AH1804

MICROPOWER OMNIPOLAR HALL EFFECT SENSORSWITCH

NEW PRODUCT

Description

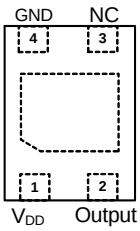
The AH1804 is a micropower Omnipolar Hall effect switch IC with a single output driver with internal pull up and pull down capability. Designed for portable and battery powered equipment such as cellular phones and portable PCs the average supply current is only 12µA at 3.3V. To support battery powered equipment the AH1804 can operate over the supply range of 2.5V to 3.6V and uses a hibernating clocking system to minimize the power consumption.

The output is activated with either a north or south pole of sufficient strength. When the magnetic flux density **(B)** is larger than operate point **(Bop)**, the output will be turned on (pulled low) and held until **B** is lower than release point **(Brp)**.

The AH1804 is available in SC59 and small low profile DFN1216-4 packages.

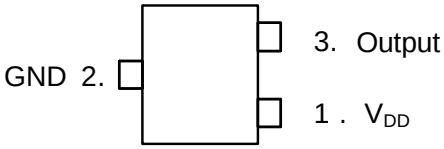
Pin Assignments

(Top View)



DFN1216-4

(Top View)



SC59

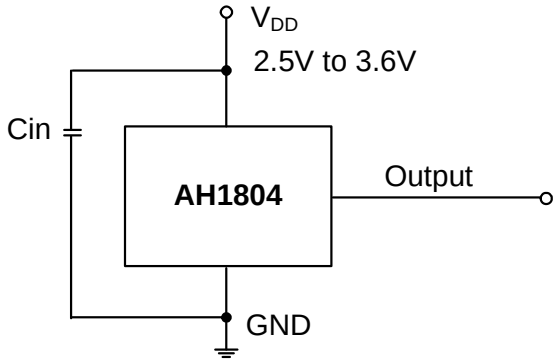
Features

- Omnipolar operation (North or South pole)
- Low supply voltage 2.5V to 3.6V
- Micropower operation
- No external pull up resistors required
- Chopper stabilized design
  - o Superior temperature stability
  - o Extremely Low Switch-Point Drift
  - o Insensitive to Physical Stress
- Good RF noise immunity
- -40°C to 85°C operating temperature
- Small low profile DFN1216-4 and SC59 packages
- ESD (HBM) > 5KV
- "Green" Molding Compound

Applications

- Cover switch in clam-shell and slide cellular phones
- Cover switch in portable PC's, Tablets and PDA
- Display screen open/close detect in Digital camcorders
- Contact-less switch in portable battery powered consumer and industrial products

Typical Application Circuit



Note: Cin is for power stabilization and to strengthen the noise immunity, C = 100nF or higher must be used.

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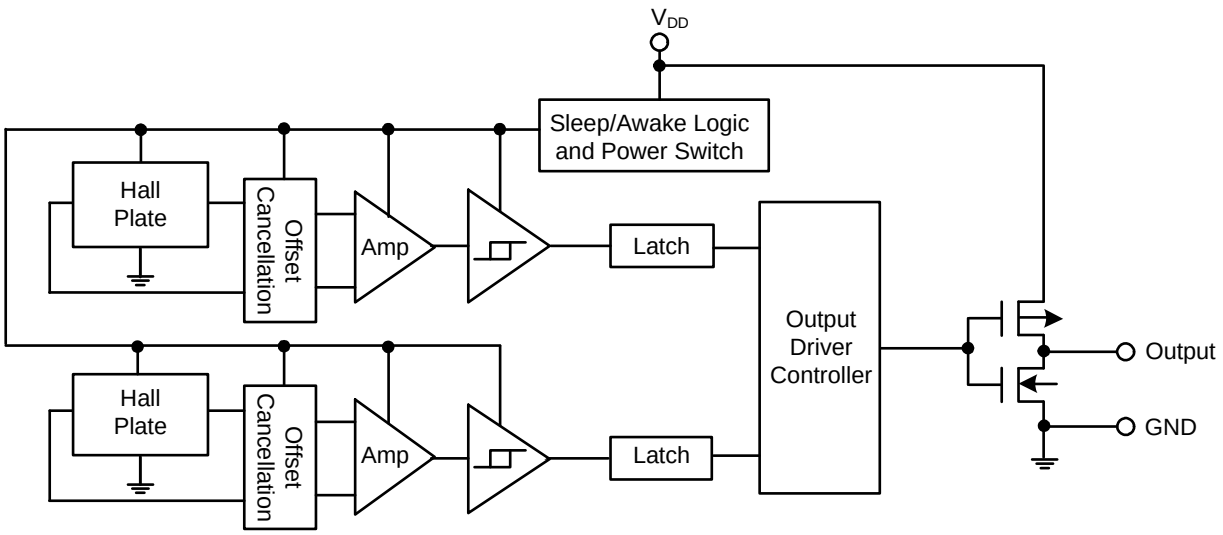
Pin Descriptions

Pin Name	P/I/O	Description
V_{DD}	P/I	Power Supply Input
GND	P/I	Ground
Output	O	Output Pin
NC	NC	No Connection (Note 1)

Notes: 1. NC is "No Connection" which is not connected internally. This pin can be left open or tied to ground.

Functional Block Diagram



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Absolute Maximum Ratings (T_A = 25°C, Note 2)

Symbol	Characteristics		Values	Unit
V_{DD}	Supply voltage (Note 3)		5.0	V
$V_{DD\ rev}$	Reverse supply voltage		-0.3	V
B	Magnetic flux density		Unlimited	
Ts	Storage Temperature Range		-65 to +150	°C
P_D	Package Power Dissipation	DFN1216-4	230	mW
		SC59	270	
T_J	Maximum Junction Temperature		150	°C

Notes: 2. Stresses greater than the 'Absolute Maximum Ratings' specified above, may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions exceeding those indicated in this specification is not implied. Device reliability may be affected by exposure to absolute maximum rating conditions for extended periods of time
3. The absolute maximum of 5V is a transient stress rating and is not meant as functional operating conditions. It is not recommended to operate the device at the absolute maximum rated conditions for any period of time.

Recommended Operating Conditions (T_A = 25°C)

Symbol	Characteristics	Conditions	Rating	Unit
V_{DD}	Supply Voltage	C_{IN} =0.1µF (Note 4)	2.5 to 3.6	V
T_A	Operating Temperature Range	Operating	-40 to +85	°C

Notes: 4. Decoupling capacitor C_{IN} = 100nF or higher must be used for full 2.5V to 3.6V supply range.

Electrical Characteristics (T_A = 25°C, V_{DD} = 3.3V, unless otherwise specified)

Symbol	Characteristics	Conditions	Min	Typ.	Max	Unit
V_{OL}	Output Low Voltage (on)	I_{OUT} = 1mA	—	0.1	0.2	V
V_{OH}	Output High Voltage (off)	I_{OUT} = -1mA	V_{DD}-0.2	V_{DD}-0.1	——	V
Idd(en)	Supply current	Chip enable	—	4	—	mA
Idd(dis)		Chip disable	—	8	—	µA
Idd(avg)		Average supply current,	—	12	—	µA
Tawake	Awake Time	(Note 5)	—	50	100	µs
Tperiod	Period	(Note 5)	—	50	100	ms
D.C.	Duty Cycle		—	0.1	—	%

Notes: 5. When power is initially on, the operating V_{DD} (2.5V to 3.6V) must be applied to be guaranteed for the output sampling. The output state is valid after the second operating phase (typical 100ms).

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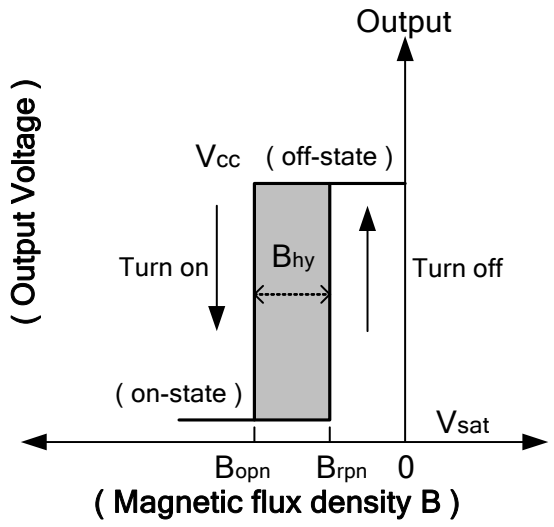
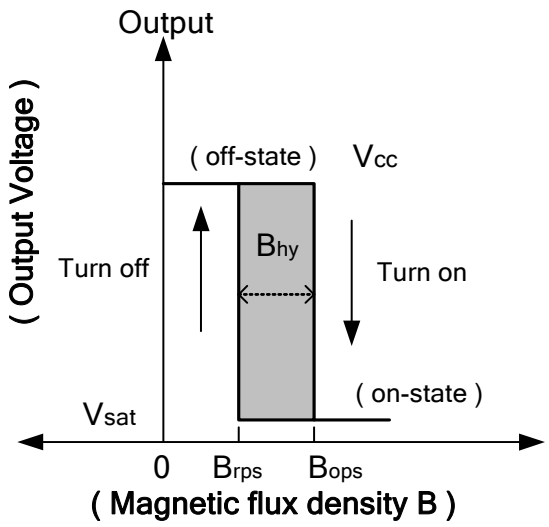
Magnetic Characteristics (T_A = 25°C, V_{DD} = 3.3V, Note 6)

(1mT=10 Gauss)

Symbol	Characteristics	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	20	40	60	Gauss
Bopn(north pole to brand side)		-60	-40	-20	
Brps(south pole to brand side)	Release Point	15	32	-	
Brpn(north pole to brand side)		-	-32	-15	
Bhy (|Bopx|-|Brpx|)	Hysteresis		8	-	

Notes: 6. The magnetic characteristics may vary with operating temperature and after soldering.





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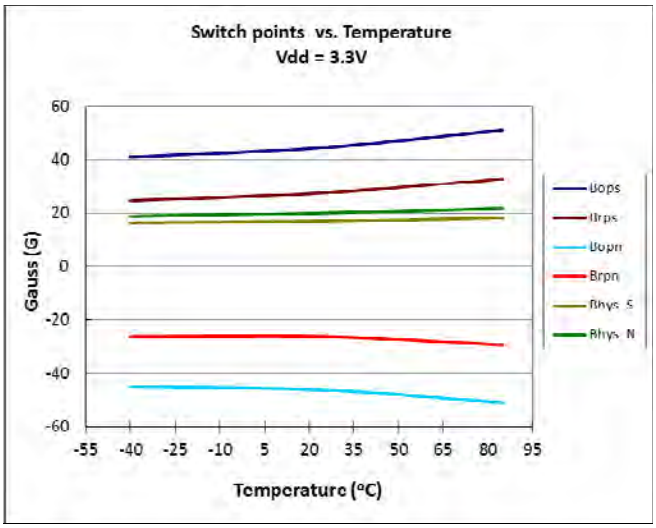
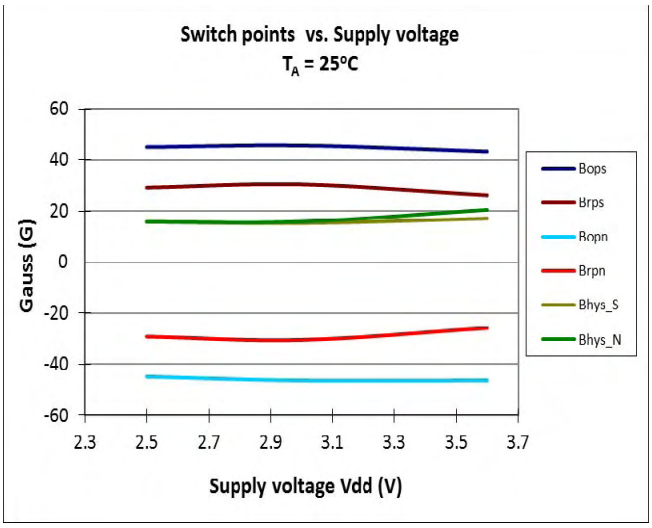
Typical Characteristics

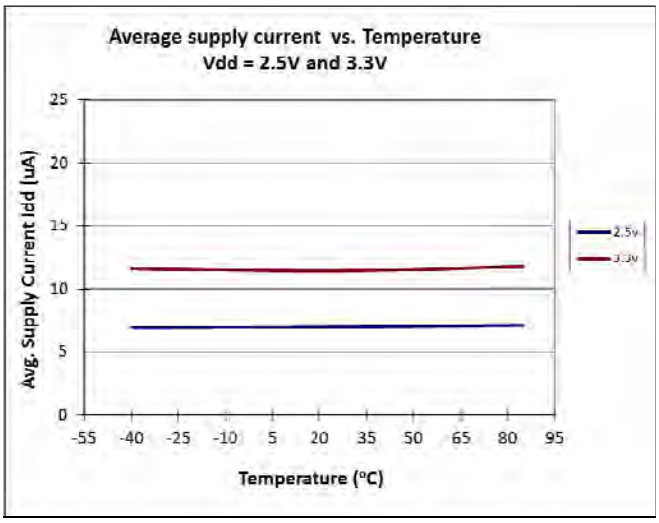
Typical Switch Point Bop and Brp vs. Temperature



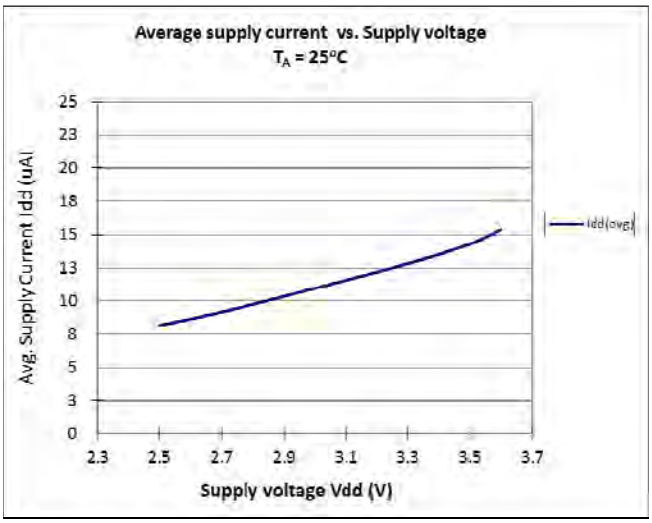
Typical Switch Points Bop and Brp vs. Supply Voltage



Average Supply Current vs. Temperature



Average Supply Current vs. Supply Voltage



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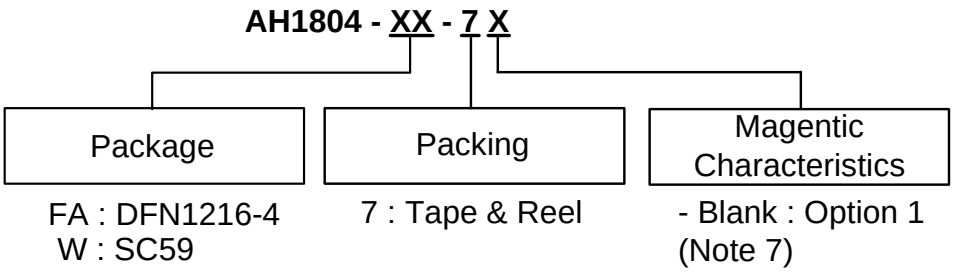
Ordering Information



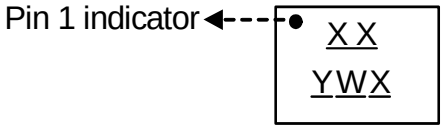
Device (Note 8)	Package Code	Packaging (Note 9)	7" Tape and Reel		Magentic Characteristics (Note 7)
			Quantity	Part Number Suffix	
AH1804-FA-7	FA	DFN1216-4	3000/Tape & Reel	-7	-Blank
AH1804-W-7	W	SC59	3000/Tape & Reel	-7	-Blank

Notes:
7. Please refer the Magnetic Characteristics table.
8. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
9. 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

Marking Information

(1) DFN1216-4

(Top View)

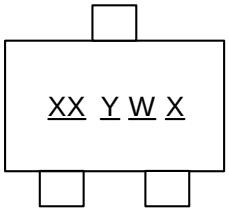


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week; a~z : 27~52 week; z represents 52 and 53 week
X : Internal code

Part Number	Package	Identification Code
AH1804-FA-7	DFN1216-4	KJ

(2) SC59 (commonly known as SOT23 in Asia)

(Top View)



XX : Identification code
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X : Internal code

Part Number	Package	Identification Code
AH1804-W-7	SC59	WJ

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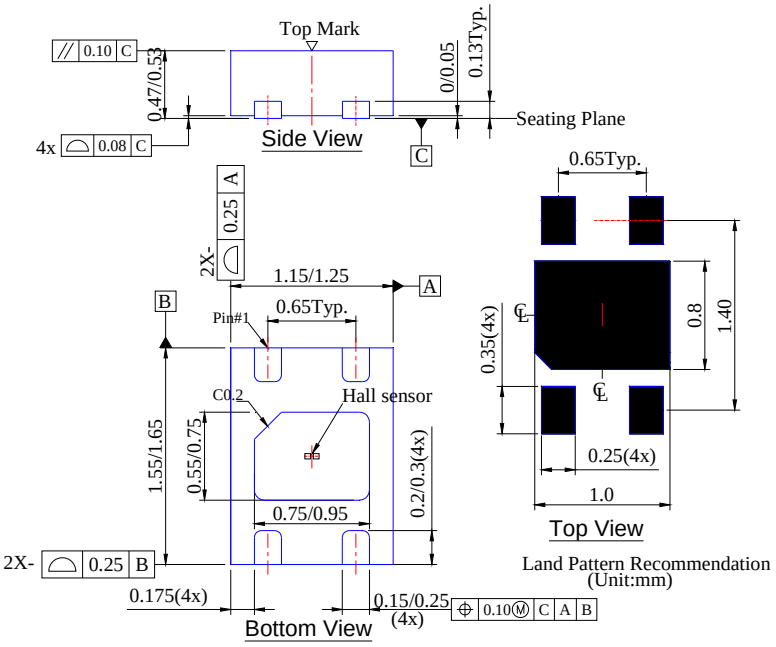
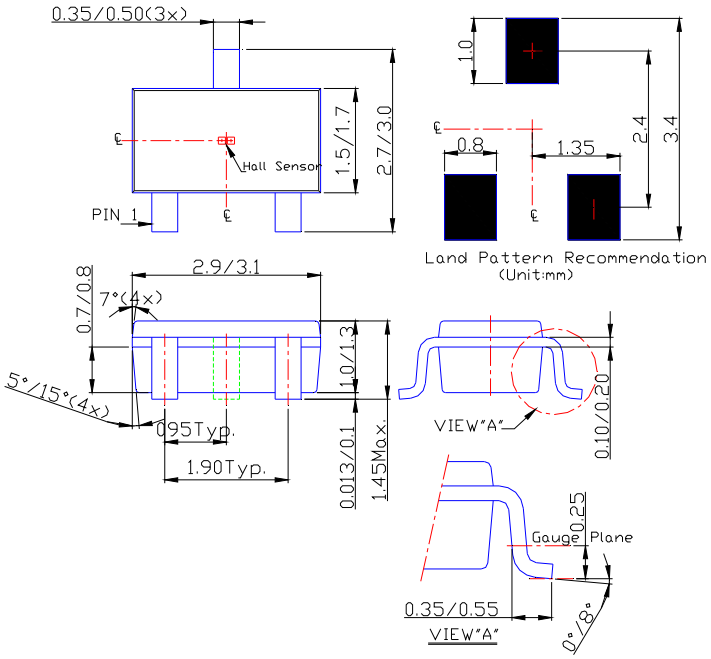
Package Outline Dimensions (All Dimensions in mm)

(1) Package type: DFN1216-4



(2) Package Type: SC59 (commonly known as SOT23 in Asia)



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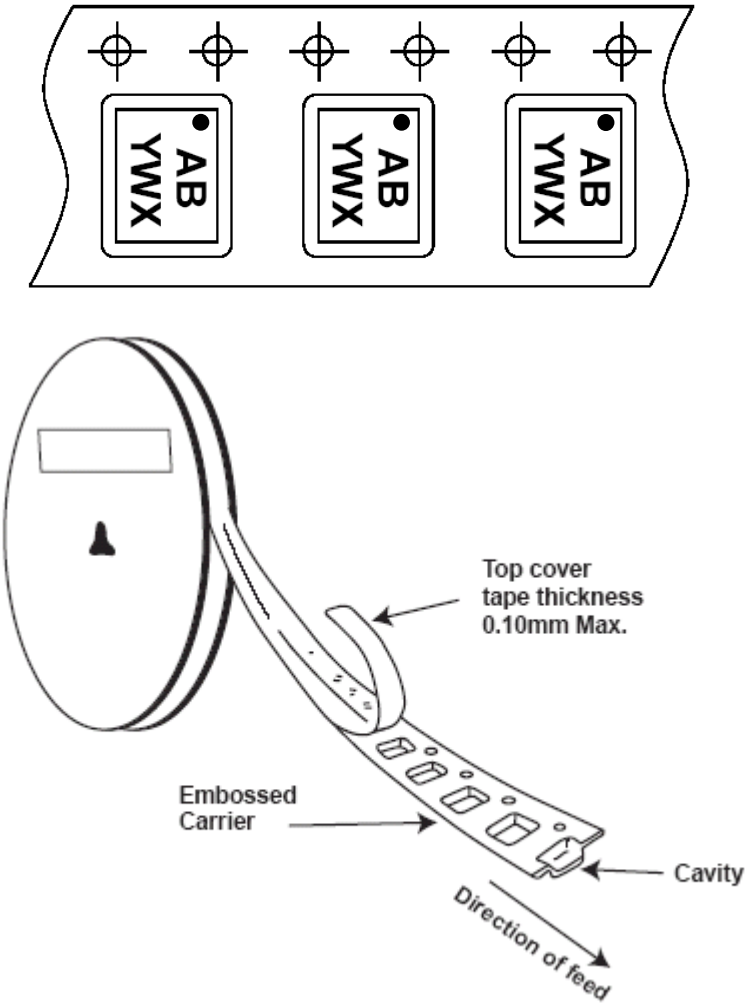
Taping Orientation (Note 10)

DFN1216-4



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

NEW PRODUCT

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