HALL EFFECT LATCH FOR HIGH TEMPERATURE

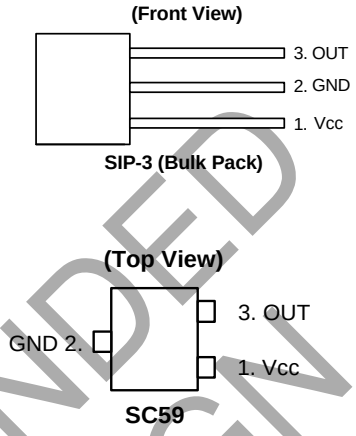
Description

AH175 is a single-digital-output Hall-Effect latch sensor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, an open-collector output pre-driver. 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 AH175 is available in SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 packages.

Pin Assignments



Features

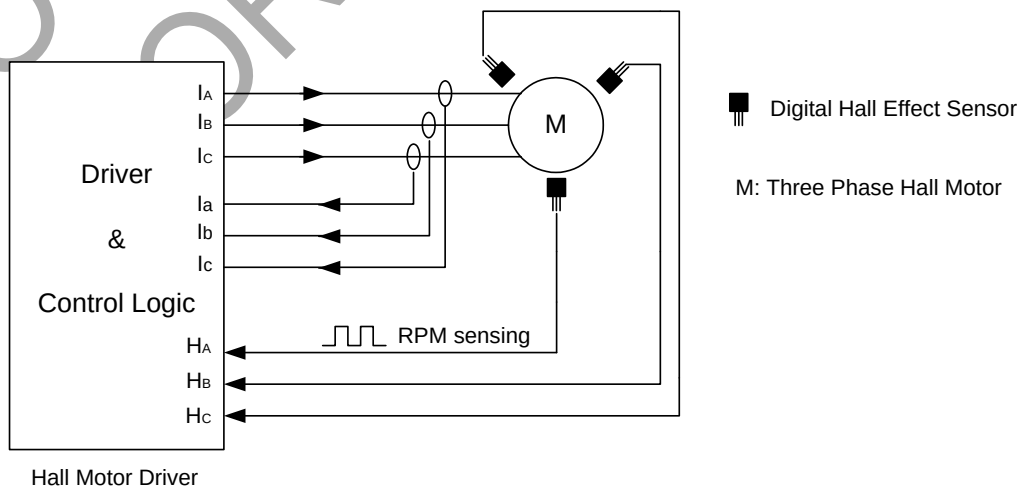
- Bipolar Hall-Effect Latch Sensor
- 3.5V to 20V DC Operating Voltage
- Open Collector Pre-Driver
- 25mA Output Sink Current
- Built-in Power Reverse Protection
- Operating Temperature: -40ºC to +150ºC
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 Packages (SC59 is Commonly Known as SOT23 in Asia)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Applications

- Rotor Position Sensing
- Current Switch
- Encoder
- RPM Detection

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

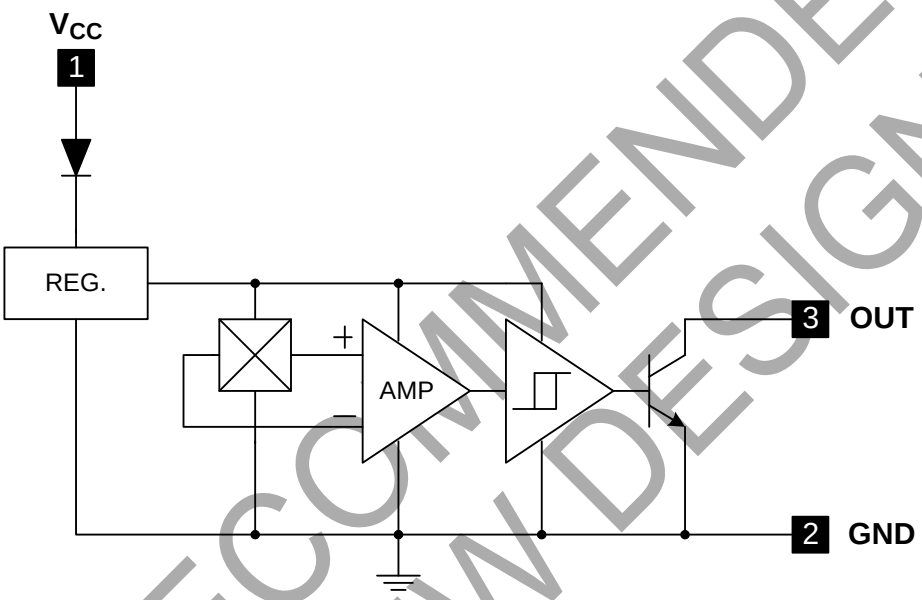


3 Phase Hall Motor

Pin Descriptions

Pin Name	Pin #	Description
Vcc	1	Positive Power Supply
GND	2	Ground
OUT	3	Output Stage

Functional Block Diagram



Absolute Maximum Ratings (T_A = +25°C)

Symbol	Characteristics		Values	Unit
V_{CC}	Supply Voltage		20	V
V_{OUT} (off)	Output "Off" Voltage		20	V
I_O (sink)	Output "On" Current		25	mA
T_S	Storage Temperature Range		-65 to +150	°C
T_J	Maximum Junction Temperature		+150	°C
P_D	Power Dissipation	SIP-3 (Ammo Pack)	550	mW
		SIP-3 (Bulk Pack)	550	mW
		SC59	230	mW

Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage	Operating	3.5	20	V
T_A	Operating Ambient Temperature (Note 4)	Operating	-40	+150	°C

Notes: 4. The device P_D and Safety Operation Area should not be exceeded.

Electrical Characteristics (T_A = +25°C)

Symbol	Characteristics	Conditions	Min	Typ.	Max	Unit
$V_{OUT\ (SAT)}$	Output Saturation Voltage	V_{CC} = 12V, OUT "ON" I_O = 10mA	-	300	400	mV
I_{CC}	Supply Current	V_{CC} = 12V, OUT "OFF"	-	3.5	6	mA

Magnetic Characteristics (T_A = +25°C, V_{CC} = 12V, unless otherwise specified, Note 5)

(1mT = 10 Gauss)

A Grade

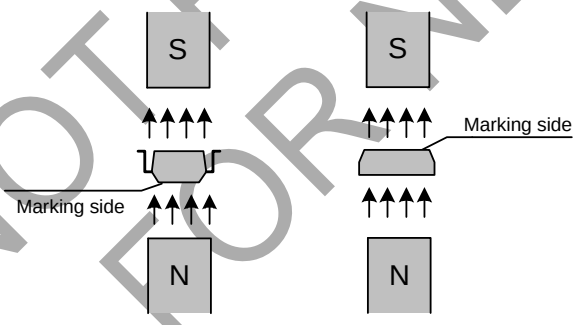
Symbol	Parameter	Min	Typ	Max	Unit
Bops(South Pole to Brand Side)	Operation Point	15	-	60	Gauss
Brps(South Pole to Brand Side)	Release Point	-60	-	-15	Gauss
Bhy(|Bopx|-|Brpx|)	Hysteresis	30	80	120	Gauss

B Grade

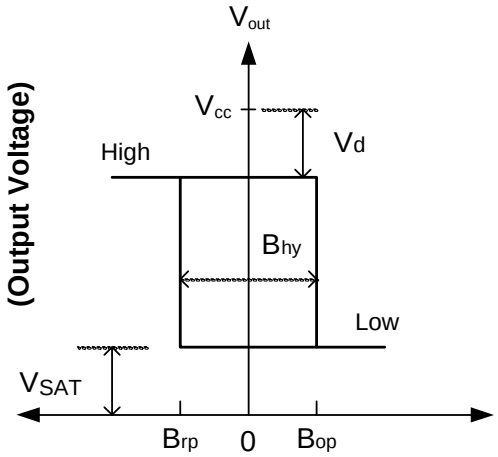
Symbol	Parameter	Min	Typ	Max	Unit
Bops(South Pole to Brand Side)	Operation Point	5	-	80	Gauss
Brps(South Pole to Brand Side)	Release Point	-80	-	-5	Gauss
Bhy(|Bopx|-|Brpx|)	Hysteresis	10	80	160	Gauss

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

Operating Characteristics



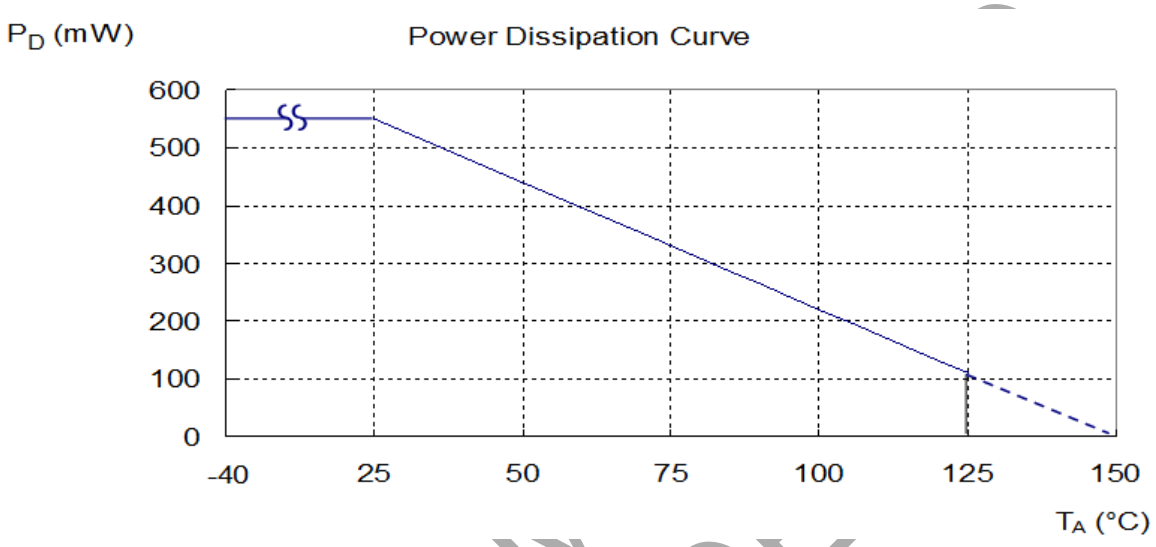
SC59 **SIP-3 (Ammo Pack)**
SIP-3 (Bulk Pack)



Performance Characteristics

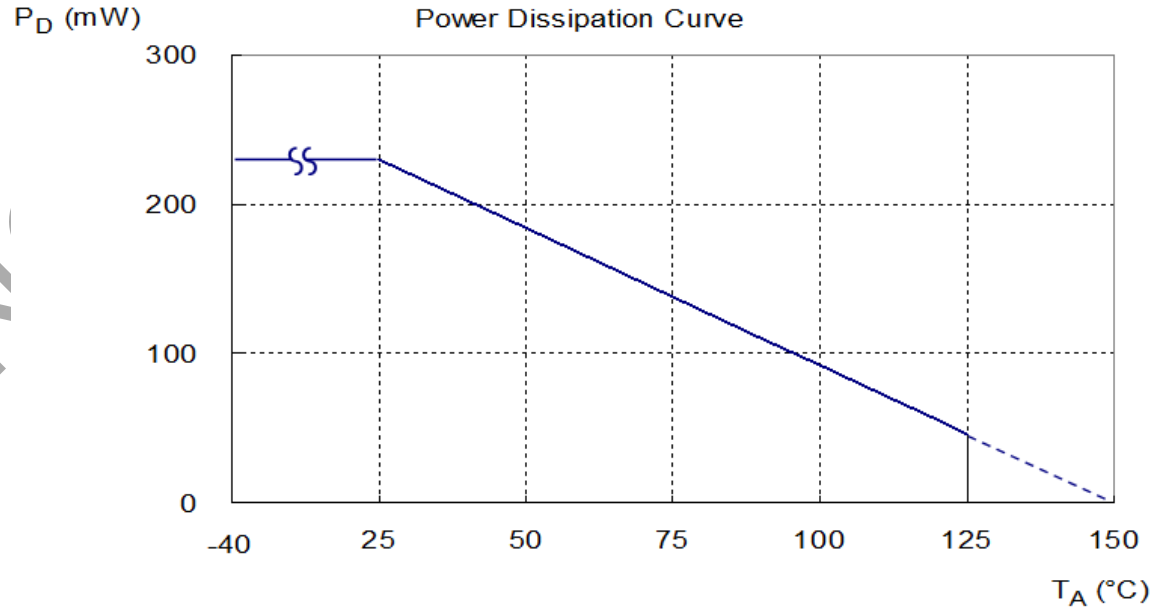
(1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

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

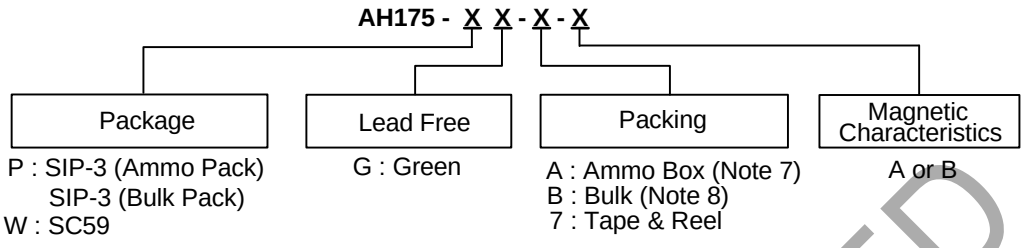


(2) SC59 (Commonly Known as SOT23 in Asia)

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

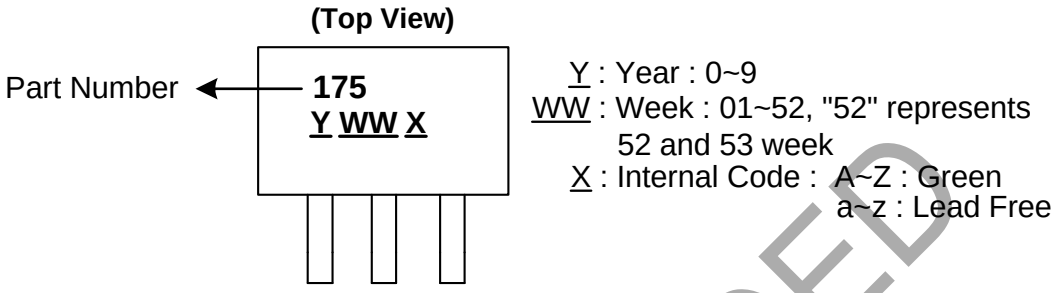


Part Number	Status (Note 9)	Package Code	Packaging (Note 6)	Bulk		7" Tape and Reel		Ammo Box	
				Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH175-PG-A-A	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH175-PG-A-B	NRND	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH175-PG-B-A	NRND	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH175-PG-B-B	NRND	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH175-WG-7-A	NRND	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA
AH175-WG-7-A	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

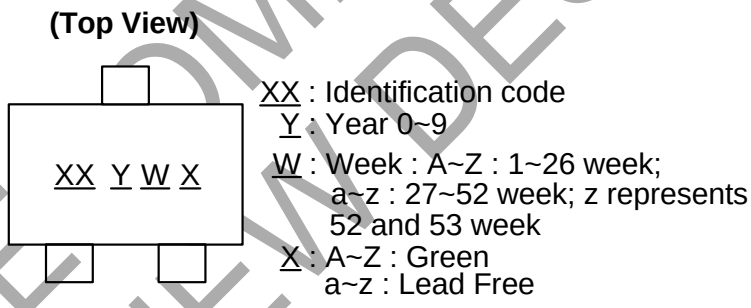
Marking Information

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



Part Number	Package	Identification Code
AH175	SIP-3 (Ammo Pack)	175
AH175	SIP-3 (Bulk Pack)	175

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

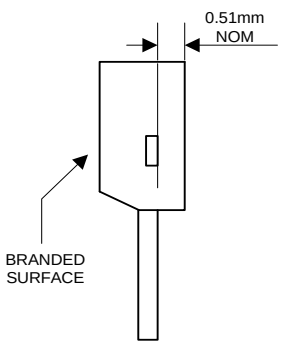


Part Number	Package	Identification Code
AH175	SC59	J5

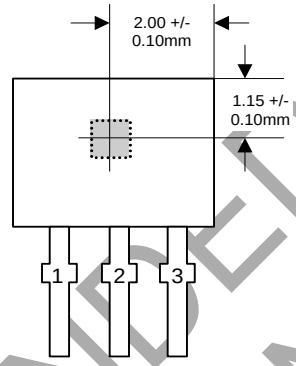
Package Outline Dimensions (All Dimensions in mm)

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

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

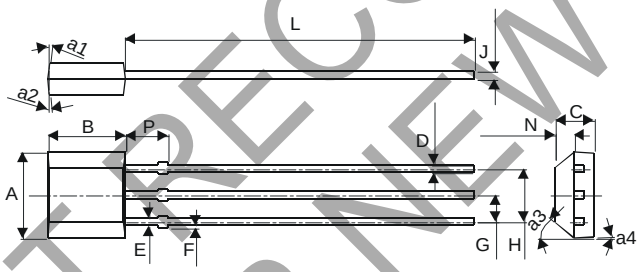


Active Area Depth



Sensor Location

Package Dimensions

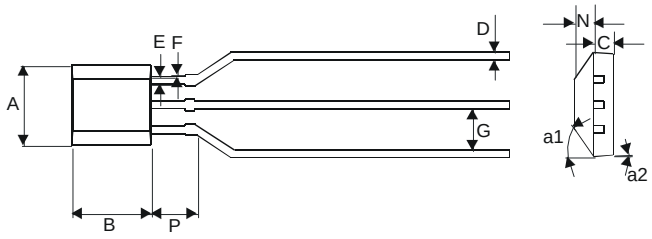


SIP-3 (Bulk Pack)		
Dim	**Min**	**Max**
A	3.9	4.3
a1	5° Typ	
a2	5° Typ	
a3	45° Typ	
a4	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

Package Outline Dimensions (Continued)

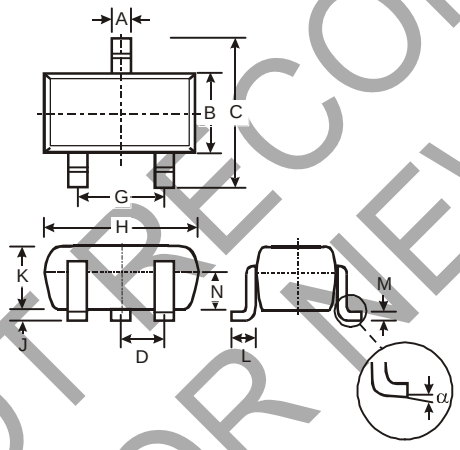
Please see http://www.diodes.com/package-outlines.html for the latest version.

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

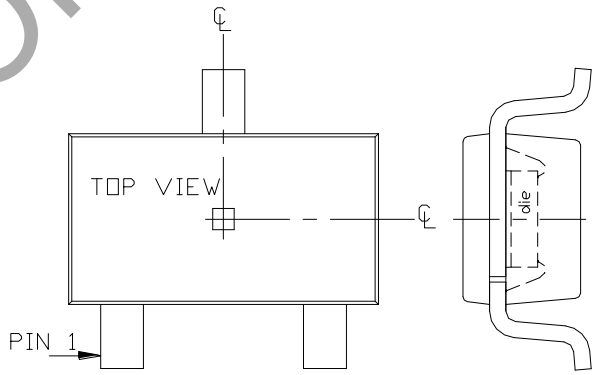


SIP-3 (Ammo Pack)		
Dim	**Min**	**Max**
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

(3) 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			

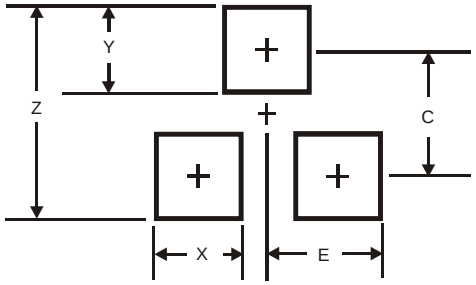


℄ =Package Center Line

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