# MicroPower, Ultra-sensitive Hall Effect Switch

## ❖ GENERAL DESCRIPTION

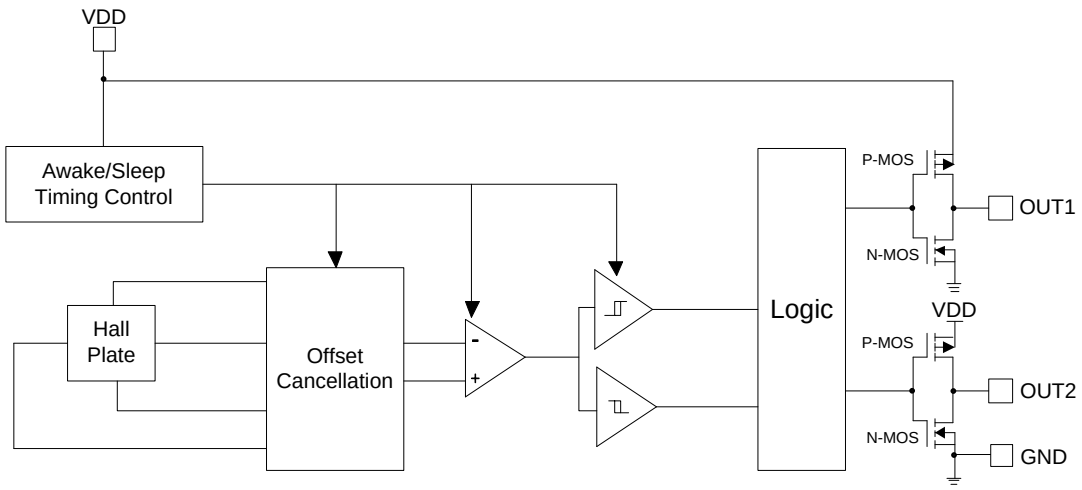
AX8112 is a Hall Effect sensor device with Dual output driver, mainly designed for battery–operation, hand-held equipment (such as Cellular and Cordless Phone, PDA). For AX8112, the total operation power is down to 10uW in the 1.8V supply.

Either north or South Pole of sufficient strength will turn the output on. The output will be turned off under no magnetic field. When the magnetic flux density (B) is larger than operate point (Bop) the output is switched on. The output is turned off when B becomes lower than the release point (Brp). The output will remain off when there is no magnetic field. The AX8112 has two outputs, output one pulls low when switched on and output two is inverted.

## ❖ FEATURES

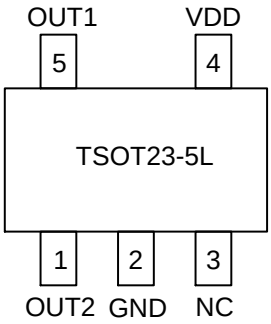
- Micro Power Operation for Battery Applications
- 1.65V to 3.30V battery operation
- Chopper Stabilized Technology
- Operation with North or South Pole
- Good RF noise immunity
- High sensitivity and high stability of the magnetic switching points
- 5-pin Thin TSOT23 Package

## ❖ BLOCK DIAGRAM



## ❖ PIN ASSIGNMET

The packages of AX8112 are TSOT23-5L; the pin assignment is given by:




| Name | Description |
|---|---|
| **VDD** | Power Input |
| **GND** | Ground |
| **OUT1** | Output Pin (active Low) |
| **OUT2** | Output Pin (active High) |

## ❖ ORDER/MARKING INFORMATION

| Order Information | Top Marking |
|---|---|
| **AX8112 XX X**<br>Package Type<br>BT:TSOT23-5L<br>Packing<br>Blank : Bag<br>A : Taping | **HF Y W X** → ID code:internal<br>WW: 01~26 (A~Z)<br>27~52 (a~z)<br>Year: A= 2010<br>1= 2011<br>AX8112 |

## ❖ ABSOLUTE MAXIMUM RATINGS (at $T_A$=25°C)

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| VDD Pin Voltage | $V_{DD}$ | - 0.3 to 4.5V | V |
| Output Pin Voltage | $V_{OUT}$ | - 0.3 to 4.5V | V |
| Output Current | $I_{OUT}$ | ±1 | mA |
| Storage Temperature Range | $T_{ST}$ | -65 to +150 | °C |
| Junction Temperature | $T_J$ | +125 | °C |
| Operating Temperature Range | $T_{OP}$ | -40 to +85 | °C |
| Thermal Resistance from Junction to case | $\theta_{JC}$ | 180 | °C/W |
| Thermal Resistance from Junction to ambient | $\theta_{JA}$ | 250 | °C/W |
| Power Dissipation[PD=( $T_J$-$T_A$ ) / $\theta_{JA}$ ] | PD | 400 | mW |

Note : $\theta_{JA}$ is measured with the PCB copper area of approximately 1 $in^2$(Multi-layer).

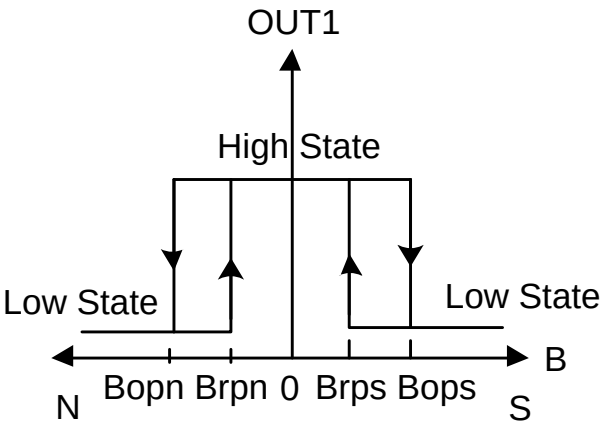
## ❖ ELECTRICAL CHARACTERISTICS ($V_{DD}$ = 1.8V, $T_A$=25°C, unless otherwise specified)

| Characteristics | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | | 1.65 | 1.8 | 3.3 | V |
| Supply Current | $I_{DD}$ | Awake state | - | 1.4 | 3 | mA |
| | | Sleep state | - | 3.6 | 7 | uA |
| | | Average | - | 5 | 10 | uA |
| Output High Voltage | $V_{OH}$ | $I_{OUT}$=0.5mA (Source) | $V_{DD}$-0.2 | - | - | V |
| Output Low Voltage | $V_{OL}$ | $I_{OUT}$=0.5mA (Sink) | - | - | 0.2 | V |
| Output Wake-Up Time | $T_{wake-up}$ | | - | 40 | 80 | us |
| Period | $T_{Period}$ | | - | 40 | 80 | ms |
| Duty Cycle | D.C | | - | 0.1 | - | % |

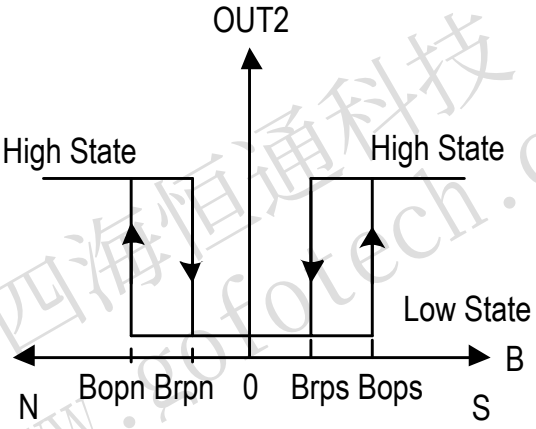
## ❖ MAGNETIC CHARACTERISTICS ($V_{DD}$ = 1.8V, $T_A$=25°C, unless otherwise specified)

| Characteristics | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Operating Points | $B_{OPS}$ | | - | 30 | 42 | Gauss |
| | $B_{OPN}$ | | -42 | -30 | - | |
| Release Points | $B_{RPS}$ | | 10 | 20 | - | |
| | $B_{RPN}$ | | - | -20 | -10 | |
| Hysteresis | $B_{Hys}$ | | - | 10 | - | |

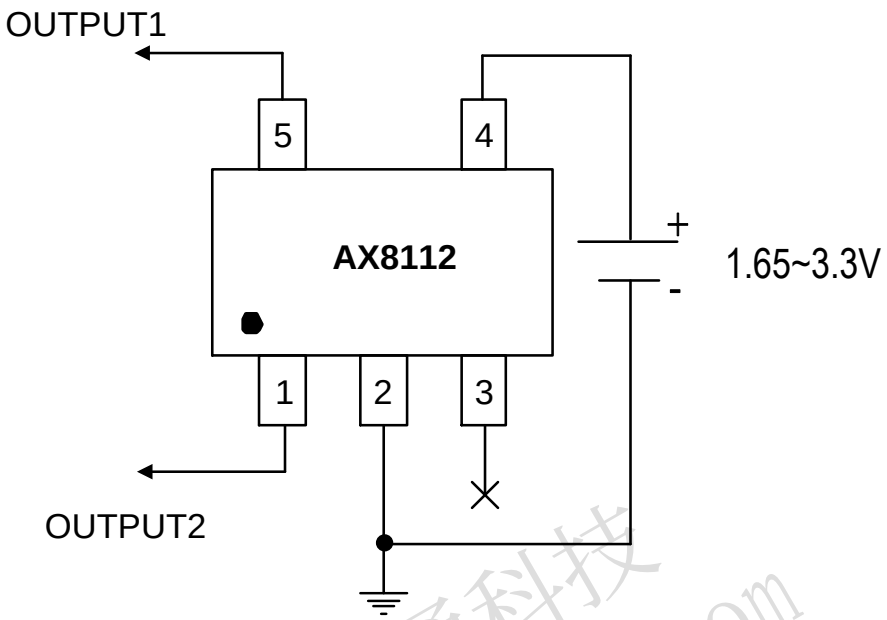
1. OUT1:



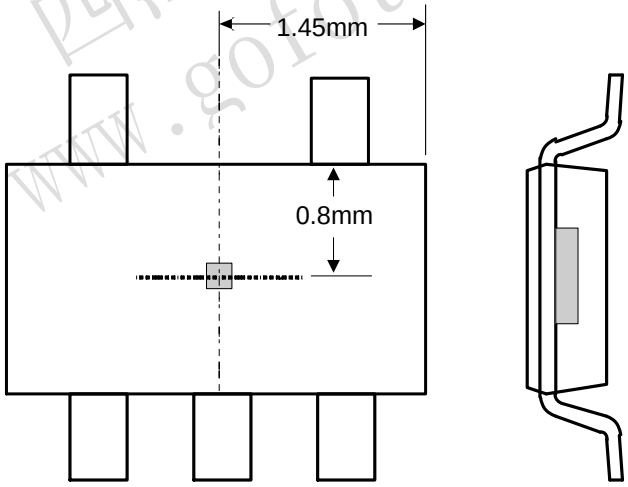

2. OUT2:



## ❖ APPLICATION CIRCUIT

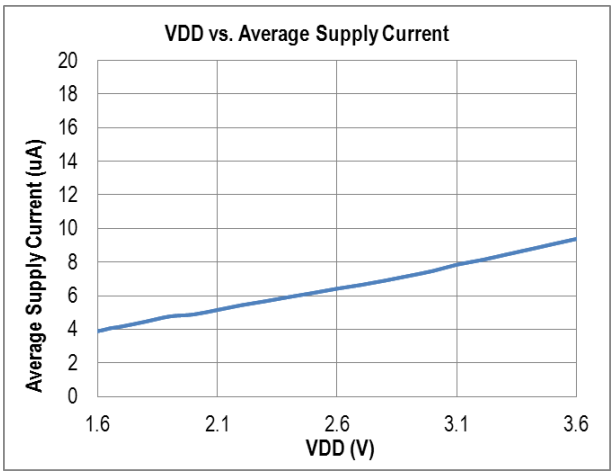


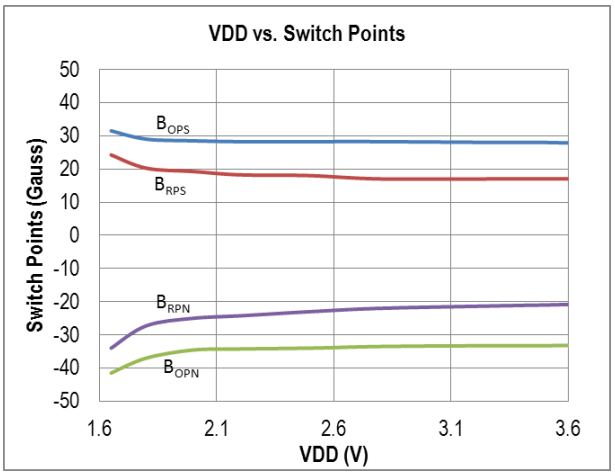

## ❖ SENSOR LOCATION

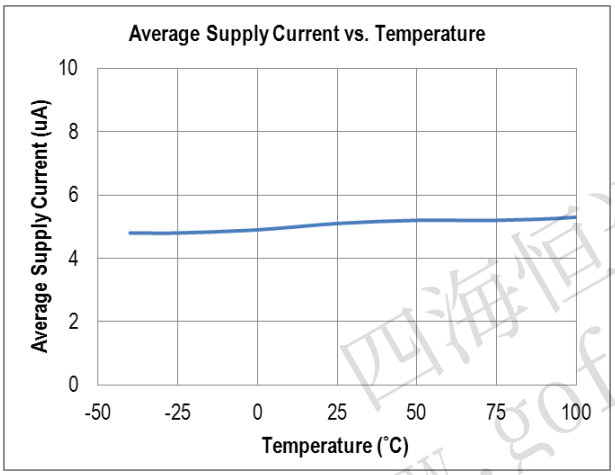


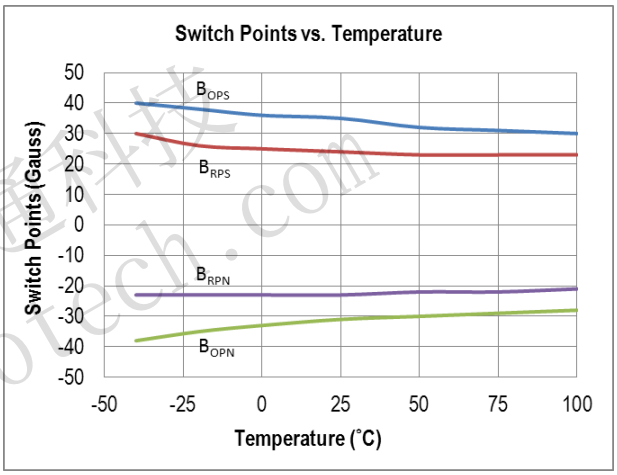

Top view

## ❖ TYPICAL CHARACTERISTICS

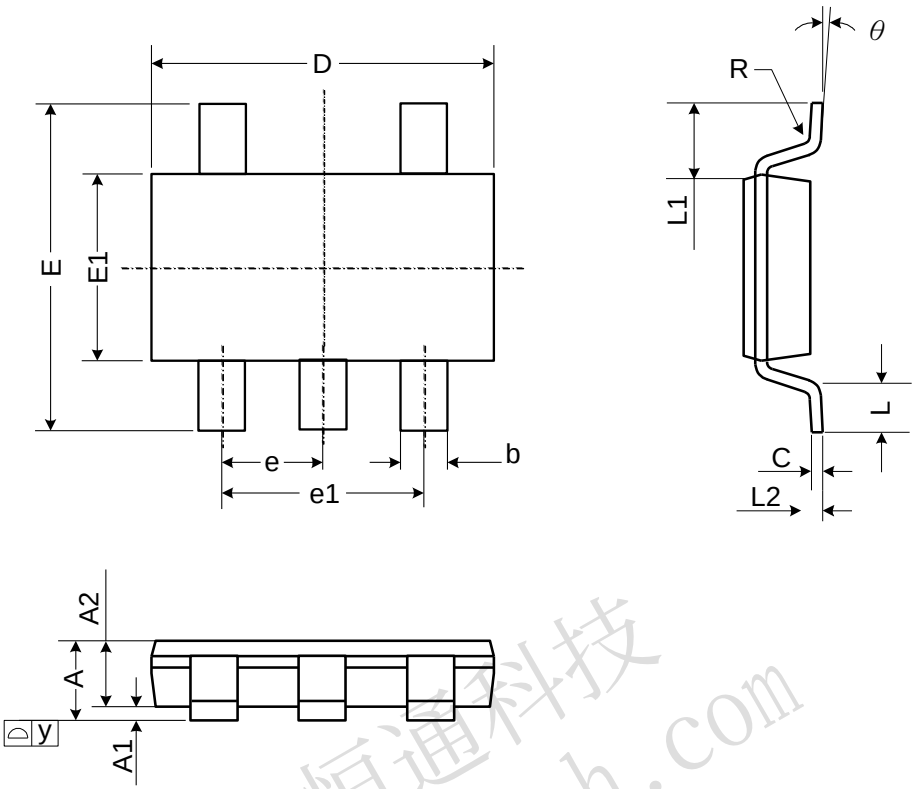


## ❖ PACKAGE OUTLINES




| Symbol | Dimensions in Millimeters | | | Dimensions in Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Nom. | Max. | Min. | Nom. | Max. |
| A | - | - | 1.10 | - | - | 0.043 |
| A1 | 0.00 | - | 0.10 | 0 | - | 0.004 |
| A2 | 0.70 | 0.90 | 1.00 | 0.028 | 0.035 | 0.039 |
| b | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| C | 0.08 | 0.14 | 0.20 | 0.003 | 0.006 | 0.008 |
| D | 2.80 | 2.90 | 3.00 | 0.110 | 0.114 | 0.118 |
| E | 2.60 | 2.80 | 3.00 | 0.102 | 0.110 | 0.118 |
| E1 | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| e | 0.95 BSC. | | | 0.037 BSC. | | |
| e1 | 1.90 BSC. | | | 0.075 BSC. | | |
| L | 0.30 | 0.45 | 0.60 | 0.012 | 0.018 | 0.024 |
| L1 | 0.60 REF. | | | 0.024 REF. | | |
| L2 | 0.25 BSC. | | | 0.010 BSC. | | |
| y | - | - | 0.10 | - | - | 0.004 |
| R | 0.10 | - | - | 0.004 | - | - |
| θ | 0° | - | 8° | 0° | - | 8° |

JECED outline: MO-193 AB