SINGLE PHASE HALL EFFECT LATCH

Description

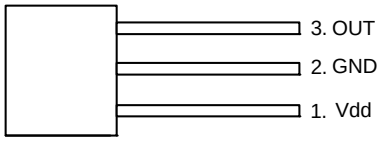
AH375 is an integrated Hall-Effect latched sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a Schmitt trigger to provide switching hysteresis for noise rejection, and open drain output. An internal band-gap regulator provides a temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

When the magnetic flux density (**B**) is larger than operate point (**Bop**), output is switched on (OUT pin is pulled low). The output state is held on until a magnetic flux density reversal falls below Brp. When **B** is less than Brp, the output is switched off.

The AH375 is available in SIP-3L and SC59 packages.

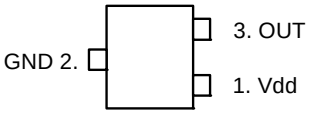
Pin Assignments

(Top View)



SIP-3L

(Top View)



SC59

Features

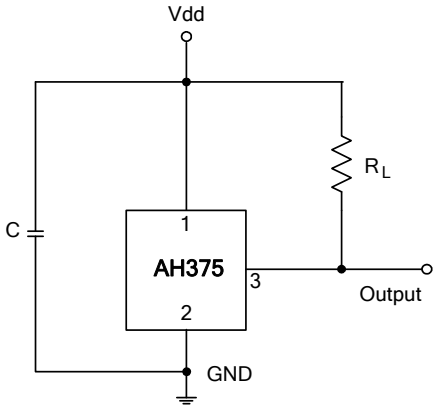
- Bipolar Hall-Effect latch sensor
- 2.2V to 20V DC Operating voltage
- Temperature compensation
- Open drain pre-driver
- 25mA maximum output sink current
- Operating temperature: -40°C to +125°C
- SIP-3L and SC59 packages
  (SC59 is commonly known as SOT23 in Asia)
- Green Molding Compound (No Br, Sb) (Note 1)

Applications

- Brush-Less DC Motor
- Brush-Less DC Fan
- Revolution Counting
- Speed Measurement

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.

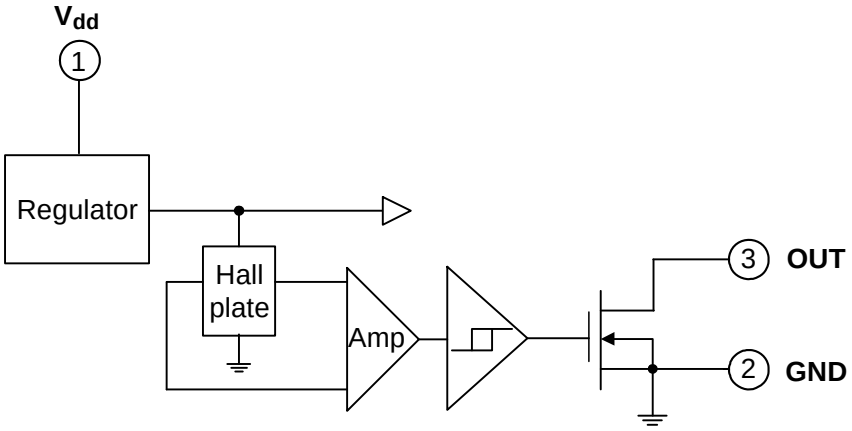
Typical Application Circuit



Pin Descriptions

Pin Name	P/I/O	Pin #	Description
Vdd	P	1	Positive Power Supply
GND	P	2	Ground
OUT	O	3	Output Pin

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C)

Symbol	Characteristics		Values	Unit
Vdd	Supply Voltage		20	V
B	Magnetic Flux Density		Unlimited	
V_{DS}	Output OFF Voltage		30	V
Id	Output "On" Current	Continuous	25	mA
T_S	Storage Temperature Range		-65~+150	°C
$T_{J(MAX)}$	Maximum Junction Temperature		150	°C
P_D	Package Power Dissipation	SIP-3L	550	mW
		SC59	230	
θ_{JC}	Thermal Resistance	SIP-3L	227	°C/W
		SC59	543	

Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
Vdd	Supply Voltage (Note 2)	Operating	2.2	20	V
T_A	Operating Ambient Temperature	Operating	-40	125	°C

Notes: 2. The output of IC will be switched after the supply voltage is over 2.2V, but the magnetic characteristics won't be normal until the supply is over 2.5V.

Electrical Characteristics (T_A = 25 °C, Vdd = 12V)

Symbol	Characteristic	Test Conditions	Min	Typ.	Max	Unit
$V_{DS\ (SAT)}$	Output Saturation Voltage	Iout = 20mA	-	300	700	mV
Ioff	Output Leakage Current	V_{DD} = 14V	-	<0.1	10	uA
Idd	Supply Current	Output Open	-	2	4	mA

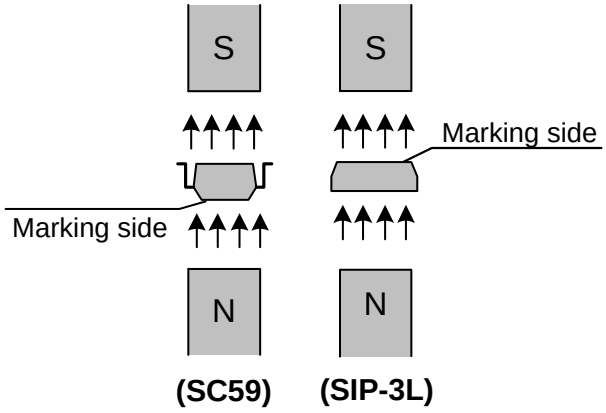
Magnetic Characteristics (T_A = 25 °C, Vdd = 2.5V to 20V, Note 3)

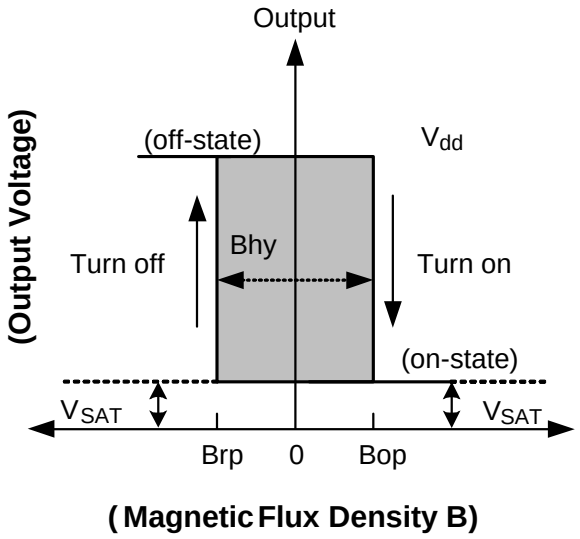
(1mT = 10 Gauss)

Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	5	30	60	Gauss
Brps(south pole to brand side)	Release Point	-60	-30	-5	Gauss
Bhy(|Bopx|-|Brpx|)	Hysteresis	-	60	-	Gauss

Notes: 3. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

Operating Characteristics

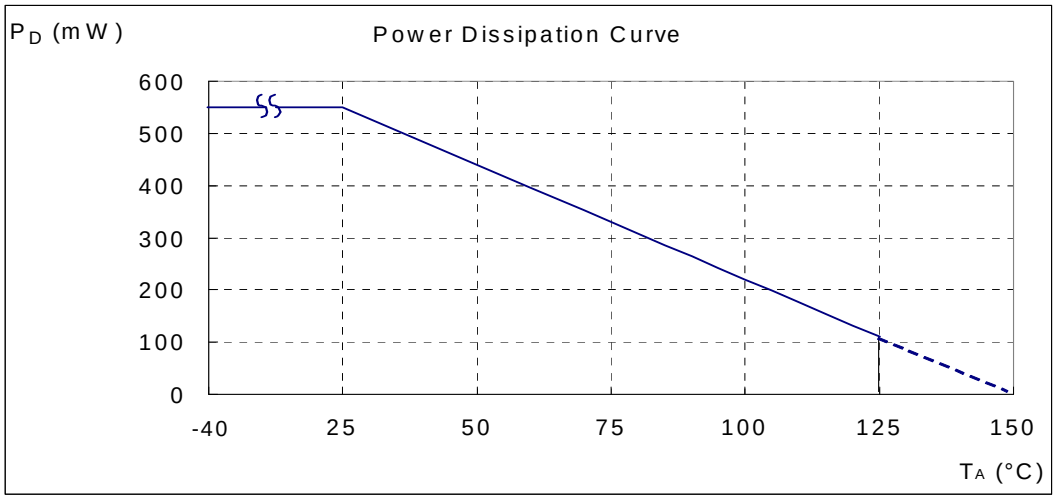




Performance Characteristics

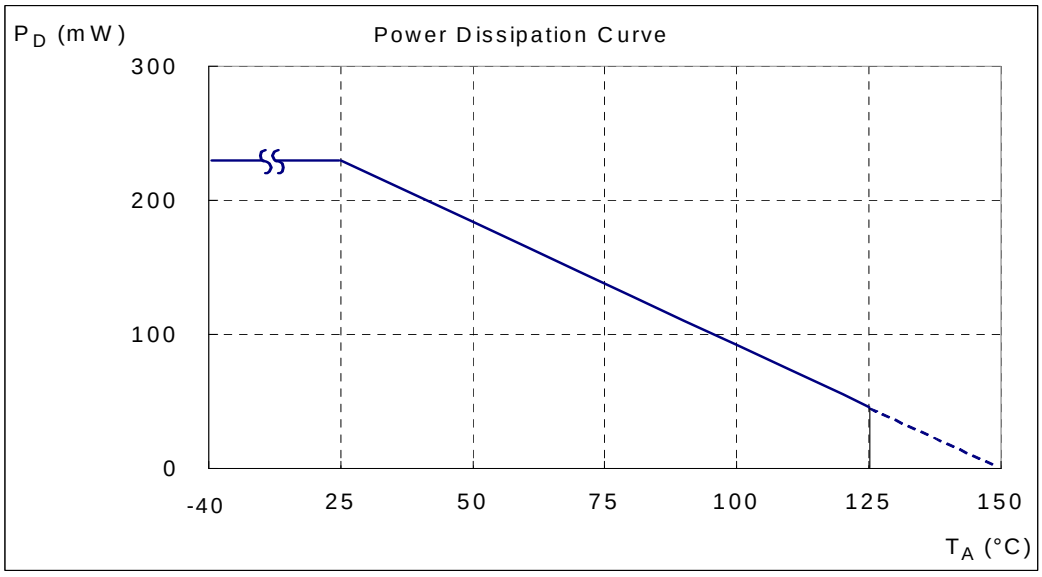
(1) SIP-3L

T_A (°C)	25	50	60	70	80	85	90	95	100
P_D (mW)	550	440	396	352	308	286	264	242	220
T_A (°C)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**150**
P_D(mW)	198	176	154	132	110	88	66	44	0

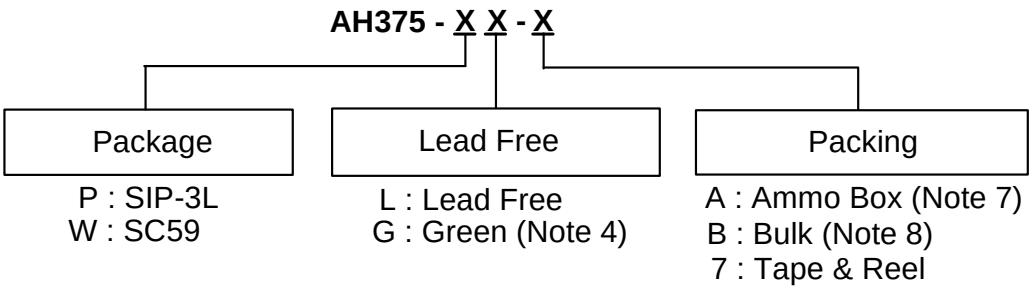


(2) SC59 (commonly known as SOT23 in Asia)

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

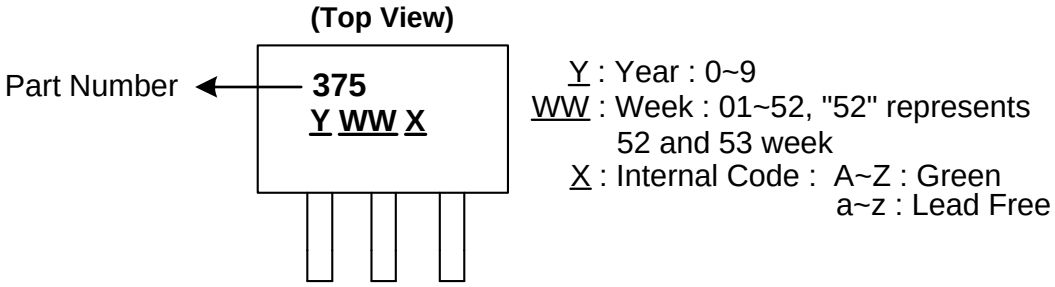


Device	Package Code	Packaging (Note 5, 6)	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH375-PL-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A
AH375-PL-B	P	SIP-3L	1000	-B	NA	NA	NA	NA
AH375-PG-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A
AH375-PG-B	P	SIP-3L	1000	-B	NA	NA	NA	NA
AH375-WL-7	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA
AH375-WG-7	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA

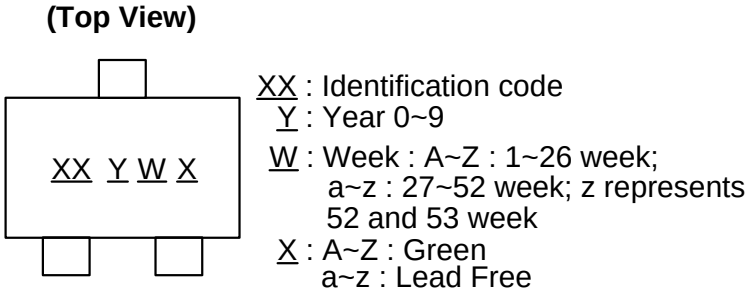
Notes:
4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
6. Reverse taping as shown on Diodes Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website http://www.diodes.com/datasheets/ap02007.pdf.
7. Ammo Box is for SIP-3L Spread Lead.
8. Bulk is for SIP-3L Straight Lead.

Marking Information

(1) SIP-3L



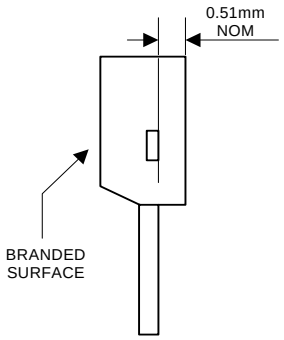
(2) SC59 (Commonly known as SOT23 in Asia)



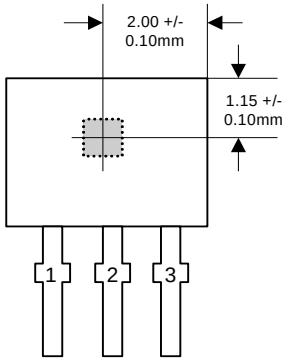
Part Number	Package	Identification Code
AH375	SC59	P3

Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SIP-3L for Bulk pack

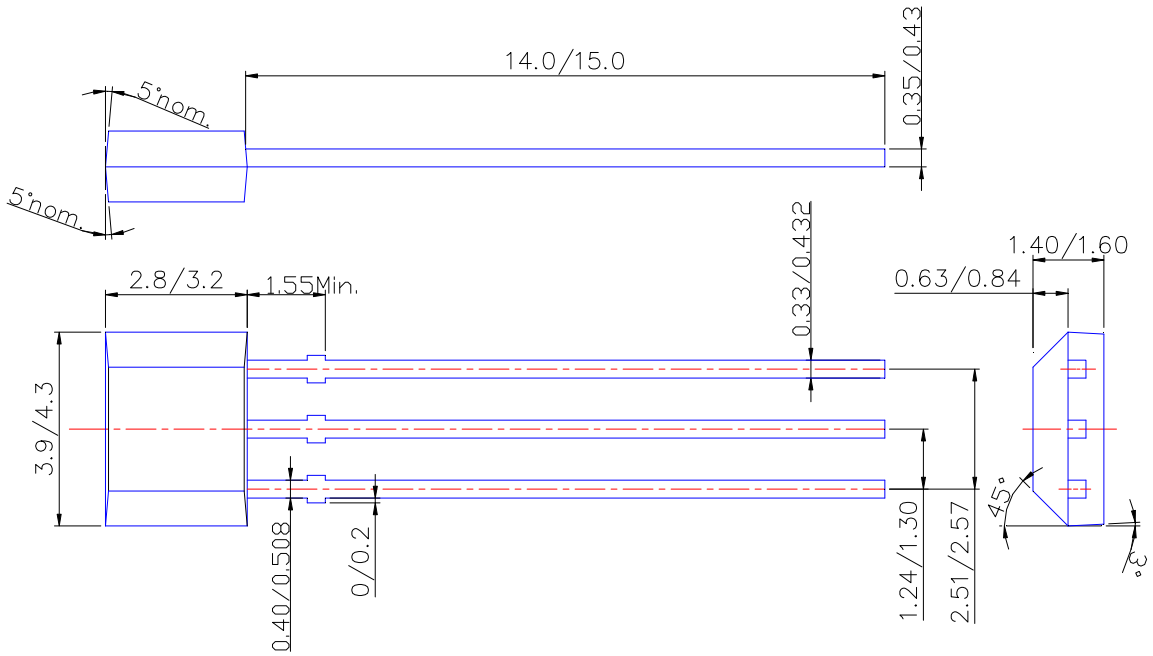


Active Area Depth



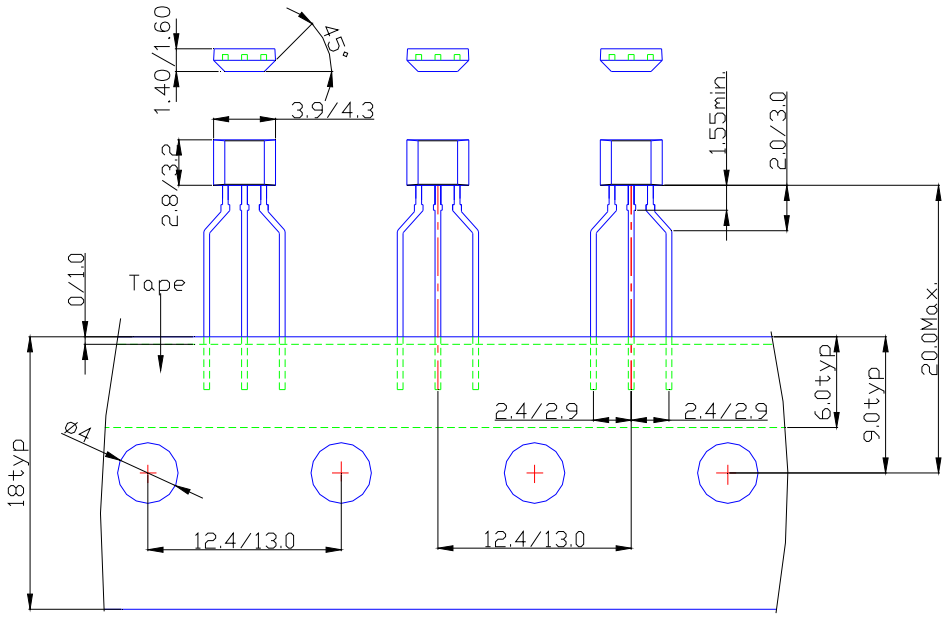
Sensor Location

Package Dimension

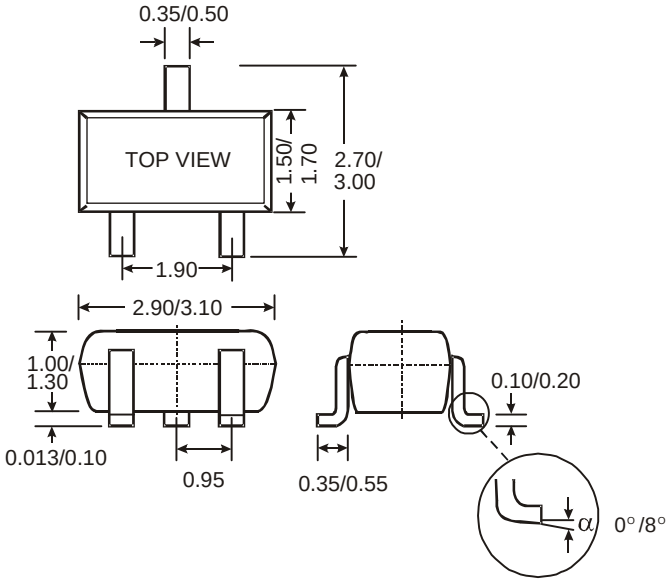


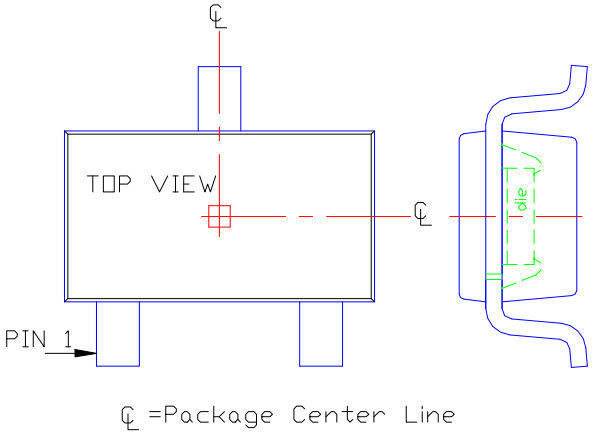
Package Outline Dimensions (Continued)

(2) Package Type: SIP-3L for Ammo pack



(3) SC59 (Commonly known as SOT23 in Asia)





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