YAMAHA

YAS525B

MS-1C

Magnetic field Sensor

■ Overview

YAS525B is the biaxial geomagnetic sensor IC integrating a high sensitivity biaxial magnetic sensor, a buffer amplifier, an AD converter (ADC), a clock generator, and serial data interface (supports I^2C bus) on one chip.
YAS525B allows you to make up a high sensitive, compact and low-power electronic compass in a portable GPS system or a mobile phone.

■ Features

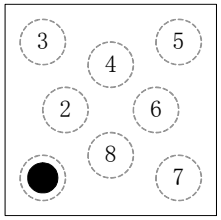
- A manufacturing process that makes magnetic sensor on a Si wafer with high precision realizes integration with peripheral circuits.
- High sensitive geomagnetic sensor IC is realized by integrating a magnetic sensor and a low noise buffer amplifier.
- High noise immunity is improved by digitizing output from geomagnetic sensor IC.
- External interface supports I^2C bus (100kbps/400kbps, slave mode).
- Geomagnetic sensor with superior high board density and low-power consumption.
- Automatic power-down control mode is available after measurements.
- Others.
  - Manufacturing process ..... CMOS + Magnetic Sensor
  - Package ..... Lead-free 8-ball WLCSP Package (YAS525B-WZ)
  - Power supply voltage ..... 2.5 ～ 3.3V
  - Operating temperature ..... -20 ～ +85°C
  - Power consumption during operation ... 10mW (V_{DD}=3.0V, when magnetic field is measured.)
  - Magnetic sensor section
    - Measuring magnetic field range ... ±300μT
    - Resolution ..... ≦0.6μT/count
  - Measuring time ..... within 10ms/magnetic sensor mono-axial measurement

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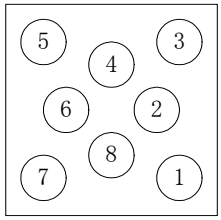
YAS525B CATALOG
CATALOG No.: LSI-BAS525B21
2007.6

■ Pin Description

Here is a figure for pin assignment and a table for pin descriptions.



8Pin WLCSP Top View



8Pin WLCSP Bottom View

Pin Descriptions

Pin No.	Name	I/O	Function	
1	T2	I+	Test input	(Use in non-connection)
2	VSS	-	Ground	
3	T1	I+	Test mode	(Use in non-connection)
4	SCL	Is	Serial Clock	
5	NC	-	Non-connection	
6	VDD	-	Power supply	(typ 3V)
7	NC	-	Non-connection	
8	SDA	Is/Od	Serial data	

Note: Pin 1 and pin 3 are used in non-connection.
Pin 5 is connected to pin 7 in the chip.

I+ : Input with pull-up resistor
Is : Schmitt trigger input
Od : Open drain output

■ Pin Functions

● Power Supply (VDD, VSS)

These pins are for power supply of YAS525B.

● Serial Data Interface (SCL, SDA)

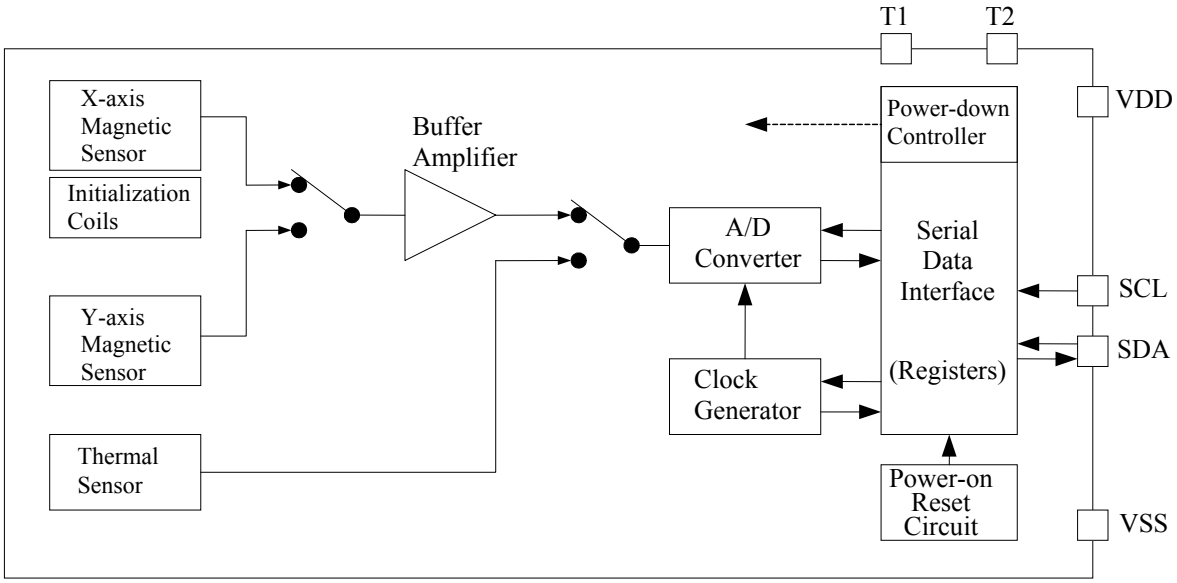
SCL – Serial clock input pin.
This pin is used with an external pull-up register.
SDA – Serial data input/output pin.
This pin is used with an external pull-up register.

● Others (T1, T2)

T1 – Test mode control pin.
Use this pin in non-connection.
T2 – Test input pin.
Use this pin in non-connection.

■ Block Diagram

Here is the internal block diagram of YAS525B.



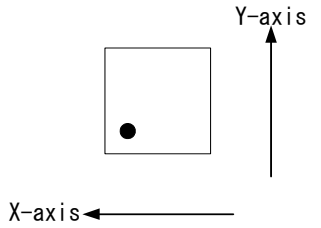
Block Diagram

■ Function Descriptions

● Analog Circuit Section

○ Magnetic Sensor

A sensor for X-axis and Y-axis is embedded independently.
(As for sensitivity direction of X-axis and Y-axis, see the following figure.)



Chip alignment and X,Y-axis

○ Buffer Amplifier

The amplifier amplifies a signal from the magnetic sensor output.

○ Thermal Sensor

The sensor is a thermal sensor for the compensation of temperature characteristics of the magnetic sensor.

○ A/D Converter (ADC)

The ADC converts magnetic sensor output and temperature sensor output into digital data.

○ Clock Generator

The clock generation section supplies clocks for ADC and digital circuits.

○ Power-on Reset

The section detects a rising of the power–on and initializes circuits.

○ Initialization Coil

The coil is used when the magnetic sensor cannot give original characteristics due to receiving strong magnetic field.
Generating magnetic field by the initialization coil initializes the magnetic sensor characteristics.
The initialization coil is operated by setting Config register CONFR [3:0].

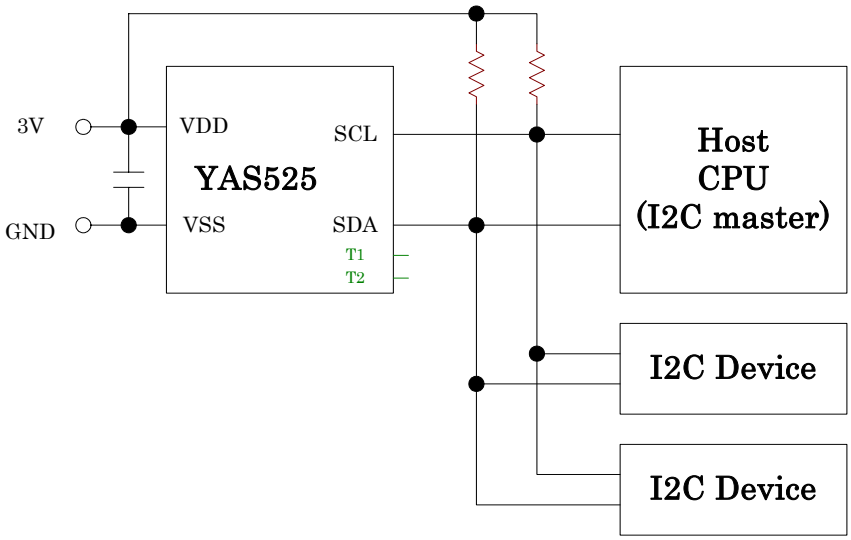
● Digital Circuit Section

○ Serial Data Interface

YAS525B serial data interface supports I^2C serial interface and operates in the slave mode.

■ Example of System Configuration

Here is an example of system configuration.



Example of system configuration

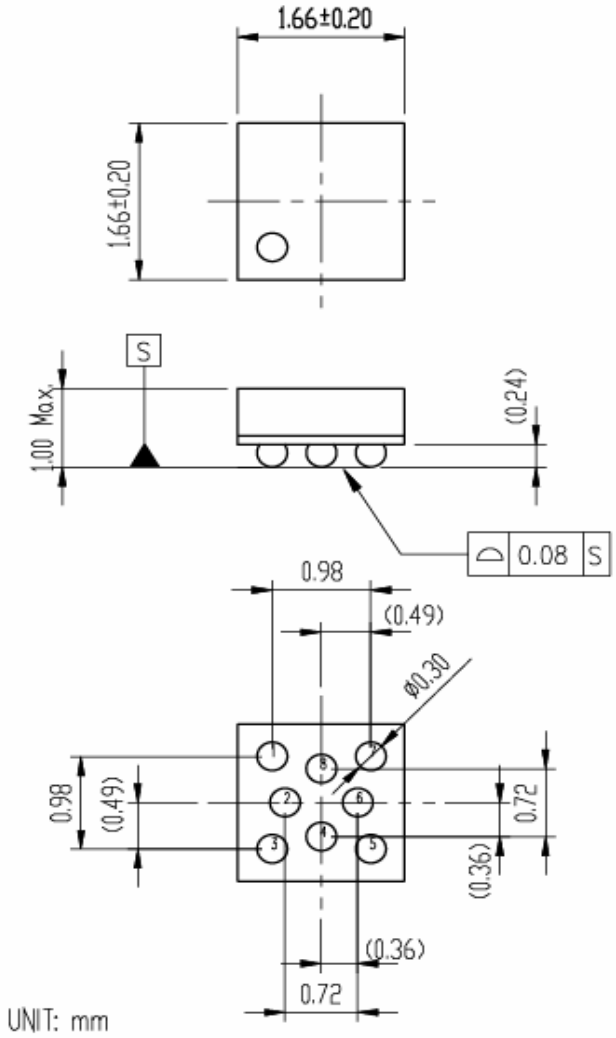
■ Package Outline Drawing

Caution

*** The product of the WLCSP package should be used under light-shielded conditions.**
Since the WLCSP package has a structure that a silicon wafer is exposed, if light (such as sunlight) hits the wafer, the device may malfunction (leak current increase etc.) due to electric charge internally generated by the photoelectric effect.

*** Please mount the package without underfill because temperature correction may not be normally performed when mounting YAS525B on a board.**

C-PK8WP-1



モールドコーナー形状は、この図面と若干異なるタイプもあります。
カッコ内の寸法値は参考値です。
モールド外形寸法はバリを含みません。
単位： mm

The shape of the molded corner may slightly differ from the shape in this diagram.
The figure in the parentheses ( ) should be used as a reference.
Plastic body dimensions do not include resin burr.
UNIT: mm

注） 表面実装LSIは、保管条件、及び半田付けについての特別な配慮が必要です。
詳しくはヤマハ代理店までお問い合わせください。

Note: The storage and soldering of LSIs for surface mounting need special consideration.
For detailed information, please contact your local Yamaha agent.

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