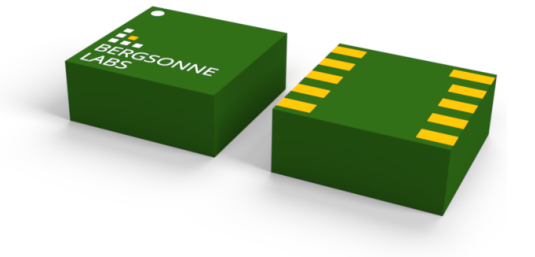
Sense.I.9

digital 9-DOF IMU

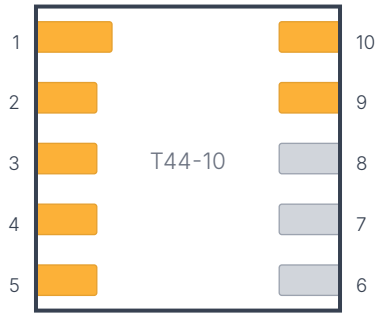
The Sense.I.9 embeds the TDK Invensense ICM20948 IMU with a co-packaged 6-DOF IMU and a 3-DOF magnetic compass. The triaxial accelerometer has a configurable 16-bit full-scale range from +/-2g to +/-16g with an output data rate up to 4.5 kHz, while the triaxial rate gyroscope has a 16-bit full-scale range from +/-250 to 2000 degrees per second with an output date rate up to 9 kHz. The triaxial magnetic compass has a 16-bit full-scale range of +/-4900µT with an output data rate of up to 100 Hz. The sensor includes configurable filters and an on-board motion processor.



Overview

Revision	c
Package	T44-10
Power	1.71–1.95V
Component	ICM-20948
Interfaces	I2C, SPI

Pad Assignments



(top view)

PAD	TYPE	FUNCTION	NOTE
1	power	GND	
2	digital	I2C.AD0	weak internal pull-up sets I2C address to 0x69. Connect to GND to set I2C address to 0x68.
	interface	SPI.MISO	
3	digital	I2C.EN	weak internal pull-up enables I2C. Connect to GND to switch to SPI mode.
	interface	SPI.CS	
4	interface	I2C.CLK	when using a non-Core processor, ensure adequate external pull-up resistance.
	interface	SPI.CLK	
5	interface	I2C.DAT	when using a non-Core processor, ensure adequate external pull-up resistance.
	interface	SPI.MOSI	
9	digital	INT	programmable interrupt output
10	power	V+	1.71-1.95V

Interfaces

I2C

I2C

Mode	slave
Max Clock	400kHz
Addresses	0x69 (default), 0x68
Format	7-bit addr, 8-bit data

FUNCTION	REQ	PAD(S)
I2C.CLK	Yes	4
I2C.DAT	Yes	5
I2C.AD0	No	2
I2C.EN	No	3

SPI

SPI

Mode	slave
Max Clock	7MHz

FUNCTION	REQ	PAD(S)
SPI.MISO	Yes	2
SPI.CS	Yes	3
SPI.CLK	Yes	4
SPI.MOSI	Yes	5

Application Notes

Sensor Axes

The IMU and compass origins are colocated, with the axes aligned at the center of the IC, which is at (-0.2, -0.2) mm relative to the center of the tile. The Z axis (blue head) of the sensor extends from the top surface of the tile, while the X axis (red head) points up between pads 1 and 10.