AH1883

MICROPOWER, ULTRA-SENSITIVE HALL EFFECT SWITCH

Description

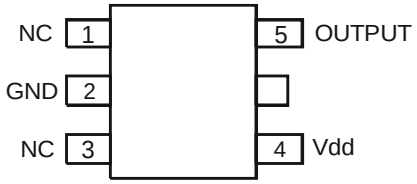
The AH1883 micropower Omnipolar Hall Effect switch IC is designed for portable and battery powered equipment such as cellular phones, cordless phones, camcorders, PDA's, and portable PC's. Based on two high sensitivity Hall Effect plates and chopper stabilized architecture, the AH1883 provides reliable solution over the whole operating range.

To support portable and battery powered equipment the design has been optimized to operate from 1.65V to 3.3V and consumes 13uW typical with a supply of 1.8V. To minimize PCB space the AH1883 incudes a push-pull output structure, therefore does not require an external pull up resistor, and is packaged in small low profile SOT553 and U-DFN2020-3 packages.

Either North or South pole of sufficient strength will turn the output on. When the magnetic flux density (**B**) is larger than operate (**Bop**) the output is switched on. 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.

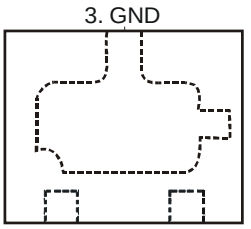
Pin Assignments

(Top View)



SOT553

(Top View)



U-DFN2020-3

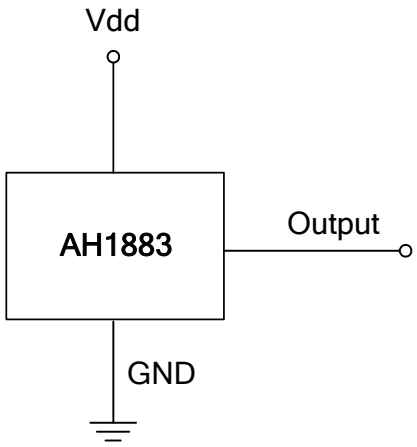
Features

- Micropower operation
- Operation with North or South Pole
- 1.65V to 3.3V battery operation
- Chopper stabilized
  - 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
- ESD (HBM) ＞ 6kV in SOT553 and U-DFN2020-3
- Small low profile packages: SOT553 and U-DFN2020-3
- "Green" Molding Compound

Applications

- Cellular phone
- PDA
- Portable PCs – Netbook, Notebook, Tablets
- Camcorders
- Cordless phone
- Handheld game consoles
- Proximity detection and contact-less switch applications

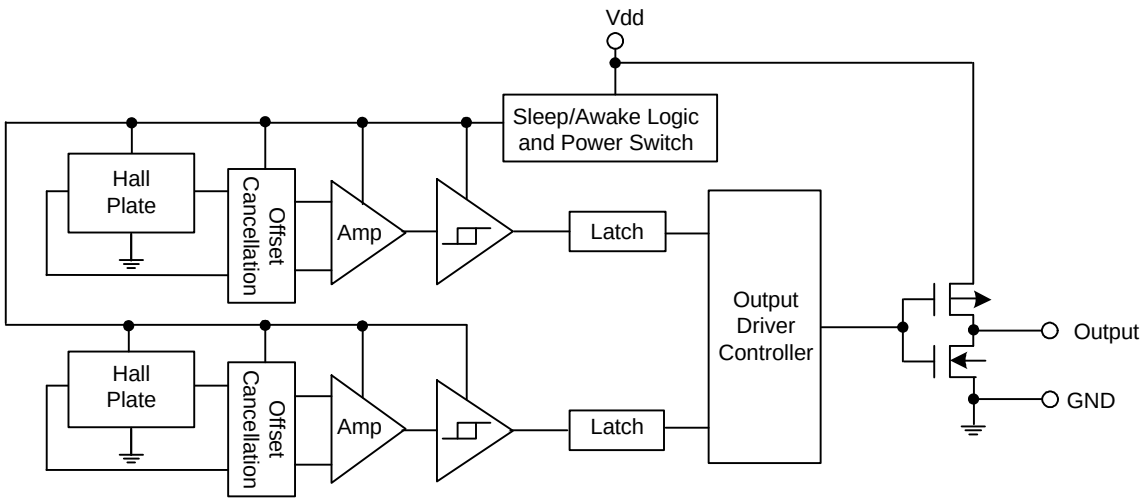
Typical Application Circuit



Pin Descriptions

Pin Name	P/I/O	Pin #	Description
NC		1	No Connection
GND	P/I	2	Ground
NC		3	No Connection
Vdd	P/I	4	Power Supply Voltage
Output	O	5	Output Pin (active Low)

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C, Note 1)

Symbol	Characteristics	Values	Unit
Vdd	Supply voltage	5	V
B	Magnetic flux density	Unlimited	
T_S	Storage Temperature Range	-65 to +150	°C
P_D	Package Power Dissipation	230	mW
T_J	Maximum Junction Temperature	150	°C

Notes: 1. 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

Recommended Operating Conditions (T_A = 25°C)

Symbol	Parameter	Conditions	Rating	Unit
Vdd	Supply Voltage	Operating	1.65 to 3.3	V
T_A	Operating Temperature Range	Operating	-40 to +85	°C

Electrical Characteristics (T_A = 25°C, Vdd = 1.8V, unless otherwise specified)

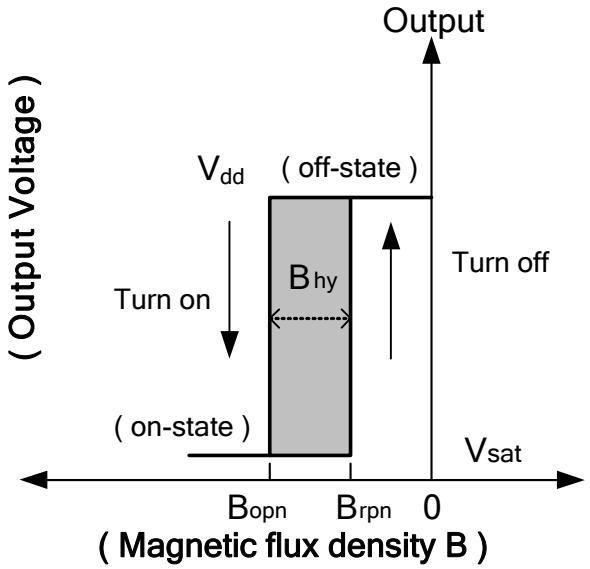
Symbol	Characteristic	Conditions	Min	Typ.	Max	Unit
V_{OH}	Output On Voltage (High side)	I_O= -0.5mA	Vdd-0.2	-	-	V
V_{OL}	Output On Voltage (Low side)	I_O= 0.5mA	-	-	0.2	V
Idd(en)	Supply Current	Chip enable	-	2	4	mA
Idd(dis)		Chip disable	-	5	8	uA
Idd(avg)		average supply current	-	7	12	uA
Tawake	Awake Time		-	50	100	µs
Tperiod	Period		-	50	100	ms
D.C.	Duty Cycle		-	0.1	-	%

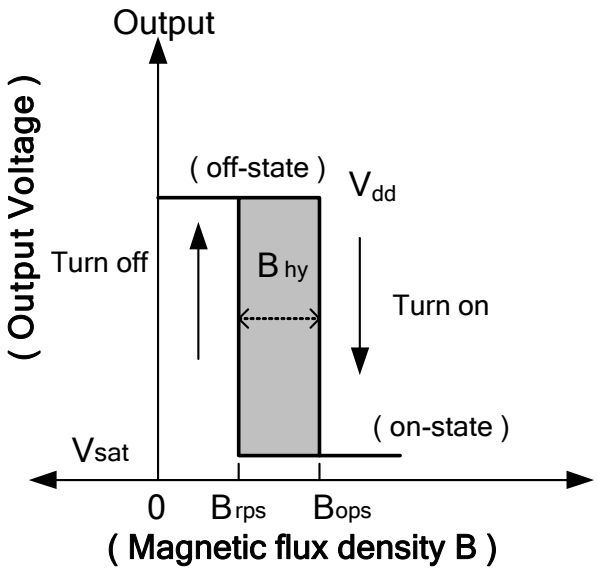
Magnetic Characteristics (T_A = 25°C, Vdd = 1.8V~3.0V, Note 2 & 3)

(1mT=10 Gauss)

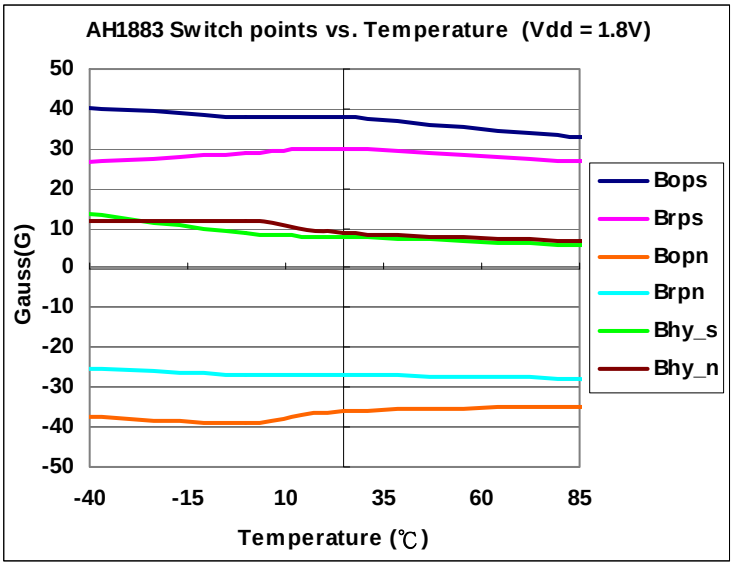
Symbol	Characteristic	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operate Point	-	37	55	Gauss
Bopn(north pole to brand side)		-55	-37	-	
Brps(south pole to brand side)	Release Point	6	29	-	
Brpn(north pole to brand side)		-	-29	-6	
Bhy(|Bopx|-|Brpx|)	Hysteresis	3	8	-	

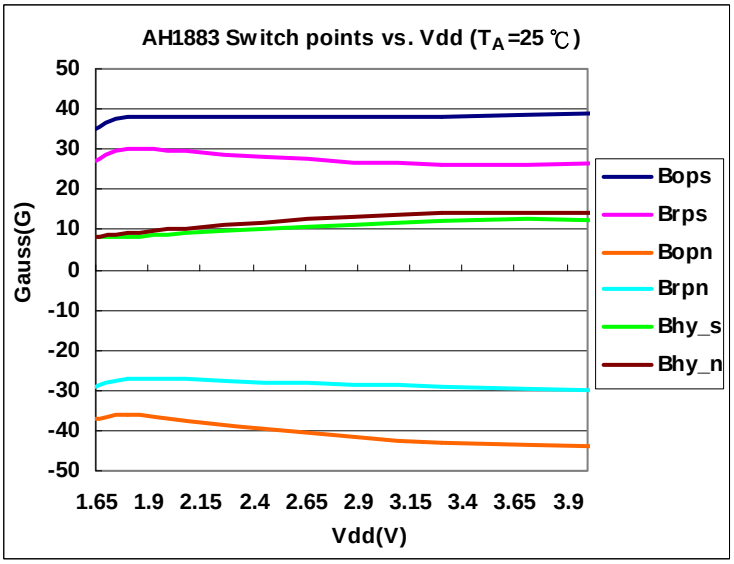
Notes: 2. Typical data is at T_A = 25°C, Vdd = 3V, and for design information only.
3. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

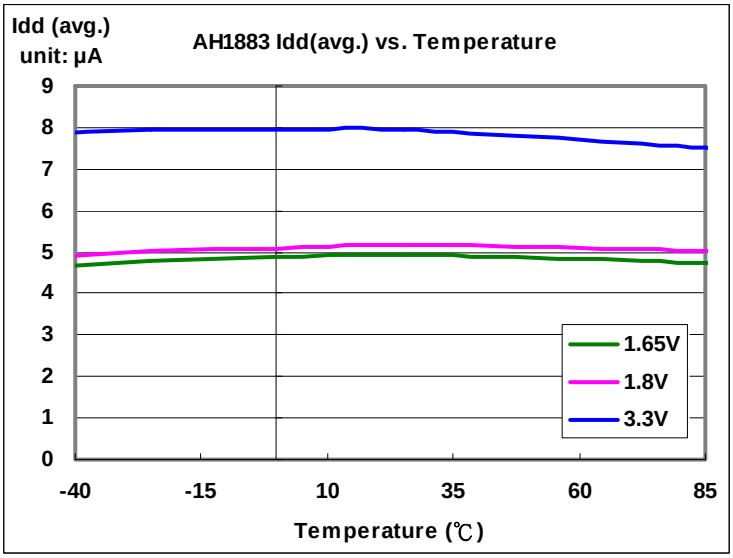


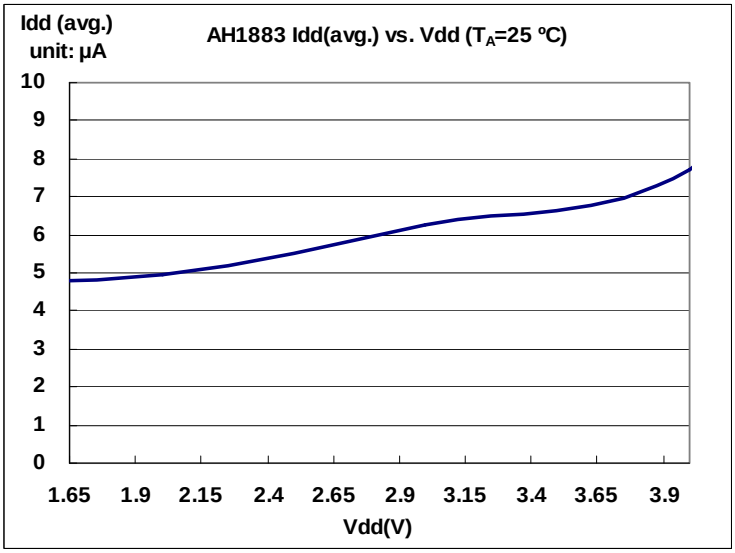


Typical Operating Characteristics





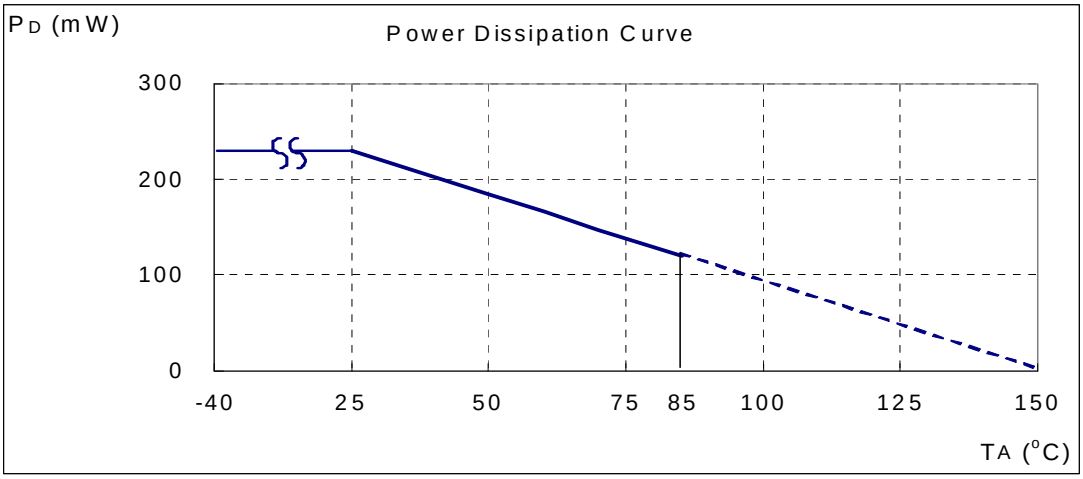




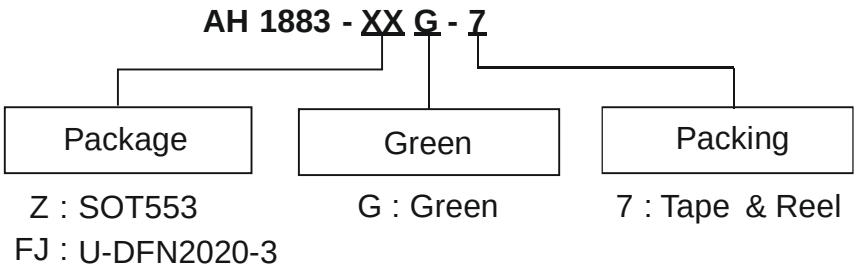
Performance Characteristics

For SOT553 and U-DFN2020-3

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



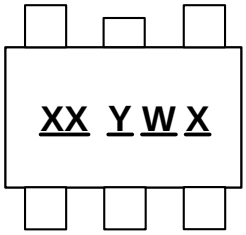
Device	Package Code	Packaging (Note 4 & 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
AH1883-ZG-7	Z	SOT553	3000/Tape & Reel	-7
AH1883-FJG-7	FJ	U-DFN2020-3	3000/Tape & Reel	-7

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) SOT553

(Top View)

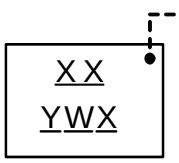


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week;
z represents 52 and 53 week
X : Internal code

Part Number	Package	Identification Code
AH1883	SOT553	KP

(2) U-DFN2020-3

(Top View)

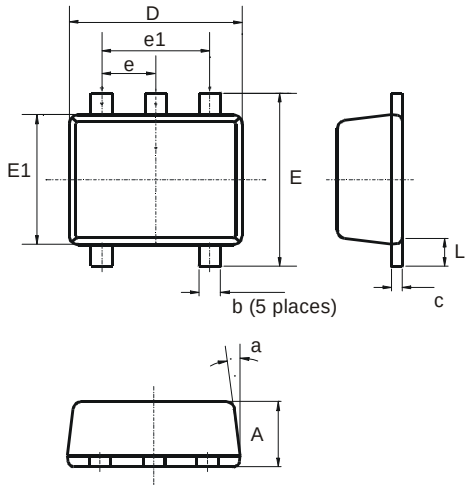


Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week;
z represents 52 and 53 week
X : Internal code

Part Number	Package	Identification Code
AH1883	U-DFN2020-3	KP

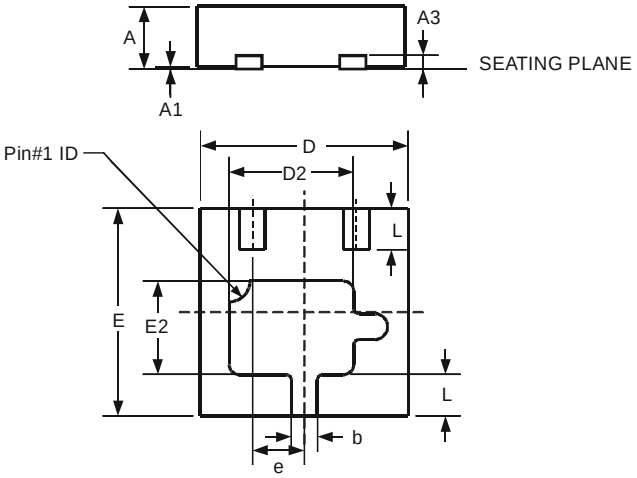
Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SOT553



SOT553			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	0.60
c	0.10	0.18	0.15
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
L	0.10	0.30	0.20
b	0.15	0.30	0.20
e	0.50 Typ		
e1	1.00 Typ		
a	6°	8°	7°
All Dimensions in mm			

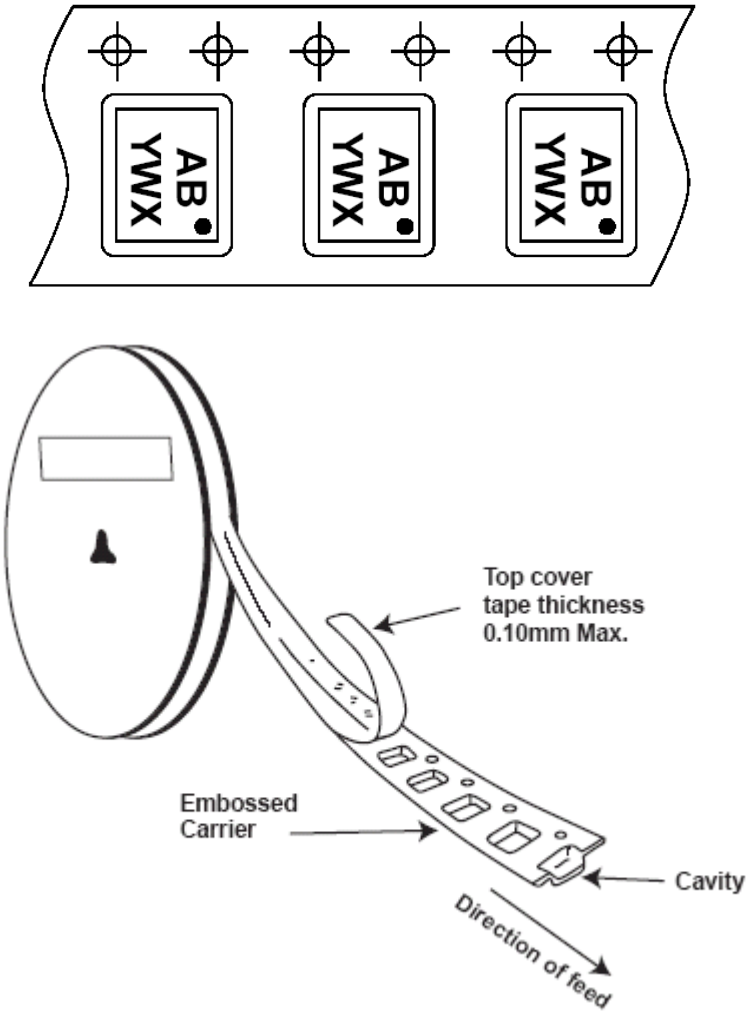
(2) Package Type: U-DFN2020-3



U-DFN2020-3			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	—	—	0.152
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	1.10	1.30	1.20
e	—	—	0.50
E	1.95	2.075	2.00
E2	0.80	1.00	0.90
L	0.35	0.45	0.40
All Dimensions in mm			

Taping Orientation (Note 6)

For U-DFN2020-3



Notes: 6. The taping orientation of the other package type can be found on our website at http://www.diodes.com/datasheets/ap02007.pdf.

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