

Automotive 6-axis MotionTracking® MEMS Device for ADAS and Autonomous Driving Applications

GENERAL DESCRIPTION

The IAM-20685 is a 6-axis MotionTracking® device that combines a 3-axis gyroscope and a 3-axis accelerometer in a small plastic package with wettable flanks option.

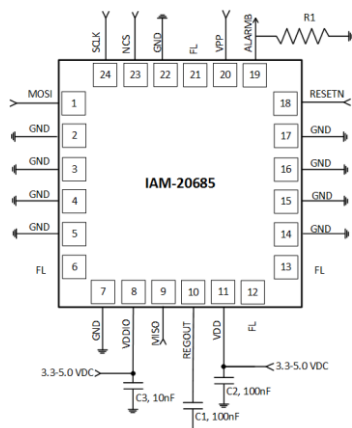
The IAM-20685 features:

- Six independent axes
- Gyroscope with programmable full scale range from ± 41 dps to ± 1966 dps
- Accelerometer with programmable full-scale range from ± 2 g, to ± 65 g
- Minimal cross-axis sensitivity between the accelerometer and gyroscope axes
- MEMS structure hermetically sealed and bonded at wafer level
- 10,000 g shock tolerant structure
- Two temperature sensors
- 10 MHz, 32-bits Serial Peripheral Interface (SPI) with CRC-based error-detecting code algorithm
- ISO-26262 ASIL B
- Automotive-qualified
- Reliability testing performed according to AEC – Q100 grade 2 (-40°C to 105°C) qualification
- Final test at three temperatures: -40°C , 25°C , 105°C

IAM-20685 includes on-chip 16-bit ADCs, programmable digital filters, and embedded self-test. The device features a VDD operating range of 3.0V to 5.5V, a separate digital IO supply, VDDIO, from 3.0V to 5.5V, and a current consumption below 10 mA in all the operating conditions.

The IAM-20685 has been developed according to ISO-26262 with an automotive safety integrity level ASIL-B. Fault detection over lifetime is achieved by a set of embedded safety mechanisms (SMs) executed either at startup, upon command, or run-time.

TYPICAL OPERATING CIRCUIT



By leveraging its patented and volume-proven CMOS-MEMS fabrication platform, which integrates Micro Electro-Mechanical Systems (MEMS) wafers with companion CMOS electronics through wafer-level bonding, TDK InvenSense has driven the package size down to a footprint and thickness of $4.5 \times 4.5 \times 1.1 \text{ mm}^3$ (24-pin DQFN), to offer fully integrated, high performance component in a very small form factor.

APPLICATIONS

IAM-20685 address a wide range of automotive applications, including but not limited to:

- Navigation
- Telematics and V2X
- Autonomous driving
- Automated parking
- ADAS
- Dead reckoning
- High precise positioning
- Vision systems image stabilization

ORDERING INFORMATION

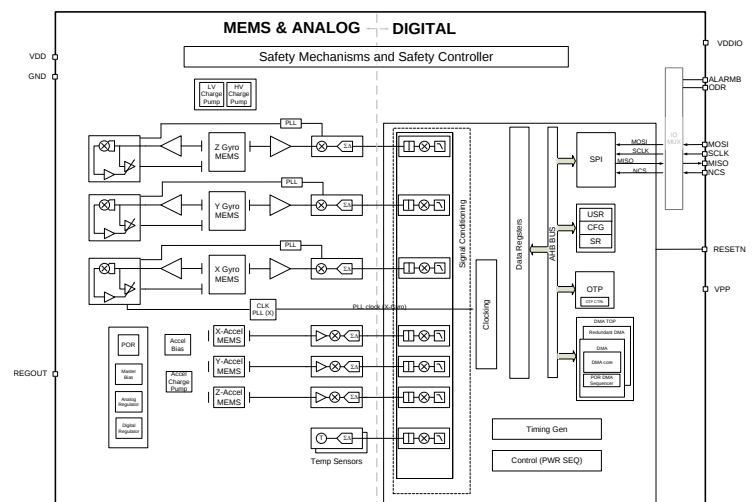
PART NUMBER	TEMPERATURE	PACKAGE	MSL*
IAM-20685†	-40°C to $+105^{\circ}\text{C}$	24-Pin DQFN	3

†Denotes RoHS and Green-compliant package

* Moisture sensitivity level of the package



BLOCK DIAGRAM



REVISION HISTORY

REVISION DATE	REVISION	DESCRIPTION
12/23/2019	1.0	Initial Release
11/03/2022	1.1	Block diagram review

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