STEVAL-MKI128V2

ST MEMS sensor system module

STEVAL-MKI128V2

Applications

- Tablet and mobile phone
- Gaming and virtual reality input devices
- Intelligent mobile device

Description

The ST MEMS sensor system module integrates an LSM303D system-in-package featuring a 3D digital linear acceleration sensor and a 3D digital magnetic sensor, along with ST's L3GD20 3D gyroscope sensor, LPS25H high accuracy pressure sensor and HTS221 capacitive digital relative humidity and temperature sensor.

ST's new iNEMO system module product family is designed for enhanced multiple degrees-of-freedom motion detection, delivering multi-sensing integration to reduce system architecture size and BOM, and to improved accuracy.

Features

- Analog supply voltage 2.4 V to 3.6 V
- Digital supply voltage I/Os, 1.8 V
- Low-power mode
- Power-down mode
- 3D accelerometer sensor
  - ±2g/±4g/±8g/±16g dynamic, selectable full-scale acceleration range
- 3D gyroscope sensor
  - ±245/±500/±2000 dps dynamic, selectable full-scale angular rate
- 3D magnetometer
  - - ±2/±4/±8/±12 gauss dynamically selectable magnetic full-scale
- High accuracy pressure sensor
  - Piezoresistive pressure sensor
  - 260-1260 mbar absolute pressure range
  - Low power consumption
  - Low noise (0.020 mbar RMS)
  - 25 cm resolution
- Humidity and temperature sensor:
  - 0 to 100% RH range
  - -40 to 120 °C temperature range
  - 16 bit ADC measurements
- ECOPACK®, RoHS, and "Green" compliant

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1   Introduction

ST's MEMS sensor system module supports ST's new iNEMO sensor-fusion software suite to design reliable and customizable hardware/software multi-axis MEMS solutions for tablet computers and other mobile devices. The iNEMO engine libraries bring sensor measurements to the high level of accuracy required by today's enhanced motion user interfaces and accurate heading recognition systems. The iNEMO engine sensor-fusion suite can fuse data sensed by inertial modules with data coming from magnetic and pressure sensors, featuring up to 10 degrees of freedom: 3-axis linear acceleration, 3-axis angular rate and 3-axis magnetic motion sensing, together with barometric/altitude readings.

The MEMS sensor system module with iNEMO sensor-fusion software suite and application support layers are the perfect combination for tablet and other mobile device development.

2   Block diagram and pin description

Figure 1. STEVAL-MKI128V2 ST MEMS module block diagram
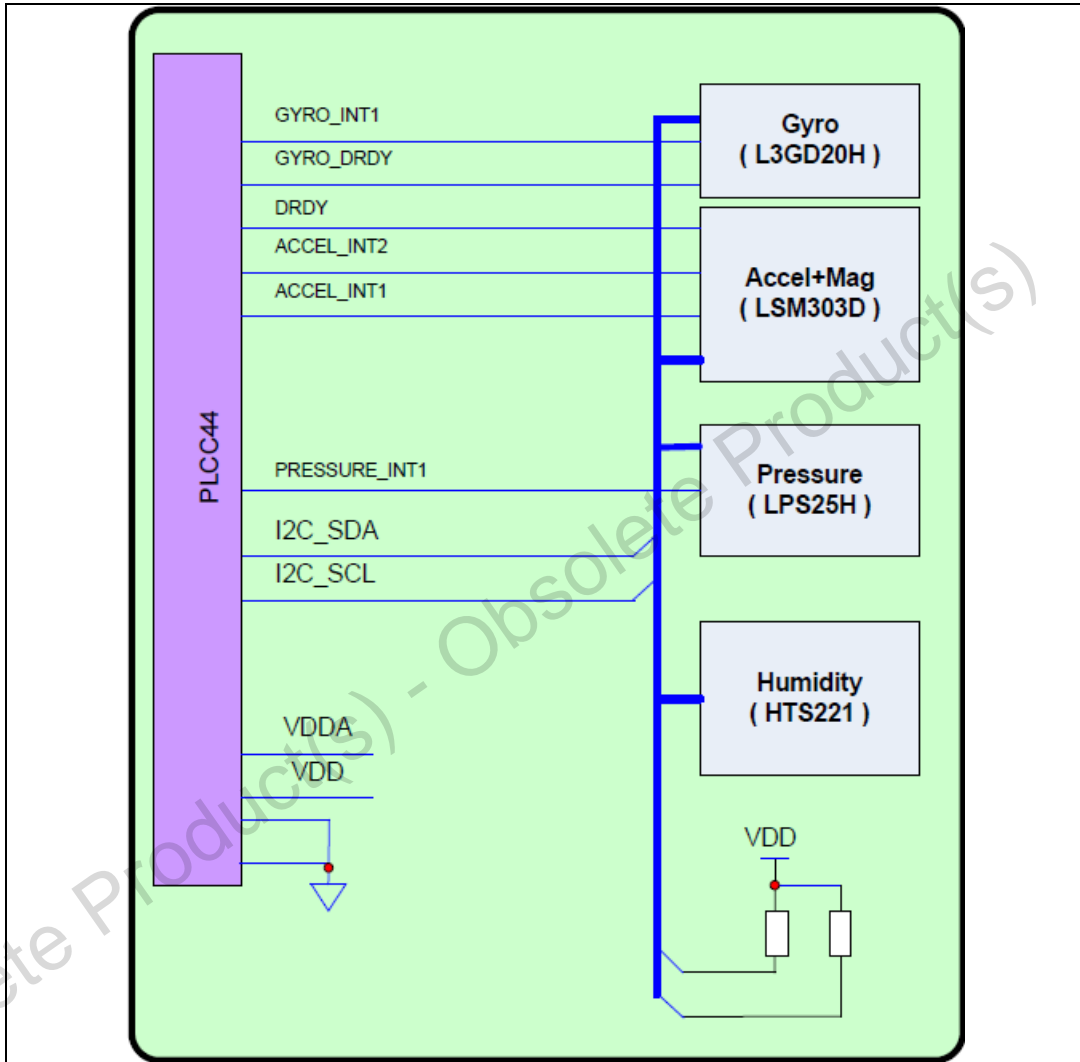
2.1 Pin information
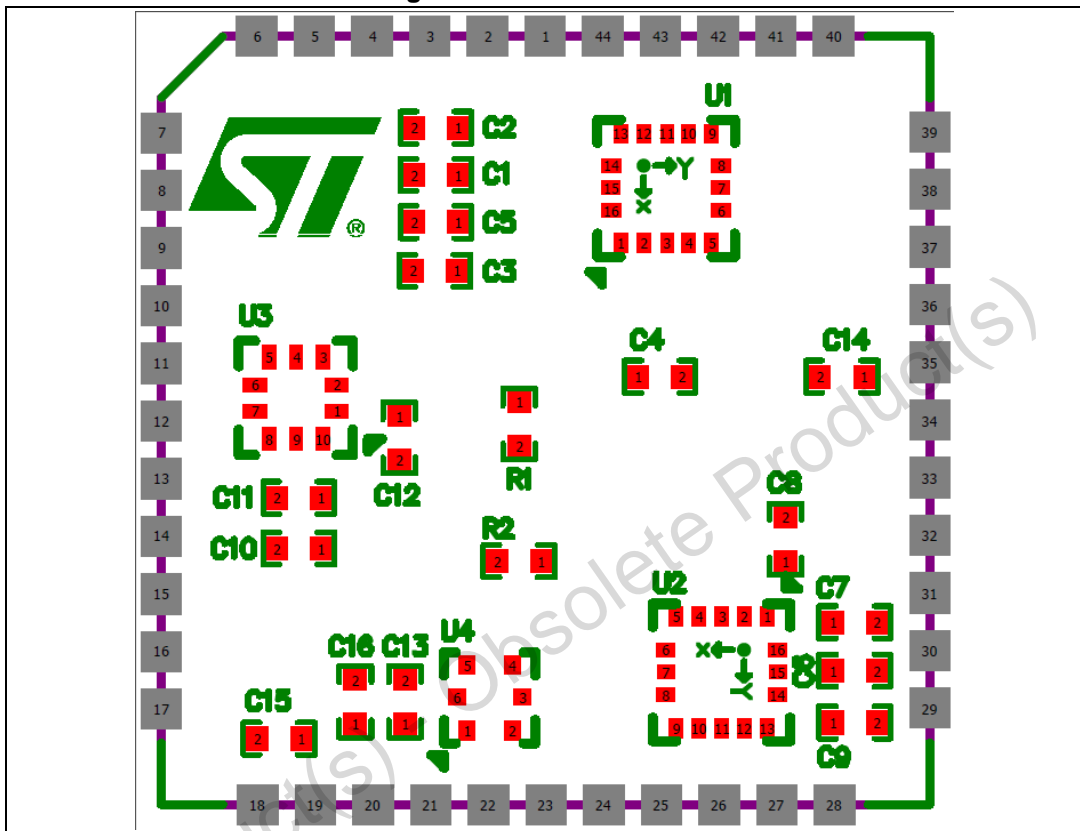
Figure 2. Pin connections

Table 1. Pin description

Pin no.	Name	Function
44	I2C_SDA (shared by all IC)	I^{2}C slave: serial data;
1	I2C_SCL (shared by all IC)	I^{2}C salve: serial clock;
3	PRESSURE_INT1	Pressure interrupt 1
4	PRESSURE_INT2	Pressure interrupt 2
15	DRDY	Magnetometer data ready
41	ACCEL_INT1	Accelerometer interrupt 1
42	ACCEL_INT2	Accelerometer interrupt 2
20	GYRO_DRDY	Gyro data ready
35	GYRO_INT1	Gyro interrupt
7, 18, 40	GND	0 V power supply (ground)
38, 39	VDDA	Analog power supply(2.4 V~3.3 V)

Table 1. Pin description (continued)

Pin no.	Name	Function
19	VDD	Digital power supply (1.8 V~VDD)
2, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 43	NC	Reserved

3 Application hints

Figure 3. ST MEMS module electrical connection example
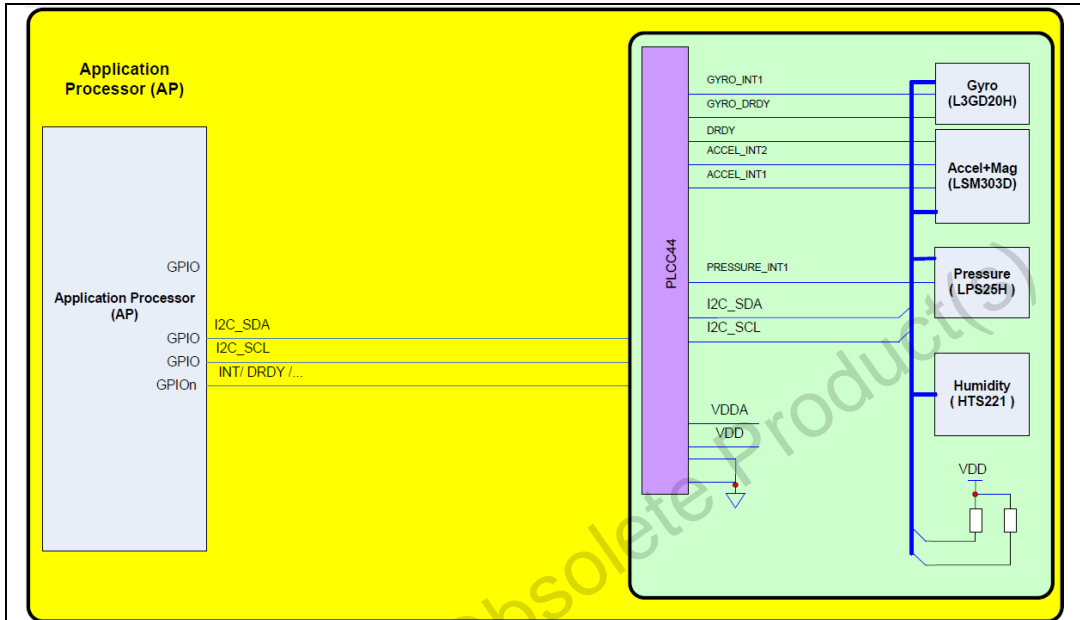
4   Board mechanical data

Table 2. STEVAL-MKI128V2 mechanical data

Symbol	mils		
	Min.	**Typ.**	**Max.**
D		666	
D1		615	-
e	-	50	3.040
b1		35	0.533
r		12.5	

Figure 4. STEVAL-MKI128V2 mechanical drawing

5   Internal schematic diagram

Figure 5. STEVAL-MKI128V2 circuit schematic
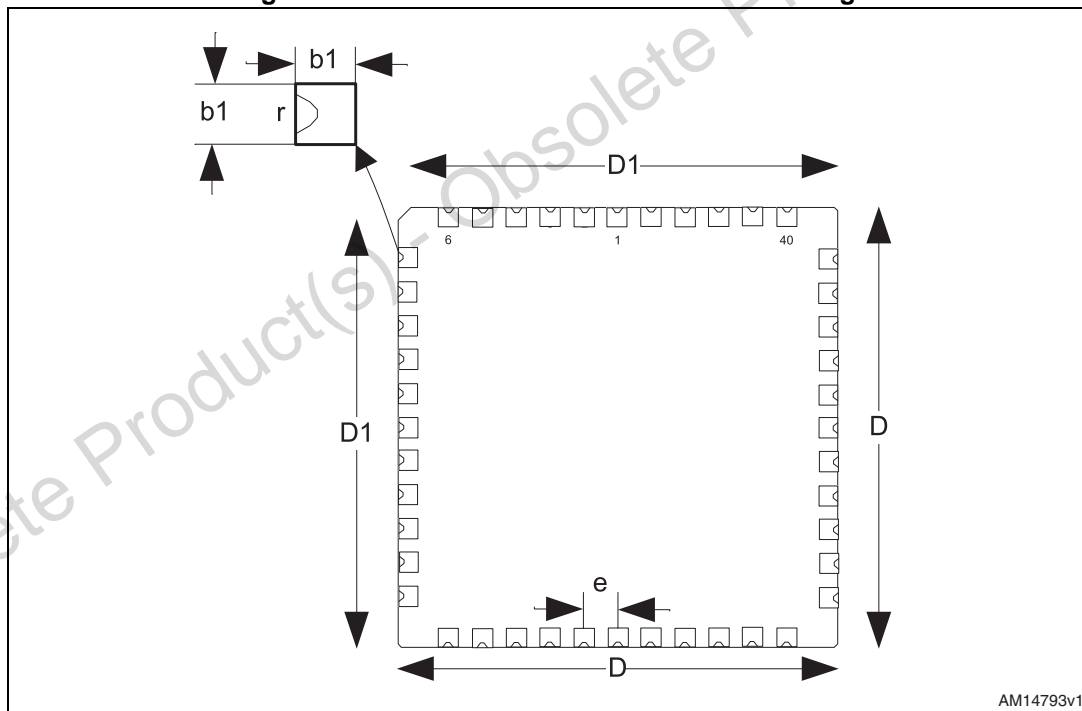
6 Revision history

Table 3. Document revision history

Date	Revision	Changes
23-May-2013	1	Initial release.

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