

MEMS Sensors

TDK introduces revolutionary MEMS-based CO₂ gas sensor platform

- Miniaturized ultra-low power MEMS platform for direct and accurate detection of CO₂ in home, automotive, IoT, healthcare and other applications
- TCE-11101 is housed in a 5 mm x 5 mm x 1 mm 28-pin LGA package
- Platform offers very wide sensing range (400 ppm to 50,000ppm)

January 8, 2021

TDK Corporation (TSE: 6762) announces the InvenSense TCE-11101, a miniaturized ultra-low power MEMS gas sensor platform for direct and accurate detection of CO₂ in home, automotive, IoT, healthcare, and other applications. The TCE-11101 introduces new technology that expands TDK's sensor leadership into new applications and solutions, as part of the new SmartEnviro™ family. Its small size and low power enable consumer and commercial devices of all form factors that do not need to be wall-powered. The TCE-11101 is housed in a 5 mm x 5 mm x 1 mm 28-pin LGA package and requires minimal external components to complete the design.

Currently available gas sensors use bulky, power-intensive, and expensive optical techniques; or an intrinsically inaccurate "eCO₂" approach. TDK's TCE-11101 is based on a ground-breaking technology platform made possible by TDK's unique combination of novel materials development, MEMS process technologies, and AI and machine learning capabilities, delivering a solution that is orders of magnitude smaller than traditional sensors, consumes less than 1mW of power, and provides accurate measurement of CO₂ gas concentration.

The TCE-11101 significantly expands the use cases for CO₂ detection in a wide variety of new and existing applications where traditional sensors fail due to size and power concerns or simply the economics of their usage, while "eCO₂" solutions fail to provide the required performance. For example, the TCE-11101 is ideal for applications such as fixed or robotic indoor air quality monitoring due to its ability to provide accurate CO₂ readings, doing so at extremely low power, in a very small form factor, and in a low cost, easy-to-integrate digital device. Further, in applications such as Demand Controlled Ventilation (DCV), the TCE-11101 allows granular control of a HVAC system by accurately measuring CO₂ levels that precisely indicate occupancy in a room or given space – information which can be used to optimize energy consumption for HVAC in Smart Buildings or Smart Homes.

Features and benefits of the SmartEnviro products include:

- Ultra-low power
- Direct CO₂ sensing
- Digital interface (I²C)
- Miniaturized form factor
- Technology that offers very wide sensing range (400 ppm to 50,000ppm)

- Integrated solution with on-board programmability via 16-bit microcontroller
- Background calibration for long-term stability
- RoHS and Green compliant

“In addition to IoT consumer solutions, the TCE-11101 enables a wide range of health and commercial applications such as leakage detection, while also ensuring high accuracy,” said Dr. Sreeni Rao, Senior Director, Emerging Business, InvenSense, a TDK Group Company. “Furthermore, easy integration and programmability help simplify final system design and deployment.”

The gas sensor platform solution includes:

- TCE-11101
 - The TCE-11101 is a 5 mm x 5 mm x 1 mm 28-pin LGA package, with a metal cap and integrated particle ingress filter to ensure long life operation. It includes an ASIC that provides automatic calibration, reporting, and a serial interface for data output and configuration, making it incredibly easy to integrate into nearly any application, with the low power consumption enabling its use in battery-powered devices.
- DK-11101
 - TDK offers a comprehensive evaluation kit with supporting software so developers can quickly evaluate the TCE-11101 and integrate it into their next design.

The TCE-11101 sensor and DK-11101 development kit are available now for select early partners and customers. TDK will demonstrate the SmartEnviro platform along with the industry's most comprehensive portfolio of passive components, sensors, power supplies and batteries during the upcoming CES 2021 conference, being held digitally at <https://www.ces.tech>. For more information on our SmartEnviro sensor solutions please visit www.invensense.tdk.com/smartenviro or contact InvenSense Sales at sales@invensense.com.

Glossary

- CO₂: Carbon Dioxide
- eCO₂: Equivalent CO₂
- MEMS: Micro-Electro-Mechanical Systems

Main applications

- Home
- Industrial
- Automotive
- Healthcare
- IoT
- Robotics
- HVAC

Main features and benefits

- Ultra-low power
- Direct CO₂ sensing
- Digital interface (I²C)
- Miniaturized form factor
- Background calibration for long-term stability
- Integrated solution with on-board programmability
- Technology that offers very wide sensing range (400 ppm to 50,000ppm)

Key data

Product	Baseline Accuracy	Package Size (mm)	Lifetime	Temperature Range	Interface	Additional Features
TCE-11101	±75 ppm ±3% of reading	5 x 5 x 1 28-pin LGA	5 Years	0-60 C	I ² C	
DK-11101	±75 ppm ±3% of reading	5 x 5 x 1 28-pin LGA	5 Years	0-60 C	I ² C, USB	Calibration and correction

About TDK Corporation

TDK Corporation is a world leader in electronic solutions for the smart society based in Tokyo, Japan. Built on a foundation of material sciences mastery, TDK welcomes societal transformation by resolutely remaining at the forefront of technological evolution and deliberately “Attracting Tomorrow.” It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK’s comprehensive, innovation-driven portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, as well as magnetics, high-frequency, and piezo and protection devices. The product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic, and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads and more. These products are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics and TDK-Lambda. TDK focuses on demanding markets in automotive, industrial and consumer electronics, and information and communication technology. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2020, TDK posted total sales of USD 12.5 billion and employed about 107,000 people worldwide.

About InvenSense

InvenSense, Inc., a TDK Group company, is a world leading provider of MEMS sensor platforms. InvenSense’s vision of Sensing Everything® targets the consumer electronics and industrial areas with integrated Motion, Sound, and Ultrasonic solutions. InvenSense’s solutions combine MEMS (micro electrical mechanical systems) sensors, such as accelerometers, gyroscopes, compasses, microphones, and ultrasonic 3D-sensing with proprietary algorithms and firmware that intelligently process, synthesize, and calibrate the output of sensors, maximizing performance and accuracy. InvenSense’s motion tracking, ultrasonic, audio, fingerprint, location platforms and services can be found in Mobile, Wearables, Smart Home, Industrial, Automotive, and IoT products. InvenSense became part of the MEMS Sensors Business Group within the newly formed Sensor Systems Business Company of TDK Corporation in 2017. In February of 2018, Chirp Microsystems joined the InvenSense family through its acquisition by TDK. InvenSense is headquartered in San Jose, California and has offices worldwide. For more information, go to invensense.tdk.com

You can download this text and associated images at
https://www.tdk.com/corp/en/news_center/press/20210108_01.htm

Further information on the products can be found under <https://www.invensense.tdk.com>

Contacts for media

Region	Contact		Phone	Mail
Global	Mr. David A. ALMOSLINO	InvenSense San Jose, CA	+1 408-501- 2278	pr@invensense.com
North America	Ms. Sarah MACKENZIE	Publitek Portland, OR	+1 503-720- 3743	TDK-global@publitek.com