
Unmatched precision magnetometer with ultra-low power, compact size, and an extensive dynamic range.

Datasheet - In Production



Features

- 5V - 10mA power supply
- Ultra-Low Power consumption
- high-accuracy
- Robust design
- Compact footprint
- I²C/SPI
- Onboard PNI RM3100 compass

Applications

- Drones
- Ground vehicles
- Electronic compasses
- Steering angle sensors

Description

The Siderion **RM3100** is a high-performance, ultra-low power 3D magnetic sensor designed for precision compassing, contactless angle measurement, and motion detection.

Leveraging PNI's patented Magneto - Inductive (MI) technology, the RM3100 delivers exceptional accuracy, stability, and immunity to environmental interference, such as stray magnetic fields and temperature variations without requiring factory calibration.

The RM3100 combines cutting-edge sensor technology with energy efficiency, making it the ideal choice for designers seeking high-performance magnetic sensing in compact, power-sensitive applications.

Its JST-GH connectors make it ideal for integration with Pixhawk or other autopilot systems.

The RM3100 operates across a temperature range from -40°C to +70°C.

Table 1. Device summary

Order ref code	Temperature [°C]	Product size [mm]	Weight [g]
SID-SENS-RM3100	-40 to +70	26.0 x 33.0 x 10.0	7

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1. Block diagram and pin description

1.1 RM3100 Orientation

Figure 1. RM3100 - NED (XYZ) orientation (bottom view)

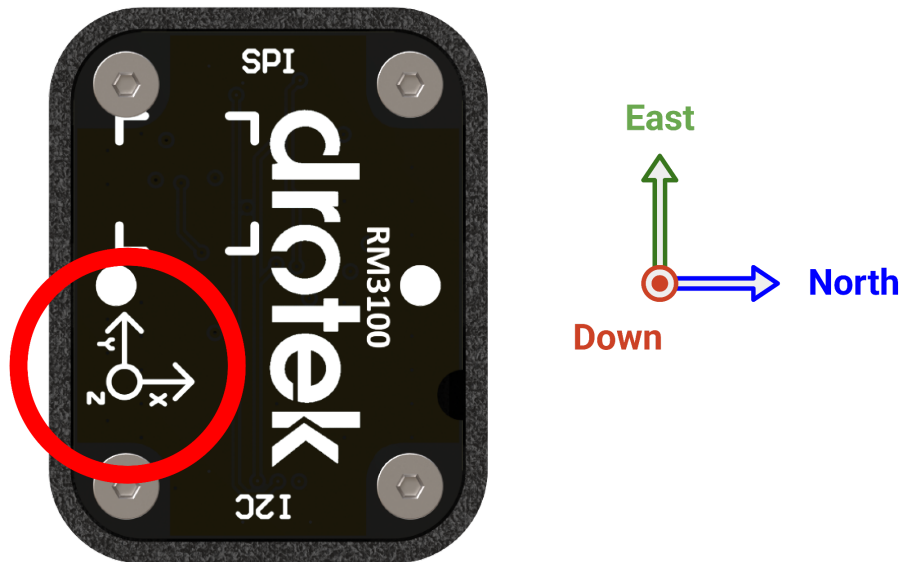
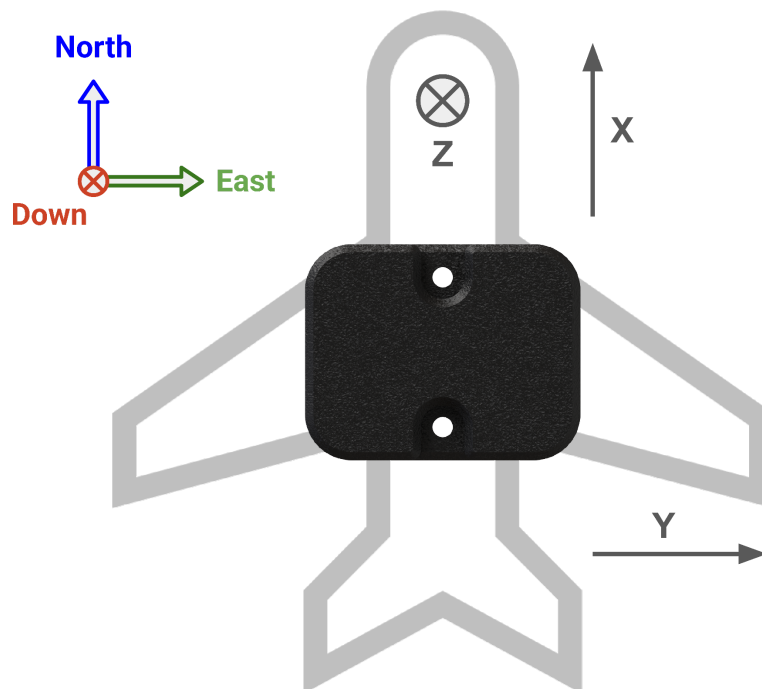


Figure 2. RM3100 - NED (XYZ) orientation (Top view on a drone)



1.2 Pin description

Figure 3. RM3100 pinout (side views)

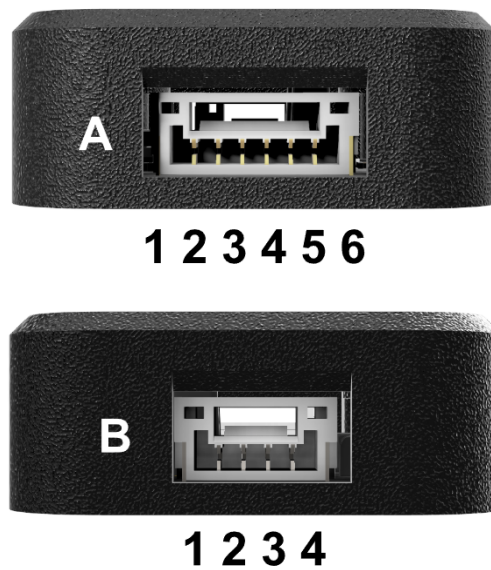


Table 2. Pinout configuration

	Pin	Name	Type	Function
SPI	A1	5V IN	P	5V input
	A2	SPI SCK	I	SPI Clock
	A3	SPI MISO	O	SPI Master Input, Slave Output
	A4	SPI MOSI	I	SPI Master Output, Slave Input
	A5	SPI CS	I	SPI Chip Select
	A6	GND	P	Ground reference
I2C	B1	5V IN	P	5V input
	B2	I2C SCL	I	I2C Serial Clock
	B3	I2C SDA	I/O	I2C Serial Data
	B4	GND	P	Ground reference

P : Power / I : Input / O : Output

2. Absolute maximum ratings

Stresses above those listed as “absolute maximum ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device under these conditions is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Table 3. Beacon F20P absolute maximum ratings

Symbol	Parameter	Maximum value	Units
Vusb	USB supply voltage	-0.3 to +6	V
Vdd	Internal supply voltage	-0.5 to +3.6	V
Vdd_IO	I/O pins supply voltage	-0.5 to Vdd+0.1	V
W	Product weight	7	g
TOP	Operating temperature	-40 to +70	°C
TSTG	Storage temperature	-40 to +80	°C



This device is sensitive to electrostatic discharge (ESD), improper handling can cause permanent damage to the part.

3. Specifications

3.1 PNI RM3100 specifications

Table 4. RM3100 electrical specifications

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
Vdd	Internal supply voltage		2.0	3.0	3.6	V
Vdd_IO	Supply voltage for I/O		2.0	3.0	3.6	V
Vdd_Ripple	Vdd ripple voltage				0.05	Vpp
Idd	Current consumption				1	mA
Vil	IO pin low level input voltage		0		0.3* Vdd	V
Vih	IO pin high level input voltage		0.7* Vdd		Vdd	V
Iidle	Idle Mode Current				1	μA
Ileak	Leakage Current @ DVDD pin (AVDD=AVSS=DVSS=0V, DVDD=3.6V)				100	nA
Top	Operating temperature		-20		+85	°C
I2Cadd	7bit I2C address	0b0100000				

Table 5. RM3100 Geomagnetic Sensor Performance

Parameter	Cycle counts			Units
	50	100	200	
Field Measurement Range	-800 to +800			μT
Gain	20	38	75	LSB/μT
Sensitivity	50	26	13	nT
Noise	30	20	15	nT
Noise Density @ Max. Single-Axis Sample Rate	1.2			nT/√Hz
Repeatability over ±200 μT	15	8	8	nT
Hysteresis over ±200 μT	15			nT
Linearity over ±200 μT	0.5			%
Maximum Single-Axis Sample Rate (divide by 3 for max. 3-axis sample rate)	1600	850	440	Hz
Single-Axis Average Current @ 24 Hz Sample Rate (equivalent to 3-axis @ 8 Hz)	70	135	260	μA
Bias Resistor, Rb	121			Ω
External Timing Resistor for Clock, REXT	33			KΩ
Circuit Oscillation Frequency	180			kHz

4. Applications

4.1 Standalone configuration

5. Communication interfaces

There are two communications interfaces including SPI and I2C. All the inputs have internal pull-up resistors in normal operation and can be left open if not used. All the PIOs are supplied by VCC, therefore all the voltage levels of the PIO pins are related to Vdd supply voltage.

5.1 SPI interface

The RM3100 has an SPI slave interface that can be selected by plugging a cable in the SPI connector. The SPI pins available are: SPI_MISO,, SPI_MOSI, SPI_CS_N, SPI_CLK. The SPI interface is designed to allow communication to a host CPU. The interface can be operated in slave mode only. The maximum SPI clock frequency is 1 MHz.

This section provides SPI timing values for the RM3100 slave operation. The following tables present timing values under different capacitive loading conditions. Default SPI configuration is CPOL = 0 and CPHA = 0.

Figure 4. SPI chronogram specifications

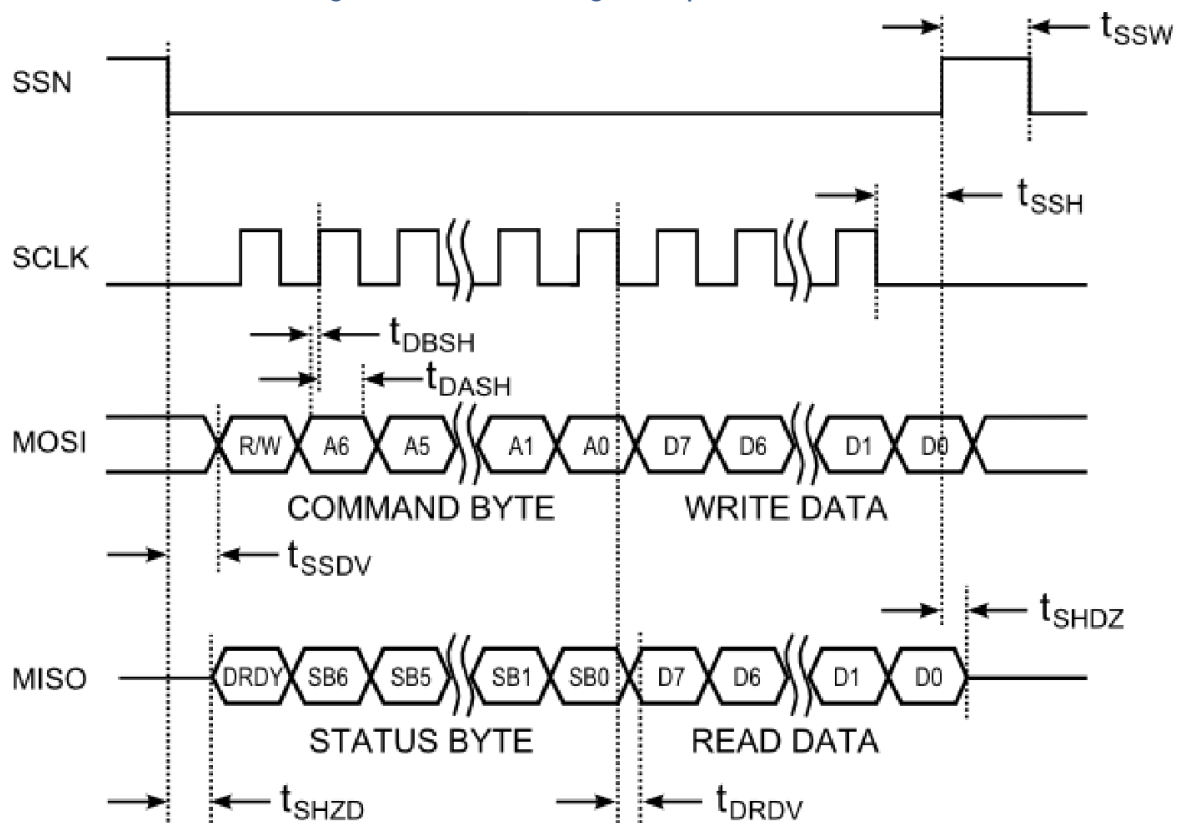


Table 6. RM3100 SPI timing specifications

Timing value @ 20pF load	Min [ns]	Max [ns]
"A" - MISO data valid time (CS)	17	42
"B" - MISO data valid time (SCK) weak driver mode	16	39
"C" - MISO data hold time	52	88
"D" - MISO rise/fall time, weak driver mode	2	21
"E" - MISO data disable lag time	7	20

5.2 Slave I2C interface

An I2C compliant interface is available for communication with an external host CPU. The interface can be operated in slave mode only. It is fully compatible with Fast-Mode-Plus of the I2C industry standard. Since the maximum SCL clock frequency is 1 MHz (in Fast-Mode-Plus), the maximum bit rate is 1 Mbit/s. The interface stretches the clock when slowed down while serving interrupts, therefore the real bit rates may be slightly lower.

Figure 5. I2C chronogram specifications

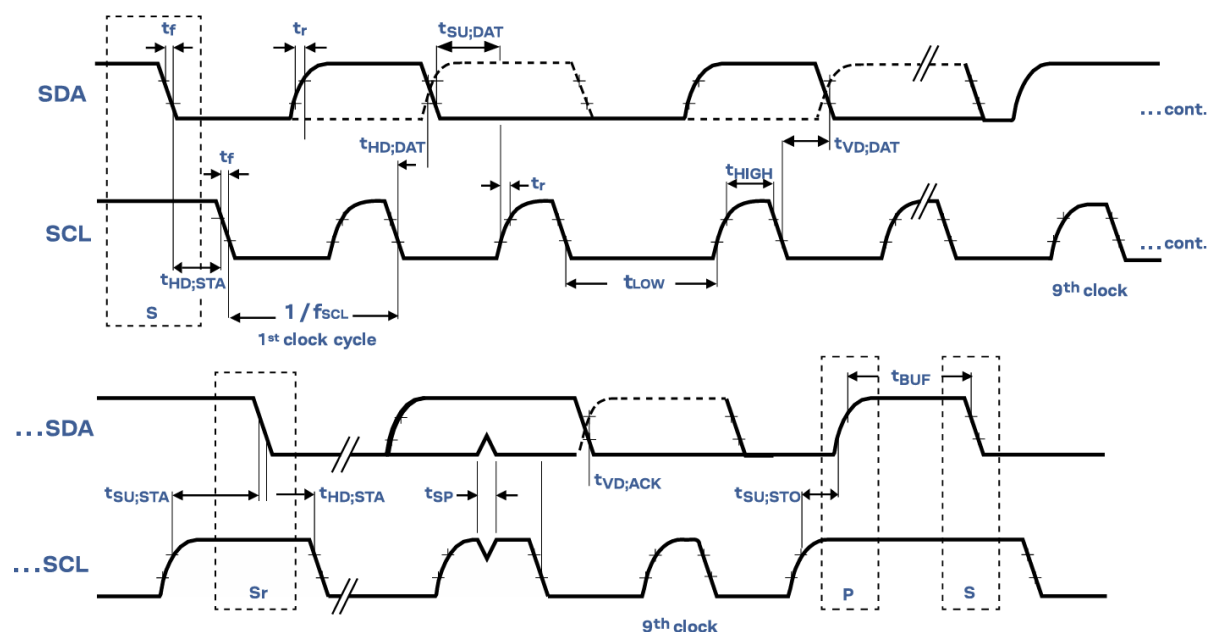
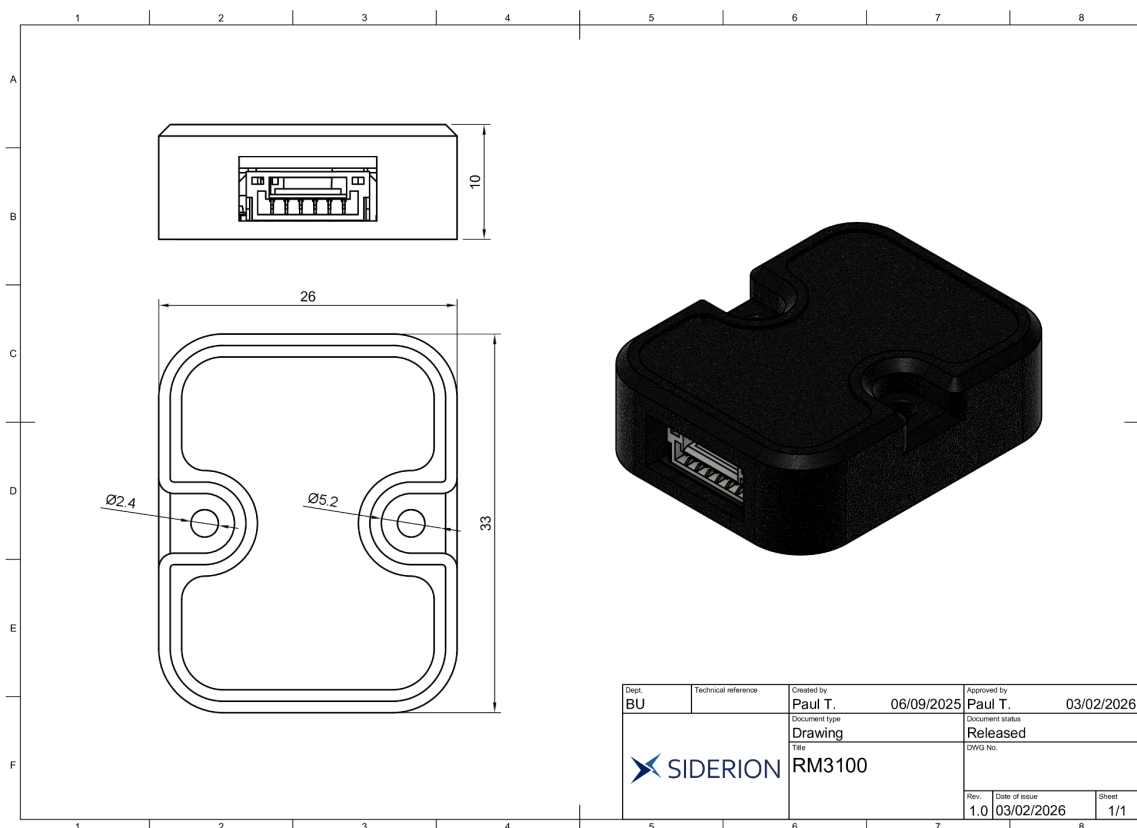


Table 7. RM3100 I2C timing specifications

Symbol	Parameter	Min	Max	Units
Vil	LOW-LEVEL input voltage	Vss-0.3	0.3xVdd	V
Vih	HIGH-LEVEL input voltage	0.7xVdd	Vdd+0.3	V
Fscl	SCL clock frequency	0	1	MHz

6. Mechanical drawings

Figure 6. RM3100 v1.0 mechanical drawings



7. Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Sep-2025	1.0	SiderionDoc_RM3100 / Initial release

8. Appendix

PNI RM3100 datasheet: [RM3100 User Manual r07](#)

Siderion user's guide:

Siderion tutorials:

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