



Sense.I.9

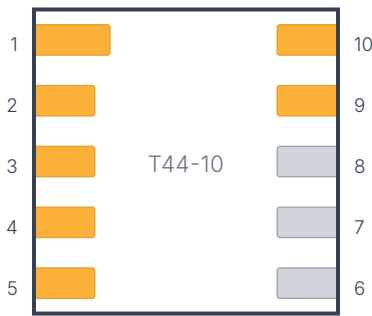
digital 9-DOF IMU

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
Supply	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			SPI SPI		
Mode			Mode		
Max Clock			Max Clock		
Addresses					
Format					
FUNCTION			FUNCTION		
REQ			REQ		
PAD(S)			PAD(S)		
I2C.CLK			SPI.MISO		
I2C.DAT			SPI.CS		
I2C.AD0			SPI.CLK		
I2C.EN			SPI.MOSI		

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 of all sensors extends from the top surface of the tile, while the X axis points up between pads 1 and 10, as shown here.