



Sense.I.6D

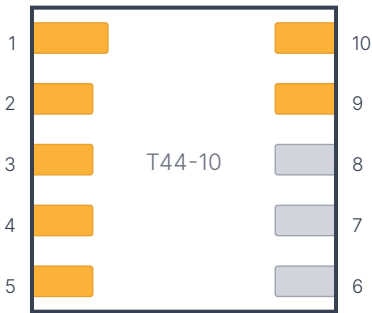
digital 6-DOF IMU with dual accelerometers

The Sense.I.6D tile embeds the STMicroelectronics LSM6DSV320X digital IMU with dual-range accelerometers and sophisticated on-board activity tracking. Serial communications via I2C (up to 1-MHz fast-mode plus), I3C, or SPI (up to 10-MHz) provide access to simultaneous 16-bit measurements of triaxial low-g accelerations ($\pm 2g$ - $16g$), triaxial high-g accelerations (± 32 - $320g$), and triaxial angular rate measurements (± 250 - 4000 dps) with output data rates ranging from 7.5 Hz to 7.68 kHz. The output path includes a 4.5-kB smart FIFO with dynamic data compression. Onboard filtering, sensor fusion, and a 960-Hz finite state machine provide accurate motion computation and activity tracking, including attitude quaternions, gravity vector and gyro bias tracking, pedometry, step detection, step counting, and programmable motion-event interrupts (free fall, wake, tilt, tap, etc.).

Overview

Revision	a
Package	T44-10
Supply	1.71–3.6V (VDDIO is internally connected to VDD)
Component	LSM6DSV320X
Interfaces	I2C, SPI, SPI3, I3C

Pad Assignments



(top view)

PAD	TYPE	FUNCTION	NOTE
1	power	GND	
2	digital interface	I2C.AD0 SPI.MISO	A weak internal pull-up sets I2C address to 0x6B. Connect to GND to set I2C address to 0x6A.
3	digital interface	I2C.EN SPI.CS	A weak internal pull-up enables I2C. Connect to GND to switch to SPI mode.
	interface	SPI3.CS	
4	interface	I2C.CLK	
	interface	SPI.CLK	
	interface	I3C.CLK	
	interface	SPI3.CLK	
5	interface	I2C.DAT	
	interface	SPI.MOSI	
	interface	SPI3.DAT	



	interface	I3C.DAT	
9	digital	INT1	programmable interrupt output
10	power	V+	see supply details



Interfaces

I2C

Mode

slave

Max Clock

1MHz

Addresses

0x6B (default), 0x6A

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

Mode

slave

Max Clock

10MHz

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

3-wire SPI

Mode

slave

Max Clock

10MHz

FUNCTION	REQ	PAD(S)
SPI3.CS	Yes	3
SPI3.CLK	Yes	4
SPI3.DAT	Yes	5

I3C

Mode

slave

Max Clock

12.5MHz (SDR)

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

Application Notes

Sensor Axes
The Z axis of the IMU protrudes through the center of the tile, while the XY plane is approximately 1.0mm from the bottom surface of the tile, with the X axis pointing toward the left side (pads 1-5), as shown.