

P4562D

STMicroelectronics reveals innovative infrared (IR) sensor for presence and motion detection in building automation

Highly integrated ultra-low power sensor with micromachined thermal transistors replaces conventional passive infrared detectors

Geneva, Switzerland, July 24, 2023 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, is launching a novel human-presence and -motion detector to enhance security systems, home-automation equipment, and IoT devices that typically use passive infrared (PIR) sensing.

The [STHS34PF80](#) sensor contains thermal transistors that can detect stationary objects, unlike conventional PIR detectors that require the detected object to be moving to produce a measurable response from the sensor. Also, while PIRs need a Fresnel lens to sense moving objects, ST's novel detector allows simpler, lens-free construction.

“Today’s smart homes, smart buildings, and IoT applications need accurate presence detection to improve control of systems such as lighting, heating, security, and safety monitoring for a sustainable future,” said Simone Ferri, General Manager, AMS MEMS Sub-Group, STMicroelectronics. *“Our new STHS34PF80 is an economical, ultra-low-power sensor that lets building automation operate consistently whether detected occupants are moving or not. It’s made using an innovative combination of CMOS chip fabrication, silicon micromachining, and low-voltage circuit design capabilities.”*

Embedding a smart algorithm for presence and motion detection, the STHS34PF80 targets alarms and security systems, home automation, smart lighting, IoT devices, smart lockers, and smart wall pads. Its lens-free range of four meters and 80° field of view cover a large area in front of the sensor. With operating current of 10µA, power consumption is less than a conventional PIR, and the 3.2mm x 4.2mm x 1.455mm surface-mount package is compact and suited to automated high-speed assembly. The sensor has high resistance to unwanted effects of direct lighting and high immunity to electromagnetic interference (EMI).

The [STEVAL-MKI231KA](#) simplifies experimenting with the STHS34PF80. Plugging into the [X-NUCLEO-IKS01A3](#) or the [STEVAL-MKI109V3](#) lets developers use ST's [Unico-GUI](#) graphical interface to configure the IR sensor and take measurements within a simplified workflow. Drivers for the STHS34PF80 are available on [GitHub](#). In addition, a ready-to-use library for compensating and detecting presence of people or objects is available in the [X-CUBE-MEMS1](#) software package. Users can quickly start running simple applications, taking advantage of the STHS34PF80 and testing the results to begin creating an application.

Further technical information

The STHS34PF80 contains thermal MOSFETs (TMOS) that are sensitive to the heating effects of infrared radiation incident on their gates, as well as digital readout circuitry integrated efficiently on the same chip using ST's mature and reliable silicon-on-insulator (SOI) CMOS

technology. The SOI's architecture facilitates micromachining with ST's proven MEMS (micro electromechanical systems) processes to thermally isolate the TMOS for accurate temperature sensing.

The TMOS is powered at a sub-threshold voltage below that needed to turn the transistor fully on. In this mode, the drain-source current is highly temperature dependent and produces an accurately measurable response to minimal infrared radiation. This enables the sensor to detect human presence, via infrared emissions, whether the person is moving or still.

Another benefit of sub-threshold operation is that the transistor consumes very low power, allowing battery-powered sensors that contain the STHS34PF80 to operate for long periods between charging or battery replacement. In addition, the standard CMOS fabrication technology ensures cost-effective sensor production with high wafer yield, also leveraging sub-micron transistor geometry for small sensor dimensions. This contrasts with PIR sensors, whose sensitivity can depend on pyroelectric-pixel size. Moreover, the integrated digital interface allows direct connection to the host without analog front end circuitry.

The [STHS34PF80](#) is in production now and available in a 10-lead land-grid array (LGA) package, priced from \$2.60 for orders of 1000 pieces.

For further information please visit www.st.com/infrared-sensor.

About STMicroelectronics

At ST, we are over 50,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of the Internet of Things and connectivity. We are committed to achieving our goal of becoming carbon neutral by 2027. Further information can be found at www.st.com.

For Press Information Contact:

Michael Markowitz
STMicroelectronics
Tel: +1 781 591 0354
Email: michael.markowitz@st.com