

MicroPower, Ultra-sensitive Hall Effect Switch

❖ GENERAL DESCRIPTION

AX8113 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 AX8113, 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.

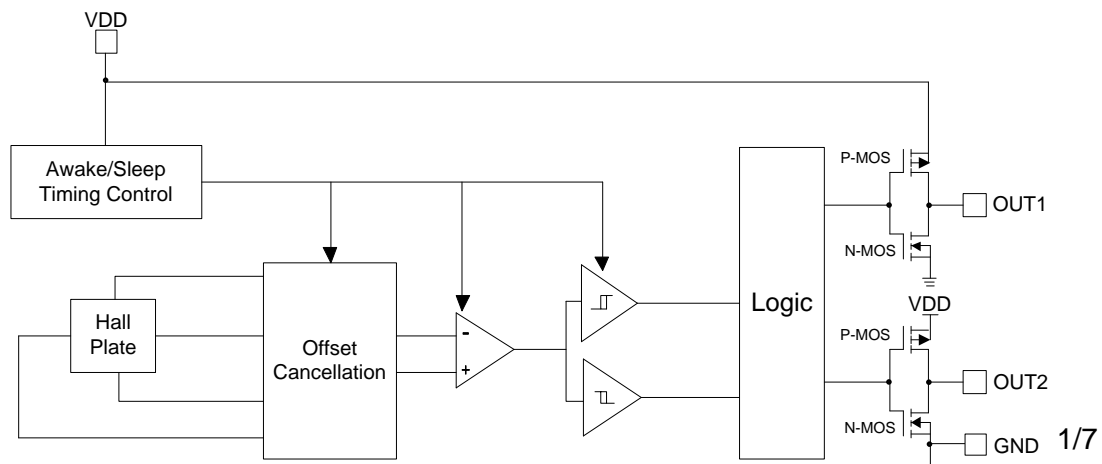
While the magnetic flux density (B) is larger than operate point B_{OPS} (South Pole), the OUT1 will be turned on (low), the OUT1 is held until B is lower than release point B_{RPS} (South Pole), then turned off (high).

While the magnetic flux density (B) is larger than operate point B_{OPN} (North Pole), the OUT2 will be turned on (low), the output is held until B is lower than release point B_{RPN} (North Pole), then turned off (high).

❖ FEATURES

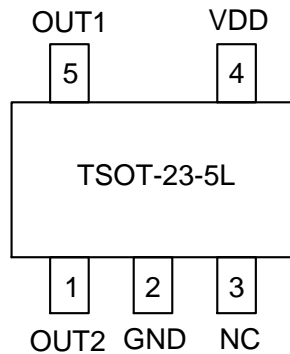
- Micro Power Operation for Battery Applications
- 1.65V to 3.30V battery operation
- Chopper Stabilized Technology
- Operation with South Pole (OUT1) or North Pole (OUT2)
- Good RF noise immunity
- High sensitivity and high stability of the magnetic switching points
- 5-pin Thin TSOT-23 Package

❖ BLOCK DIAGRAM



❖ PIN ASSIGNMET

The packages of AX8113 are TSOT-23-5L; the pin assignment is given by:



| Name | Description |
|------|-----------------------------------|
| VDD | Power Input |
| GND | Ground |
| OUT1 | Output Pin (active Low in S-Pole) |
| OUT2 | Output Pin (active Low in N-Pole) |

❖ ORDER/MARKING INFORMATION

| Order Information | Top Marking |
|--|--|
| <p>AX8113 XX X</p> <p>Package Type: BT:TSOT-23-5L Packing: Blank : Bag, A : Taping</p> | <p>HGY WX</p> <p>AX8113</p> <p>→ ID code:internal → WW: 01~26 (A~Z), 27~52 (a~z) → Year: A= 2010, 1= 2011</p> |

❖ 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 | θ _{JC} | 180 | °C/W |
| Thermal Resistance from Junction to ambient | θ _{JA} | 250 | °C/W |
| Power Dissipation[PD=(T _J -T _A) / θ _{JA}] | PD | 400 | mW |

Note : θ_{JA} is measured with the PCB copper area of approximately 1 in²(Multi-layer).

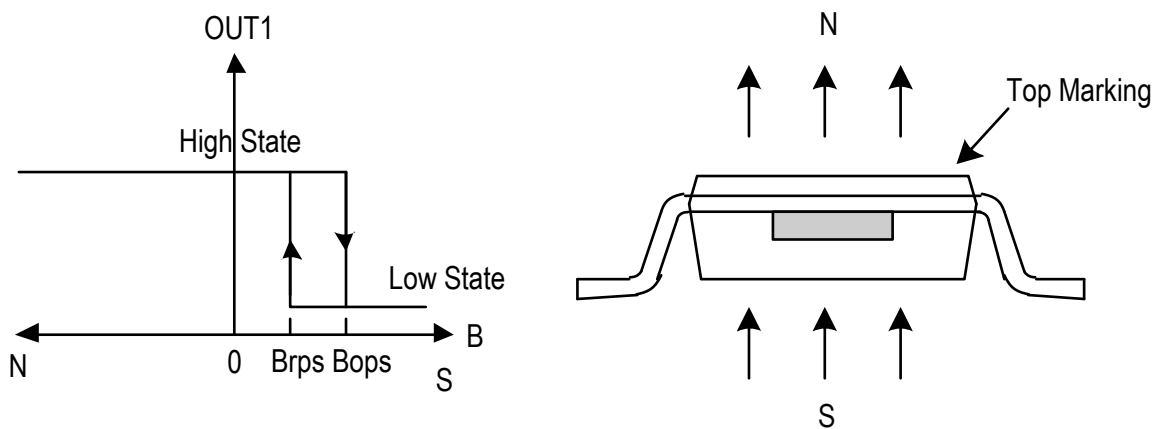
❖ ELECTRICAL CHARACTERISTICS ($V_{DD} = 1.8V$, $T_A=25^{\circ}C$, unless otherwise specified)

| 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 | μA |
| | | Average | - | 5 | 10 | μA |
| 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 | μs |
| Period | T_{Period} | | - | 40 | 80 | ms |
| Duty Cycle | D.C | | - | 0.1 | - | % |

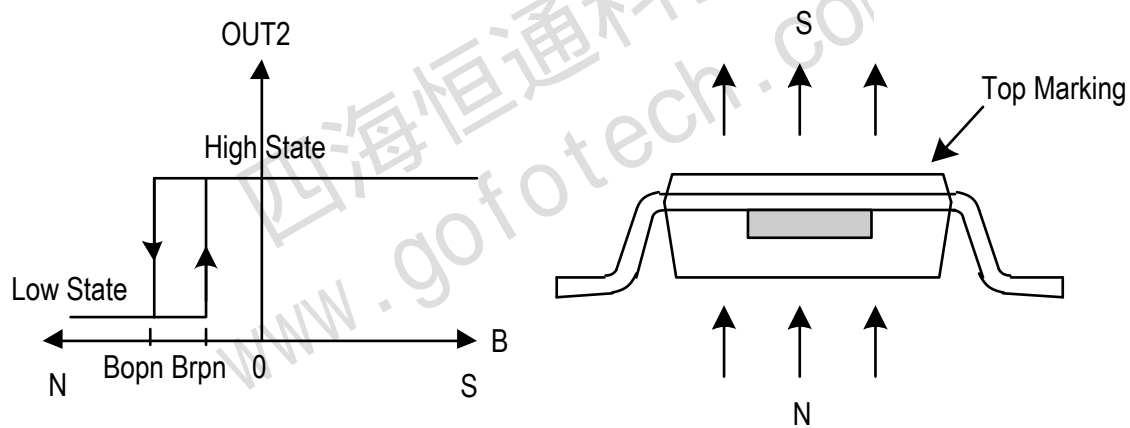
❖ MAGNETIC CHARACTERISTICS ($V_{DD} = 1.8V$, $T_A=25^{\circ}C$, unless otherwise specified)

| 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 | - | |

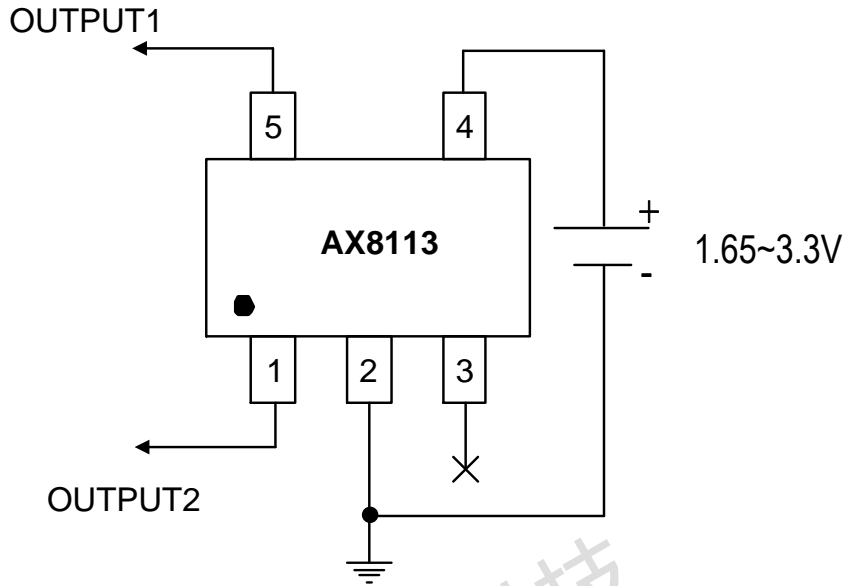
1. OUT1:



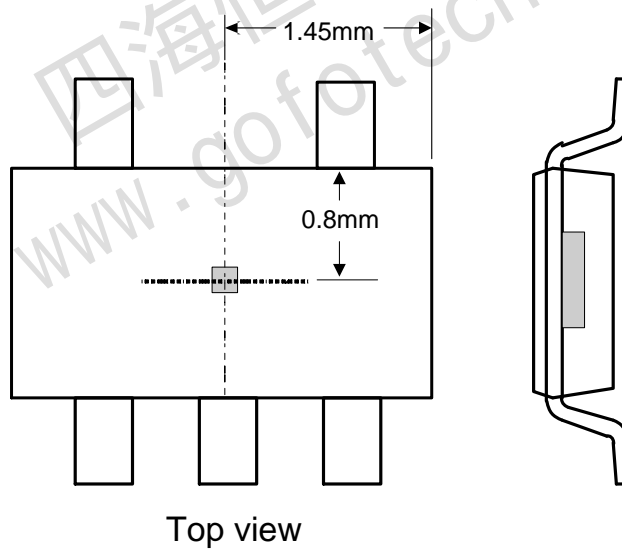
2. OUT2:



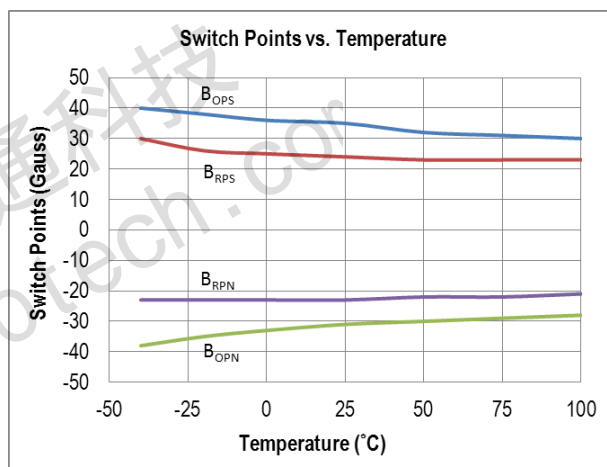
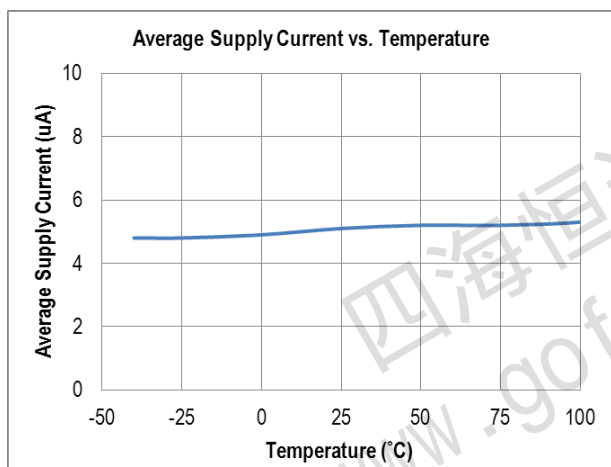
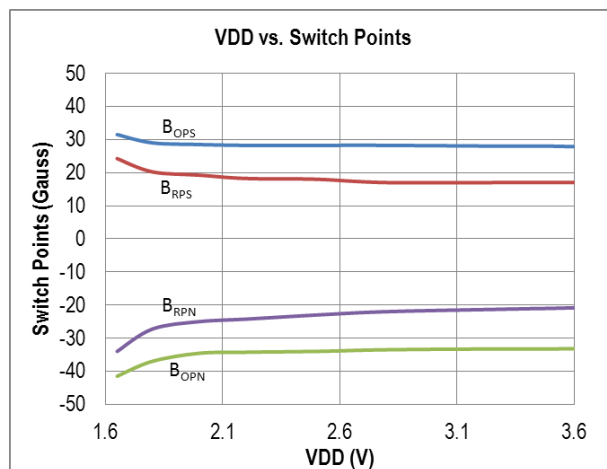
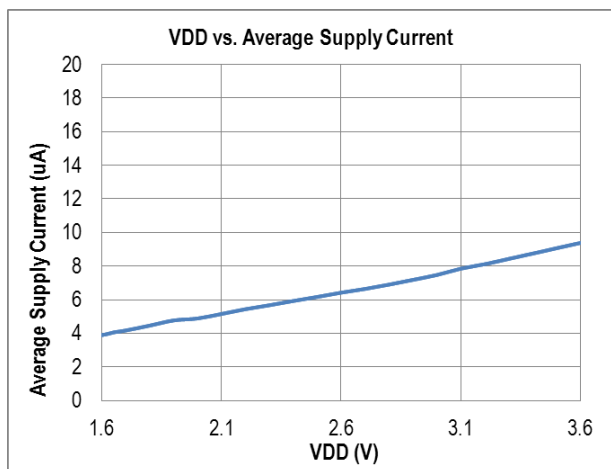
❖ APPLICATION CIRCUIT



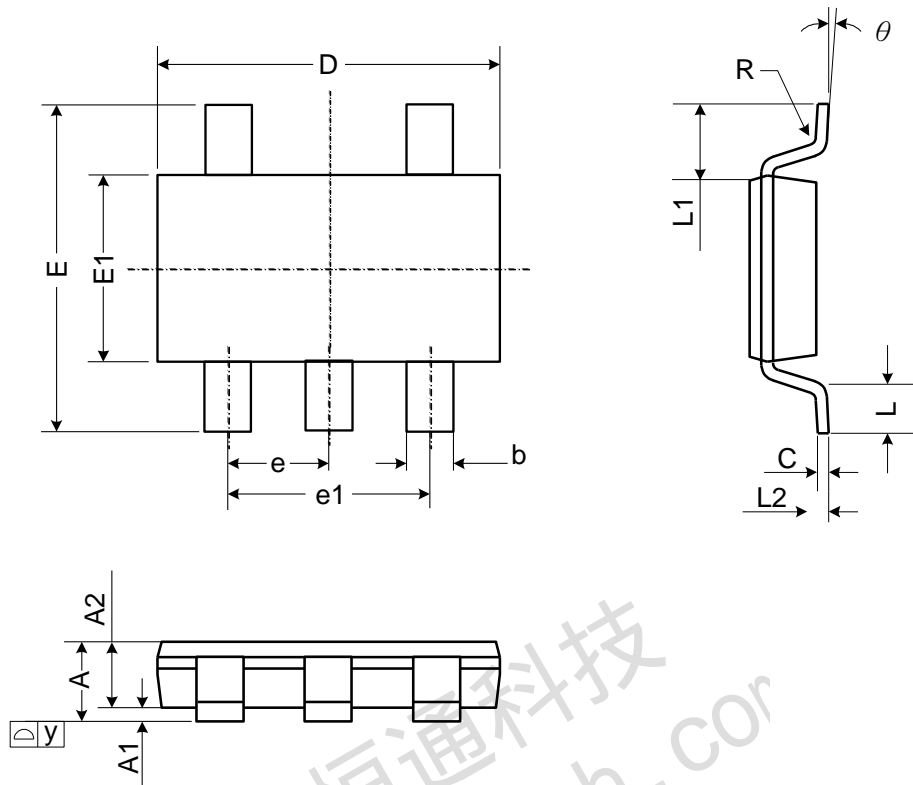
❖ SENSOR LOCATION



❖ 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