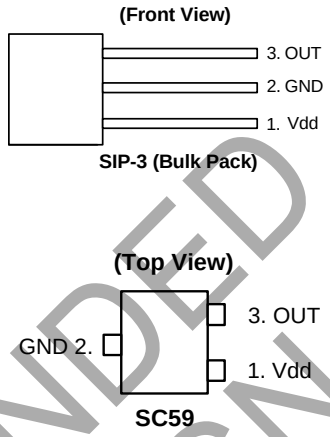
Description

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-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 packages.

Pin Assignments



Features

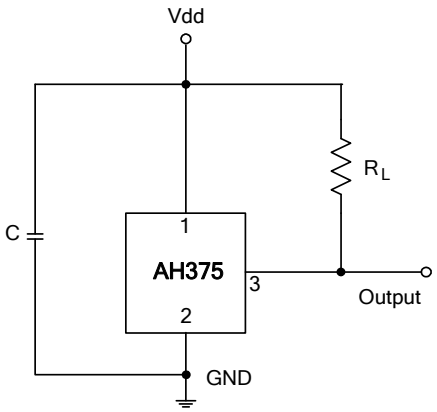
- Bipolar Hall-Effect Latch Sensor
- 2.2V to 20V DC Operating Voltage
- Temperature Compensation
- Open Drain Pre-Driver
- 25mA Maximum Output Sink Current
- Operating Temperature: -40°C to +125°C
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 Packages (SC59 is Commonly Known as SOT23 in Asia)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Applications

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

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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.

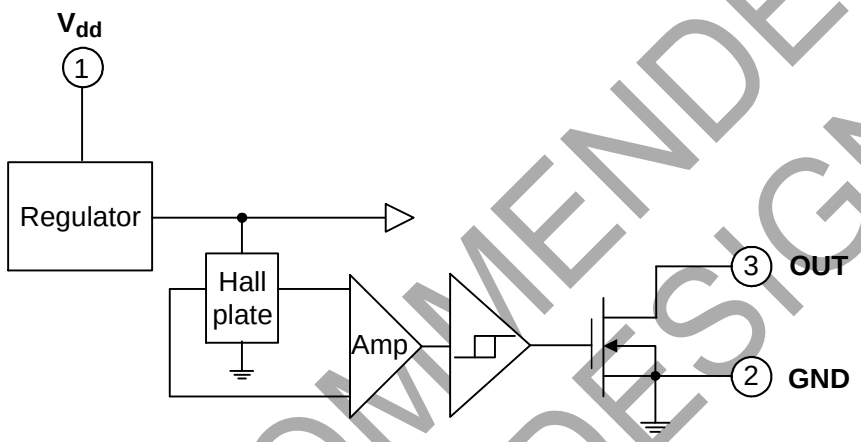
Typical Applications Circuit



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 to +150	°C
$T_{J(MAX)}$	Maximum Junction Temperature		+150	°C
P_D	Package Power Dissipation	SIP-3 (Ammo Pack)	550	mW
		SIP-3 (Bulk Pack)	550	
		SC59	230	
θ_{JC}	Thermal Resistance	SIP-3 (Ammo Pack)	227	°C/W
		SIP-3 (Bulk Pack)	227	
		SC59	543	

Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
Vdd	Supply Voltage (Note 4)	Operating	2.2	20	V
T_A	Operating Ambient Temperature	Operating	-40	+125	°C

Notes: 4. 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	I_{OUT} = 20mA	-	300	700	mV
I_{OFF}	Output Leakage Current	Vdd = 14V	-	<0.1	10	μA
Idd	Supply Current	Output Open	-	2	4	mA

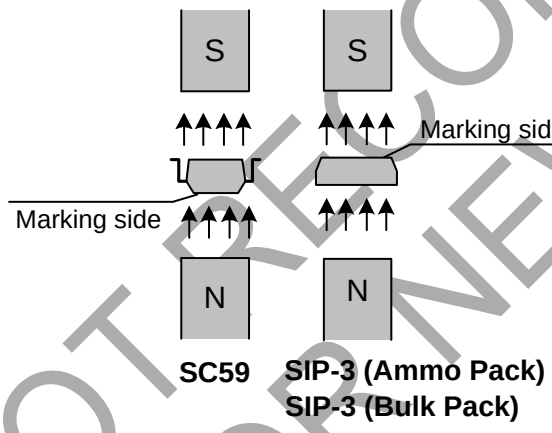
Magnetic Characteristics (T_A = +25°C, Vdd = 2.5V to 20V, Note 5)

(1mT = 10 Gauss)

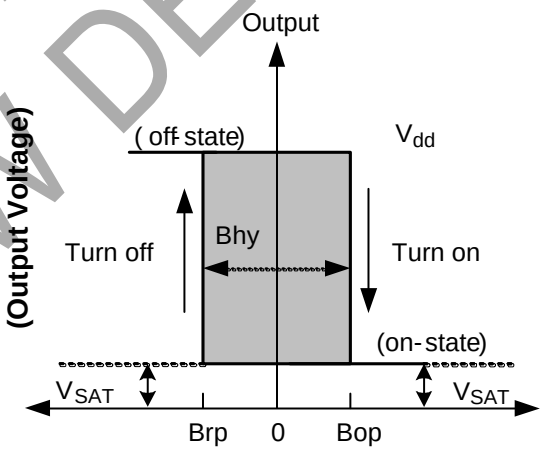
Symbol	Parameter	Min	Typ.	Max	Unit
Bops(South Pole to Brand Side)	Operation Point	5	30	60	Gauss
Brps(South Pole to Brand Side)	Release Point	-60	-30	-5	Gauss
Bhy(|Bopx|-|Brpx|)	Hysteresis	-	60	-	Gauss

Notes: 5. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

Operating Characteristics



SC59 **SIP-3 (Ammo Pack)**
SIP-3 (Bulk Pack)

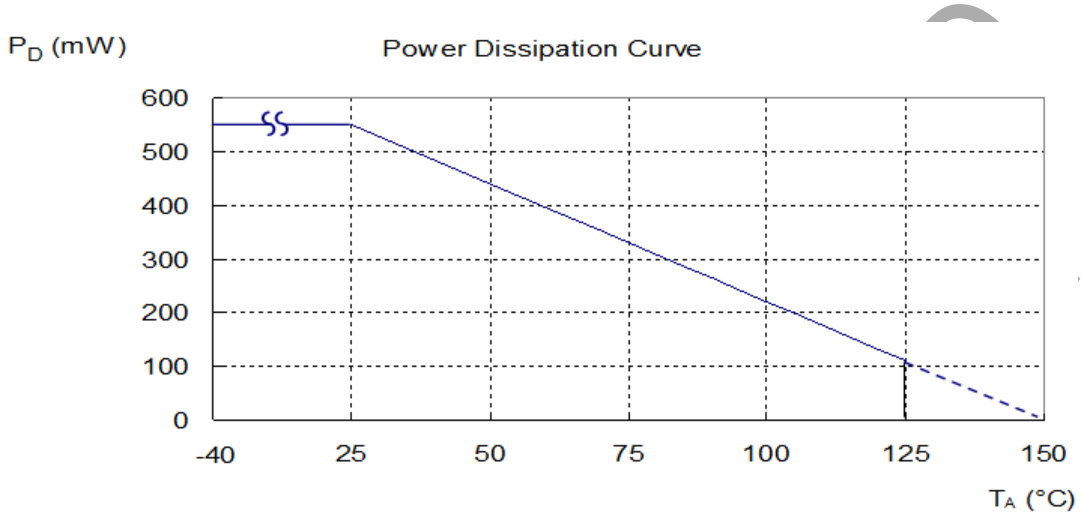


(Magnetic Flux Density B)

Performance Characteristics

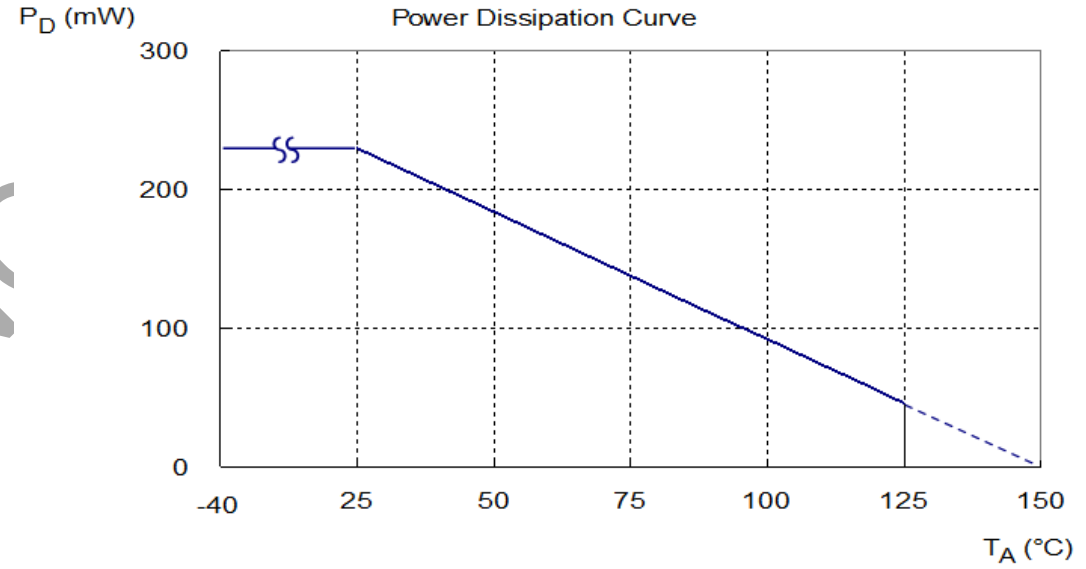
(1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

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

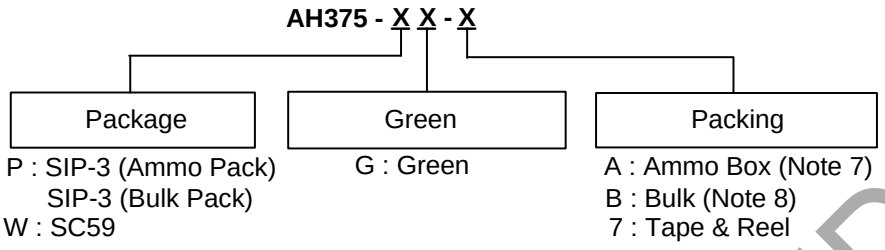


(2) SC59 (Commonly Known as SOT23 in Asia)

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



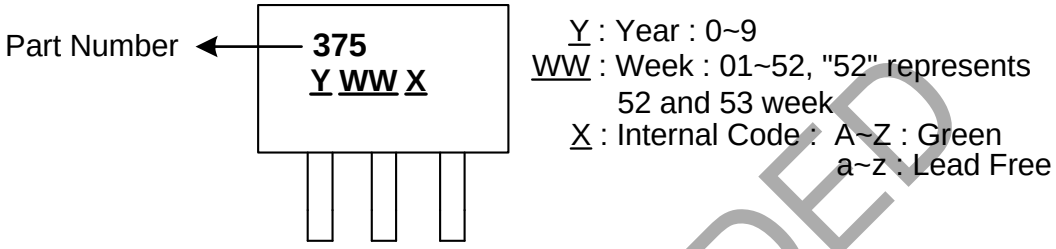
Part Number	Status (Note 9)	Package Code	Packaging (Note 6)	Bulk		7" Tape and Reel		Ammo Box	
				Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH375-PG-A	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH375-PG-B	NRND	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH375-WG-7	NRND	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA

Notes:
6. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at http://www.diodes.com/package-outlines.html.
7. Ammo Box is for SIP-3 Spread Lead.
8. Bulk is for SIP-3 Straight Lead.
9. NRND = Not Recommended for New Design

Marking Information

(1) Package Types: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

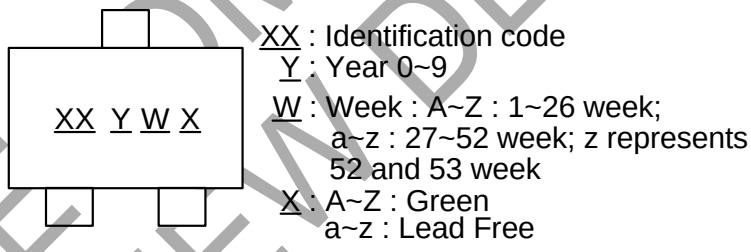
(Top View)



Part Number	Package	Identification Code
AH375	SIP-3 (Ammo Pack)	375
AH375	SIP-3 (Bulk Pack)	375

(2) Package Type: SC59

(Top View)

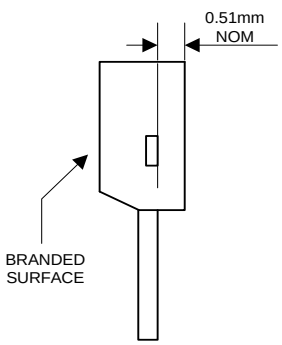


Part Number	Package	Identification Code
AH375	SC59	P3

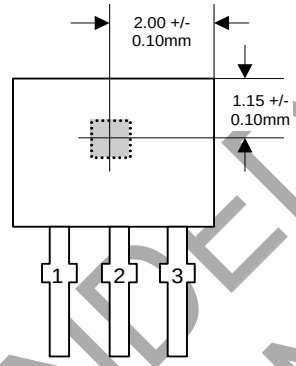
Package Outline Dimensions (All Dimensions in mm)

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

(1) Package Type: SIP-3 (Bulk Pack)

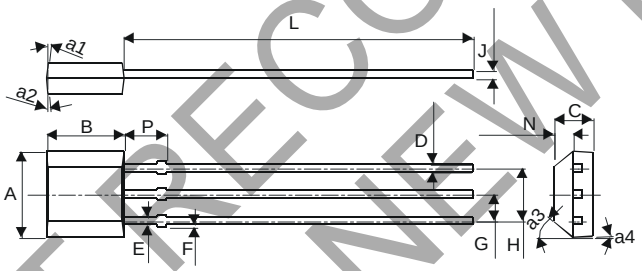


Active Area Depth



Sensor Location

Package Dimensions

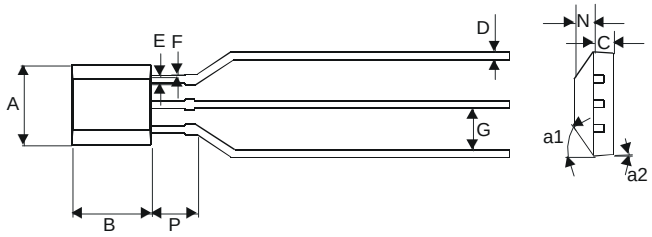


SIP-3 (Bulk Pack)		
Dim	**Min**	**Max**
A	3.9	4.3
a1	5° Typ	
a2	5° Typ	
a3	45° Typ	
a4	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

Package Outline Dimensions (Continued)

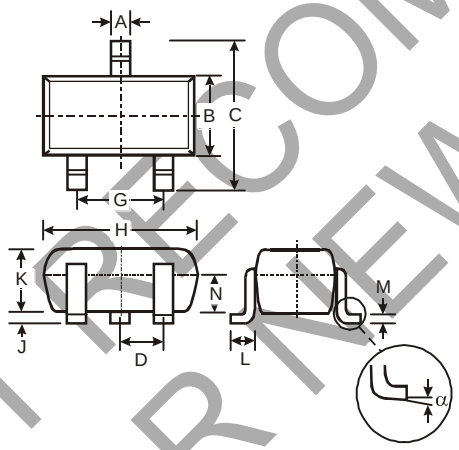
Please see http://www.diodes.com/package-outlines.html for the latest version.

(2) Package Type: SIP-3 (Ammo Pack)

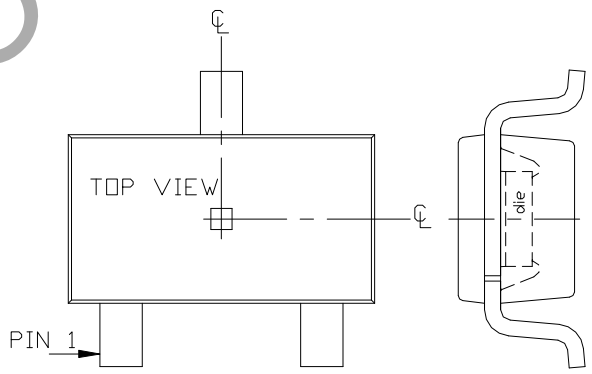


SIP-3 (Ammo Pack)		
Dim	**Min**	**Max**
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

(3) Package Type: SC59 (Commonly Known as SOT23 in Asia)



SC59			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			

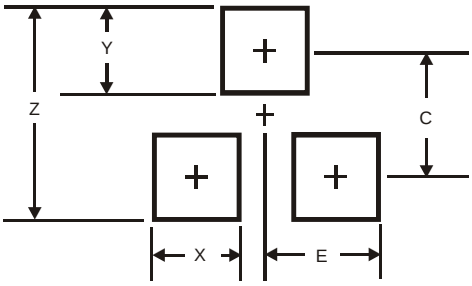


℄ =Package Center Line

Suggested Pad Layout

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

(1) Package Type: SC59 (Commonly Known as SOT23 in Asia)



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35