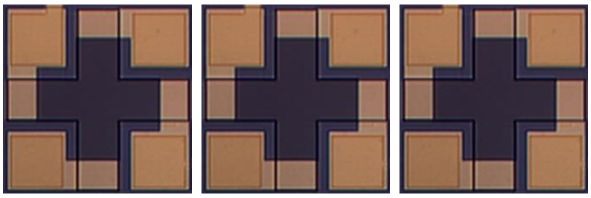

P3A

Highly sensitive Hall Effect sensor

Advanced Hall Sensors Ltd (AHS) specialises in the design and manufacture of semiconductor sensors using the technique of Molecular Beam Epitaxy (MBE), which provides excellent uniformity and reproducibility. P3A Hall Sensor is outstanding for its High sensitivity and its low temperature coefficients. The P3A Hall Sensor is fabricated from AlGaAs/InGaAs/GaAs-2DEG (Two-dimensional electron gas) heterojunction semiconductors. Due to its wide band-gap material and high mobility, this sensor provides numerous advantages over existing Silicon technology.

Features and benefits

- High Sensitivity (300V/AT)
- Low current requirement
- Very low power consumption
- Extended operating temperature range
- Small linearity error of the Hall voltage
- Plastic miniature package for through slot and SOT-143 surface mounting

Potential applications

- Magnetic field measurement
- Low temperature applications
- Current and power measurements
- Control of brushless DC motors
- Micro switches
- Position sensing
- Speed and RPM sensing

Table 1. Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Control Voltage	V_C	5	V
Control Current	I_C	4	mA
Power Dissipation	P_D	20	mW
Operating Temperature	T_{OP}	-100 to +200	°C
Storage temperature	T_S	-100 to +200	°C
Soldering temperature	T_{SOL}	260	°C

Table 2. Electrical characteristics

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Hall Voltage	V_H	I_C=1mA, B=100mT	25	28	35	mV
Residual Ratio*1	V_{HO}/V_H	I_C=1mA	-10		+10	%
Residual Ratio	V_{HO}/V_H	I_C=0.5mA	-4		+4	%
Input Resistance	R_{IN}	I_C=1mA, B=0mT	1.1	1.25	1.45	kΩ
Output Resistance	R_{OUT}	I_C=1mA, B=0mT	1.1	1.25	1.45	kΩ
Temperature coefficient of Hall Voltage*2	α	I_C=1mA, B=100mT (T_1=-100°C, T_2=150°C)	-0.05	-0.08	-0.1	%/°C
Temperature coefficient of Input Resistance*3	β	I_C=1mA, B=0mT (T_1=-100°C, T_2=150°C)	-----	0.3	0.4	%/°C
Linearity of Hall Voltage*4	γ	I_C=1mA, B_1=60mT, B_2=500mT	-----	1	1.5	%

Notes:

1. $Residual\_Ratio = \frac{V_{HO}(B = 0mT)}{V_H(B = 100mT)}$

2. $\alpha = \frac{1}{V_H(T_1)} \times \frac{V_H(T_2) - V_H(T_1)}{T_2 - T_1} \times 100$

3. $\beta = \frac{1}{R_{IN}(T_1)} \times \frac{R_{IN}(T_2) - R_{IN}(T_1)}{T_2 - T_1} \times 100$

4. $\gamma = \frac{K_H(B_2) - K_H(B_1)}{\frac{1}{2}[K_H(B_1) + K_H(B_2)]} \times 100$

$$K_H = \frac{V_H}{IB}$$

V_{HO}: Offset voltage
B: Magnetic flux density
T_1, T_2: Ambient Temperature
K_H: Current sensitivity

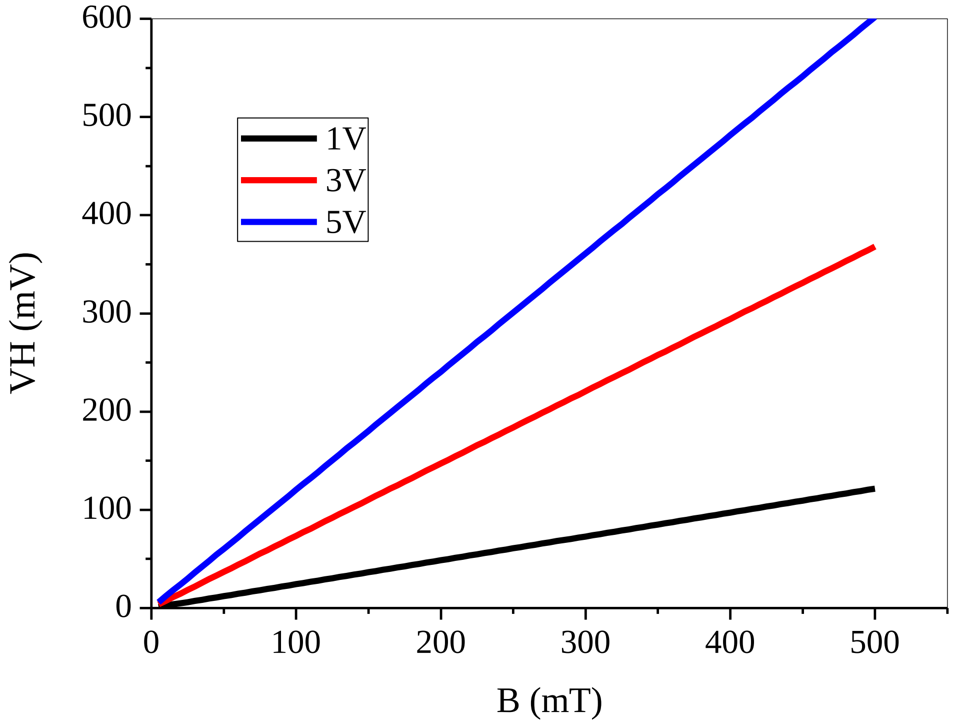

Figure 1. Output Hall Voltage versus Magnetic field at inputs of 1V, 3V and 5V across the Hall sensor.

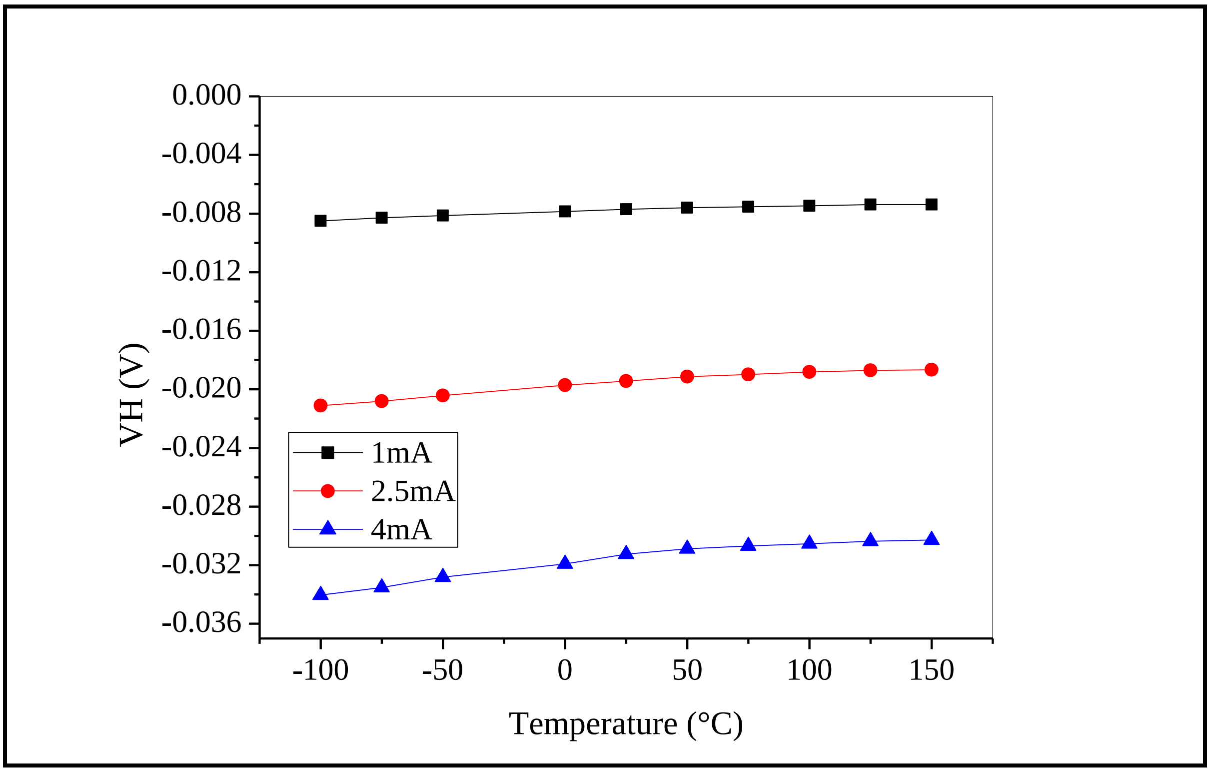

Figure 2. Output Hall Voltage versus Temperature at input bias currents of 1mA, 2.5mA and 4mA across the Hall sensor and at 30mT magnetic field.

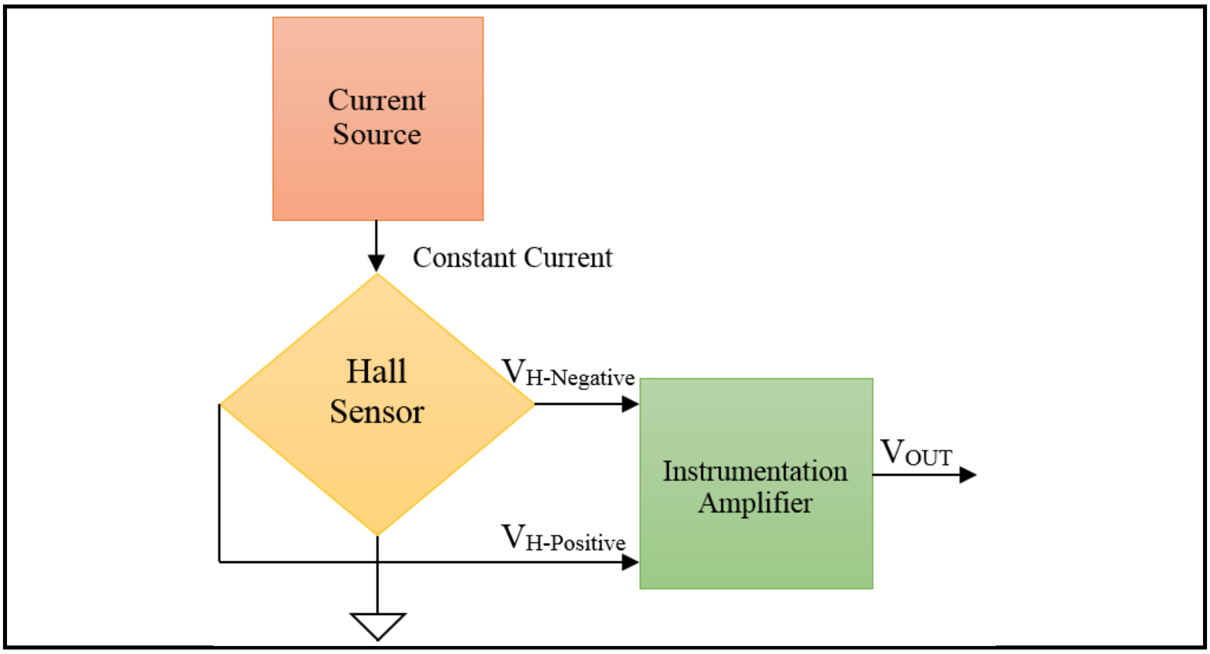

Figure 3. Recommended circuit.

Contact us:
Email: sales@ahsltd.com
Phone: +44 161 873 7334
Address: Advanced Hall Sensors Ltd, Unit C3, Broadoak Business Park, Ashburton Road West Trafford Park Manchester, M17 1RW

Outline drawings (unit: mm)