

# Low-power barometric pressure sensor for mobile and wearable gadgets and iot devices

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Infineon Technologies AG has launched an ultra-high  $\pm 5\text{cm}$  resolution, miniature MEMS (Micro Electro Mechanical Systems) pressure sensor for use in mobile and wearable gadgets and IoT (Internet of Things) devices. The DPS310 is a low-power digital barometric pressure sensor that enables the development of new and enhanced navigation, location, well-being, gesture recognition and weather monitoring applications.

Delivering accurate and stable performance across a wide temperature range, the DPS310 is ideal for indoor navigation and assisted location applications – such as floor detection in shopping malls and parking garages– and outdoor navigation where it can help to improve navigation accuracy or support 'dead reckoning' when GPS signal is not available. In addition, the ability to provide accurate data for calculating elevation gain and vertical speed suits activity tracking in mobile and wearable health and sports gadgets, while ultra-precise pressure measurement opens up new possibilities for gesture recognition and the detection of rapid weather changes.

The Infineon DPS310 pressure sensor is based on the capacitive sensing principle rather than the piezo-electric principle employed in most other digital [pressure sensors](#). This guarantees high precision across a broad range of temperatures even when temperature changes rapidly. This is clearly an advantage since the temperature inside a mobile device can change quickly due to several heat sources.

In high-precision mode the DPS310 can measure heights within  $\pm 5\text{cm}$

enabling the exact detection of transient states, which are the biggest challenges of [indoor navigation](#). The high resolution of Infineon's pressure sensor could help, for example, in identifying when a person is moving from one floor of a building to another and triggering the download of a new floorplan. High-accuracy height measurement is also required by sports and fitness applications that need to differentiate between the different types of 'steps' a wearer might be taking and the corresponding calorie 'burn rate'.

For the new pressure sensor Infineon makes use of advanced semiconductor process technologies that were originally developed for the company's automotive sensors. The sensors are highly reliable and, for example, integrated in safety applications such as airbags. These technologies contribute to both the small device size of 2.0mm x 2.5mm x 1.0mm and its low-power consumption. In low power mode the current consumption is only 3 $\mu$ A at one measurement per second, falling to just less than 1 $\mu$ A in standby mode. An integrated FIFO that stores the last 32 measurements helps to further reduce overall system power consumption by extending the time that a host processor can remain in sleep mode between sensor readouts.

The DPS310 provides reliable and accurate performance at pressures from 300hPa to 1200hPa and at temperatures from -40°C to 85°C. Multiple measurement and resolution modes allow the device to be optimized to the target application. For example, one-time measurement can be configured for GPS altitude accuracy, while the option to take several measurements per second will address the needs of [gesture recognition](#). Each sensor is calibrated individually and has onboard the calibration coefficients for accurate compensation of measured pressure and temperature values. Sensor measurement data and calibration coefficients are available through the sensor's I<sup>2</sup>C/SPI digital interface.

"Pressure sensors are becoming an essential part of mobile and [wearable](#)

gadgets. With regard to IoT the pressure sensor is also an important building block of integrated consumer sensor solutions," says Dr. Roland Helm, Segment Head Sensors at Infineon Technologies. "Built on proven semiconductor processes and combining ultra-high-resolution, good temperature stability, low-power operation and miniature package size, the DPS310 enables developers to improve the functionality and enhance the user experience in applications ranging from assisted location and navigation through sport and fitness to real-time weather monitoring."

Provided by Infineon

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