AH180N

MICROPOWER OMNIPOLAR HALL-EFFECT SWITCH

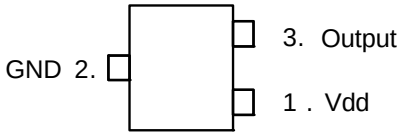
Description

The AH180N is a high sensitivity, micro power Omnipolar Hall Effect switch IC designed for portable and battery powered equipment such as cellular phones, PDA' s and portable PC' s. Based on two sensitive Hall Effect plates and a chopper stabilized architecture the AH180N provides a reliable solution over the whole operating range. To support portable and battery powered equipment the design has been optimized to operate over the supply range of 2.5V to 5.5V and consumes only 24uA with a supply of 3V.

The single open drain output can switched on with either a North or South pole of sufficient strength. When the magnetic flux density (B) is larger than operate point (Bop) the output is switched on (pulled low). 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.

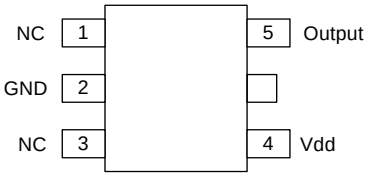
Pin Assignments

(Top View)



SC59 and TSOT23

(Top View)



SOT553

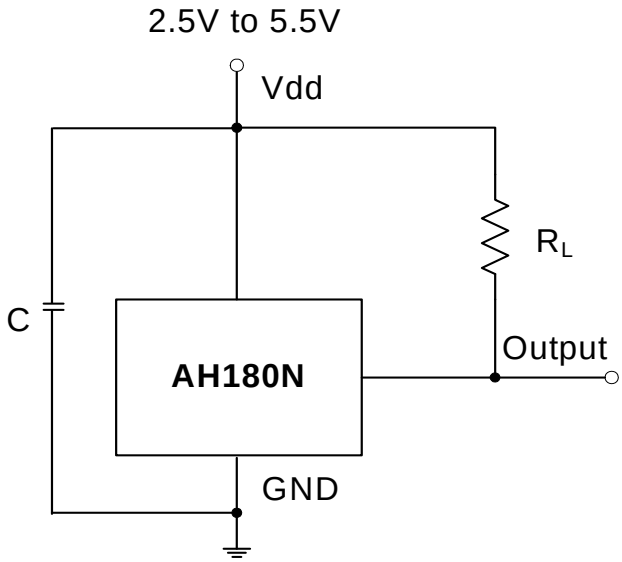
Features

- Omnipolar (North or South pole) operation
- High sensitivity
- Single open drain output
- Micropower operation
- 2.5V to 5.5V operating range
- Chopper stabilized design provides
  - o Superior temperature stability
  - o Minimal switch point drift
  - o Enhanced immunity to stress
- Good RF noise immunity
- -40°C to 85°C operating temperature
- ESD (HBM) ＞ 6KV
- SC59 (SOT23), TSOT23, and SOT553 Low profile packages
- "Green" Molding Compound

Applications

- Cover switch in clam-shell or slide type cellular phones
- Display switch for portable PCs
- On/Off switch for PDAs and digital cameras
- Contact-less switch in consumer products

Typical Application Circuit

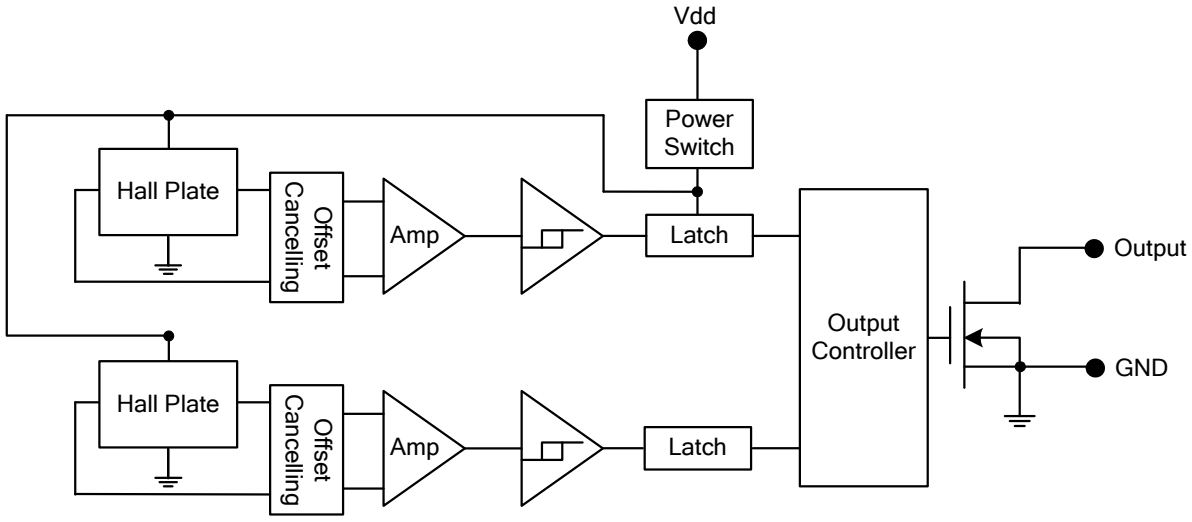


Note: C is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF ~ 100nF.
R_L is the pull-up resistor, the recommended resistance is 10kOhm ~ 100kOhm.

Pin Descriptions

Pin Name	P/I/O	Description
Vdd	P/I	Power Supply Input
GND	P/I	Ground
Output	O	Output Pin

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C)

Symbol	Characteristics		Values	Unit
Vdd	Supply Voltage		7	V
B	Magnetic Flux Density		Unlimited	
P_D	Package Power Dissipation	SC59	230	mW
		TSOT23	230	
		SOT553	230	
Ts	Storage Temperature Range		-65 to +150	°C
T_J	Maximum Junction Temperature		150	°C

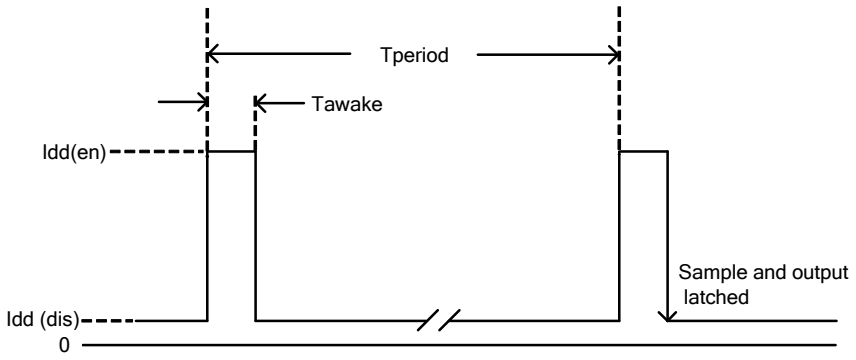
Recommended Operating Conditions (T_A = 25°C)

Symbol	Parameter	Conditions	Rating	Unit
Vdd	Supply Voltage	Operating	2.5 to 5.5	V
T_A	Operating Temperature Range	Operating	-40 to +85	°C

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

Symbol	Characteristic	Conditions	Min	Typ.	Max	Unit
V_{OUT}	Output On Voltage	I_{OUT} =1mA	—	0.1	0.3	V
Ioff	Output Leakage Current	V_{OUT} =5.5V, Output off	—	<0.1	1	µA
Idd(en)	Supply Current	Chip enable, T_A = 25°C, Vdd = 3V	—	3	6	mA
Idd(en)		Chip enable, TA = -40 to 85(C, Vdd = 2.5V to 5.5V	—	3	12	mA
Idd(dis)		Chip disable, T_A = 25°C, Vdd = 3V	—	5	10	µA
Idd(dis)		Chip disable, T_A = -40 to 85°C, Vdd = 2.5V to 5.5V	—	5	28	µA
Idd(avg)		Average supply current, T_A = 25°C, Vdd = 3V	—	8	16	µA
Idd(avg)		Average supply current, T_A = -40 to 85°C, Vdd = 2.5V to 5.5V	—	8	40	µA
Tawake	Awake Time	(Note 1)	—	75	125	µs
Tperiod	Period	(Note 1)	—	75	125	ms
D.C.	Duty Cycle		—	0.1	—	%

Notes: 1. When power is initially turned on, Vdd must be within its correct operating range (2.5V to 5.5V) to guaranteed the output sampling. The output state is valid after the second operating cycle (typical 150ms).

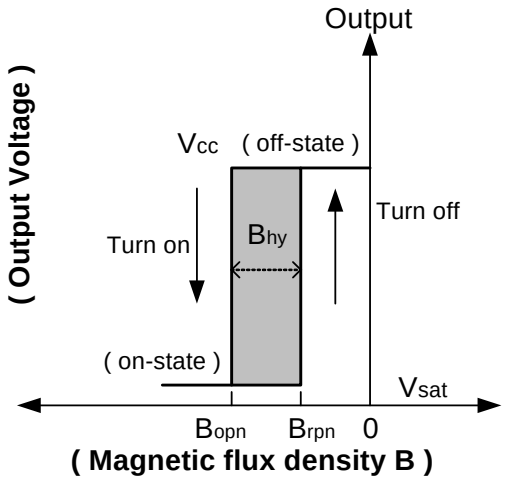


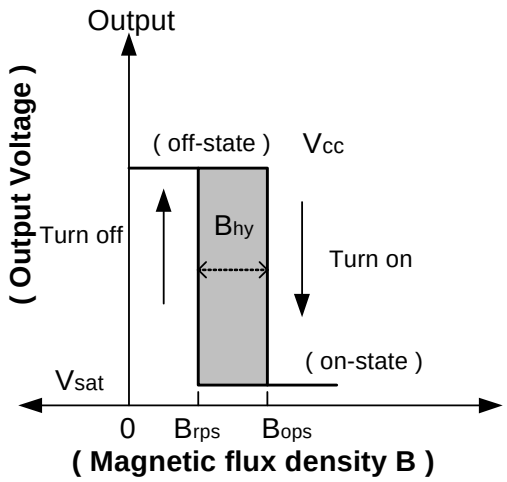
Magnetic Characteristics (T_A = 25°C, Vdd = 3V, Note 2 & 3)

(1mT=10 Gauss)

Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	-	35	50	Gauss
Bopn(north pole to brand side)		-50	-35	-	
Brps(south pole to brand side)	Release Point	10	25	-	
Brpn(north pole to brand side)		-	-25	-10	
Bhy(|Bopx|-|Brpx|)	Hysteresis	-	10	-	

Notes: 2. Typical data is at T_A = 25°C, V_{dd} = 3V, and for design information only.
3. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

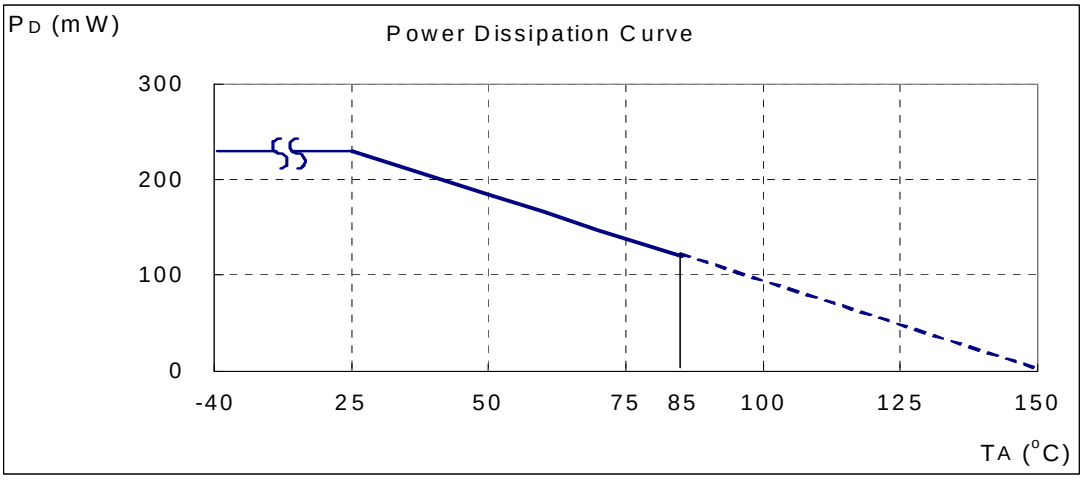




Performance Characteristics

(1) SC59 (commonly known as SOT23 in Asia), TSOT23, and SOT553

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

AH 180N - XX G - 7

Package	Green	Packing
W : SC59 WS : TSOT23 Z : SOT553	G : Green	7 : Tape & Reel

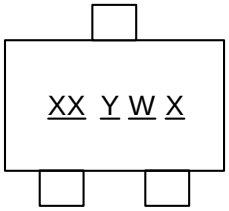
Device	Package Code	Packaging (Note 4 & 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
AH180N-WG-7	W	SC59	3000/Tape & Reel	-7
AH180N-WSG-7	WS	TSOT23	3000/Tape & Reel	-7
AH180N-ZG-7	Z	SOT553	3000/Tape & Reel	-7

Notes: 4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
5. 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) SC59 (commonly known as SOT23 in Asia) and TSOT23

(Top View)

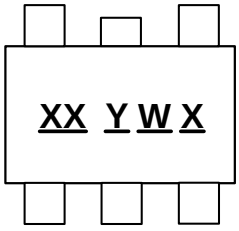


XX : Identification code
Y : Year 0 to 9
W : Week : A to Z : 1 to 26 week; a to z : 27 to 52 week; z represents 52 and 53 week
X : A to Z : Green

Part Number	Package	Identification Code
AH180N	SC59	K9
AH180N	TSOT23	N9

(2) SOT553

(Top View)

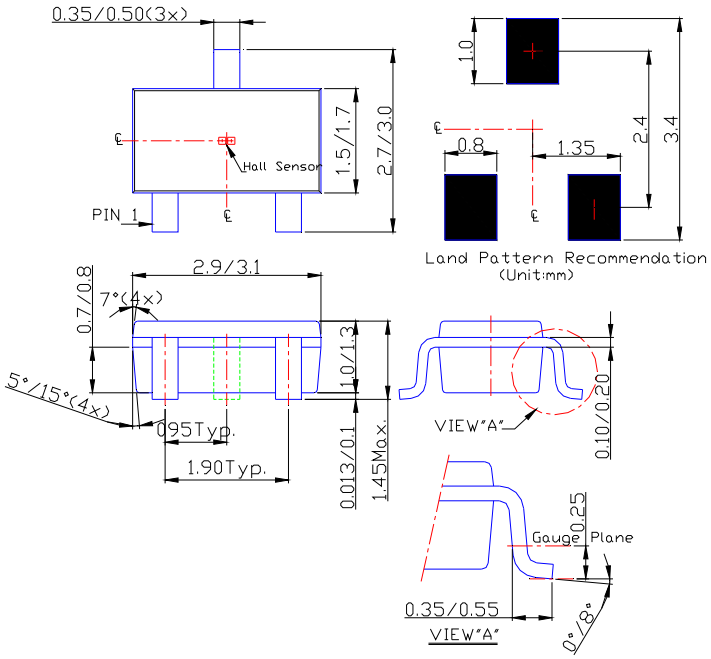


XX : Identification Code
Y : Year : 0 to 9
W : Week : A to Z : 1~26 week; a to z : 27~52 week; z represents 52 and 53 week
X : A to Z : Green

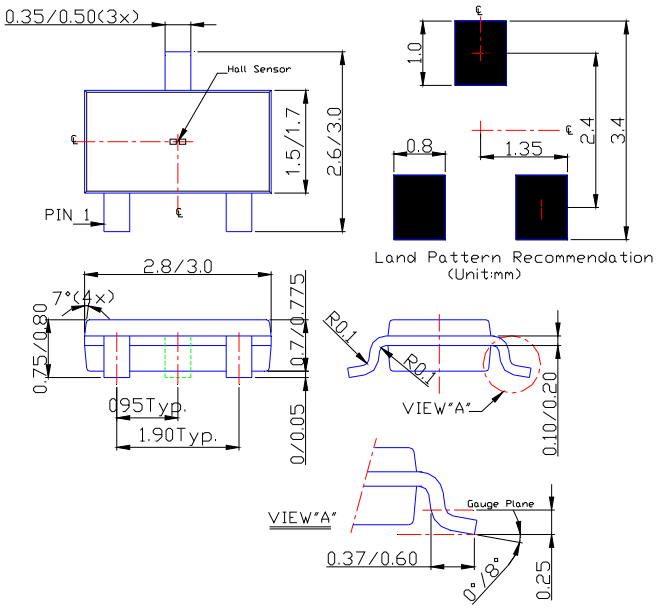
Part Number	Package	Identification Code
AH180N	SOT553	K9

Package Outline Dimensions (All Dimensions in mm)

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

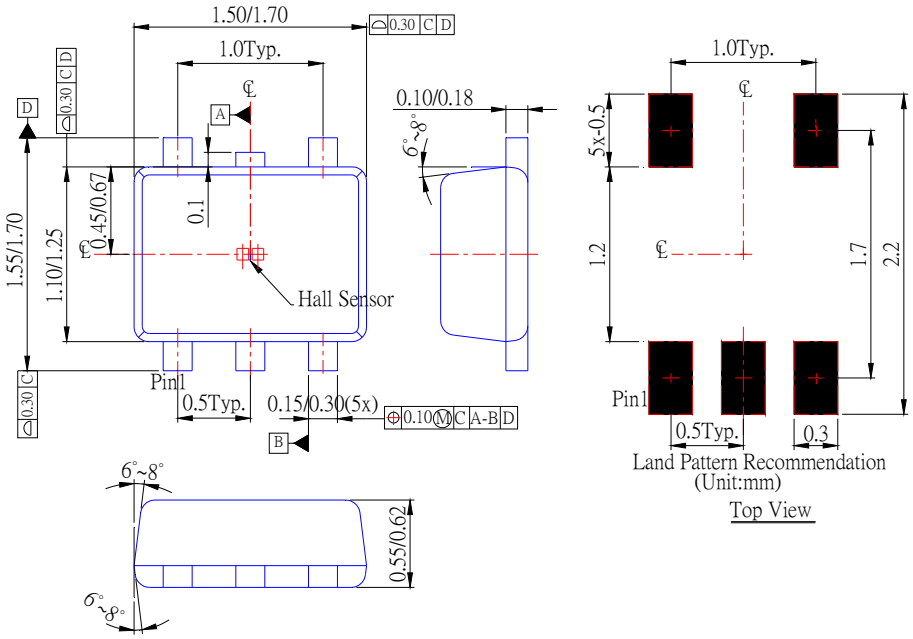


(2) Package Type: TSOT23



Package Outline Dimensions (Continued)

(3) Package Type: SOT553



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