

## ◆ General Description

The DH103 is an ultra-sensitive Hall-effect omnipolar switch IC with digital latched output, mainly designed for battery-operation, hand-held equipment.

Special CMOS process is used for low-voltage and low-power requirement. A chopper stabilized amplifier improves stability of magnetic switch points. The circuit design provides an internally controlled clocking mechanism to cycle power to the Hall sensor and analog signal processing circuits. This serves to place the high current-consuming portions of the circuit into a “Sleep” mode. Periodically the device is “Awakened” by this internal logic and the magnetic flux from the Hall sensor is evaluated against the predefined thresholds. If the flux density is above or below the  $B_{OP}/B_{RP}$  thresholds then the output transistor is driven to change states accordingly. While in the “Sleep” cycle the output transistor is latched in its previous state. The design has been optimized for service in applications requiring extended operating lifetime in battery powered systems.

The IC switching behaviour is omnipolar, either north or south pole sufficient strength will turn the output

on. If the magnetic flux density is larger than operating point ( $B_{OP}$ ), the output will be turned on; if it is less than releasing point ( $B_{RP}$ ), the output will be turned off.

The DH103 is available in SIP-3L, SOT-23-3L packages which are optimized for most applications.

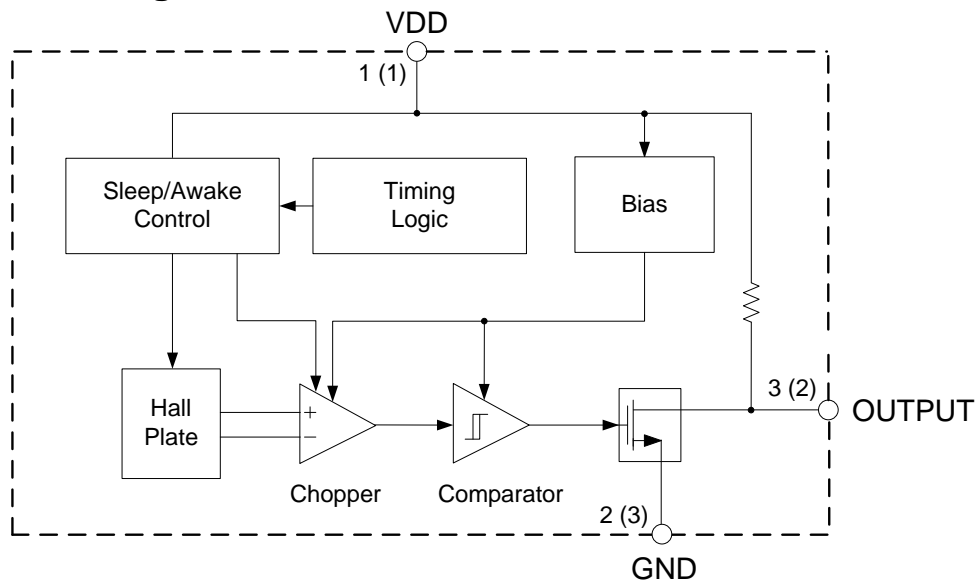
## ◆ Features

- On Chip Hall Effect Sensor
- Micropower Operation
- 2.2 to 5.5V Power Supply
- Switching for Both Poles of a Magnet
- Chopper Stabilized amplifier stage
- Superior Temperature Stability
- Digital Output Signal
- Built-in Pull-up Resistor : 100Kohm

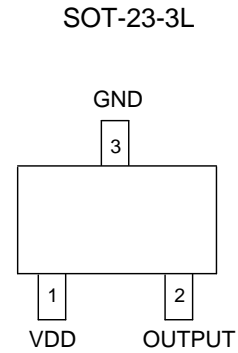
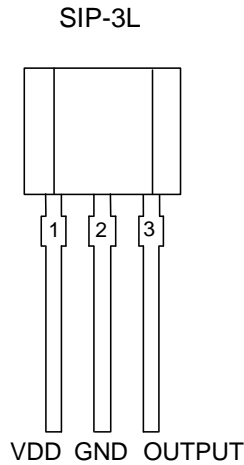
## ◆ Applications

- Solid State Switch
- Handheld Wireless Handset Awake Switch
- Lid close sensor for battery-powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications

## ◆ Functional Block Diagram



### ◆ Pin Configuration



### ◆ Absolute Maximum Ratings (T<sub>A</sub>=25°C, Note 1)

Parameter	Symbol	Value	Unit
Supply Voltage	V <sub>DD</sub>	6.0	V
Supply Current (Fault)	I <sub>DD</sub>	5.0	mA
Output Voltage	V <sub>OUT</sub>	6.0	V
Output Current	I <sub>OUT</sub>	5.0	mA
Magnetic Flux Density	B	Unlimited	Gauss
Power Dissipation	P <sub>D</sub>	SIP-3L	400
		SOT-23-3L	230
Storage Temperature	T <sub>STG</sub>	-55 to 150	°C
Junction Temperature	T <sub>J</sub>	150	°C

### ◆ Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>DD</sub>	2.2	5.5	V
Operating Temperature	T <sub>OP</sub>	-40	85	°C

### ◆ Electrical Characteristics

V<sub>DD</sub>=3.0V, T<sub>A</sub> =25°C, unless otherwise specified.

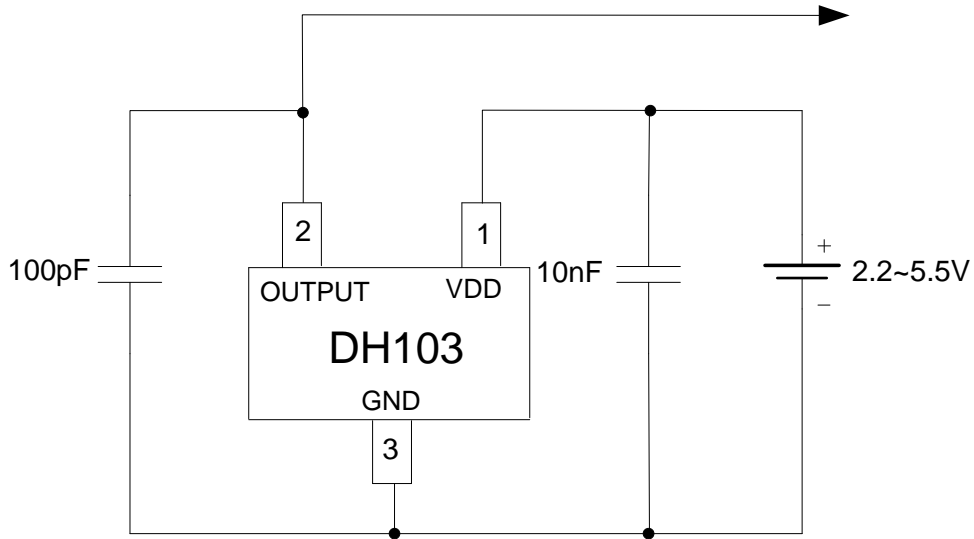
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V <sub>DD</sub>	Operating	2.2	3.0	5.5	V
Supply Current	I <sub>AW</sub>	Awake		1.0	1.5	mA
	I <sub>SL</sub>	Sleep		1.0	2.0	μA
	I <sub>AVG</sub>	Average		4.0	10.0	μA
Output Current	I <sub>OUT</sub>				5.0	mA
Output Leakage Current	I <sub>LEAK</sub>	B <  B <sub>RP</sub>		<0.01	1.0	μA
Saturation Voltage	V <sub>SAT</sub>	I <sub>OUT</sub> =1.0mA		0.05	0.25	V
Awake Mode Time	t <sub>AW</sub>	Operating	30	50	70	μs
Sleep Mode Time	t <sub>SL</sub>	Operating	20	30	40	ms
Duty Cycle	D			0.20		%

◆ **Magnetic Characteristics** (Note 3)

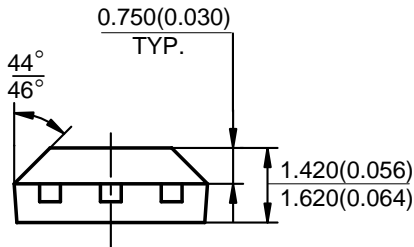
$V_{DD}=3.0V$ ,  $T_A = 25^{\circ}C$ , unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	$B_{OP}$	$B >  B_{OP} , V_{OUT} = \text{low}(\text{output on})$		+/-16	+/-25	Gauss
Releasing Point	$B_{RP}$	$B <  B_{RP} , V_{OUT} = \text{high}(\text{output off})$	+/-5	+/-10		Gauss
Hysteresis	$B_{HYS}$		3	6	9	Gauss

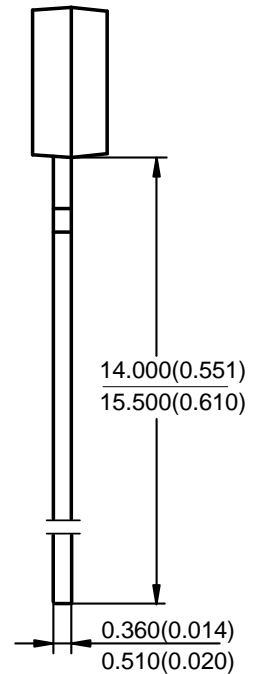
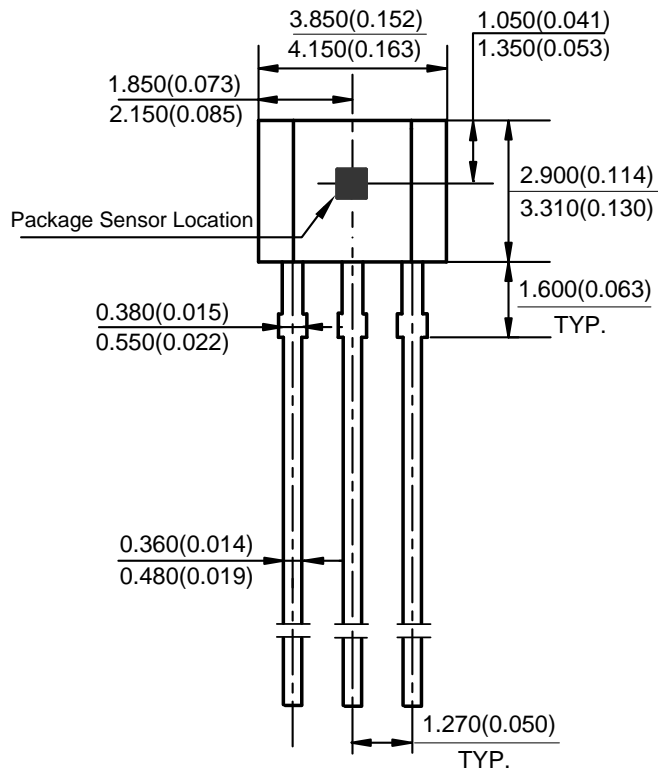
◆ **Typical Application Circuit**



◆ **Mechanical Dimensions**



SIP-3L Unit: mm(inch)



◆ Mechanical Dimensions (Continued)

SOT-23-3L Unit: mm(inch)

