Linear Hall Effect Sensor IC

Features:
- Wide operating range 3.0~12V, -40°C~125°C
- Flat Response to 23kHz
- High Sensitivity 9.0 mV/G
- Wide sensible magnetic field range on different supplied voltage
  ±200 Gauss on 5V supplied voltage
  ±500 Gauss on 12V supplied voltage. Low operating current 3mA
- Two package styles TO-92S/SOT-23 available.
- Built-in temperature compensated circuit to minimize temperature’s effect

Functional Description:
The W138 integrates Hall sensing element, linear amplifier, sensitivity controller and emitter follower output stage. It accurately tracks extremely small change in magnetic flux density—generally too small to operate Hall effect switch.

W138 can be applied as current sensor, tooth sensor, proximity detectors and motion detectors. As sensitive monitor of magnetic flux, it can effectively measure a system’s performance with negligible system loading while providing isolation from contaminated and electrically noisy environments.
Electrical Characteristics: (T=+25°C, Vdd=5.0V)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>Vcc</td>
<td></td>
<td>3.0</td>
<td></td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Supply Current</td>
<td>Isupply</td>
<td>B=0 Gauss</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>mA</td>
</tr>
<tr>
<td>Quiescent Vout</td>
<td>V0G</td>
<td>B=0 G (A Grade)</td>
<td>2.4</td>
<td>2.5</td>
<td>2.6</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B=0 G (B Grade)</td>
<td>2.3</td>
<td>2.5</td>
<td>2.7</td>
<td>V</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>△Vout</td>
<td>B=0 to ±200 G</td>
<td>8.0</td>
<td>9.0</td>
<td>10.0</td>
<td>mV/G</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>BW</td>
<td></td>
<td></td>
<td>23</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Measurable Guass Range</td>
<td>MGR</td>
<td>Vdd=5V</td>
<td></td>
<td>±200</td>
<td></td>
<td>Guass</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vdd=12V</td>
<td></td>
<td>±500</td>
<td></td>
<td></td>
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<tr>
<td>Temperature Drift</td>
<td>△Vout</td>
<td>B=0 Gauss</td>
<td></td>
<td>±1.0</td>
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<td>mV/℃</td>
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<tr>
<td>Output Noise</td>
<td>VNp-p</td>
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<td>15</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
</tbody>
</table>

1. All output-voltage measurements are made with a voltmeter having an input impedance of at least 100kΩ.
2. Do not apply any ‘resistor load’ on output pin, it will degrade IC’s performance.

Application circuit:

Winson reserves the right to make changes to improve reliability or manufacturability.
Package Information:

TO92S:

![Package Diagram of TO92S](image)

SOT23:

![Package Diagram of SOT23](image)
Characteristic Diagrams:

**WSH138 Sensitivity standardization of 30°C VS. Temperature**

![Graph showing the sensitivity standardization of 30°C VS. Temperature with the equation y = 0.0072x + 2.5217 and R² = 0.9994.]

**WSH138 Vout vs. Magnetic field with Vdd 5V**

![Graph showing the relationship between Vout and the magnetic field with Vdd 5V, with the equation y = 0.0054x + 1.7188 and R² = 0.9982.]

**WSH138 Vout vs. Magnetic field with Vdd 3.3V**

![Graph showing the relationship between Vout and the magnetic field with Vdd 3.3V, with the equation y = 0.0054x + 1.7188 and R² = 0.9982.]

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