MEMS Sensors

TDK introduces two new high-performance ultrasonic ToF sensors

- ICU-10201 and ICU-20201 are high performance ultrasonic ToF sensors integrating PMUT (Piezoelectric Micromachined Ultrasonic Transducer) with an ultra-low-power SoC (system on chip) in a miniature 3.5 x 3.5 mm^2 reflowable package
- The MEMS sensors provide accurate range measurements at distances up to 5m over a wide and configurable Field-of-View (FoV) on any surface and under any lighting condition
- Due to a powerful embedded processor and extended memory space, the sensors deliver high computational power allowing complete application algorithms directly on the chip

January 6, 2022

TDK Corporation (TSE: 6762) introduces the Chirp ICU-10201 and ICU-20201, two new high-performance, ultra-low power integrated ultrasonic Time-of-Flight (ToF) sensors for short- and long-range detection. The new MEMS sensors embed a more powerful on-chip processor with higher computational power; the enhanced processing capabilities allow a wide range of application algorithms to fit and to run on-chip, completely offloading the system MCU.

Compared to the previous generation, the ICU-10201 and ICU-20201 embed:

- 10 times faster DSP with HW multiplier for higher calculation power;
- 3 times larger code memory;
- 2 times larger data memory;
- A fast host interface (SPI);
- Support a wide range of IO supply voltages

“With the introduction of the ICU-10201 and the ICU-20201, TDK continues to expand the SmartSonic™ product family which enhance everyday objects making them greener, safer, and more aware of the surrounding environment,” said Massimo Mascotto, Director of Product Marketing, Chirp, a TDK group company. “In line with the strong shift driven by the recent pandemic, the sensors allow the implementation of touchless control for appliances located in public areas, such as factories, schools, train stations and airports, thus enabling increased personal safety.”

- ICU-20201
  - The ICU-20201 MEMS sensor provides accurate range measurements to targets up to 5m away.
- ICU-10201
  - The ICU-10201 MEMS sensor provides accurate range measurements to targets up to 1.2m away.

Differentiating from infrared sensors, TDK's ultrasonic time-of-flight sensor measurements are achieved in any lighting condition, including full sunlight, and provides millimeter-level accuracy, independent of the target's color and optical transparency.
The ICU-10201 and ICU-20201 in an ultra-compact package footprint of 3.5 x 3.5 mm^2 are available for immediate sampling. For additional information, please contact sales@invensense.com. TDK will be introducing the two new high-performance ultrasonic ToF sensors during the 2022 CES Virtual Press Conference. For more information contact pr@invensense.com

---

Glossary

- ToF: Time of Flight
- FoV: Field of View
- EV: Evaluation module
- DK: Developer Kit
- MEMS: Micro-Electro-Mechanical Systems

Key applications

- ICU-10201
  - Augmented/Virtual reality and gaming, gesture control, robotics and drones, obstacle avoidance, floor type and cliff detection for robotic vacuums, mobile and computing devices, ultra-low power remote presence-sensing nodes, water/liquid dispenser - level sensing
- ICU-20201
  - Robotics and drones, obstacle avoidance, mobile and computing devices, proximity/presence sensing, home/building automation, water/liquid dispenser - level sensing & shelf inventory monitoring

Key features and benefits:

- ICU-10201
  - Second generation high performance, ultra-low power, miniature long-range ultrasonic sensor, operating range 10cm to 1.2m
  - Works in any lighting condition
  - Detects objects of any color and optical transparency
  - Customizable field of view (FoV) up to 180°
  - 3.5 mm x 3.5 mm x 1.26 mm, 8-pin LGA package
- ICU-20201
  - Second generation, high performance, ultra-low power, miniature ultrasonic sensor, operating range 20cm to 5m
  - Works in any lighting condition
  - Detects objects of any color and optical transparency
  - Customizable field of view (FoV) up to 180°
  - 3.5 mm x 3.5 mm x 1.26 mm, 8-pin LGA package

Key data

Product	Operation	Package Size (mm)	Range	Current Consumption (1 sample/s, 1m Range)	Interface	Comments
ICU-10201	Pulse-Echo	3.5 x 3.5 x 1.26 8-pin LGA	10cm to 1.2m	17uA	I^2C	Field-of-View (FoV) Configurable Up to 180°
ICU-20201	Pulse-Echo	3.5 x 3.5 x 1.26 8-pin LGA	20cm to 5m	17uA	I^2C	Field-of-View (FoV) Configurable Up to 180°

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 2021, TDK posted total sales of USD 13.3 billion and employed about 129,000 people worldwide.

About InvenSense

InvenSense, Inc., a TDK Group company, is a world leading provider of performance MEMS sensor platforms. InvenSense’s vision of Sensing Everything® targets the consumer electronics and industrial areas with integrated Motion, Sound, Environment, 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, gas, 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 from
https://www.tdk.com/en/news_center/press/20220106_04.html

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

Contacts for regional 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-US@publitek.com