Innovative all-CMOS pressure sensor from ScioSense sets new performance standard in wearable and mobile applications

Compact new ENS220 combines high accuracy and low noise in barometric pressure measurements at user-selectable output data rates up to 1kHz

Munich, Germany, 15 November 2022 – ScioSense, a manufacturer of semiconductor-based environmental and flow sensors, today introduced the ENS220, an ultra-low power barometric pressure and temperature sensor in a compact package which offers outstanding speed, resolution and accuracy.

The ENS220 is on display at the ScioSense booth B3.419 at Electronica (Munich, 15-18 November 2022).

The sensor's industry-standard LGA package footprint of 2.0mm x 2.0mm makes the ENS220 suitable for use in wearable and mobile devices such as smart watches and wristbands, GPS navigation systems and personal health monitoring devices.
Altitude or height measurements derived from the ENS220's relative pressure measurements are accurate to as little as ±2.5 Pa which gives a precision of ±21 cm for a height difference of 83 m. The typical noise level is 0.85 Pa rms at 4ms conversion time.

The combination allows to detect height change as small as 7 cm, which can be used in indoor navigation and localization, activity tracking and fall detection applications.
These applications are enabled by the ENS220's high speed, low noise and high resolution, as well as its accuracy. Measurements are resolved to 1/64Pa. The output data rate is configurable by the user up to a maximum of 1kHz, enabling device manufacturers to optimize the balance between latency and power consumption. The ENS220's high accuracy at high speed makes it particularly attractive for applications such as fall detection which require a high-speed series of accurate height measurements in small increments.

This high performance is also compatible with battery power sources thanks to the ENS220's extremely low power consumption. Operating current at the nominal 1.8V supply voltage is less than 80µA when sampling at 1kHz, just 0.8µA when sampling every minute, and 0.1µA in Idle mode.

All-new all-CMOS architecture

Setting a new standard in the market for small surface-mount pressure sensors, the ENS220 is the result of an important technical innovation. While competing pressure sensors are comprised of a MEMS sensor membrane co-packaged with a CMOS signal-processing ASIC, the ENS220 is different: both the sensor membranes and the ASIC are implemented in CMOS silicon in a single monolithic chip.

This all-CMOS architecture eliminates the parasitics which are generated at the MEMS/CMOS interface in other devices. The all-CMOS architecture also means that ScioSense can match the capacitance of the membranes to the capacitance of the signal-processing circuitry, to minimize noise in circuit elements including the device's 24-bit ADC. This results in:

- A lower noise floor
- Higher sensitivity
- Smaller size
- Lower cost of fabrication

The ENS220's built-in temperature sensor – accurate to ±0.2K at 8mK resolution – ensures reliable compensation of pressure outputs across the measurement range of 300hPa to 1,200hPa and -40°C to 85°C.

Dirk Enderlein, CEO at ScioSense, said: 'The ENS220 is the first substantial breakthrough in the pressure sensor market for many years. By implementing the entire sensor in CMOS, ScioSense has dramatically lowered the noise floor, increased sensitivity and shortened conversion time compared to conventional MEMS pressure sensors. This makes the ENS220 the world's best pressure sensor for applications which require accurate and precise height or altitude measurements at a high sampling rate.'

The ENS220 provides pressure and temperature measurements via digital I^2C or SPI interfaces. The device's LGA package dimensions are 2.0mm x 2.0mm x 0.75mm.

Samples of the ENS220 will be available worldwide from Q1 2023 from authorized distributors. More information may be found at www.sciosense.com.

About ScioSense – Sensing tomorrow's world

Headquartered in Eindhoven, The Netherlands, ScioSense is the leading expert and manufacturer of semiconductor-based environmental and flow sensors. Its product portfolio consists of humidity, gas/air quality, temperature, pressure and flow sensors for building automation, home appliances, IoT/wearables/mobiles, automotive and industrial applications.

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