H series is the bare chip magnetic sensor in which the nano-granular TMR elements are arranged into full bridge circuit. The difference of few magnetic fields of small and minute space is detectable. Because of high resistance, consumption current is very small and the best for mobile use.

**Features**
- High output voltage
- High sensitivity
- Minute size
- Low power consumption
- Low temperature dependency
- Low hysteresis

**Structure**
- Sensor: nano-granular TMR (Full bridge circuit)
- Substrate: Si
- Electrode: Au

**Applications**
- Encoder
- Linear scale
- Current sensor
- Compass
- Bill acceptor, etc

**Electro-magnetic specification**
- Supply voltage, \( V_{dc} \): 1~5 V
- Absolute maximum rating, \( V_{dc} \): 10 V
- Output voltage, \( V_{out} \): 350 mVp-p (Min) (in the case of \( V_{dc}=5 \) V, rotation magnetic field \( H=H_k \), and differential output \( V_{out1}-V_{out2} \))
- Offset voltage, \( V_{off} \): 150 mV (Max)
- ESD voltage: 100 V (Typ, human body mode)
- Temperature range: -40 ℃~125 ℃

**H-series Line-up**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Resistance (without field)</th>
<th>Effective magnetic field, ( H_k )</th>
</tr>
</thead>
<tbody>
<tr>
<td>H21</td>
<td>500 kΩ</td>
<td>±9 kA/m (100 Oe)</td>
</tr>
<tr>
<td>H22</td>
<td>500 kΩ</td>
<td>±16 kA/m (200 Oe)</td>
</tr>
<tr>
<td>H23</td>
<td>500 kΩ</td>
<td>±24 kA/m (300 Oe)</td>
</tr>
<tr>
<td>H24</td>
<td>500 kΩ</td>
<td>±48 kA/m (600 Oe)</td>
</tr>
</tbody>
</table>
Nano-granular TMR type magnetic sensors, **H** series

**Output voltage characteristic**

- The vertical axis shows the differential output (V_{out1}- V_{out2}) at the supply voltage (V_{cc}) of 5 V.
- The magnetic field was applied along the direction of the arrow.

![H21 Circuit Diagram](image1)

![H22, H23, H24 Circuit Diagrams](image2)

**Temperature characteristics (reference data of J-series)**

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Offset voltage V_{off} (25°C) - V_{off} (To°C) (mV)</th>
<th>Output voltage (V_{out}(To°C) - V_{out}(25°C)) / V_{out}(25°C) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>J01 V_{cc}=5 V</td>
<td>J01 V_{cc}=5 V</td>
</tr>
<tr>
<td></td>
<td>H=50 Oe</td>
<td>H=50 Oe</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>+3σ</td>
<td>+3σ</td>
</tr>
<tr>
<td></td>
<td>-3σ</td>
<td>-3σ</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>Ave</td>
<td>Ave</td>
</tr>
</tbody>
</table>

※This catalogue was compiled in July 2013. All items listed in the catalogue are subject to change without any prior notice.

Products listed in this catalogue are manufactured for use in standard applications (eg: household appliances, OA/AV, Telecommunications, measurement instruments). Please do not use the products in critical reliability and security applications (eg: space and aviation, critical-safety transport applications, nuclear power control, medical, life-supporting units and equipment).