

IST8304

3D Magnetometer

Brief Datasheet

Table of Contents

- 1 GENERAL DESCRIPTION 3**
- 2 BLOCK DIAGRAM, PACKAGE DIMENSION AND APPLICATION CIRCUIT ... 4**
 - 2.1 Block diagram 4
 - 2.2 Package Dimensions and Pin Description..... 4
 - 2.3 Application Circuit..... 6
- 3 ELECTRICAL SPECIFICATIONS 7**
 - 3.1 Absolute Maximum Ratings..... 7
 - 3.2 Recommended Operating Conditions..... 7
 - 3.3 Electrical Specifications 7
 - 3.4 Magnetic Sensor Specifications..... 8
- 4 ORDERING INFORMATION..... 9**

1 General Description

iSentek IST8304 is a 3-axis digital magnetometer. It is an integrated chip with 3-axis magnetic sensors and control ASIC. IST8304 provides an I²C digital output with fast mode up to 400kHz. The compact form factor is easy for surface mount therefore is suitable for high-volume design and production.

Features

- Single chip 3-axis magnetic sensor
- I²C slave, Fast Mode up to 400kHz
- Small form factor, 1.6x1.6x1.0mm³, 11-pin BGA package
- Wide magnetic field range of ±1600uT
- 14 bits data output
- Low noise performance
- Auto zero drift for anti-magnetic interference
- Low power consumption (80uA@10Hz)
- Ultra low hysteresis (<0.1%FS)
- Software and algorithm support available (Tilt & cross-axis compensation, Soft-Gyro algorithm)
- Fast response

Applications

Digital Compass

Location Based Services

Navigation Applications

Augmented Reality Applications

Virtual Reality Applications

Magnetometry

IOT devices

Gaming

2 Block Diagram, Package Dimension and Application Circuit

2.1 Block diagram

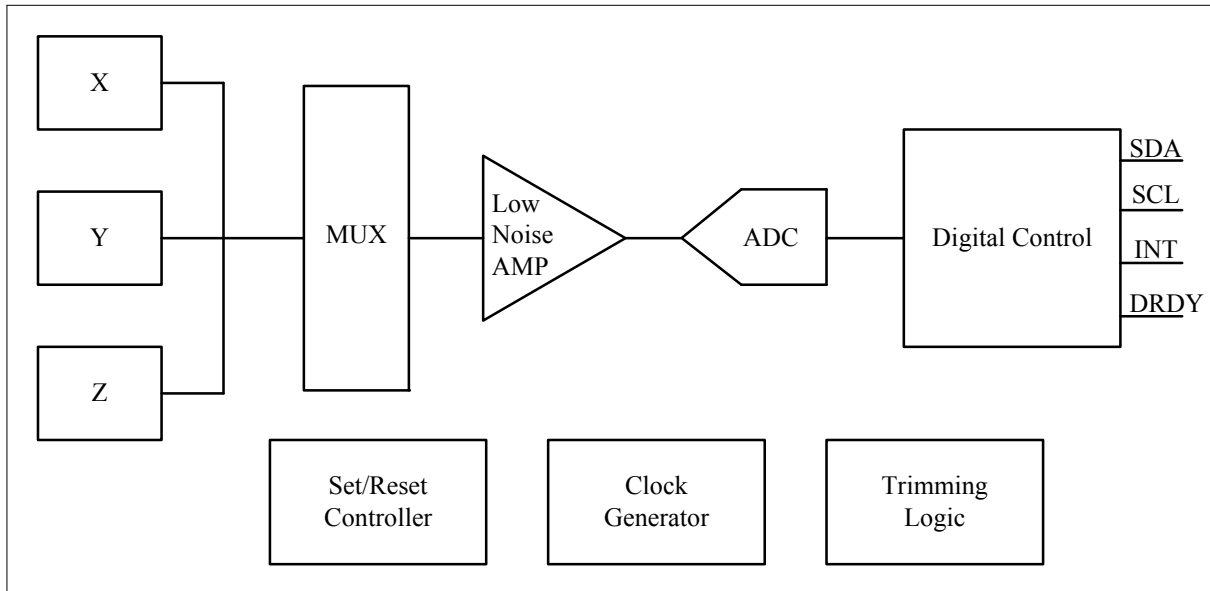
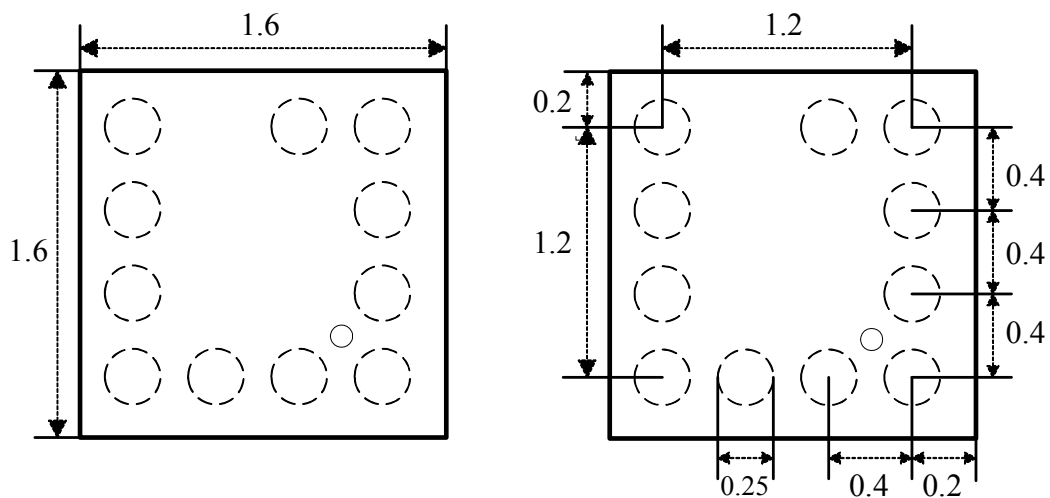


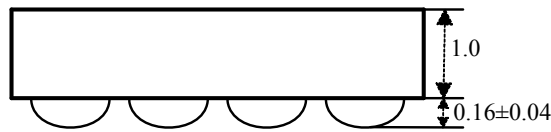
Figure 1. Block Diagram

2.2 Package Dimensions and Pin Description

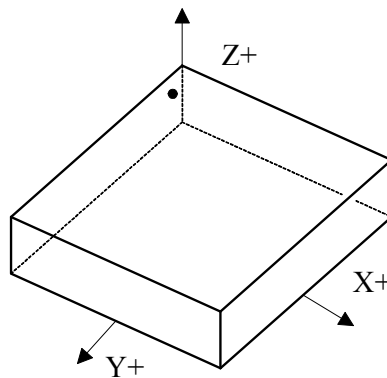
IST8304 BGA Top View



IST8304 BGA Side View



IST8304 3D Top View



Unit: mm
Tolerance: ±0.1mm

Pin	Name	Function
1	DRDY	Data ready indication, output pin only
2	NC	Not use
3	SCL	I ² C serial clock
4	SDA	I ² C serial data
5	VPP	Test pin, floating connection is suggested
6	DVDD	Digital supply voltage, 1.72~3.6V
7	RSTN	Reset pin, resets registers by setting it to “Low”. Internally pulled to “High” for floating connection. MCU connection is suggested (but not necessary).
8	CAD1	I ² C slave address
9	CAD0	I ² C slave address
10	VSS	GND
11	AVDD	Analog supply voltage, 1.72~2.8V

2.3 Application Circuit

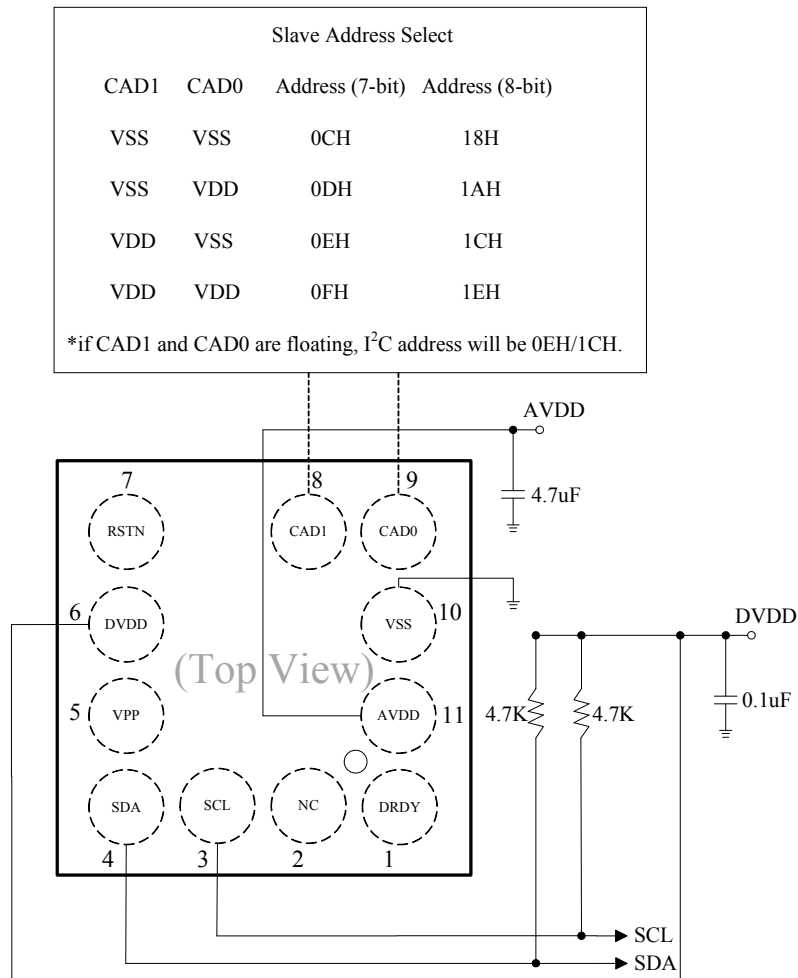


Figure 2. Application Circuit

3 Electrical Specifications

3.1 Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Storage Temperature	TSTG	-40 to +125	°C
Operating Temperature	TA	-40 to +85	°C
Analog Supply Voltage	AVDD	-0.5 to +2.8	V
Digital Supply Voltage	DVDD	-0.5 to +3.6	V
Digital Input Voltage	VIN	-0.3 to DVDD+0.3	V
Electrostatic Discharge Voltage* ¹	VESD_HBM	-4000 to 4000	V
Electrostatic Discharge Voltage* ²	VESD_MM	-350 to 350	V
Reflow Classification	JESD22-A113 with 260 °C Peak Temperature		

1. Human Body Model (HBM)

2. Machine Model (MM)

3.2 Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature	TA	-40		+85	°C
Analog Supply Voltage	AVDD	1.72	2.5	2.8	V
Digital Supply Voltage	DVDD	1.72	1.8	3.6	V

3.3 Electrical Specifications

(Operating conditions: TA=+25°C; AVDD=2.5V; DVDD=1.8V; 4.7µF ceramic capacitors **tied closely** to AVDD and GND respectively.)

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit
Operating Current	IDD3A	Full operation, at				uA
		0.5 sps		18		
		1 sps		20		
		8 sps		72		
		10 sps		80		
		20 sps		140		
		50 sps		320		
		100 sps		600		
200 sps		1200				
Standby Current	ISTB			10		uA
Output Data Rate (ODR)	ODR		0.5		200	Hz
Input Low Voltage	VIL		0		DVDD *30%	V
Input High Voltage	VIH		DVDD *70%		DVDD	V
Output Low Voltage	VOL	IOL= +4 mA	0		DVDD *20%	V
Output High Voltage	VOH	IOH= -100 uA (Except SCL and SDA)	DVDD *80%		DVDD	V

3.4 Magnetic Sensor Specifications

(Operating conditions: TA=+25°C; AVDD=2.5V; DVDD=1.8V; 4.7µF ceramic capacitors tied closely to AVDD and GND respectively.)

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit
Dynamic Range	MDR			±1600		uT
Linearity	Lin			1		%FS
Resolution	RESO			0.3		uT/LSB
Sensitivity	SEN			3.3		LSB/uT
Zero Gauss Drift	ZGD			±0.3		uT
Hysteresis	HS			0.1		%FS

4 Ordering Information

Order Number	Package Type	Packaging	Marking Information
IST8304	BGA – 11 pin	Tape and Reel: 3k pieces per reel	XAB + 03 X: Last number of the year AB: Week of the year 03: Product code of IST8304

For more information on iSentek’s Magnetic Sensors, please contact us by phone at +86-132-6706-8686 (China), +86-755-3337-0168 (China) or +886-2-2698-3306 ext:110 (Taiwan); via e-mail: sales@isentek.com or visit us online at www.isentek.com.

The application circuits herein constitute typical usage and interface of iSentek’s product. iSentek does not warranty or assume liability of customer-designed circuits derived from this description or depiction.

iSentek reserves the right to make changes to improve reliability, function or design. iSentek does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights nor the rights of others.

US Patent 9,297,863, Taiwanese Patents I437249, I420128 and I463160 apply to our magnetic sensor technology described.