ICM-456xy

A TDK SmartMotion™ Solution

GENERAL DESCRIPTION

The ICM-456xy is an ultra-high-performance 6-axis MEMS motion sensor family with the world's first BalancedGyro™ technology and lowest power consumption.

The sensor combines a 3-axis gyroscope and a 3-axis accelerometer in a compact 2.5 mm x 3 mm x 0.81 mm package. It has a configurable host interface that supports I3C^{SM}, I^{2}C, and SPI serial communication, triple interface (host interface + 2 Optical Image Stabilization (OIS) interface), up to 8 KB FIFO and 2 programmable interrupts.

FEATURES

- 6-axis current: 0.43 mA (Low Noise mode)
- Gyro Full-scale range: Up to ±4000 dps
- Accelerometer Full-scale range: Up to ±32g
- Gyroscope Noise: 3.8 mdps/rtHz
- Accelerometer Noise: 70 µg/rtHz
- eDMP - Enhanced Digital Motion Processor for implementing motion algorithms
- On-chip APEX Motion Functions: Pedometer, Tilt Detection, Single/Double Tap Detection, Raise to Wake, Wake on Motion, Free-Fall Detection, Significant Motion Detection, Low-G Detection, High-G Detection
- FIFO Data Rate (FDR) for system power savings
- Triple Interface (UI + 2 OIS) for OIS applications

HIGHLIGHTS

World's first BalancedGyro technology

- Supreme vibration rejection (Lowest VRE, VIN)
- Best-in-class temperature stability
- Reduced sensor-to-sensor coupling

Advanced on-chip Sensor Fusion and Machine Learning

- Lowest power On-chip sensor fusion without host processor involvement
- All-in-one Machine Learning software for easy activity classification
- Ready-to-go Algorithms: Spatial Audio, VAD, SIF, OIS, Robo-Vac etc.

Industry's lowest current consumption

- Lowest 6-axis Active Motion current – 420 µA
- Ultra-low power mode; Sleep current – 2.2 µA

APPLICATIONS

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

PART NUMBER	TARGET APPLICATIONS	INTERFACES	FSR	DATA RESOLUTION	RTC SUPPORT
ICM-45686	AR/VR, HMD, and Controllers	Host Interface + AUX OIS Controller / I²C 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 + I²C Master to connect external sensors	±2000dps, ±16g	16-bits	No