

MEMS Sensors

TDK launches SmartMotion™ ultra-high-performance family with world's first BalancedGyro™ technology and lowest power consumption for consumer applications

- ICM-45xxx 6-axis motion-sensor family with industry's lowest power consumption
- Powered by world's first BalancedGyro (BG) technology
- Highly accurate on-chip self-calibration

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TDK Corporation (TSE: 6762) announces the availability of the InvenSense ICM-45xxx SmartMotion™ ultra-high-performance (UHP) family of 6-axis MEMS motion sensors. This family introduces the on-chip self-calibration, industry's lowest power consumption, and world's first BalancedGyro™ (BG) technology. BalancedGyro technology by TDK is the first-of-its-kind gyroscope MEMS architecture that enables supreme vibration rejection and temperature stability performance, an enhancement never seen before in a consumer gyroscope. Applications such as robotic vacuum cleaners and smartphones can greatly benefit from this technology as they require negligible gyro drift due to temperature and vibration fluctuations.

The ICM-45xxx family also provides a new self-calibration feature that allows sensitivity calibration to be done on-chip, leading to a 10x improvement in lifetime sensor accuracy of the gyroscope. This reduces the overall rotational angle error especially for Optical Image Stabilization (OIS) applications that require accurate compensation of the hand rotational error while taking a picture. The self-calibration also saves significant cost and effort of performing extensive factory calibration for sensitivity error.

In addition, the ICM-45xxx family offers the world's lowest power 6-axis motion sensors in relation to the competition. The ICM-45xxx allows the gyroscope to be on 40% of the time more than any IMU in the industry. The product family also introduces an ultra-low power accelerometer mode for low-power wake up applications. Wearables and hearables today require a motion sensor that can detect high intensity workouts, activities, and gestures at the lowest possible power. This requires both the gyroscope and accelerometer to be ON, making the power consumption significantly high. ICM-45xxx bridges this gap by offering the lowest power consumer gyroscope in the industry today.

"Innovation in MEMS technology is the key today to meet the complex growing demands of the consumer technology market. With the BalancedGyro Technology and the lowest power consumption, the ICM-45xxx family is a pioneer in the world of consumer motion sensors," said Pankaj Aggarwal, Vice President, Product Marketing, Consumer Motion sensors.

Part Number	Target Applications	Interfaces	FSR	Data Resolution	RTC Support
ICM-45686	AR/VR, HMD and Controllers	Host Interface + AUX OIS Controller / I ² C Master to connect external sensors	±4000dps, ±32g	16-bits (baseline); FIFO packet option: Gyro 19-bits, Accel 18-bits	Yes
ICM-45631	OIS Smartphones, OIS Modules	Host Interface + 2x AUX OIS Controller Interfaces	±2000dps, ±16g	16-bits (baseline); FIFO packet option: Gyro 19-bits, Accel 18-bits	Yes
ICM-45605	Wearables, Hearables, Game Controllers, Cameras, IoT, Drones	Host Interface + I ² C Master to connect external sensors	±2000dps, ±16g	16-bits	No

The ICM-45xxx family comprises of three unique devices covering a wide range of consumer segments including smartphones AR, VR, wearables, and robotics. Some of the key high-performance applications enabled by this device include optical image stabilization (OIS), head pose estimation, spatial audio, robotic navigation, and high-intensity activity monitoring. This product family also comes with embedded motion features (APEX) such as Pedometer, Wake on Motion, Freefall, tap detection and an 8KB of FIFO to allow more intelligence, power savings at a system level all in a 2.5mm x 3mm x 0.81mm package.

The InvenSense ICM-45xxx family will be available from multiple distributors in June 2022. For samples and additional information, please contact sales@invensense.com or visit <https://www.invensense.tdk.com/smartmotion/>. TDK will be introducing the ICM-45xxx family during the 2022 CES Virtual Press Conference for more information contact pr@invensense.com.

Glossary

- MEMS: Micro Electrical Mechanical Systems
- BG: Balanced Gyroscope
- UHP: Ultra High Performance
- OIS: Optical Image Stabilization

- IMU: Inertial Measurement Unit
- AR: Augmented Reality
- VR: Virtual Reality
- HMD: Head Mounted Display
- FIFO: First In First Out
- IoT: Internet of Things
- 6-Axis: 3-Axis Gyroscope + 3-Axis Accelerometer
- APEX: Advanced pedometer and event detection

Key applications

- Smartphones
- Hearables (TWS)
- Wearables
- Augmented Reality Glasses
- Virtual Reality
- High-Accuracy Robotics
- Gaming Controllers
- Drones, Flight Controllers
- PC and Notebooks
- Cameras

Key features and benefits:

- BalancedGyro Technology - Supreme Vibration Rejection and Temperature stability
- On-chip Self Calibration – Life-time sensor accuracy, avoid factory calibration cost
- Lowest 6-axis IMU power
- Ultra-Low Power Mode for Accelerometer
- 1.2 V support for low system power
- Triple Optical Stabilization interface
- APEX Motion Engine
- 2.5mm x 3mm x 0.81mm package

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.

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