

## Description

AH1822 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 $\mu$ 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.

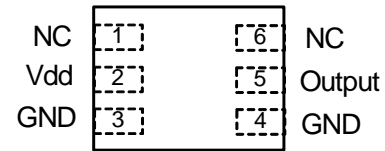
## Features

- 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
- ESD (HBM) > 5kV
- **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.

## Pin Assignments

### ( Top View )



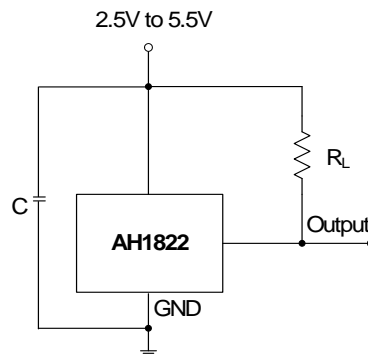
**X2-DFN2015-6**

Note: 4. NC is "No Connection" which is recommended to be tied to ground.

## Applications

- Cover Switch in Clam-Shell Cellular Phones
- Cover Switch in Notebook PC/PDA
- Contact-Less Switch in Consumer Products

## Typical Applications Circuit

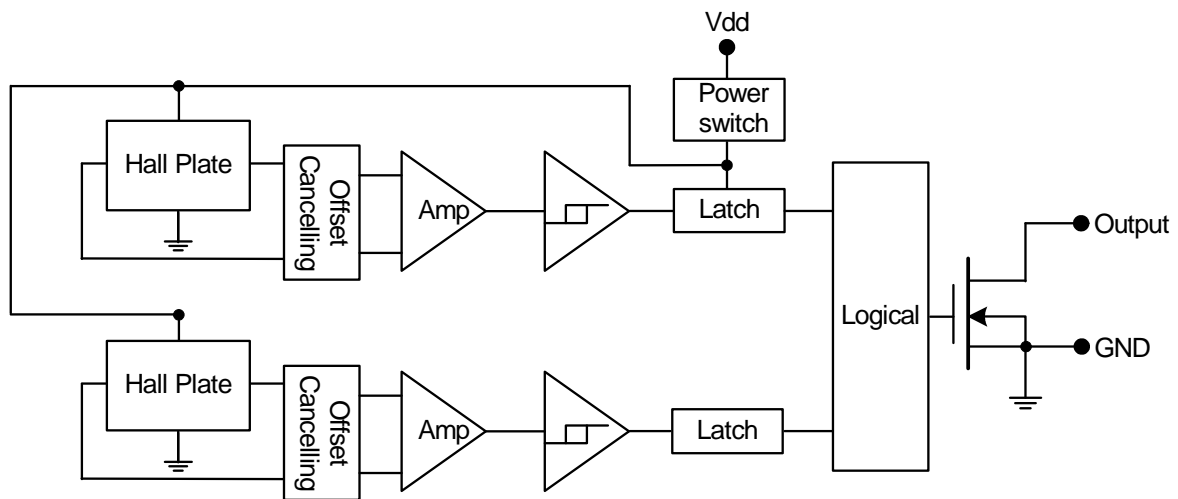


Note: 5. C is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF to 100nF.  $R_L$  is the pull-up resistor, the recommended resistance is 10k $\Omega$  to 100k $\Omega$ .

## Pin Descriptions

Pin Name	P/I/O	Description
Vdd	P/I	Power Supply Input
GND	P/I	Ground
Output	O	Output Pin
NC	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>STG</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Package Power Dissipation	230	mW
T <sub>J</sub>	Maximum Junction Temperature	+150	°C

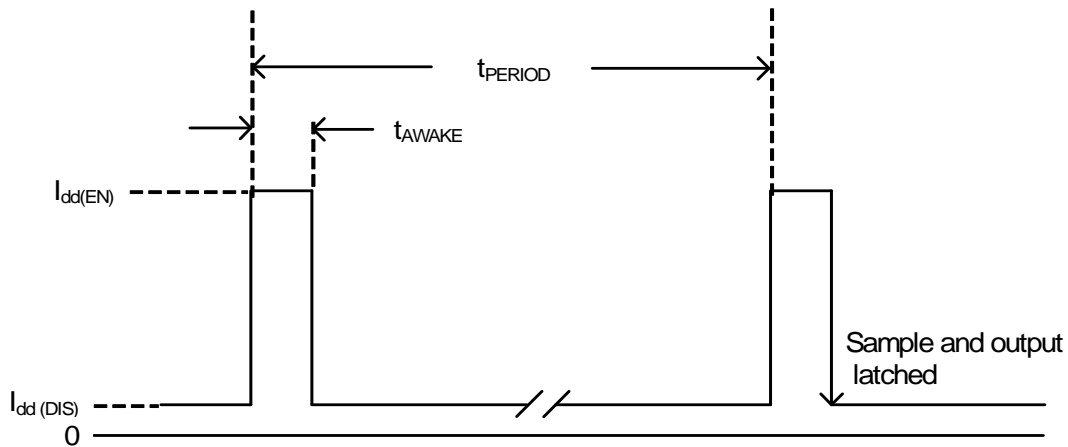
## Recommended Operating Conditions

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
$I_{dd}(EN)$		Chip enable, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{dd} = 2.5\text{V}$ to $5.5\text{V}$	—	3	10	mA
$I_{dd}(DIS)$		Chip disable, $T_A = +25^\circ\text{C}$ , $V_{dd} = 3\text{V}$	—	5	10	$\mu\text{A}$
$I_{dd}(DIS)$		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	$\mu\text{A}$
$I_{dd}(AVG)$		Average supply current, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{dd} = 2.5\text{V}$ to $5.5\text{V}$	—	8	28	$\mu\text{A}$
$f_c$		Chopping Frequency	For design information only	—	300	—
$t_{AWAKE}$	Awake Time	(Note 6)	—	75	150	$\mu\text{s}$
$t_{PERIOD}$	Period	(Note 6)	—	75	150	ms
D.C.	Duty Cycle	—	—	0.1	—	%

Notes: 6. 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).

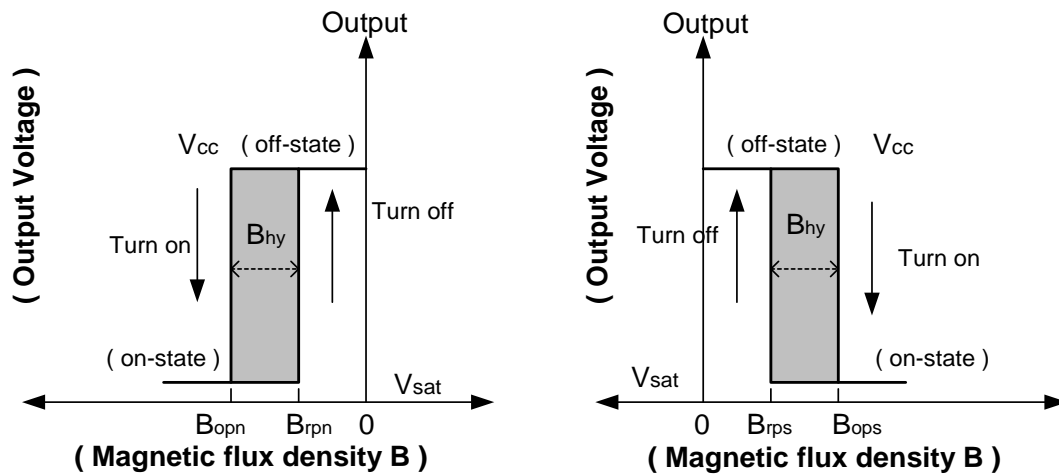


**Magnetic Characteristics** (@ $T_A = +25^\circ\text{C}$ ,  $V_{dd} = 3\text{V}$ , unless otherwise specified. Notes 7 and 8)

(1mT=10 Gauss)

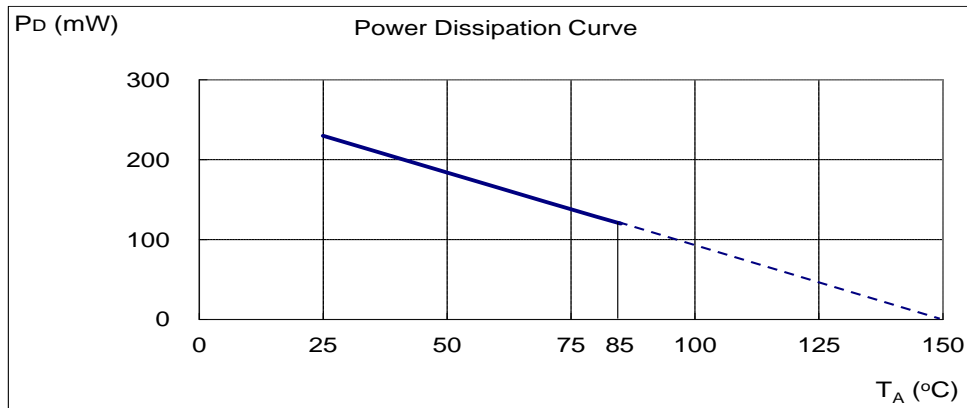
Symbol	Characteristic	Min	Typ	Max	Unit
Bops(South Pole to Brand Side)	Operate Point	—	28	55	Gauss
Bopn(North Pole to Brand Side)		-55	-28	—	
Brps(South Pole to Brand Side)	Release Point	10	20	—	
Brpn(North Pole to Brand Side)		—	-20	-10	
$B_{hy} (  B_{opx} - B_{rpx}  )$	Hysteresis	5	8	—	

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

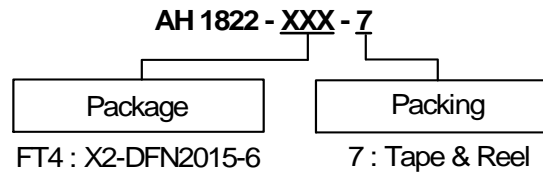


**Performance Characteristics**

$T_A$ ( $^\circ\text{C}$ )	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



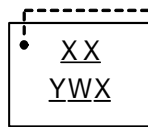
Device	Package Code	Packaging	7" Tape and Reel	
			Quantity	Part Number Suffix
AH1822-FT4-7	FT4	X2-DFN2015-6	3000/Tape & Reel	-7

Note: 9. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

(1) X2-DFN2015-6

**( Top View )**



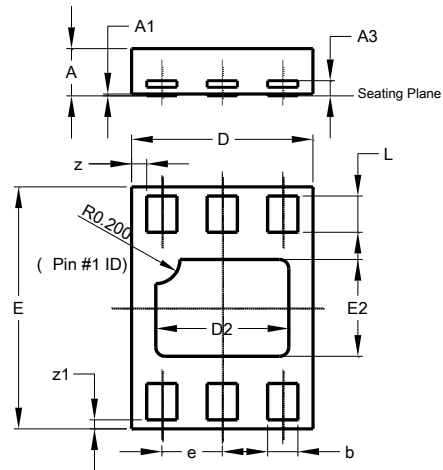
Pin 1 indicator  
XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
a~z : 27~52 week; z represents  
52 and 53 week  
X : A~Z : Green

Part Number	Package	Identification Code
AH1822	X2-DFN2015-6	K7

**Package Outline Dimensions** (All dimensions in mm.)

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(1) Package Type: X2-DFN2015-6

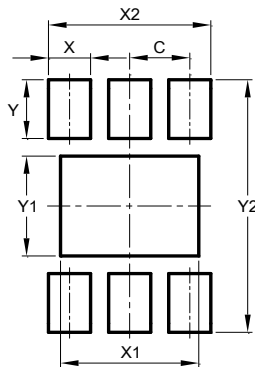


X2-DFN2015-6			
Dim	Min	Max	Typ
A	0.375	0.40	0.390
A1	0	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.45	1.575	1.50
D2	1.00	1.20	1.10
e	-	-	0.50
E	1.95	2.075	2.00
E2	0.70	0.90	0.80
L	0.25	0.35	0.30
Z	-	-	0.125
Z1	-	-	0.075
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

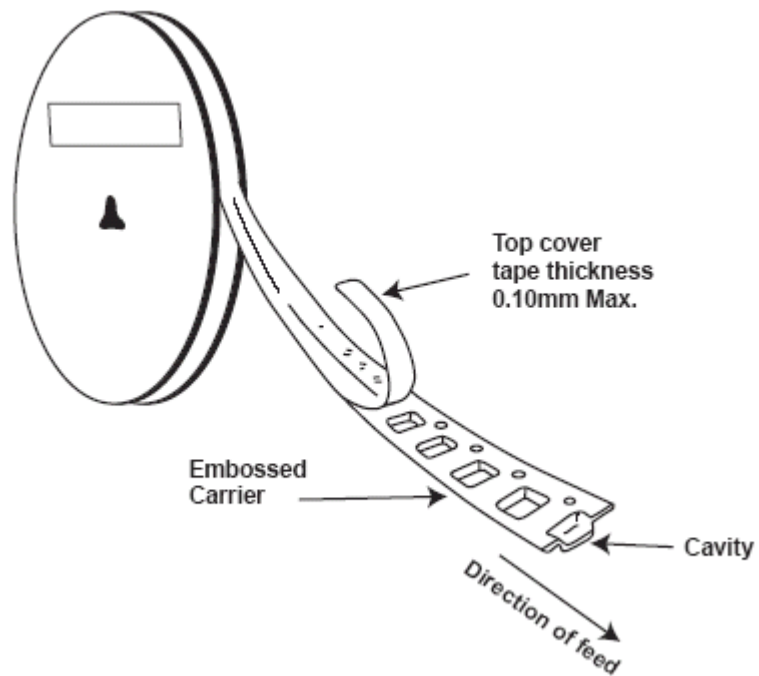
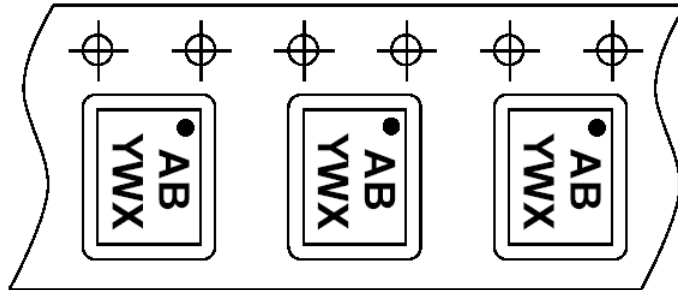
(1) Package type: X2-DFN2015-6



X2-DFN2015-6	
Dimensions	Value (in mm)
C	0.500
X	0.350
X1	1.150
X2	1.350
Y	0.500
Y1	0.850
Y2	2.150

## Taping Orientation

(1) X2-DFN2015-6



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

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А