1. General Description

WAMS4810 is ratio-metric low power linear hall effect sensor, produced with CMOS technology. The ratio-metric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. The WAMS4810 has a quiescent output voltage that is 50% of the supply voltage. The integrated circuitry provides increased temperature stability and sensitivity. WAMS4810 features factory programmed sensitivities of 1.23 mV/Gs and 2.5 mV/Gs, respectively.

The operating voltage ranges from1.7 to 5.5V, and the maximum withstand voltage can reach 6V. The operating temperature ranges from -40 to +125℃, and it is suitable for various consumer and industrial application fields.

WAMS4810 provides a green SOT23-3 package.

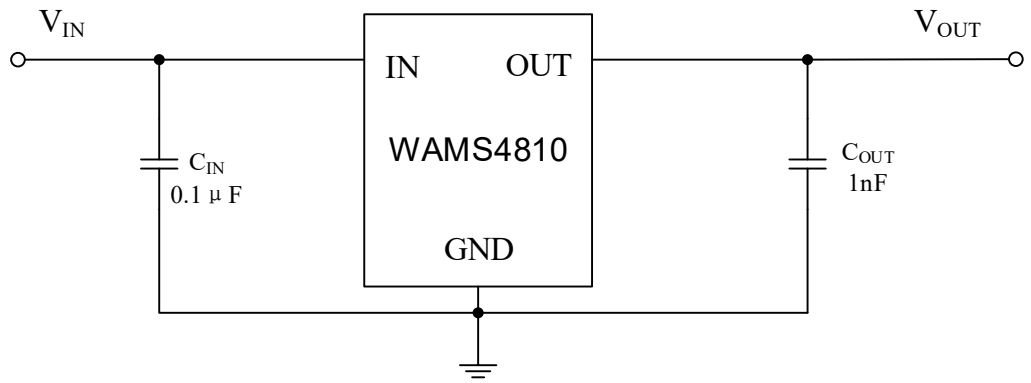
2. Features

- Input Voltage: 1.7V to 5.5V
- Quiescent Current: 0.8mA @V_{IN}=1.8V
- Ratio-metric Rail to Rail Linear Output
- Low output noise
- Operating ambient temperature: -40 to +125℃
- ESD HBM：±4KV

3. Applications

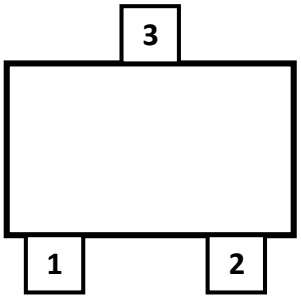
- Gamepads, Pedals, Keyboards
- Current sensing
- Speed Detection
- Position Detection
- Weight sensing
- Liquid level sensing

4. Typical Application Circuit



5. Pin Configuration

(Top View)



SOT23-3

6. Pin Description

PIN NUMBER SOT23-3	PIN NAME	I/O	PIN FUNCTION
1	IN	I	Power supply
2	OUT	O	Output
3	GND	-	Ground reference

7. Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)[1]

SYMBOL	PARAMETER		RATING	UNIT
V_{IN}	IN withstand Voltage		-0.1 to 6	V
V_{OUT}	Output Voltage		-0.1 to 6	V
$R_{\theta JA}$	Package Thermal Resistance	SOT23-3	228	°C/W
T_J	Junction Temperature		150	°C
T_{STG}	Storage Temperature		-65 to 150	°C
ESD	ESD(HBM)		±4000	V
	ESD(MM)		±400	V

NOTE1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

8. Recommended Operating Conditions

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_{IN}	Input Voltage	1.7	5.5	V
T_A	Operating Ambient Temperature	-40	125	°C

9. Electrical Characteristics [1]

(V_{IN} = 3.3 V, T_A=25°C, unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS		MIN	TYP.	MAX	UNIT
V_{IN}	Input Voltage			1.7	3.3	5.5	V
I_{Q1}	Quiescent Current	B=0Gs, V_{IN} = 3.3 V			0.95	1.1	mA
I_{Q2}	Quiescent Current	B=0Gs, V_{IN} = 1.8 V			0.8		mA
$V_{OUT(Q)}$	Quiescent Voltage	B=0Gs		1.63	1.65	1.67	V
$V_{OUT(Q)_T}$	$V_{OUT(Q)}$ Temperature Drift				±2		%
Tr	Response time				18		μS
Lin_{ERR}	Linearity Sensitivity Error				±1.5		%
$Sens_{_T}$	Sensitivity Temperature Drift				1000		PPM/℃
V_{OH}	Output High Voltage	B=+1200Gs		VCC-0.1			V
V_{OL}	Output Low Voltage	B=-1200Gs				0.1	V
R_O	Output Resistance				5	10	Ω
Sens	Sensitivity	B=±1200Gs VCC=3V	WAMS4810A	1.15	1.23	1.31	mV/ Gs
		B=±600Gs VCC=3V	WAMS4810B	2.33	2.5	2.66	mV/ Gs
B	Linear magnetic sensing range	WAMS4810A			±1200		Gs
		WAMS4810B			±600		Gs
V_N	Output Referred Noise	1kHz			2		mVpp

NOTE1: Each test result may vary with the test condition.

10. Function Description

10.1 Overview

The WAMS4810 is a 3pin linear Hall effect sensor. The device operates from 1.7V to 5.5V power supplies, measures magnetic flux density.

10.2 Block Diagram

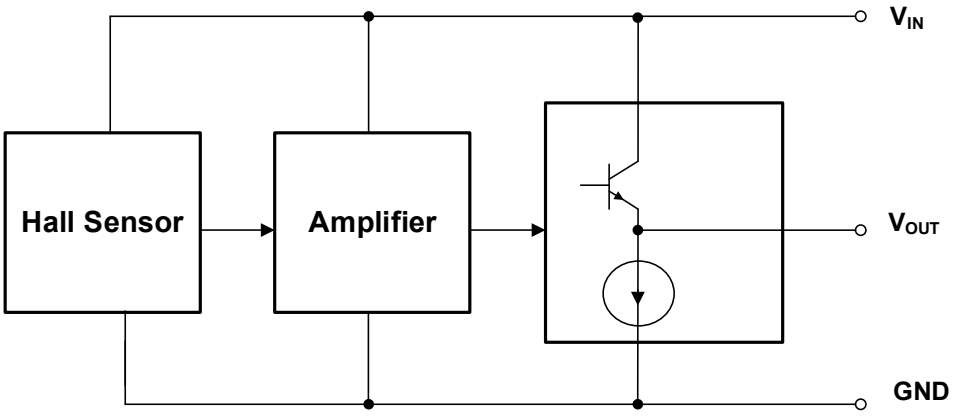


Figure 1. Block Diagram

10.3 Feature Description

10.3.1 Magnetic Flux Direction

As shown in Figure 2, the WAMS4810 is sensitive to the magnetic field component that is perpendicular to the top of the package.

Magnetic flux that travels from the bottom to the top of the package is considered positive. This condition exists when a south magnetic pole is near the top (marked-side) of the package. Magnetic flux that travels from the top to the bottom of the package results in negative millitesla values.

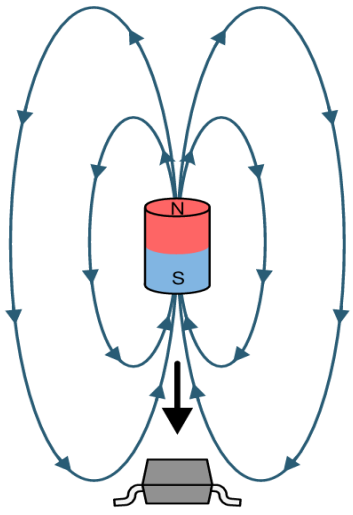


Figure 2. The Flux Direction for Positive B

10.3.2 Sensitivity Linearity

The device produces a linear response when the output voltage is within the specified V_{OUT} range. Outside this range, sensitivity is reduced and nonlinear.

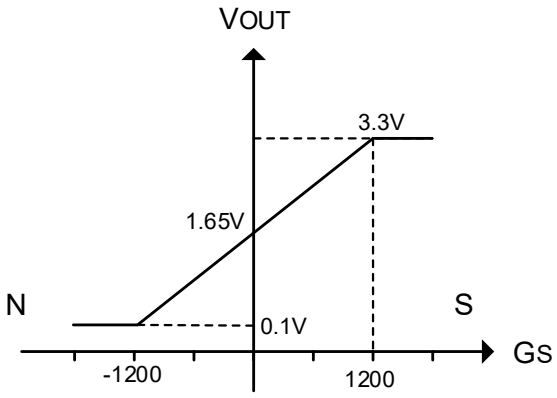


Figure 3. WAMS4810A Magnetic Response

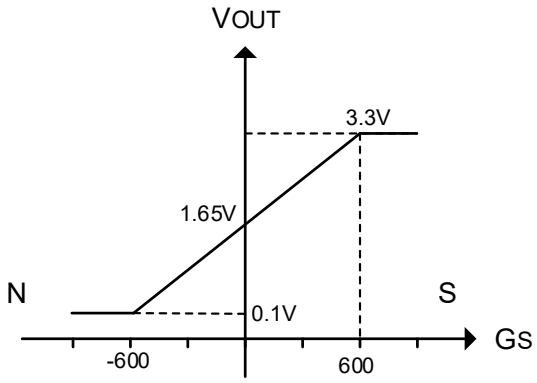


Figure 4. WAMS4810B Magnetic Response

11. Application and Implementation

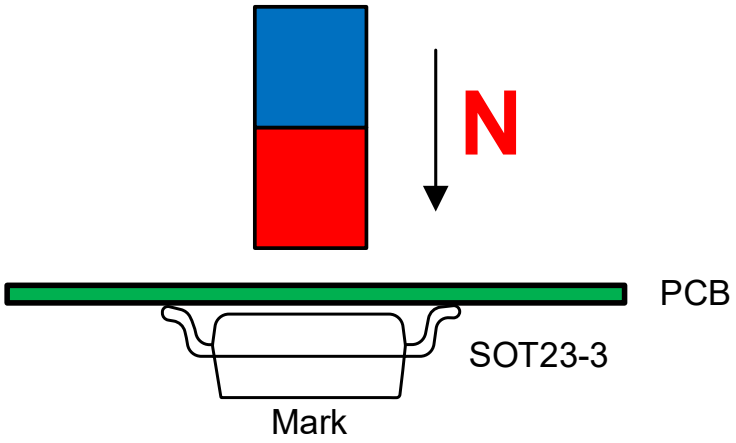


Figure 4. Common Magnet Orientation

12. Naming Conventions

WAMSAAAABBC

WAMS: WAYON Magnetic Sensors;

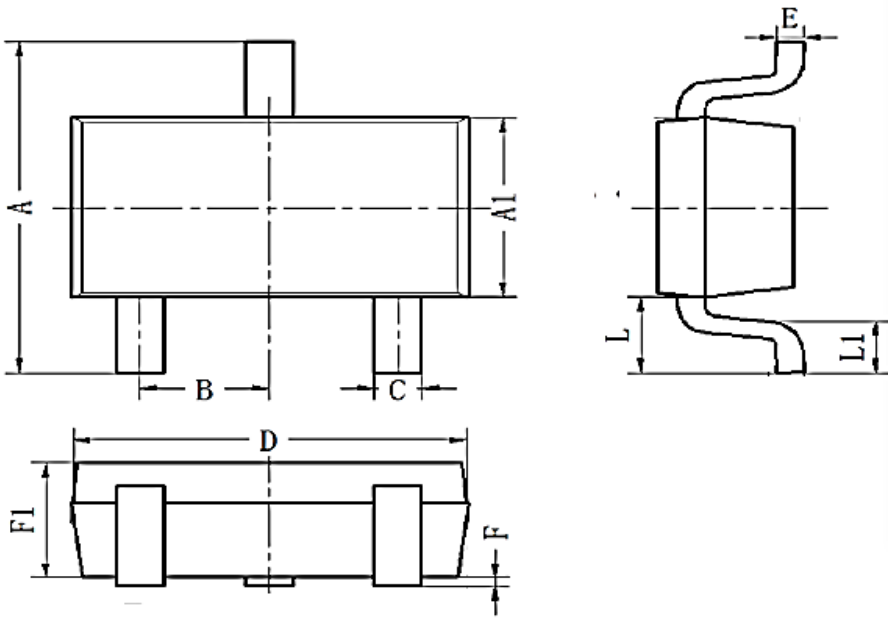
AAAA: Product Number;

BB: Package – MC: SOT23-3;

C: R-Reel & T-tube;

13. Package Information

SOT 23-3



SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	2.60	2.80	3.00
A1	1.50	1.60	1.70
B		0.95BSC	
C	0.25	0.40	0.50
D	2.82	2.92	3.02
E	0.10	0.15	0.20
L		0.59REF	
L1	0.30	0.45	0.60
F1	0.90	1.10	1.30
F	0.00	0.08	0.15

14. Ordering Information

PART NUMBER	PACKAGE	PACKING QUANTITY
WAMS4810AMCR	SOT23-3L	3k/Reel
WAMS4810BMCR	SOT23-3L	3k/Reel

* XXXX is variable.

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Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.

Product Specification Statement

- The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.
- The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.
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- Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.
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