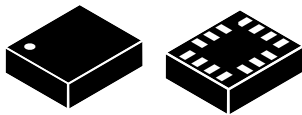


Automotive 6-axis inertial module: 3D accelerometer and 3D gyroscope


LGA-14L

 Typ: (2.5 x 3.0 x 0.83 mm³)


Features

- AEC-Q100 qualified
- Extended temperature range from -40 to +105 °C
- Embedded compensation for high stability over temperature
- Accelerometer user-selectable full scale up to ±16 g
- Extended gyroscope range from ±125 to ±4000 dps
- SPI & I²C host serial interface
- Six-channel synchronized output to enhance accuracy of dead-reckoning algorithms
- Smart programmable interrupts
- Embedded 3 kB FIFO available to underload host processor
- ECOPACK[®], RoHS and “Green” compliant

Applications

- Dead reckoning (DR)
- Vehicle-to-everything (V2X)
- Telematics, eTolling
- Anti-theft systems
- Impact detection and crash reconstruction
- Motion-activated functions
- Driving comfort
- Vibration monitoring and compensation

Description

The [ASM330LHH](#) is a system-in-package featuring a 3D digital accelerometer and a 3D digital gyroscope with an extended temperature range up to +105 °C and designed to address automotive non-safety applications.

ST’s family of MEMS sensor modules leverages the robust and mature manufacturing processes already used for the production of micromachined accelerometers and gyroscopes to serve both the automotive and consumer market. The ASM330LHH is AEC-Q100 compliant and industrialized through a dedicated MEMS production flow to meet automotive reliability standards. All the parts are fully tested with respect to temperature to ensure the highest quality level.

The sensing elements are manufactured using ST’s proprietary micromachining processes, while the IC interfaces are developed using CMOS technology that allows the design of a dedicated circuit which is trimmed to better match the characteristics of the sensing element.

The ASM330LHH has a full-scale acceleration range of ±2/±4/±8/±16 g and a wide angular rate range of ±125/±250/±500/±1000/±2000/±4000 dps that enables its usage in a broad range of automotive applications.

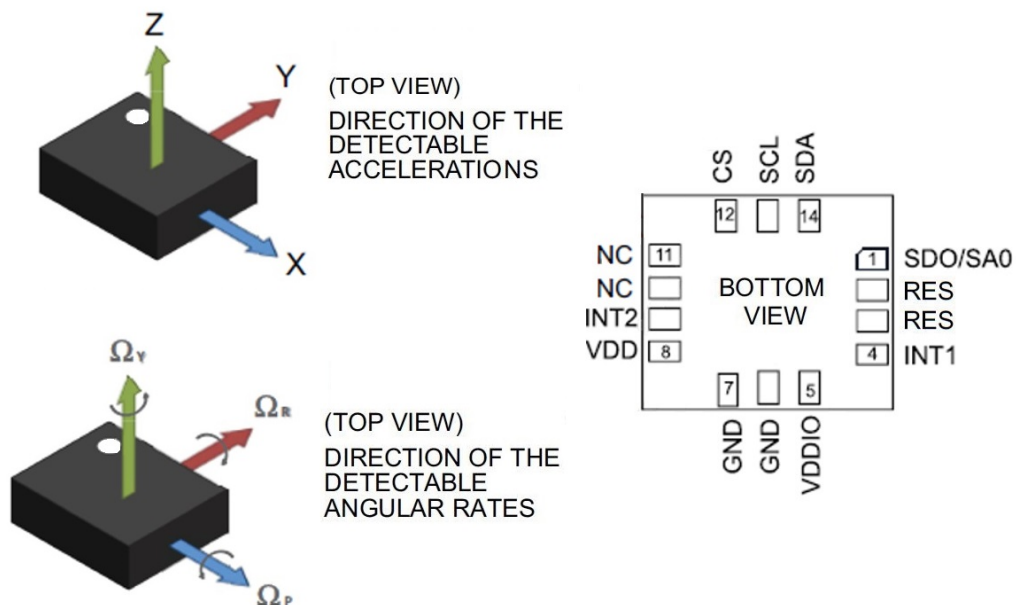
All the design aspects of the ASM330LHH have been optimized to reach superior output stability, extremely low noise and full data synchronization to the benefit of sensor-assisted applications like dead reckoning and sensor fusion.

The ASM330LHH is available in a 14-lead plastic land grid array (LGA) package.

Product status link		
ASM330LHH		
Product summary		
Order code	ASM330LHH	ASM330LHHTR
Temp. range	-40 °C to +105 °C	
Package	LGA-14L (2.5 x 3.0 x 0.83 mm ³)	
Packing	Tray	Tape and reel

Parts marked as “ES” are not yet qualified and therefore not yet ready to be used in production and any consequences deriving from such usage will not be under the responsibility of STMicroelectronics. Under no circumstances will STMicroelectronics be liable for any customer usage of these engineering samples in production. ST Quality has to be contacted prior to any decision to use these Engineering Samples to run any qualification activity.

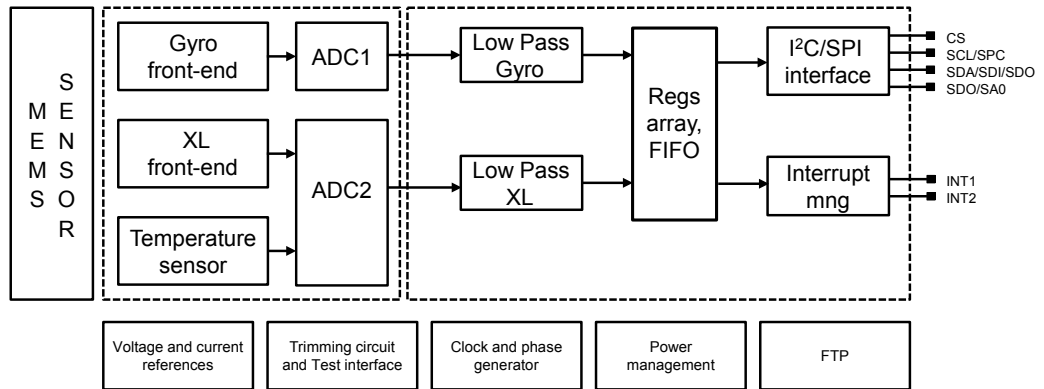
1 Pin description

Figure 1. Pin connections

Table 1. Pin description

Pin #	Name	Function
1	SDA	SPI 4-wire serial data output (SDO)
	SDO	I ² C least significant bit of the device address (SA0)
2	RES	Connect to VDDIO or GND
3	RES	Connect to VDDIO or GND
4	INT1	Programmable interrupt #1
5	Vdd_IO ⁽¹⁾	Power supply for I/O pin
6	GND	Connect to GND
7	GND	Connect to GND
8	Vdd ⁽²⁾	Power supply
9	INT2	Programmable interrupt #2 (INT2) / Data enabled (DEN)
10	NC	Leave unconnected
11	NC	Leave unconnected
12	CS	I ² C/SPI mode selection (1: SPI idle mode / I ² C communication enabled; 0: SPI communication mode / I ² C disabled and reset)
13	SCL	I ² C serial clock (SCL) SPI serial port clock (SPC)
14	SDA	I ² C serial data (SDA) SPI serial data input (SDI)
		3-wire interface serial data output (SDO)

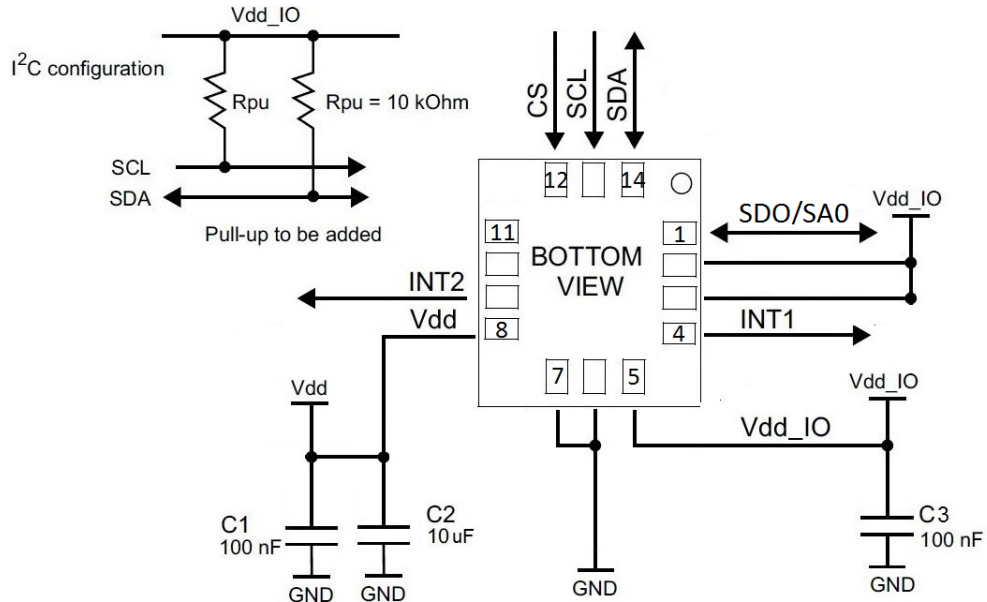
1. Recommended 100 nF filter capacitor.
2. Recommended 100 nF plus 10 μF capacitors.

2 Block diagram

Figure 2. Block diagram


3 Application hints

Figure 3. ASM330LHH electrical connections



The device core is supplied through the Vdd line while the I/O pads are supplied through the Vdd_IO line. As a common design practice, the power supply decoupling capacitors C1 = 100 nF ceramic and C2 = 10 μ F aluminum should be placed as near as possible to pin 8, while C3 = 100 nF ceramic should be positioned as close as possible to pin 5.

All the voltage and ground supplies must be present at the same time to have proper IC behavior.

The functionality of the device and the measured acceleration/angular rate data are selectable and accessible through the I²C or SPI interfaces. When using the I²C protocol, CS must be tied high. Every time the CS line is set to low level, the I²C bus is internally reset.

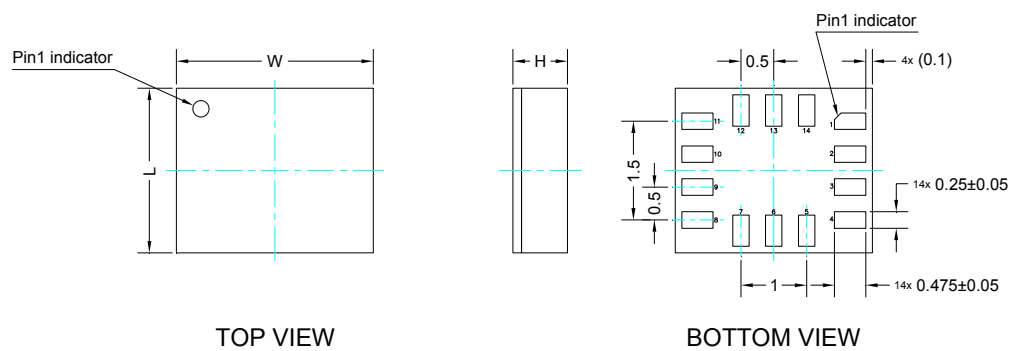
All the functions, the threshold and the timing of the two interrupt pins can be completely programmed by the user through the I²C/SPI interface.

4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

4.1 LGA-14L package information

Figure 4. LGA-14L 2.5 x 3 x 0.83 mm³ (typ.) package outline and mechanical data



Dimensions are in millimeter unless otherwise specified
 General tolerance is +/-0.1mm unless otherwise specified

OUTER DIMENSIONS

ITEM	DIMENSION [mm]	TOLERANCE [mm]
Length [L]	2.50	±0.1
Width [W]	3.00	±0.1
Height [H]	0.86	MAX

DM00249496_1

4.2 LGA-14L packing information

Figure 5. Carrier tape information for LGA-14L package

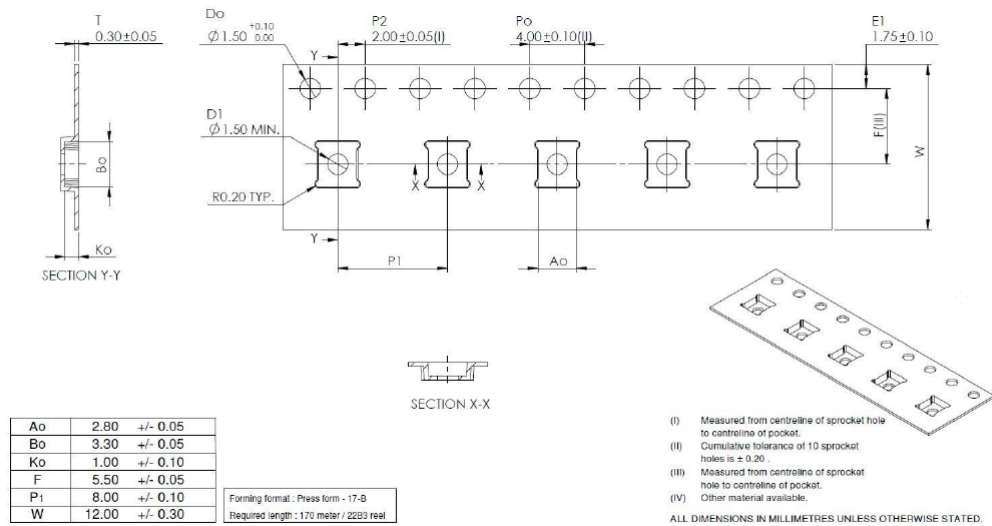


Figure 6. LGA-14L package orientation in carrier tape

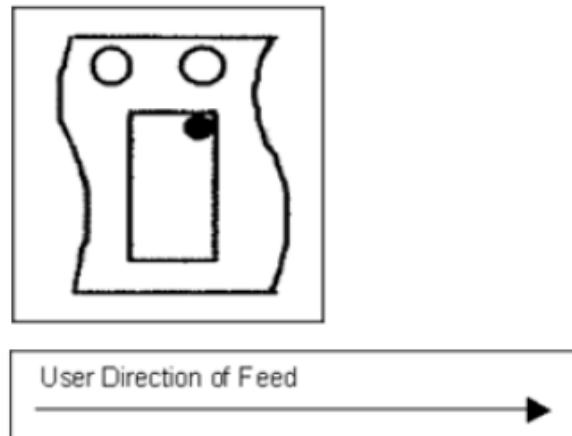


Figure 7. Reel information for carrier tape of LGA-14L package

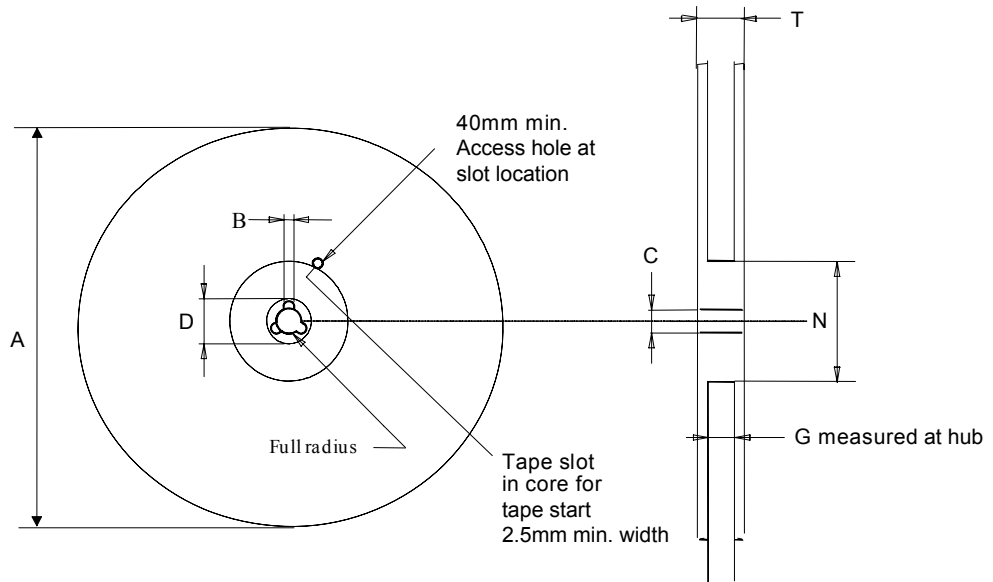


Table 2. Reel dimensions for carrier tape of LGA-14L package

Reel dimensions (mm)	
A (max)	330
B (min)	1.5
C	13 ±0.25
D (min)	20.2
N (min)	60
G	12.4 +2/-0
T (max)	18.4

Revision history

Table 3. Document revision history

Date	Version	Changes
05-Jul-2018	1	Initial release

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