Telematics and infotainment

SMG130 angular rate sensor for motion detection

BOSCH
Invented for life

PRODUCT BENEFITS

- Target applications
  – Telematics and tolling systems
  – Navigation (dead reckoning) and eCall
  – Vehicle dynamics data logging
  – Platform stabilization and compensation (e.g. images)
- Extremely flexible application options
- Cost-effective
- Ultra compact sensor design gives small footprint
- Low power consumption – also at system level
- Billion-fold applied technology
  (due to CE background)
- RoHS compliant and AEC-Q100 qualification

1 16-pin standard LGA package,
3 mm × 4.5 mm × 0.95 mm

flexible

mounting possibilities due to 3-axis

economical

through its 5 power-safe modes, which give a very low power consumption.

TASK

The SMG130 detects angular rates in three perpendicular axes and allows tilt, motion, vibration, or shock sensing regardless of the mounting orientation of the sensor. It is especially designed to support navigation systems when GPS reception is poor by providing additional information, based on the latest calculated reference point. Due to the precise measurement of the angular rate, the navigation system is able to calculate driving maneuvers and thus determine the vehicle's position. The system therefore overcomes navigation dropouts.

FUNCTION

The SMG130 is a digital 16 bit 3-axis gyroscope (Ω_{xyz}) and is based on the Coriolis vibratory gyroscope principle: High-frequency electrostatic forces generate an oscillation of two seismic masses controlled by a closed loop drive system. When rotating around the nominal axis, the Coriolis forces acting on the oscillators can be measured by capacity changes in the detection system.
Numerous programming options, a low signal noise, and a very small footprint make the SMG130 a highly versatile and easily applied angular rate sensor.

TECHNICAL CHARACTERISTICS

Measurement ranges [1,2] (sensitivity)	±125 °/s ±250 °/s ±500 °/s ±1,000 °/s ±2,000 °/s	262.4 LSB/°/s 131.2 LSB/°/s 65.6 LSB/°/s 32.8 LSB/°/s 16.4 LSB/°/s
Digital resolution	16 bit	
Non-linearity	±1 %	
Sensitivity tolerance [2]	±1 % at 2,000 °/s	
Sensitivity variation [3]	±2 % at 2,000 °/s	
Zero-point offset [2]	±1 °/s	
Offset variation [3]	±1 °/s	
Band width [1]	12 Hz to 523 Hz	
Noise (rms)	0.02 °/s /√Hz	

OPERATING CONDITIONS

Supply voltage (VDD)	2.4 to 3.6 V
Supply current (normal operation)	< 6.5 mA
Operating temperature	−40 °C to +85 °C
Interfaces	SPI and I²C

[1] Switchable
[2] At +25 °C
[3] Over temperature (−40 °C to +85 °C); reference +25 °C

Robert Bosch GmbH | PO 106050 | 70049 Stuttgart | Germany | **www.bosch-semiconductors.com** | **www.bosch-mobility-solutions.com**