Omnipolar Hall Effect Switch IC

Features:
- Operates from 2.4V to 26V supply voltage
- Operation with **North** or **South** Pole
- On-chip Hall Sensor and driver
- On-chip temperature compensation circuitry minimizes shifts in On/Off points temperature and supply voltage
- On-chip voltage regulator to stabilize On/Off switch point
- Wide range operating temperature –40 ~ 125℃
- Easily Manufacturability with magnet pole independence
  - South or North magnetic field: Output Low
  - No magnetic field: Output High.

Functional Description:
WSH131 is designed to integrate pole independent Hall sensor with output driver together on the same chip. Either North or South magnetic field with sufficient strength will turn the output on (low). In the absence of a magnetic field, output is off (high). The polarity independence allow WSH131 to easily replace reed switches for superior reliability and ease of manufacturing.

To improve stability, it includes a temperature compensated voltage regulator, a differential amplifier, a Hysteresis controller and a open-collector output driver capable of sinking up to 20mA current load. The temperature-dependent bias increases the supply voltage of the hall plates and adjusts the switching points to the decreasing induction of magnets at higher temperatures. Subsequently, the output can keep switching on/off on more precise switch point regardless to the ambient temperature. WSH131 are rated for operation over temperature range from –40° C to 125 ℃ and voltage ranges from 2.4V to 26V.

Pin Descriptions:

<table>
<thead>
<tr>
<th>Name</th>
<th>P/I/O</th>
<th>Pin#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vdd</td>
<td>P</td>
<td>1</td>
<td>Positive Power Supply</td>
</tr>
<tr>
<td>Gnd</td>
<td>P</td>
<td>2</td>
<td>Ground</td>
</tr>
<tr>
<td>Vout</td>
<td>O</td>
<td>3</td>
<td>Output Pin</td>
</tr>
</tbody>
</table>

Winson reserves the right to make changes to improve reliability or manufacturability.
Absolute Maximum Rating (at Ta=25°C)

Supply Voltage  \( V_{cc} \)  -----------------------  26V
Output breakdown Voltage  \( V_{out(breakdown)} \)  -----------------------  30V
Magnetic flux density  \( B \)  ----------------------- Unlimited
Output ON Current (continuous)  \( I_c \)  -----------------------  20mA
Operating Temperature Range  \( T_a \)  ----------------------- (-40°C to +125°C)
Storage Temperature Range  \( T_s \)  ----------------------- (-65°C to +150°C)
Package Power Dissipation  \( P_d \)  -------------------------- 350mw

Electrical Characteristics:  \( (T=+25°C, V_{cc}=2.4V \text{ to } 26V) \)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>( T_y )</th>
<th>( T_y )</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>( V_{cc} )</td>
<td></td>
<td>2.4</td>
<td></td>
<td>2.4</td>
<td>26</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Output Saturation Voltage</td>
<td>( V_{out(sat)} )</td>
<td>( V_{cc}=12V, I_c=10mA )  ( B &gt; B_{op} )</td>
<td></td>
<td>0.2</td>
<td>0.6</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Output Leakage Current</td>
<td>( I_{leakage} )</td>
<td>( V_{cc}=12V, B&lt;B_{rp} )</td>
<td></td>
<td>&lt;0.1</td>
<td>10</td>
<td></td>
<td></td>
<td>uA</td>
</tr>
<tr>
<td>Supply Current</td>
<td>( I_{s(off)} )</td>
<td>( V_{cc}=12V, \text{Output Open} )</td>
<td></td>
<td>3.0</td>
<td>6</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>

Function Block:

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Magnetic Characteristics:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Grade</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Point</td>
<td>Bop</td>
<td>A</td>
<td>±20</td>
<td>±100</td>
<td>±150</td>
<td>Gauss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>±20</td>
<td>±100</td>
<td>±150</td>
<td>Gauss</td>
</tr>
<tr>
<td>Operating Point</td>
<td>Brp</td>
<td>A</td>
<td>±10</td>
<td></td>
<td></td>
<td>Gauss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>±10</td>
<td></td>
<td></td>
<td>Gauss</td>
</tr>
<tr>
<td>Hysteresis Window</td>
<td>Bhys</td>
<td></td>
<td>10</td>
<td>30</td>
<td></td>
<td>Gauss</td>
</tr>
</tbody>
</table>

Ps: + - indicate direction of magnetic field, 1mT=10 Gauss

Order Information: (Halogen Free)

<table>
<thead>
<tr>
<th>WSH131–XPAN □ (TO-92)</th>
<th>Grade:</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSH131–XPCN □ (SOT23)</td>
<td>3: 100 Gauss</td>
</tr>
<tr>
<td></td>
<td>5: 150 Gauss</td>
</tr>
</tbody>
</table>

Application Circuit:

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

TO-92S:

![Top View](image1)

![Front View](image2)

![Side View](image3)

![Bottom View](image4)

![Marking Site](image5)

Hall Sensor Location

SOT-23:

![Front View](image6)

![Side View](image7)

![Marking Site](image8)

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Additional Information:

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