# AH1802

## MICROPOWER, ULTRA-SENSITIVE OMNIPOLAR HALL-EFFECT SENSOR SWITCH

## Features

- Micropower operation
- Operation with magnetic field of either north or south pole (omnipolar)
- 2.5V to 5.5V battery operation
- Chopper stabilized
  - Superior temperature stability
  - Extremely Low Switch-Point Drift
  - Insensitive to Physical Stress
- Good RF noise immunity
- -40°C to 85°C operating temperature
- SC59/Low profile DFN2020-6 package
- ESD (HBM) > 5KV for DFN2020-6
  > 6KV for SC59
- SC59 (commonly known as SOT23 in Asia) and DFN2020-6: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/RoHS Compliant (Note 1)

## General Description

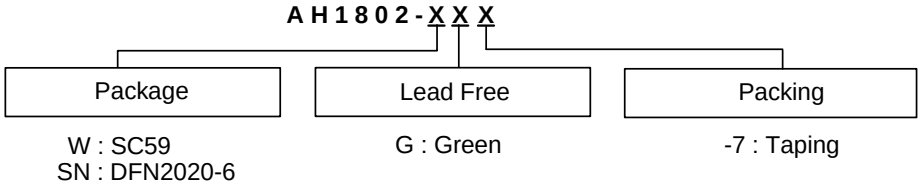
AH1802 is comprised of two Hall effect plates and an open-drain output driver, mainly designed for battery-operation, hand-held equipment (such as Cellular and Cordless Phone, PDA). The total power consumption in normal operation is typically 24 W with a 3V power source.

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 operating point **(Bop)**, the output will be turned on (low), the output is held until **B** is lower than release point **(Brp),** then turned off.

## Applications

- Cover switch in clam-shell cellular phones
- Cover switch in Notebook PC/PDA
- Contact-less switch in consumer products

## Ordering Information




Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

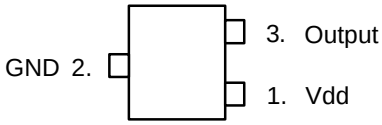
| Device | Package Code | Packaging (Note 2) | 7" Tape and Reel | |
|---|---|---|---|---|
| | | | Quantity | Part Number Suffix |
| AH1802-W | W | SC59 | 3000/Tape & Reel | -7 |
| AH1802-SN | SN | DFN2020-6 | 3000/Tape & Reel | -7 |

Note: 2. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

## Pin Assignment

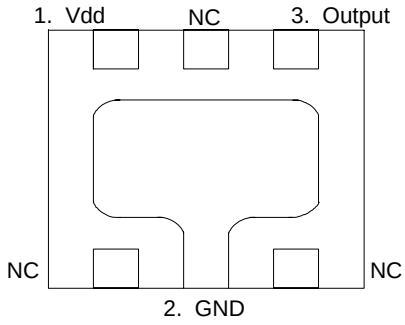
**(1) SC59**

**( Top View )**




**(2) DFN2020-6**

**( Bottom view )**

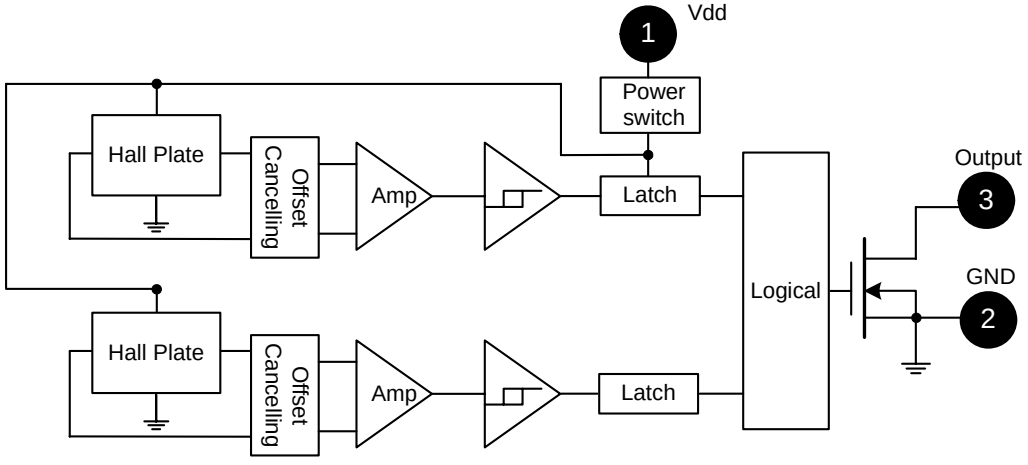



Note: 3. NC is "No Connection" which is recommended to be tied to ground.

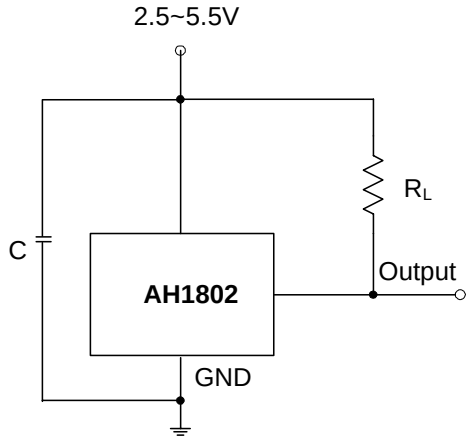
## Pin Descriptions

| Name | P/I/O | Pin # | Description |
|---|---|---|---|
| Vdd | P/I | 1 | Power Supply Input |
| GND | P/I | 2 | Ground |
| Output | O | 3 | Output Pin |

## Block Diagram



## Typical Circuit




Note: 4. C is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF~100nF.

## Absolute Maximum Ratings (at $T_A$ = 25°C)

| Symbol | Characteristics | | Values | Unit |
|---|---|---|---|---|
| Vdd | Supply voltage | | 7 | V |
| B | Magnetic flux density | | Unlimited | |
| $T_A$ | Operating Temperature Range | | -40 to +85 | °C |
| $T_S$ | Storage Temperature Range | | -65 to +150 | °C |
| $P_D$ | Package Power Dissipation | SC59 | 230 | mW |
| | | DFN2020-6 | | |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |

## Recommended Operating Conditions ( $T_A$ = 25°C )

| Symbol | Parameter | Conditions | Rating | Unit |
|---|---|---|---|---|
| Vdd | Supply Voltage | Operating | 2.5~5.5 | V |

## Electrical Characteristics ( $T_A$ = +25°C, Vdd = 3V; unless otherwise specified)

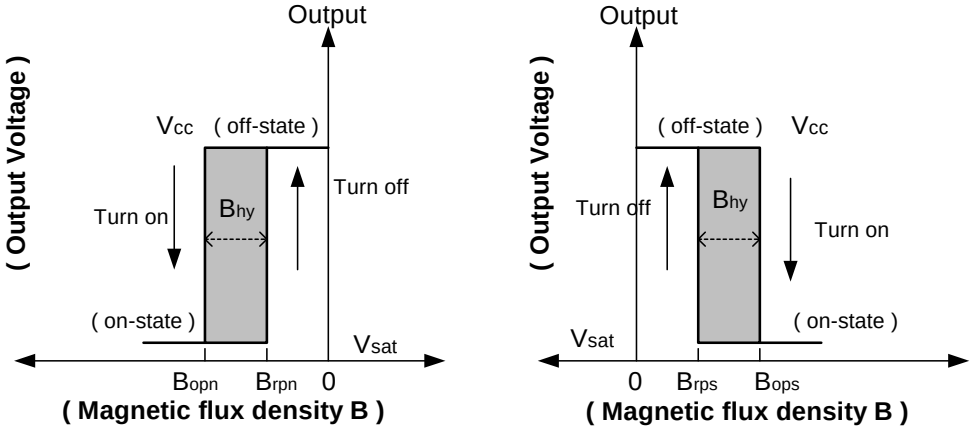
| Symbol | Characteristic | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Vout | Output On Voltage | Iout = 1mA | - | 0.1 | 0.3 | V |
| Ioff | Output Leakage Current | Vout = 5.5V, Output off | - | <0.1 | 1 | μA |
| Idd(en) | Supply Current | Chip enable, $T_A$ = 25°C, Vdd = 3V | - | 3 | 6 | mA |
| | | Chip enable, $T_A$ = -40~85°C, Vdd = 2.5~5.5V | - | 3 | 9 | mA |
| Idd(dis) | | Chip disable, $T_A$ = 25°C, Vdd = 3V | - | 5 | 10 | μA |
| | | Chip disable, $T_A$ = -40~85°C, Vdd = 2.5~5.5V | - | 5 | 14 | μA |
| Idd(avg) | | Average supply current, $T_A$ = 25°C, Vdd = 3V | - | 8 | 16 | μA |
| | | Average supply current, $T_A$ = -40~85°C, Vdd = 2.5~5.5V | - | 8 | 23 | μA |
| Tawake | Awake Time | | - | 75 | 125 | μs |
| Tperiod | Period | | - | 75 | 125 | ms |
| D.C. | Duty Cycle | | - | 0.1 | - | % |

## Magnetic Characteristics ($T_A$ = 25°C, Vdd = 3V, Note 5,6)

(1mT=10 Gauss)

| Symbol | Characteristic | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Bops(south pole to brand side) | Operate Point | 20 | 28 | 40 | Gauss |
| Bopn(north pole to brand side) | | -40 | -28 | -20 | |
| Brps(south pole to brand side) | Release Point | 10 | 20 | - | |
| Brpn(north pole to brand side) | | - | -20 | -10 | |
| Bhy( $\lvert Bopx - Brpx \rvert$ ) | Hysteresis | 5 | 8 | - | |

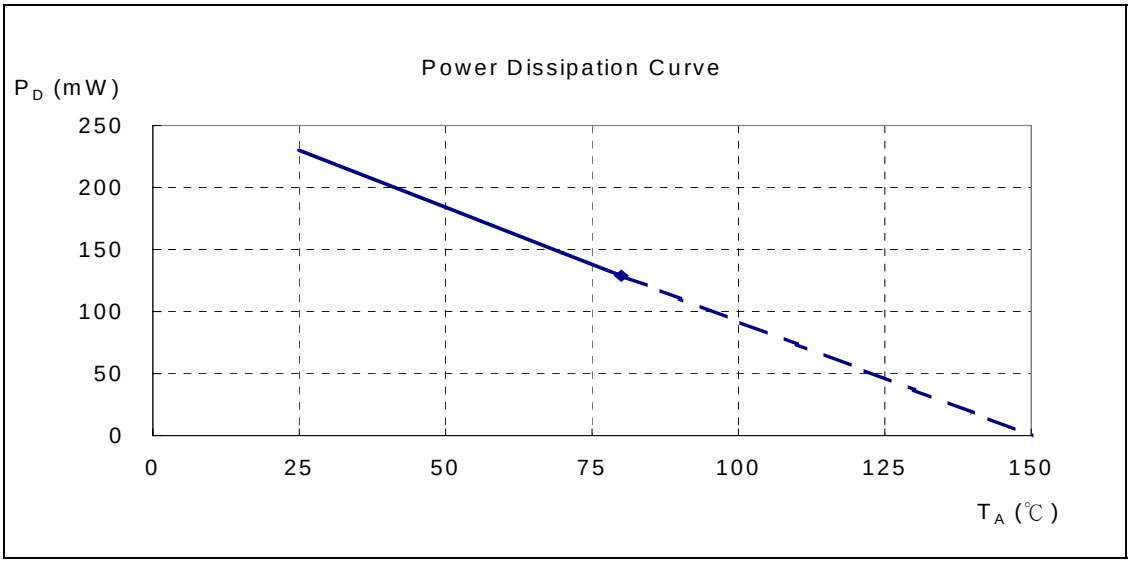
Note: 5. Typical data is at $T_A$ = 25°C, Vdd = 3V, and for design information only.
6. Operating point and release point will vary with supply voltage and operating temperature.



## Performance Characteristics

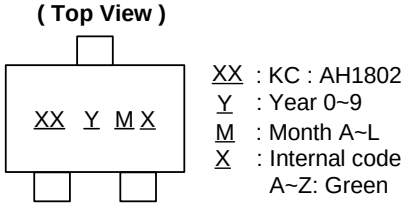
**(1) SC59 and DFN2020-6**

| $T_A$ (°C) | 25 | 50 | 60 | 70 | 80 | 85 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $P_D$ (mW) | 230 | 184 | 166 | 147 | 129 | 120 | 110 | 92 | 74 | 55 | 37 | 18 | 0 |

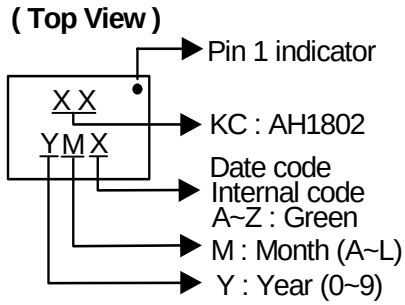



## Marking Information

**(1) SC59**




**(2) DFN2020-6**

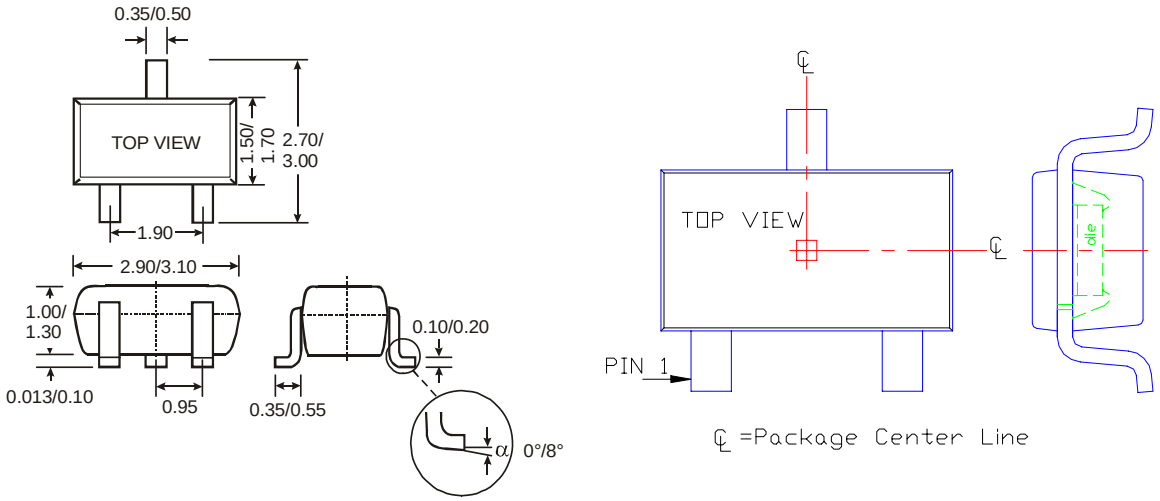



| Part Number | Package | Identification Code |
|---|---|---|
| AH1802 | SC59 | KC |

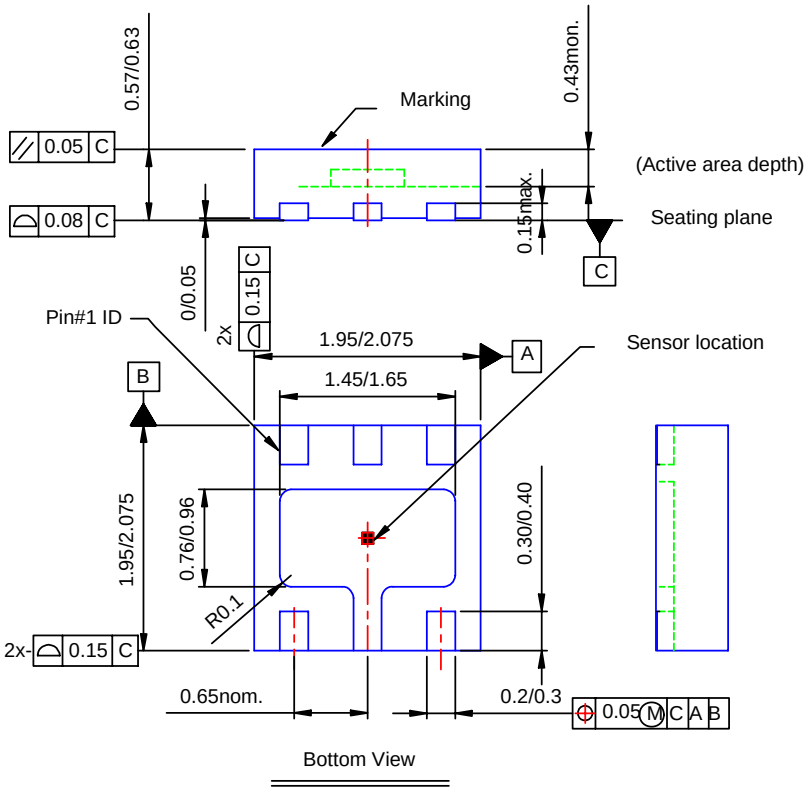
| Part Number | Package | Identification Code |
|---|---|---|
| AH1802 | DFN2020-6 | KC |

## Package Information (unit: mm)

### (1) SC59 (commonly known as SOT23 in Asia)




### (2) DFN2020-6



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