

## Description

AH1801 is a Micropower, Ultra-sensitive Hall Effect Switch, which is with two Hall effect plates and a output driver, mainly designed for battery-operation, hand-held equipment (such as Cellular and Cordless Phone, PDA). The total operation power is down to 24 $\mu$ W in the 3V supply.

Either north or south pole of sufficient strength will turn the output off. The output will be turned on under no magnetic field.

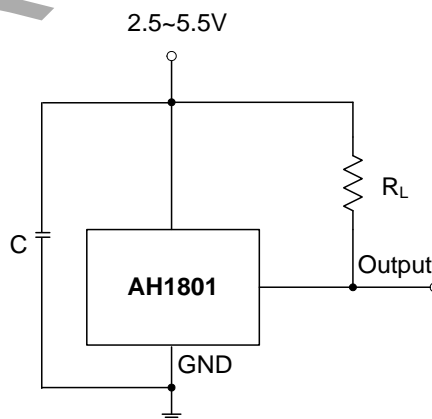
While the magnetic flux density (**B**) is larger than operate point (**Bop**), the output will be turned off, the output is held until **B** is lower than release point (**Brp**), then turned on.

## Features

- Micropower Operation
- Operation with North or South Pole
- 2.5V to 5.5V Battery Operation
- Inverted Output-on with Magnet Present
- 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
- Low Profile 3 Pin SC59 (Commonly Known as SOT23 in Asia) and DFN2020-3, DFN2020-6 Packages
- ESD (HBM) > 5KV for DFN2020-3 and DFN2020-6  
> 6KV for SC59
- SC59, DFN2020-3 and DFN2020-6: Available in "Green" Molding Compound (No Br, Sb)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

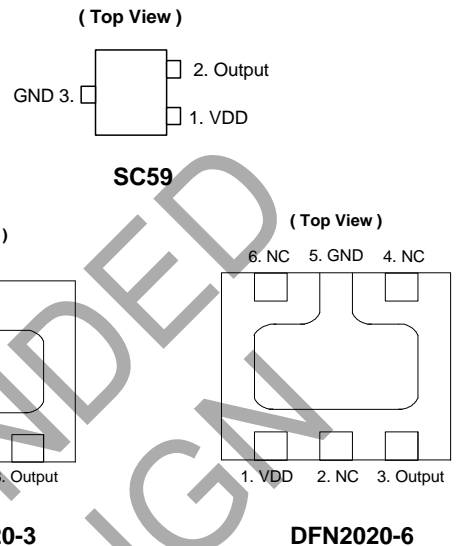
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Typical Applications Circuit



- Notes:
4. C is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF to 100nF. RL is the pull-up resistor, the recommended resistance is 10K $\Omega$  to 100K $\Omega$ .

## Pin Assignments



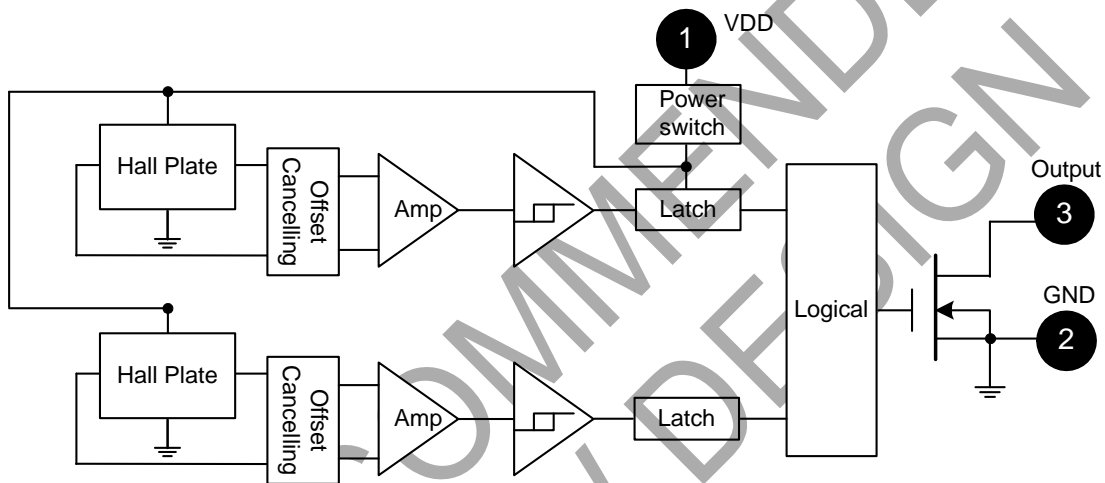
## Applications

- Cellular Phone
- PDA
- Cordless Phone

## Pin Descriptions

Pin Name	P/I/O	Description
VDD	P/I	Power Supply Input
GND	P/I	Ground
Output	O	Output Pin
NC		No Connected

## Functional Block Diagram



## Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Parameter	Rating	Unit
V <sub>DD</sub>	Supply Voltage	7	V
B	Magnetic Flux Density	Unlimited	
T <sub>S</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Package Power Dissipation	SC59	mW
		DFN2020-3	
		DFN2020-6	
T <sub>J</sub>	Maximum Junction Temperature	+150	°C

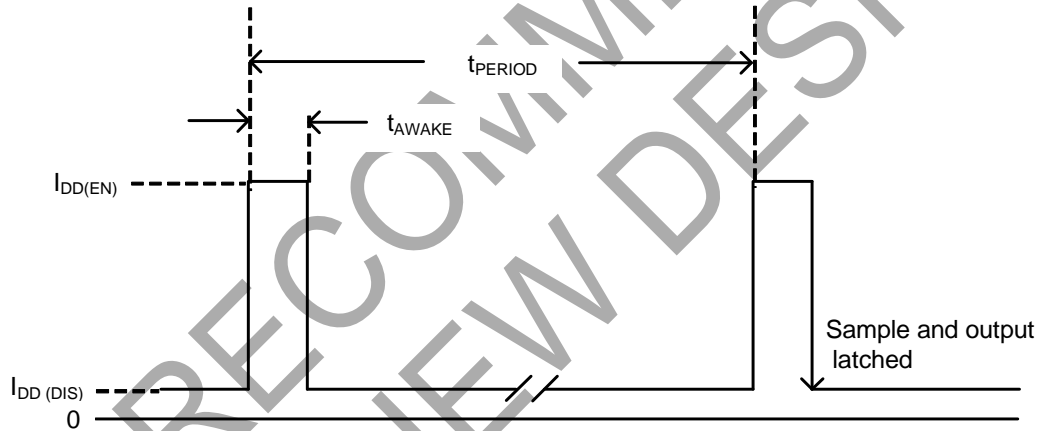
## Recommended Operating Conditions (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Rating	Unit
V <sub>DD</sub>	Supply Voltage	Operating	2.5 to 5.5	V
T <sub>A</sub>	Operating Temperature Range	Operating	-40 to +85	°C

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$ , unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{OUT}$	Output On Voltage	$I_{OUT} = 1\text{mA}$	-	0.1	0.3	V
$I_{OFF}$	Output Leakage Current	$V_{OUT} = 5.5\text{V}$ , Output off	-	<0.1	1	$\mu\text{A}$
$I_{DD(EN)}$	Supply Current	Chip enable, $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$	-	3	6	mA
		Chip enable, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{DD} = 2.5\text{V}$ to $5.5\text{V}$	-	3	9	mA
$I_{DD(DIS)}$		Chip disable, $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$	-	5	10	$\mu\text{A}$
		Chip disable, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{DD} = 2.5\text{V}$ to $5.5\text{V}$	-	5	18	$\mu\text{A}$
$I_{DD(AVG)}$		Average supply current, $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$	-	8	16	$\mu\text{A}$
	Average supply current, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{DD} = 2.5$ to $5.5\text{V}$	-	8	27	$\mu\text{A}$	
$t_{AWAKE}$	Awake Time	(Note 5)	-	75	150	$\mu\text{s}$
$t_{PERIOD}$	Period	(Note 5)	-	75	150	ms
D.C.	Duty Cycle		-	0.1	-	%

Notes: 5. When power is initially on, the operating  $V_{DD}$  (2.5V to 5.5V) must be applied to be guaranteed for the output sampling. The output state is valid after the second operating phase (typical 150ms).

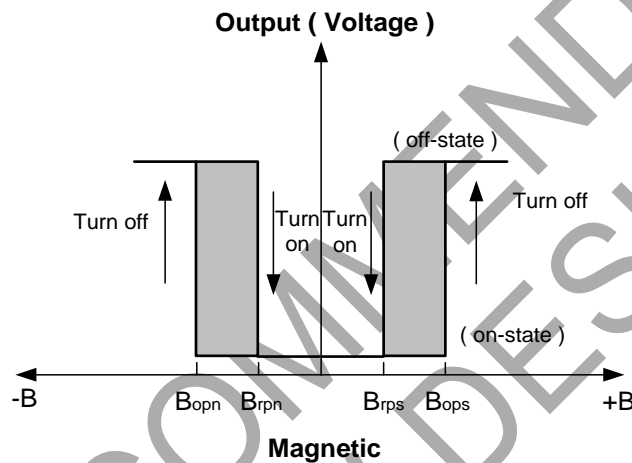


**Magnetic Characteristics** (@ $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$ , unless otherwise specified.)

(1mT=10 Gauss)

Symbol	Characteristic	Min	Typ	Max	Unit
Bops(south pole to brand side)	Operate Point	-	40	60	Gauss
Bopn(north pole to brand side)		-60	-40	-	
Brps(south pole to brand side)	Release Point	10	30	-	
Brpn(north pole to brand side)		-	-30	-10	
Bhy( Bopx - Brpx )	Hysteresis	-	10	-	

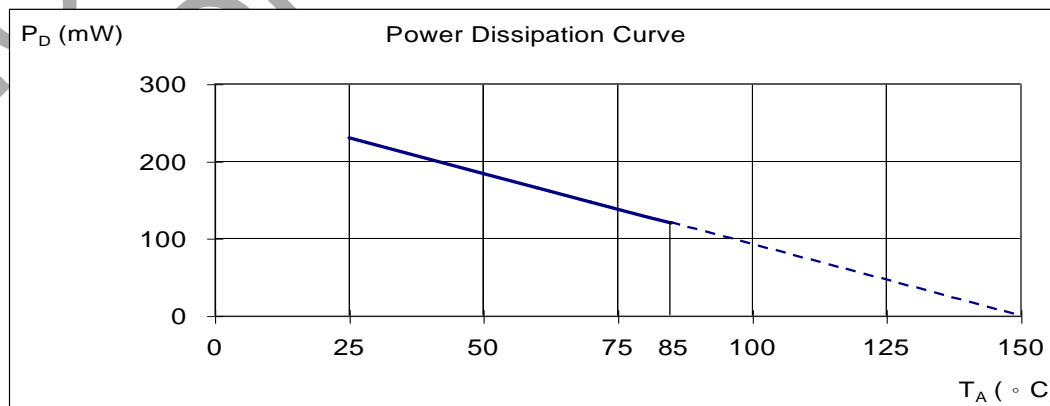
Notes: 6. Typical data is at  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$ , and for design information only.  
7. Operate point and release point will vary with supply voltage and operating temperature.



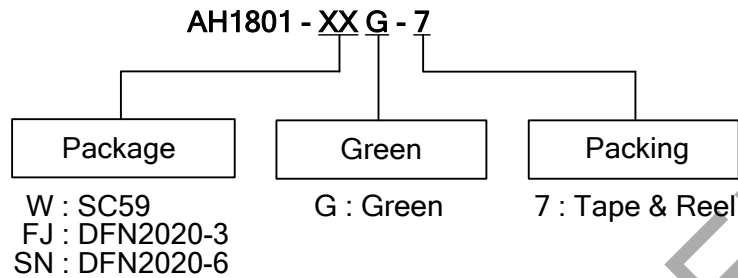
**Performance Characteristics**

(1) SC59 / DFN2020-3 / 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



## Ordering Information



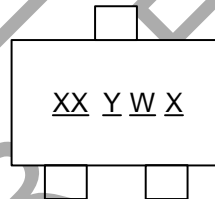
Part Number	Status (Note 9)	Package Code	Packaging (Note 8)	7" Tape and Reel	
				Quantity	Part Number Suffix
AH1801-WG-7	NRND	W	SC59	3000/Tape & Reel	-7
AH1801-FJG-7	NRND	FJ	DFN2020-3	3000/Tape & Reel	-7
AH1801-SNG-7	NRND	SN	DFN2020-6	3000/Tape & Reel	-7

Notes: 8. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.  
9. NRND = Not Recommended for New Design

## Marking Information

(1) SC59

( Top View )



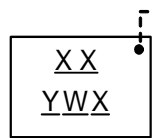
XX : Identification code  
Y : Year 0~9  
W : Week : A~Z : 1~26 week;  
a~z : 27~52 week; z represents 52 and 53 week  
X : A~Z : Green

Part Number	Package	Identification Code
AH1801	SC59	KB

**Marking Information** (Cont.)

(2) DFN2020-3

( Top View )

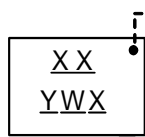


Pin 1 indicator  
XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week; z represents  
           52 and 53 week  
X : A~Z : Green

Part Number	Package	Identification Code
AH1801	DFN2020-3	K1

(3) DFN2020-6

( Top View )



Pin 1 indicator  
XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week; z represents  
           52 and 53 week  
X : A~Z : Green

Part Number	Package	Identification Code
AH1801	DFN2020-6	KB

NOT RECOMMENDED FOR NEW DESIGN

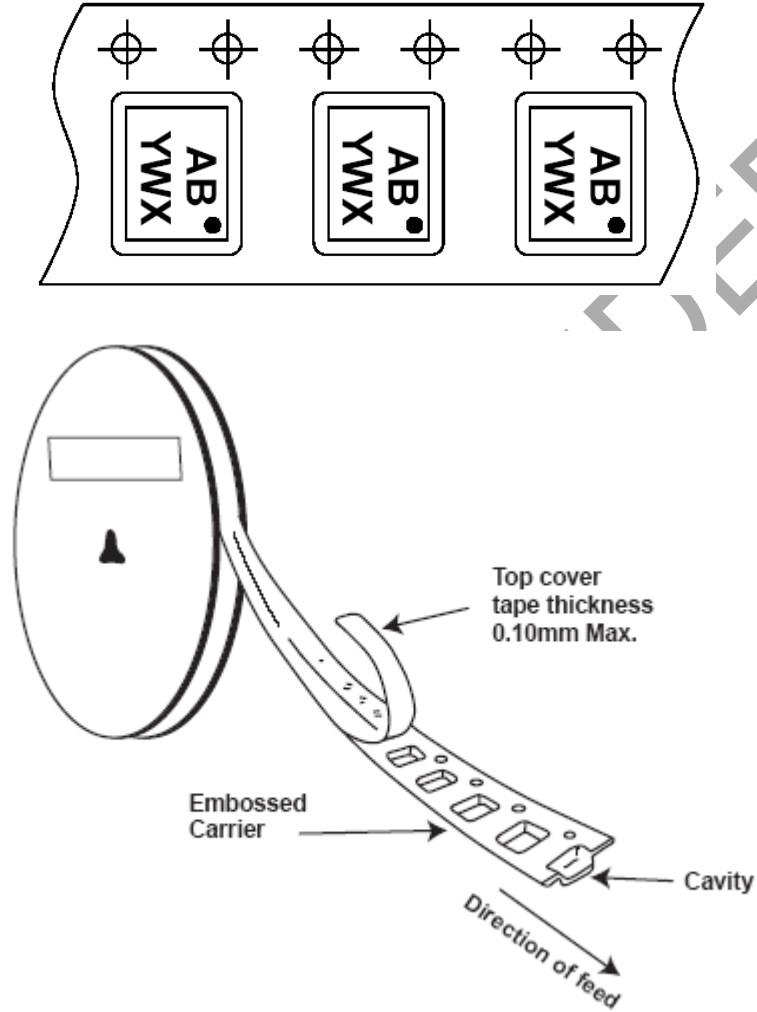






## Taping Orientation

(1) DFN2020-3 and DFN2020-6



Notes: 10. The taping orientation of the other package type can be found on our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**IMPORTANT NOTICE**

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

**LIFE SUPPORT**

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2018, Diodes Incorporated

[www.diodes.com](http://www.diodes.com)