Typical Applications

Industrial

Float switch

Level sensors

Flow meters

Pulse encoders

Position sensors

Counters

RPM sensors

Assembly equipment

Door and cover switches

Contactless switches

Reed switch replacement

Anti tamper

Alarms and Security

Consumer and Office equipment

Leisure

Automotive

Car and light truck products

Door interlock

Ignition sensors

Speed sensors

Anti skid sensors

Throttle angle sensors

Vending

DIODES INCORPORATED

Diodes Incorporated is a leading manufacturer and supplier of high quality discrete and analog semiconductor products, primarily serving the communications, computing, industrial, consumer electronics and automotive markets.

Recent acquisitions have enabled the company to further expand their product offering, which now extends from small signal devices, power discretes and bridge rectifiers through to MOSFETs, analog ICs and Hall sensors. Moreover, they are able to provide leading edge sub-miniature packages and an innovative range of high power density, low profile types under the PowerDI™ brand.

U.S. based, Diodes Incorporated is a very progressive company with additional state-of-the-art manufacturing facilities in China, a fabless IC plant in Taiwan and sales and support offices throughout the world.

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Anglia is the largest privately owned electronic component distributor in the UK and supplies a very wide range of semiconductors, opto-electronics and interconnect products together with passive and electro-mechanical components.

Awarded the prestigious 'RoHS Trusted' Kitemark, Anglia supports OEM and EMS companies in every sector of electronics manufacturing. It aims to streamline logistics and reduce customers' transaction costs through services that include KAN-BAN, EDI, and customer-dedicated inventory culminating in accurate, on-time delivery.

Technical support spans a sampling service, telephone advice from product specialists and on-site visits from field applications engineers. An in-house design team adds expert resources, helps reduce final product costs and accelerates development times.

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For further information, technical data or application advice on any of the Diodes Inc. products please contact Anglia

By telephone: **+44 (0)1945 47 47 47**

By email: **diodes@anglia.com**

or visit the Diodes Inc. section of our website at: **www.anglia.com/diodes**

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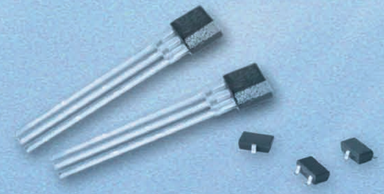
DIODES INCORPORATED

Hall Effect Switches



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Hall Effect Switches

Introduction

Discovered in 1879 by Edwin Hall, the effect refers to the potential difference (Hall voltage) on opposite sides of a thin sheet of semiconductor material through which an electric current is flowing, created by a magnetic field applied perpendicular to the Hall element.

In Diodes Inc Hall effect switches, the Hall voltage is amplified, fed through a Schmitt trigger, and then applied to an output driver stage. The resulting switch is then able to detect a magnetic field, from a magnet for example, and switch on.

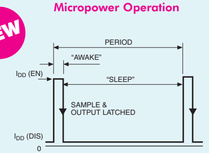
Hall effect switches are effectively sealed contactless, solid-state switches that are immune to dust, dirt and vibration, making them ideal for position sensing applications where small, robust, cost effective switches are required.

The range of Hall effect switches detailed in this shortform cover three operating modes; **Unipolar**, **Bipolar (Latch)** and **Omnipolar**.

Omnipolar comprises of a new series of Micropower devices (part no. prefix AH18x) which use a sample and hold method to reduce power consumption. Typically the devices will "wake up" for 50µs, sample the field and set the output, and then "sleep" for 50ms. This achieves a typical operating current of 8µA making these devices ideal for battery powered applications.

NEW

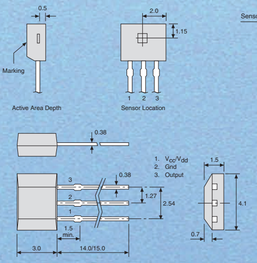
Micropower Operation



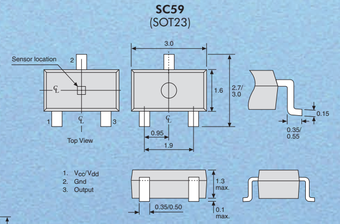
Package Information

Simplified drawings with dimensions in mm. Figure are nominal unless otherwise stated.

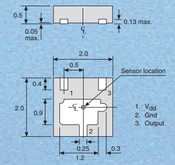
SIP3



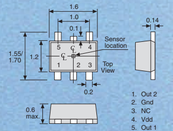
SC59
(SOT23)



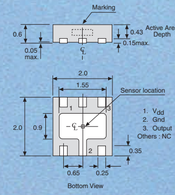
DFN2020-3



SOT553



DFN2020-6



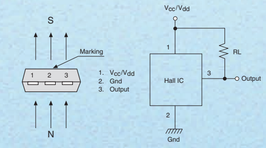
Selection Guide

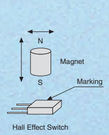
Part Number	Description	Process	Typical Application	Operating Voltage (V)	Output Current (Avg.)	Output Type	Operating Point Bop (Gauss)	Release Point Brp (Gauss)	Grade	Special Features	Operating Temp. (°C)	Pin Count	Available Packages
Unipolar													
AT5137	Single Hall Effect Switch	Bipolar	Contactless Switch	3.5 to 20	25mA	Open Collector	<100 <130	>10 >10	A B SIP3 Only	Reverse Power Protected	-20 to +85	3	SIP3, SC59
AH337	High Temp Single Hall Effect Switch	CMOS	Contactless Switch	4.2 to 28	25mA	Open Drain	90/150	30/90	–	–	-40 to +125	3	SIP3, SC59
Bipolar (Latch)													
AH173	High Temp Single Hall Effect Latch	Bipolar	Motor Position Sensor	3 to 20	25mA	Pull-Up Resistor	16/60 5/80	-60/-15 -80/-5	A B	–	-40 to +125	3	SIP3, SC59
AH175	High Temp Single Hall Effect Latch	Bipolar	Motor Position Sensor	3.5 to 20	25mA	Open Collector	15/60 5/80	-60/-15 -80/-5	A B	Reverse Power Protected	-40 to +150	3	SIP3, SC59
AH373	CMOS Hall Effect Latch	CMOS	Motor Position Sensor	2.5 to 20	25mA	Pull-Up Resistor	5/60	-60/-5	–	–	-40 to +125	3	SIP3, SC59
AH375	CMOS Hall Effect Latch	CMOS	Motor Position Sensor	2.5 to 20	25mA	Open Drain	5/60	-60/-5	–	–	-40 to +125	3	SIP3, SC59
Omnipolar Micropower devices													
AH180	Omnipolar Hall Effect Switch	CMOS	Contactless Switch	2.5 to 5.5	1mA	Open Drain	Bops <60 Bopn >-60	Brps >10 Brpn <-10	–	Chopper Stabilized	-40 to +85	3 6	SIP3, SC59 DFN2020-3 DFN2020-6
AH1801	Inverted-Output Omnipolar Hall Effect Switch	CMOS	Contactless Switch	2.5 to 5.5	1mA	Open Drain	Bops <60 Bopn >-60	Brps >10 Brpn <-10	–	Chopper Stabilized	-40 to +85	3 6	SC59 DFN2020-3 DFN2020-6
AH1802	Omnipolar Hall Effect Switch	CMOS	Contactless Switch	2.5 to 5.5	1mA	Open Drain	Bops <40 Bopn >-40	Brps >10 Brpn <-10	–	Chopper Stabilized	-40 to +85	3 6	SC59 DFN2020-6
AH1803	Omnipolar Hall Effect Switch	CMOS	Contactless Switch	2.4 to 5.5	0.5mA	CMOS	Bops <40 Bopn >-40	Brps >10 Brpn <-10	–	Chopper Stabilized	-40 to +85	3 6	SC59 DFN2020-6
Complementary Output													
AH1884	Dual-Output Omnipolar Hall Effect Switch	CMOS	Contactless Switch	1.65 to 3.3	0.5mA	CMOS	Bops <55 Bopn >-55	Brps >15 Brpn <-15	–	Chopper Stabilized Complementary Output	-40 to +85	5	SOT553

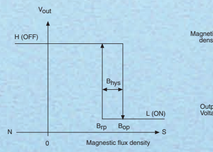
Operating Modes

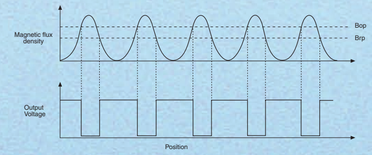
Unipolar

Unipolar Hall effect switches will switch on with a south magnetic field of sufficient strength. The output will switch off if the magnetic field is removed.



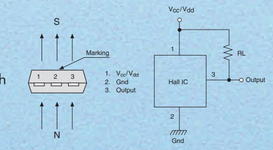


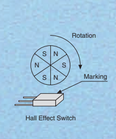


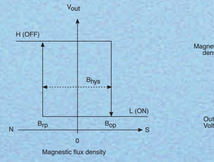


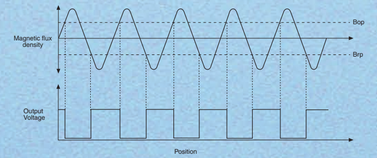
Bipolar (Latch)

Bipolar Hall effect switches will always switch on with a south magnetic field of sufficient strength and switch off with a north magnetic field of sufficient strength. The output will not change if the magnetic field is removed.



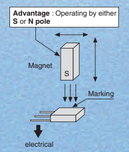


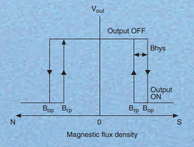


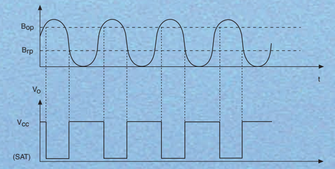


Omnipolar

Omnipolar Hall effect switches are similar to Unipolar types but contain two Hall plates, enabling then to be switched on with either north or south field of sufficient strength. The output will switch off when the field is removed.







B_{op} : Magnetic operate point. A positive magnetic field $>B_{op}$ will switch the sensor on (output low).

B_{rp} : Release point. Removal of the magnetic field $<B_{rp}$ will switch the sensor off (output high).

B_{hys} : Hysteresis. $B_{hys} = |B_{op}| + |B_{rp}|$ (Hysteresis is designed into every Hall effect switch).