



XENSIV™ pressure sensors

For automotive, industrial, and consumer applications

www.infineon.com/pressure-sensors





XENSIV™ pressure sensors

Ensure the perfect fit for all performance and integrity needs

Infineon XENSIV™ pressure sensors measure the pressure of air and gases across various industries and applications. As pressure transducer sensors, they convert physical pressure into an electric signal. Infineon XENSIV™ pressure sensors combine sensing functions (via a pressure sensor element) and conversion into an electrical signal (via an absolute pressure transducer and signal processing) in one integrated silicon device.

The sensor element and its integrated circuits (ICs) are the heart of pressure sensor technology. Infineon's small pressure sensor IC chips support various applications with best-in-class performance. Infineon is one of the world's largest semiconductor pressure sensor and transducer manufacturers, thanks to a varied portfolio of absolute air pressure sensor ICs. Our comprehensive family of XENSIV™ sensors includes a wide selection of pressure-sensitive sensors tailored specifically to the automotive, consumer, and industrial sectors. XENSIV™ sensors are compact, designed to save energy, and offer a rapid time-to-market – a perfect fit for any performance and integrity needs.



Infineon XENSIV™ BAP sensors are calibrated for specific automotive applications, especially for BMS thermal runaway detection, pneumatic seats, and electronic engine control. The BMS sensors are ISO 26262-compliant and support the highest ASIL requirements on the system level.



Powertrain systems have to fulfill the constantly increasing stringent media requirements. Environmental legislation aims to deliver cleaner air by ensuring a steady global decrease in CO2 emissions. Thanks to their accurate measurement capability, Infineon MAP and turbo MAP products with analog or digital interfaces enable engines to meet these requirements.



Typical safety-related automotive pressure sensing applications, such as side impact and pedestrian protection, call for the highest quality and accuracy standards with full ISO 26262 compliance. Every year, thousands of pedestrians are severely injured in traffic due to slow or failing sensing elements. Our Infineon XENSIV™ safety pressure sensor family includes integrated pressure sensors that tick all these boxes with PSI5 peripheral sensor interfaces for safety-critical use cases. Our sensors support new safety systems, increasing the protection of pedestrians and car occupants in the event of a collision.



Infineon's tire pressure sensors perform all of the functions necessary to implement a state-of-the-art module for a tire pressure monitoring system (TPMS). As part of our XENSIV™ pressure sensors portfolio, our SP49 TPMS sensor ICs are easy to integrate and feature a microcontroller, sensors, wireless communication, and convenient peripherals. They only need a few passive components and a battery to complete a full automotive TPMS sensor assembly.



Our family of digital barometric pressure sensors also gives designers the best choice when it comes to mobile and wearable devices. Highlights include small form factors to facilitate system integration, highest precision and relative accuracy over a wide temperature range, fast read-out speeds via the serial I²C/SPI interface, and low power consumption to ensure longer battery lifetimes.



Absolute pressure sensors (MAP and BAP)

Highest accuracy and precision on the smallest footprint and energy bill

Infineon's pressure sensors offer the highest quality and accuracy for safety-relevant automotive, industrial, or consumer lifestyle applications. Typical safety-related automotive pressure sensing applications such as side-impact and pedestrian protection call for the

highest quality and accuracy standards with full ISO 26262 compliance. Our XENSIV™ family includes integrated pressure sensors that tick all these boxes with PSI5 peripheral sensor interfaces for a safety-critical use case.

KP21x/KP22x – Analog manifold air pressure sensor family (MAP + turbo MAP)

Features

- Manifold air pressure measurement – MAP and turbo MAP
- Excellent accuracy of up to 1.0 kPa over a large temperature range
- Ratiometric analog voltage output proportional to the applied pressure
- Output signal fully compensated over pressure and temperature
- Pressure range from 10 to 400 kPa
- Temperature range from -40 to +140°C
- Output clamping (optional)
- Complete product family available with multiple transfer function
- Reverse polarity protection
- Green SMD package



KP23x – Analog barometric air pressure (BAP) sensor family

Features

- Absolute air pressure measurement
- Excellent accuracy of 1.0 kPa over a large temperature range
- Ratiometric analog voltage output proportional to the applied pressure
- Output signal fully compensated across pressure and temperature range
- Pressure range from 15 to 165 kPa
- Temperature range from -40 to +125°C
- Serial service interface
- Open bond detection (OBD) for supply and GND
- Reverse polarity protection
- Green SMD package

KP276 – Media robust MAP sensor with digital interface

Features

- Media robustness for current automotive requirements
- Digital single edge nibble transmission (SENT) interface (282 clock ticks)
- Excellent accuracy of $\pm 0.77\%$ FSS
- Temperature range -40 to +170°C (170°C for 20 min. max., 150°C operating)
- Integrated NTC temperature sensor functionality with fast start up time (typ. 10 ms)
- Green SMD package

Integrated pressure sensor ICs for manifold and barometric air pressure

Product	Max. accuracy [kPa]	Max. operating temperature [°C]	Automotive	Industrial	Classification	Pressure range [kPa]
KP21x	1.0	140	✓	✓	–	10 ... 150
KP22x	2.5	140	✓	✓	–	10 ... 400
KP23x	1.0	125	✓	✓	–	15 ... 115
KP236N6165	1.0	125	✓	✓	–	60 ... 165
KP276	3.0	150 (170 time limited)	✓	✓	–	10 ... 400

KP46x – Digital barometric air pressure family in new DFN-8 package

Features

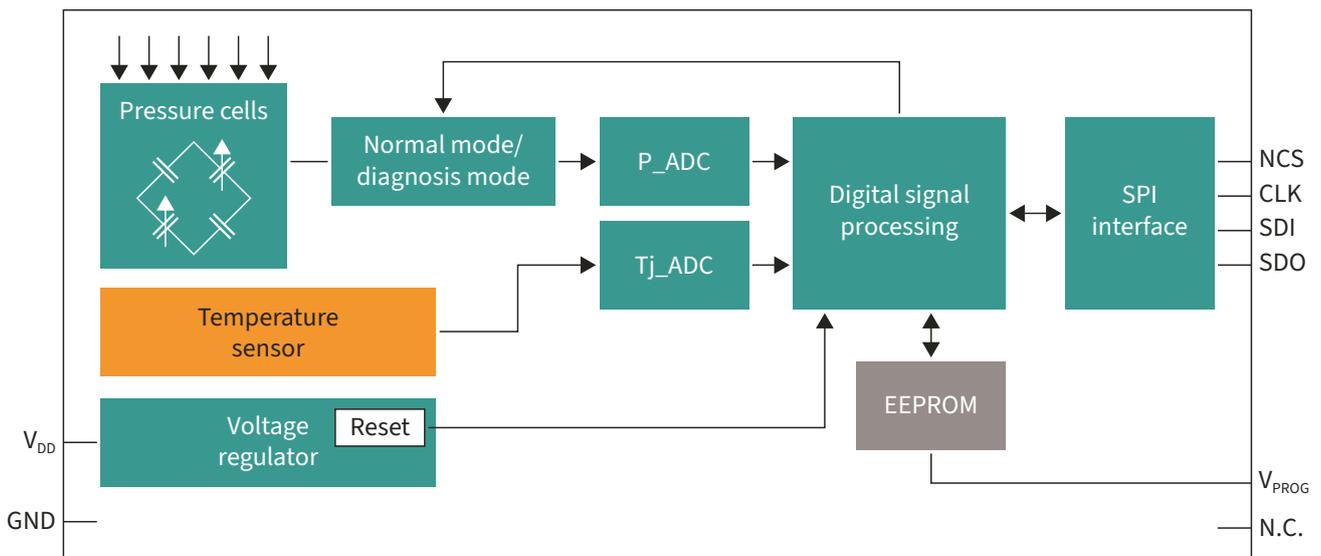
- High accuracy pressure sensing
- Pressure range according to different application needs:
 - ECU/MAF (40–115 kPa)
 - Pneumatic seats (60–165 kPa)
 - BMS thermal runaway (45–200 kPa)
- ISO 26262 compliance for KP467 (ASIL B)
- Operating ambient temperature range -40 ... +125°C, KP467 up to 105°C
- Best-in-class low power consumption with dedicated power-down mode for energy saving
- 10-, 12- or 14-bit resolution pressure and temperature values via SPI interface and backwards compatibility to legacy devices KP25x and KP264
- KP467 with autonomous low-power monitoring (LPM) feature for pressure event detection and host wake-up
- Integrated signal path diagnosis features
- Green, small 4.5×5.1 mm 8-pin DFN package for all KP46x



Applications

- KP464/KP464E for ECU and mass airflow sensing to control fuel supply and injection, for air management and ignition
- KP465 for higher pressure levels e.g., within compressed air in fuel-cell applications
- KP466 for pneumatic seat comfort application
- KP466P for pneumatic seat comfort application and thermal runaway detection in battery management system for xEVs
- KP467 for thermal runaway detection in battery management system for xEVs

Block diagram KP46x



Product	Operating pressure range [kPa]	P-accuracy -40°C [kPa]	P-accuracy 0 ... +85°C [kPa]	P-accuracy +125°C [kPa]	T-accuracy +25 ... +85 [°C]	Supply current I _{VDD} [mA]	Supply current power down I _{VDD_PD} [µA]	Classification
KP464	40 ... 115	±1.5	±1.0	±1.5	±3	3.5 (without SPI comm.)	10	AEC-Q103
KP464E	40 ... 115	±1.5	±1.0	±1.5	±3	3.5 (without SPI comm.)	10	AEC-Q103
KP465	60 ... 320	±5.0	±3.0	±5.0	±3	3.5 (without SPI comm.)	10	AEC-Q103
KP466	60 ... 165	±4.0	±1.0	±2.0	±3	5 (without SPI comm.)	10	AEC-Q103
KP466P	60 ... 165	±1.5	±1.0	±1.5	±3	5 (without SPI comm.)	10	AEC-Q103
KP467	45 ... 200	±3.0 kPa (lifetime) ±1.5 kPa (0h) ±4% of LPM threshold (±2 kPa max.)			±3	– 3.5 mA (on mode without SPI comm.) – typ. 50 µA (in LPM)	10	AEC-Q103 ISO 26262-compliant

KP497 – Advanced digital barometric air pressure and acceleration sensor

Features

- Pressure range for thermal runaway detection: 20–250 kPa
- Integrated acceleration sensor for battery shock monitoring
- ISO 26262-compliant (ASIL A)
- 2kB flash memory available for storage of customer specific data, e.g., battery passport relevant data
- High accuracy pressure sensing
- Operating ambient temperature range -40 ... +105°C
- Ultralow power consumption with dedicated power-down mode for energy saving
- Autonomous low-power monitoring (LPM) feature for event detection and host wake-up



Applications

- KP497 calibrated for thermal-runaway-detection in battery management systems for xEVs by sensing critical air pressure
- Determination of the economic value of the battery over the course of its life cycle in relation to mechanical influences and shocks; with that essential part of the information for battery passport for xEVs and for reprocessing and reuse of batteries

Product	Operating pressure range [kPa]	P-accuracy [kPa]	T-accuracy [°C]	Typ. supply current power down at 25°C I_{VDD_PD} [μA]	Classification
KP497 ¹⁾	20 ... 250	±2	±3	0.24	AEC-Q100 ISO 26262-compliant

1) Coming Q2/2025

Pressure sensors for side crash detection (SAB)

PSI5 PRO-SIL™-ready pressure sensors for side impact detection and pedestrian protection

Passive safety vehicle systems have improved significantly over the last few years, especially in terms of front impact, side impact, and pedestrian impact detection. Legal regulations and consumer tests have been the main drivers (e.g., FMVSS 214, UN ECE R135, NCAP) for increased penetration. Infineon Technologies' next-generation PSI5 safety pressure sensor family enables very fast reaction times and will help you to fulfill existing and future tests.

The pressure sensor is assembled in a module within the car's side doors in the side airbag application. When the door is compressed due to a side impact, the KPx0x provides a signal pulse proportional to the pressure change inside the door. In the pedestrian protection application, the pressure sensing system based on KP201/KP305/KP405 is mounted within the car's front bumper. In case of an impact, a pedestrian protection device is triggered. The KP201/KP305/KP405 extended pressure range allows common pedestrian protection systems to support front impact detection scenarios and also supports side crash systems.

Features and benefits

Key features	Key benefits
<ul style="list-style-type: none"> – PSI5 peripheral interfaces – Easy customization with end of line programming via PSI5 interface in the final customer module – Low design-in effort due to drop-in compatibility to previous safety pressure sensor family – Best-in-class cost performance 	<ul style="list-style-type: none"> – Fully compliant to PSI5 and AK-LV29/38 and extended pressure range addendum – ISO 26262-compliant development to be used in ASIL B(D) systems – Patented built-in diagnosis for pressure cells and circuitry – SMD package: DFN-8-1

Product summary

Type	Application	Classification	Package
KP200	Side crash detection	ISO 26262-compliant	DSOF-8-16
KP201	Side crash detection Pedestrian impact detection Front crash detection	ISO 26262-compliant	DSOF-8-16
KP204	Side crash detection	ISO 26262-compliant	DSOF-8-164
KP300	Side crash detection	ISO 26262-compliant	DSOF-8-164
KP305	Side crash detection Pedestrian impact detection Front crash detection	ISO 26262-compliant	DSOF-8-164
KP400	Side crash detection	ISO 26262-compliant	DFN-8-1
KP405	Side crash detection Pedestrian impact detection Front crash detection	ISO 26262-compliant	DFN-8-1



ISO 26262 compliant

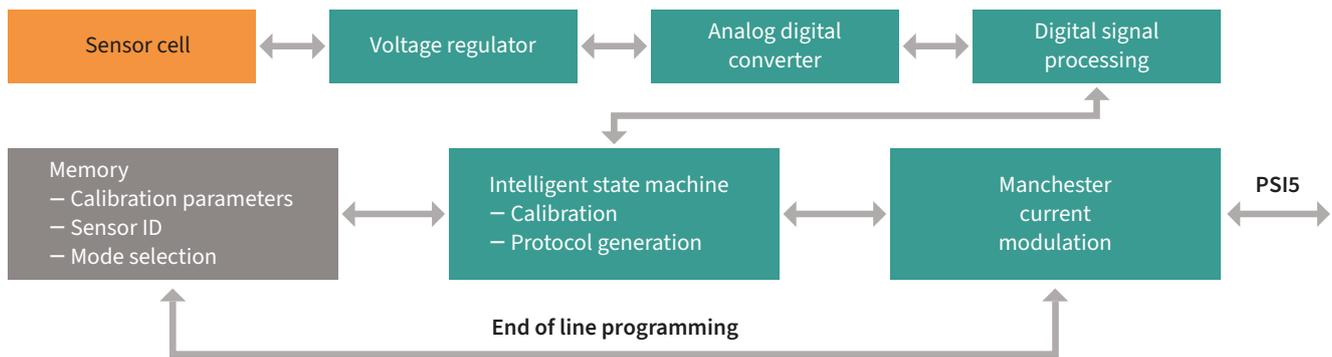
Pressure sensors KP300 and KP305

ISO 26262-compliant pressure sensor for side crash, pedestrian impact, and front crash detection

Infineon's KP30x is a monolithically integrated pressure sensor featuring a programmable PSi5 interface and compliance with AK-LV29/38. An intelligent state machine provides a pressure signal output enabling simple threshold detection algorithms. The amplitude of the signal pulse is independent of the ambient pressure but dependent on the relative pressure change. Several output formats are selectable to provide more design flexibility to the system. The KP30x family forms the next generation of safety pressure sensors and is application-compatible with Infineon's previous generation. ISO 26262-compliant development and corresponding functional safety documentation support the use of the KP30x in ASIL B(D) systems.



Block diagram



Features and benefits

Key features

- Fully compliant to PSi5 and AK-LV29/38 and extended pressure range addendum
- ISO 26262 compliant development to be used in ASIL B(D) systems
- Patented built-in diagnosis for pressure cells and circuitry
- SMD package: DSOF-8-164

Key benefits

- Easy customization with end of line programming via PSi5 interface in the final customer module
- Low design-in effort due to drop-in compatibility to previous safety pressure sensor family
- Best-in-class cost performance

Product summary

Type	Application	Classification	Package
KP300	Integrated pressure sensors	Side crash detection	DSOF-8-164
KP305	Integrated pressure sensors	Side crash detection Pedestrian impact and front crash detection	DSOF-8-164

PRO
SIL



ISO 26262
compliant

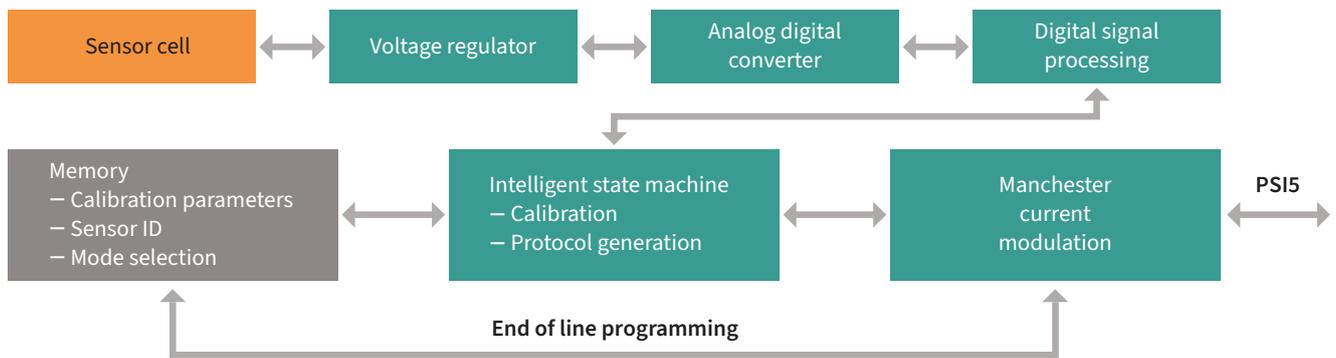
Pressure sensors KP400 and KP405

ISO 26262-compliant pressure sensor for side crash, pedestrian impact, and front crash detection in small DFN package

Infineon's KP40x is a monolithically integrated pressure sensor featuring a programmable PSi5 interface and compliance with AK-LV29/38. An intelligent state machine provides a pressure signal output, enabling simple threshold detection algorithms. The amplitude of the signal pulse is independent of the ambient pressure but dependent on the relative pressure change. Several output formats are selectable to provide more design flexibility to the system. The KP40x family forms the next generation of safety pressure sensors and is fully compatible with Infineon's previous generation. ISO 26262-compliant development and corresponding functional safety documentation support the use of the KP40x in ASIL B(D) systems. Based on the proven chip technology, the KP40x offers best-in-class cost performance and is delivered fully calibrated.



Block diagram



Features and benefits

Key features

- Small holes for intrusion protection
- Safe operation even with two blocked holes
- Easy customization with end of line programming via PSi5 interface in the final customer module
- Low design-in effort due to drop-in compatibility to previous safety pressure sensor family
- Best-in-class cost performance

Key benefits

- Fully compliant to PSi5 and AK-LV29/38 and extended pressure range addendum
- ISO 26262-compliant development to be used in ASIL B(D) systems
- Patented built-in diagnosis for pressure cells and circuitry
- SMD package: DFN-8-1

Product summary

Type	Application	Classification	Package
KP400	Integrated pressure sensors	Side crash detection	DFN-8-1
KP405	Integrated pressure sensors	Side crash detection Pedestrian impact and front crash detection	DFN-8-1



ISO 26262 compliant

Tire pressure sensors (TPMS)

SP49 – Tire pressure monitoring sensors

The Infineon SP49 product family provides highly integrated devices that perform all functions for a tire pressure monitoring system (TPMS) wheel module suited for high-volume applications. The devices measure pressure in the range from 100 kPa up to 920 kPa and acceleration between -600 g and 600 g, as well as temperature and supply voltage. Furthermore, they feature efficient power management and an integrated microcontroller. An integrated LF receiver and RF transmitter allows wireless communication.

For wired data transfer, the hardware master/slave I2C interface can be used. Further wired interfaces, such as UART, SPI, or PWM, can be realized in software. Infineon's technical leadership in MEMS technology and patented Glass-Silicon-Glass MEMS pressure sensors with best-in-class media compatibility ensure industry-leading performance in TPMS.

Features

Patented Glass-Silicon-Glass MEMS pressure sensor with Best-in-class media compatibility

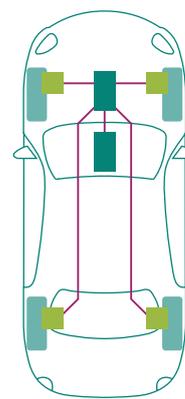
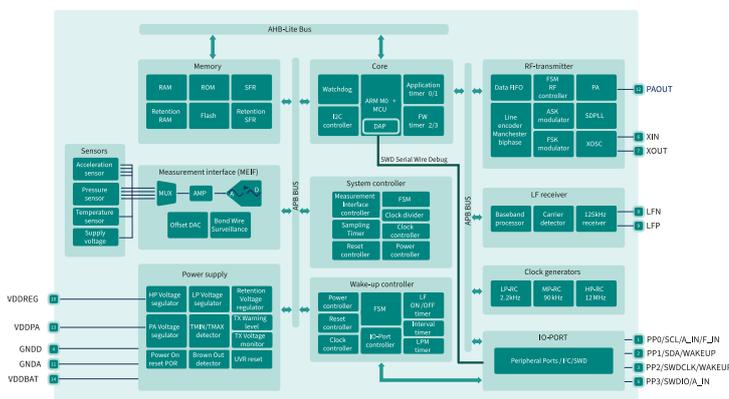
- Industry-standard power efficient 32-bit Arm® Cortex® 1)
- 19 kB of flash memory for the application code and/or user data storage; also usable for a bootloader
- 1 kB RAM plus 192 bytes of retention RAM
- Best-in-class lifetime charge consumption

1) Arm® and Cortex® are trademarks of ARM limited, UK

Customer benefits

Optimized for battery-powered applications, the system controller's flexible wake-up and power management, ultralow power down current, and wide range of supply voltages ensure a long battery lifetime (for typical TPMS applications, 10 years with a CR2032 battery). With the possibility of generating a wake-up from the integrated Interval timer, SP49 products are perfectly suited for standalone remote pressure sensing solutions demanding low charge consumption. For such applications, the LF receiver with wake-up capability and best-in-class sensitivity provides the possibility of on-demand measurements. SP49 has a tailored ASIC, which is optimized for the following new intelligent tire features.

- On-tire auto-position-sensing (APS)
- Tire filling assist
- Tire burst detection
- Load detection



SP49 fully supports all necessary requirements for a tire pressure monitoring system (TPMS)

Product table

Product variant	Product name	Pressure range [kPa]	Flash size for code [kB]	Package	Ordering code
SP490-01-11	SP49	920	19	DSOSP-14-84	SP005878909
SP490-01-12	SP49i	920	19	DSOSP-14-84	SP005825051
SP49T-05-12	SP49iTruck	1600	19	DSOSP-14-84	SP005957469

Pressure sensors for consumer and IoT

DPS368 – Digital barometric pressure sensor for mobile and wearable devices

Infineon’s digital barometric pressure sensor DPS368 is the best choice for mobile and wearable devices due to its small form factor, high precision, and low power consumption. Pressure sensing is based on capacitive technology, which guarantees ultrahigh precision (± 2 cm) and excellent relative accuracy (± 0.06 hPa) over a wide temperature range. The sensor’s internal signal processor converts the output from the pressure and temperature sensor elements to 24-bit results. Each pressure sensor has been calibrated individually and contains calibration coefficients. The application uses the coefficients to convert the measurement results to true pressure and temperature values. The sensor has a FIFO that can store the last 32 measurements. Since the host processor can remain in sleep mode for longer between readouts, a FIFO can reduce the system’s power consumption. Sensor measurements and calibration coefficients are available via the serial I²C/SPI interface.

DPS368 offers the best-in-class resolution (± 2 cm), a very fast readout speed, and low current consumption. The sensor can be used in harsh environments, as it is robust against water (IPx8 - 50 m underwater for 1 hour), dust and humidity. The small package size saves up to 80 percent of the space and makes the DPS368 ideal for mobile applications and wearable devices.



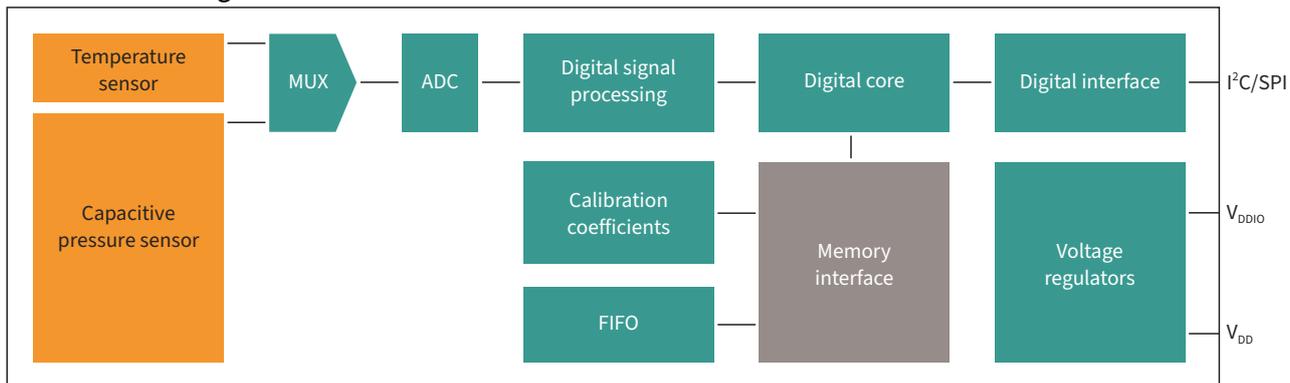
Typical applications

- Drones: altitude detection and height stability
- Health and fitness: accurate elevation gain and step counting (e.g., for smartwatches)
- Outdoor Navigation: GPS start-up time/accuracy improvement; dead reckoning (e.g., in tunnels)
- Indoor navigation: floor detection e.g., in shopping malls and parking garages
- Smart home: micro weather forecasting; room temperature control; intruder detection
- Airflow control: Smart filter replacement alarm (e.g., in home appliances); predictive maintenance
- Health care: fall detection; respiratory devices; smart inhalers

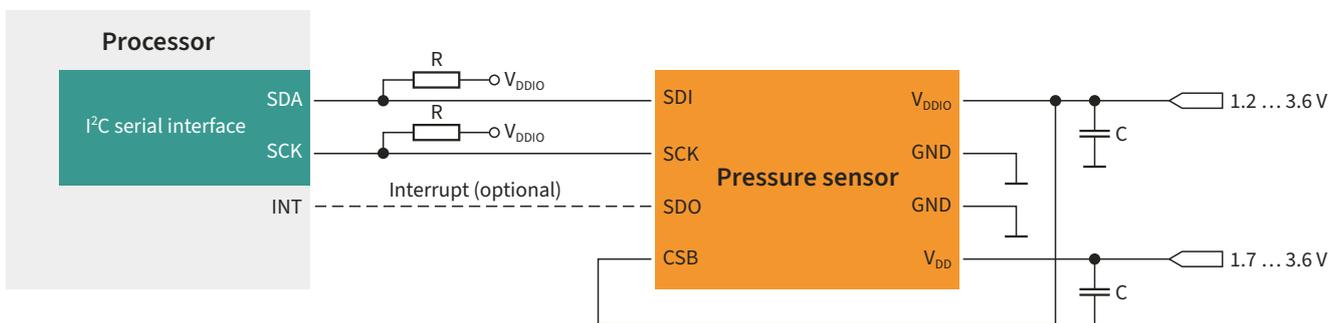
Key product features

Package size	2.0 x 2.5 x 1.1 mm
Operating pressure range	300 ... 1200 hPa
Operating temperature range	-40 ... 85°C
Pressure level precision	± 0.002 hPa (or ± 0.02 m)
Relative accuracy	± 0.06 hPa (or ± 0.5 m)
Absolute accuracy	± 1 hPa (or ± 8 m)
Temperature accuracy	0.5°C
Pressure temperature sensitivity	0.5 Pa/K
Measurement time	3.6 ms (low precision); 27.6 ms (standard mode)
Average current consumption at 1 Hz sampling rate	1.7 μ A pressure measurement, 1.5 μ A temp. measurement, standby 0.5 μ A
Supply voltage	V_{DDIO} : 1.2–3.6 V; V_{DD} : 1.7–3.6 V
Operating modes	Command (manual), background (automatic), standby
Interface	I ² C and SPI, both with optional interrupt

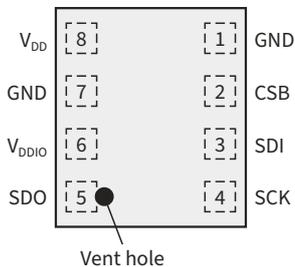
Functional block diagram



Application circuit example (in I²C configuration)



Pin configuration (top view)



Pin	Name	Function
1	GND	Ground
2	CSB	Chip select
3	SDI	Serial data in/out
4	SCK	Serial clock
5	SDO	Serial data out
6	VDDIO	Digital interface supply
7	GND	Ground
8	VDD	Analog supply

Infineon inside pressure sensor partners

Building upon its best-in-class technology, Infineon offers a full range of barometric pressure sensors as chipsets. Infineon's network of global partners offers customers a comprehensive portfolio of Infineon inside pressure sensors that will propel performance to the next level even for the most demanding applications.



Learn more about our partner program and purchase our partner solutions [here](#).

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