TDK InvenSense

ICM-20648

6-Axis MEMS MotionTracking™ Device with Enhanced EIS Support and Sensor Fusion Processing

GENERAL DESCRIPTION

The ICM-20648 is a 6-axis MotionTracking device that is ideally suited for Smartphones, Tablets, Wearable Sensors, and general IoT applications.

- 3-axis gyroscope, 3-axis accelerometer, and a Digital Motion Processor™ (DMP™) in a 3x3x0.9mm (24-pin QFN) package
- Step Count, Activity Classifier, and B2S (Bring-to-See) Gesture tuned for Wrist Worn Wearable Applications
- DMP offloads computation of motion processing algorithms from the host processor, improving system power performance
- Software drivers are fully compliant with Google's latest Android release
- Enhanced FSYNC functionality to improve timing for applications like EIS

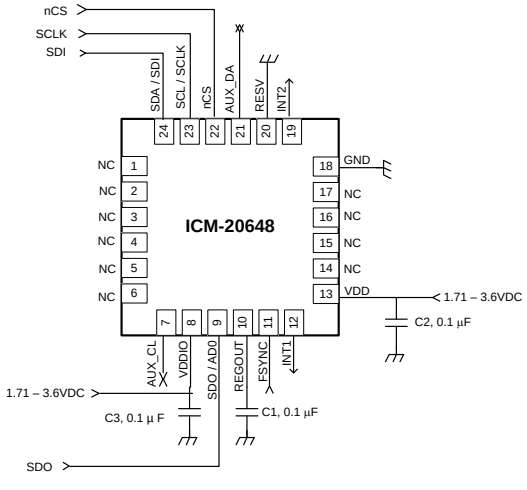
ICM-20648 supports an auxiliary I^2C interface to external sensors, on-chip 16-bit ADCs, programmable digital filters, an embedded temperature sensor, and programmable interrupts. The device features an operating voltage range down to 1.71V. Communication ports include I^2C and high speed SPI at 7 MHz.

ORDERING INFORMATION

PART	TEMP RANGE	PACKAGE
ICM-20648†	–40°C to +85°C	24-Pin QFN

†Denotes RoHS and Green-Compliant Package

TYPICAL OPERATING CIRCUIT



APPLICATIONS

- Wearable Devices
- Smartphones and Tablets
- IoT Applications
- Motion-based game controllers
- 3D remote controls for Internet connected DTVs and set top boxes, 3D mice

FEATURES

- 3-Axis Gyroscope with Programmable FSR of ±250dps, ±500dps, ±1000dps and ±2000dps
- 3-Axis Accelerometer with Programmable FSR of ±2*g*, ±4*g*, ±8*g* and ±16*g*
- Onboard Digital Motion Processor (DMP)
- Android support
- SW features supported in DMP
  - Bring to See
  - Step Counter
  - Step Detector
  - Activity Classifier (walk, run, bike, still)
  - Calibration: Accel Bias, Compass Cal, Gyro Cal
  - Game Rotation Vector
  - Significant Motion
  - Pick up
  - Rotation Vector (with Aux compass)
  - GeoMagnetic Rotation Vector (with Aux compass)
  - Linear Acceleration
  - Gravity
  - Orientation
  - Tilt
- Auxiliary I^2C interface for external sensors
- On-Chip 16-bit ADCs and Programmable Filters
- 7 MHz SPI or 400 kHz Fast Mode I^2C
- Digital-output temperature sensor
- VDD operating range of 1.71V to 3.6V
- MEMS structure hermetically sealed and bonded at wafer level
- RoHS and Green compliant

BLOCK DIAGRAM