designers to achieve compliance with ISO 26262, and integrating sensor technologies into cost-efficient system in-package solutions that deliver board-level functionality for automotive systems.
- ▶ NXP's MEMs non-automotive accelerometer portfolio offers low-g motion sensors for security, tamper detection and medical applications that require a fast response time, high sensitivity, low current consumption, low voltage operation and a standby mode in a small profile package.

Pressure Sensors

- ▶ NXP supplies a very large pressure sensor portfolio containing a wide variety of pressure ranges (from vacuum up to 1500 KPa), diverse packaging and porting options. MEMS-based pressure sensors provide robust solutions for the appliance, medical, consumer, industrial and automotive markets.
- ▶ NXP provides tire pressure monitoring system (TPMS) solutions with real-time tire pressure monitoring, alerting the driver of improperly inflated tires. Our TPMS solutions integrate a pressure sensor, microcontroller, RF transmitter and accelerometer in a single package. Other features include small footprint, low-power consumption and large customer memory size.

Magnetic Sensors

- ▶ NXP's angular magnetoresistive sensors provide true angular measurements principle independent of magnet field strength variations and insensitive to air gap and eccentricity variations. Furthermore, they are characterized by an outstanding accuracy over lifetime and a wide operating temperature range up to 180°C
- ▶ NXP's ABS speed sensors provide high jitter performance which is essential for Indirect Tire Pressure Monitoring System (iTPMS) and achieve full performance with ferrite magnets to enable more cost effective system solutions.
- ▶ NXP offers a magnetic sensor portfolio that has extremely high resolution, low-power for geo-magnetic field detection that are adopted for security or tamper detection applications or eCompass with Magnetic Calibration Software.

Easy to Use

Our sensor products are supported using the new Freedom Sensor Toolbox, a complete ecosystem for product development with NXP's sensors. The Toolbox includes enablement hardware including a demo kit, Shield development board and breakout board as shown in the figure below. Each board is enabled by our Sensor Software Frameworks and Freedom Sensor Toolbox-Community Edition (STB-CE) GUI/visualization environment. The Toolbox represents a powerful and convenient development and evaluation platform across NXP's broad sensor portfolio for all phases of customer engagement including:

- ▶ 'Out of the box' demonstration enabled by demo kits and STB-CE (plug and play)
- ▶ Sensor evaluation enabled by Shield boards, compatible FRDM boards, Sensor Software Frameworks and STB-CE
- ▶ Development of sensor applications enabled by Kinetis MCU's and ISSDK
- ▶ Prototyping your sensor designs enabled by breakout boards, Sensor Software Frameworks and STB-CE
- ▶ Framework natively includes advanced sensor algorithms (e.g., Sensor Fusion, pedometer) for rapid development.

This full enablement ecosystem provides continuity of support from sales demonstrations to customer in-house development.



SENSOR PORTFOLIO

Sensor Type	Family	Description	Sensor Toolbox Board Support
Accelerometer	MMA8491Q	3-Axis Digital Accelerometer Ultra low power tilt sensor	FRDMKL25-A8491
	MMA845xQ	3-Axis Digital Accelerometer Linear low noise high performance sensors	FRDM-KL25Z
	MMA865xQ	3-Axis Digital Accelerometer Small low power mass market sensors	FRDM-FXS-MULT2-B
	FXLS8471Q	3-Axis Digital Accelerometer Linear low noise high performance sensor with SPI interface	FRDMKL25-A8471
	MMA955xL	Intelligent Motion Sensing Platform High resolution 3-axis accelerometers with 32-bit low power embedded MCU and 16K flash. MMA9553L is an intelligent pedometer sensor.	FRDM-FXS-MULT2-B
	FXLC95000CL	Intelligent Motion Sensing Platform 3-axis accelerometer with 32-bit ColdFire MCU	FRDM-K22F-SA9500 BRKTSTBC-SA9500
	Magnetometer	MAG3110	3-Axis Digital Magnetometer Highly Accurate, Small, low power magnetic sensor
KMA2xx/KMZxx		Megnetoresistive Angular Sensor High angle range, linear sensor with over-voltage protection	
KMI1x		Magnetoresistive Speed Sensors	
KMI23/25		Wide range of ABS sensors with current interface	
FXOS8700CQ		6-Axis Digital Sensor (3-Axis Accelerometer + 3-Axis Magnetometer) Highly integrated low power sensor with high dynamic range	FRDMSTBC-AGM01 (Gyroscope + E-Compass) FRDM-K22F-AGM01 FRDM-K64F-AGM01
Gyroscope	FXAS21002C	3-Axis Digital Gyroscope Low power sensor with a wide dynamic range	FRDM-FXS-MULT2-B
Pressure	MPL3115A	Absolute Digital Pressure Sensor Wide operating range of 20 kPa to 110 kPa	FRDMKL25-P3115
	MPXxx6115A	Absolute Pressure Sensors Operating Ranges from 15 kPa up to 115 kPa, Media Resistant gel options, analog output	
	MPXH26xxxA	Absolute Pressure Sensors Operating ranges from 15 kPa up to 400 kPa, ported options and media resistant gel options	
	MPxx5004	Differential and Gauge Pressure Sensor Range of 0 to 4 kPa	FRDMSTBCDP5004
	MPX2300D	Differential, Medical Pressure Sensor Range 0 to 40 kPa	
	MPVx4006	Gauge Pressure Sensor Range of 0 to 6 kPa	
	MPxx5010	Differential and Gauge Pressure Sensor Range of 0 to 10 kPa	
	MPxv1xxx	Differential and Gauge Pressure Sensors Operating Ranges from 0 kPa up to 12 kPa	
	MPxx5050	Differential and Gauge Pressure Sensor Range of -50 to 50 kPa	
	MPXx210x	Differential and Gauge Pressure Sensor Range 0 to 100 kPa	
	MPXx220x	Differential and Gauge Pressure Sensor Range 0 to 200 kPa	
	MPX5500	Differential and Gauge Pressure Sensor Range 0 to 500 kPa	
	MPX5700	Differential and Gauge Pressure Sensor Range 0 to 700 kPa	
	MPX5999	Differential and Gauge Pressure Sensor Range 0 to 1000 kPa	
	MPxV50XX	Vacuum Pressure Sensors Operating Ranges from -25 kPa up to 25 kPa	
	MPxV70XX	Vacuum Pressure Sensors Operating Ranges from -2 kPa up to 25 kPa	

Next Generation of Trusted Innovation

With over 30 years of sensor innovation and over 3 billion units shipped worldwide, NXP's sensor solutions portfolio of accelerometers, gyroscopes, magneto-resistive and pressure solutions will enable your next generation application. The portfolio is complemented with leading enablement that spans hardware tools, software tools and use case algorithms leverages secure computing and connectivity from the greater NXP portfolio to facilitate the development of your next generation sensor system with trusted secure sensing data. To find out more, visit www.nxp.com/sensors.