# Monolithic Hall Effect ICs

## EM-series

### ASAHI KASEI MICRODEVICES

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## EM-1781

Shipped in packet-tape reel (5000pcs/Reel)

EM-1781 is ultra-small Hall effect ICs of a single silicon chip composed of Hall element and a signal processing IC.

### Operational Characteristics

![Graph showing operational characteristics](image)

### Absolute Maximum Ratings (Ta=25℃)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>VDD</td>
<td>−0.1</td>
<td>6.0</td>
<td>V</td>
</tr>
<tr>
<td>Output Current</td>
<td>IOUT</td>
<td>−0.5</td>
<td>+0.5</td>
<td>mA</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>TSTG</td>
<td>−40</td>
<td>+125</td>
<td>℃</td>
</tr>
</tbody>
</table>

### Recommended Operating Conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>VDD</td>
<td>1.6</td>
<td>1.85</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>Topr</td>
<td>−30</td>
<td>+25</td>
<td>+65</td>
<td>℃</td>
</tr>
</tbody>
</table>

### Magnetic and Electrical Characteristics (Ta=25℃ VDD=1.85V)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Point</td>
<td>BopS</td>
<td>Bop(N)</td>
<td>1.4*</td>
<td>3.0</td>
<td>4.0</td>
<td>mT</td>
</tr>
<tr>
<td>Releasing Point</td>
<td>BrpS</td>
<td>Brp(N)</td>
<td>1.1</td>
<td>2.2</td>
<td>3.7*</td>
<td>mT</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>BNC</td>
<td>BNC(N)</td>
<td>0.3*</td>
<td>0.8</td>
<td>1.5*</td>
<td>mT</td>
</tr>
<tr>
<td>Period</td>
<td>Tp</td>
<td></td>
<td>50</td>
<td>100</td>
<td>ms</td>
<td></td>
</tr>
<tr>
<td>Output High Voltage</td>
<td>VOH</td>
<td></td>
<td>+0.5mA</td>
<td>−0.4</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Output Low Voltage</td>
<td>VOL</td>
<td></td>
<td>+0.5mA</td>
<td></td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>Supply Current</td>
<td>Ico</td>
<td>Average</td>
<td>6.5</td>
<td>9</td>
<td>μA</td>
<td></td>
</tr>
</tbody>
</table>

#### Note

The characteristics with (*) marks are design targets. 1 mT = 10 (Gauss)

### Magnetic Characteristics (Ta=−30～+85℃ VDD=1.85V)

<table>
<thead>
<tr>
<th>Item</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Operating Point</td>
<td>BopS</td>
<td>Bop(N)</td>
<td>1.2</td>
<td>3.0</td>
<td>4.4</td>
<td>mT</td>
</tr>
<tr>
<td>Releasing Point</td>
<td>BrpS</td>
<td>Brp(N)</td>
<td>0.9</td>
<td>2.2</td>
<td>4.1</td>
<td>mT</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>BNC</td>
<td>BNC(N)</td>
<td>0.1</td>
<td>0.8</td>
<td>1.7</td>
<td>mT</td>
</tr>
</tbody>
</table>

#### Note

The above specifications are design targets.

### Application Circuit

![Application Circuit Diagram](image)
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**Package (Unit:mm)**

- Dimension: 2.1 x 1.3 x 0.25 mm
- Sensor center:
  - Distance from pin 1: 0.3 mm
  - Distance from pin 2: 0.25 mm
  - Distance from pin 3: 0.25 mm
  - Distance from pin 4: 0.1 mm

**Supply Voltage**

- Operating range: 0 to 6 V
- Operating temperature: -40 to 100°C

**IDD Pulse Driving (VDD=1.85V)**

- Icc ON (TYP: 1.8mA)
- Icc OFF (TYP: 1.3μA)
- Duration: 50ms (typ.)
- Rise time: 146μs (typ.)

**Temperature Dependence of Bop, Brp**

- BopS
- BrpS
- VDD=1.85V
- BrpN
- BopN

**Function Timing Chart**

- Operating Point Timing
- Releasing Point Timing

This Hall effect IC’s output is held as internal data just before the internal circuit turns OFF (Icc OFF). And after 48.8 μs, the output changes.
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