ICM-42688-P

High Precision 6-Axis MEMS MotionTracking™ Device

ICM-42688-P HIGHLIGHTS

The ICM-42688-P is a 6-axis MEMS MotionTracking device that combines a 3-axis gyroscope and a 3-axis accelerometer. It has a configurable host interface that supports I3C℠, I²C and SPI serial communication, features a 2 kB FIFO and 2 programmable interrupts with ultra-low-power wake-on-motion support to minimize system power consumption.

ICM-42688-P supports highly accurate external clock input, that helps to reduce system level sensitivity error, improve orientation measurement from gyroscope data, reduce ODR sensitivity to temperature and device to device variation.

The device includes industry first 20-bits data format support in FIFO for high-data resolution. This FIFO format encapsulates 19-bits of gyroscope data and 18-bits of accelerometer data.

Other industry-leading features include InvenSense on-chip APEX Motion Processing engine for gesture recognition, activity classification, and pedometer, along with programmable digital filters, and an embedded temperature sensor.

The device supports a VDD operating range of 1.71V to 3.6V, and a separate digital IO supply, VDDIO from 1.71V to 3.6V.

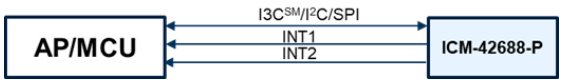
ICM-42688-P FEATURES

- Gyroscope Noise: 2.8 mdps/√Hz & Accelerometer Noise: 70 µg/√Hz
  - Low-Noise mode 6-axis current consumption of 0.88 mA
- User selectable Gyro Full-scale range (dps): ± 15.6/31.2/62.5/125/250/500/1000/2000
- User selectable Accelerometer Full-scale range (g): ± 2/4/8/16
- User-programmable digital filters for gyro, accel, and temp sensor
- APEX Motion Functions:
  - Pedometer, Tilt Detection, Tap Detection
  - Wake on Motion, Raise to Wake/Sleep, Significant Motion Detection
- Host interface: 12.5 MHz I3C℠, 1 MHz I²C, 24 MHz SPI

APPLICATIONS

- AR/VR Controllers
- Head Mounted Displays
- Wearables
- Sports
- Robotics
- IoT Applications

BLOCK DIAGRAM



ORDERING INFORMATION

PART	TEMP RANGE	PACKAGE
ICM-42688-P†	−40°C to +85°C	2.5x3mm 14-Pin LGA

†Denotes RoHS and Green-Compliant Package

TDK-INVENSENSE SENSORS FOR SMARTPHONE, MOBILE & IOT APPLICATIONS

Parameter	ICM-40607 Sensorhub	ICM-42605 Sensorhub	ICM-42686-P Handheld Action	ICM-42688-P HMD & Robotics
GYRO Noise (mdps/rt-Hz)	7	3.8	5.3	2.8
GYRO Offset Temp Stability (mdps/°C)	±30	±20	±10	±5
GYRO Range & Resolution	±2000dps; 16-bits	±2000dps; 16-bits	±4000dps; 16/19-bits	±2000dps; 16/19-bits
ACCEL Noise (µg/rt-Hz)	110	70	70	AXY: 65; AZ: 70
ACCEL Range & Resolution	±16g; 16-bits	±16g; 16-bits	±32g; 16/18-bits	±16g; 16/18-bits
ODR & Sample Synch	8kHz; No RTC	8kHz; No RTC	32kHz; RTC	32kHz; RTC

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