INTERNAL PULL-UP HALL EFFECT LATCH FOR HIGH TEMPERATURE

Features

- Bipolar Hall Effect Latch Sensor
- 3V to 20V DC Operation Voltage
- Built-in Pull-Up Resistor
- 25mA Output Sink Current
- Operating Temperature: –40°C ~ +125°C
- Lead Free Packages: SC59-3L and SIP-3L (Note 1)
- SC59-3L (commonly known as SOT23 in Asia): Available in “Green” Molding Compound (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 2)

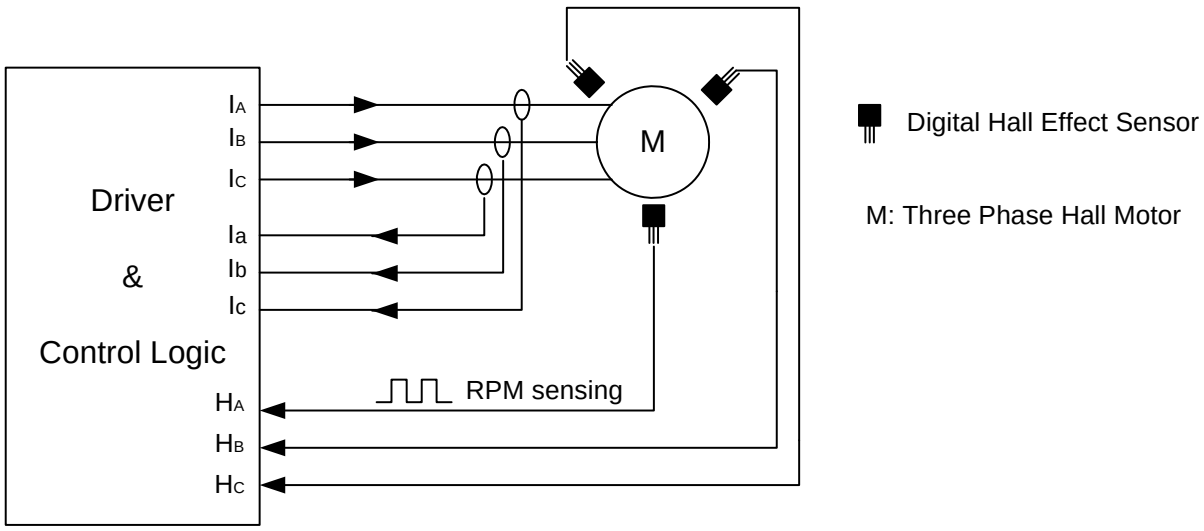
General Description

AH173 is a single-digital-output Hall-effect sensor with pull-up resistor 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, and an output driver with a pull-up resistor (Rpu). An internal band-gap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range. While the magnetic flux density (B) is larger than operate point (Bop), the OUT pin turns on (low). If B moves toward release point (Brp), the OUT pin is latched “on” state prior to B < Brp. When B < Brp, the OUT pin goes into “off ” state.

Applications

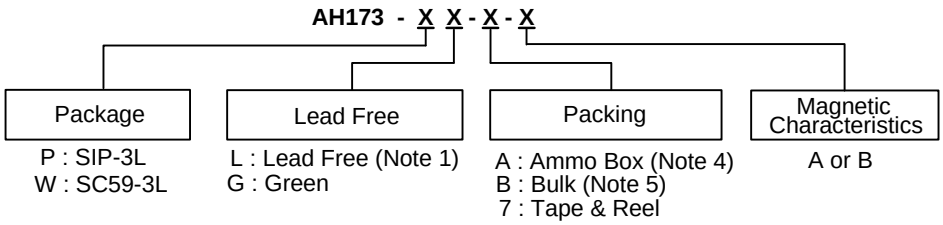
- Rotor Position Sensing
- Current Switch
- Encoder
- RPM Detection

Functional Application Circuit



3 Phase Hall Motor

Ordering Information



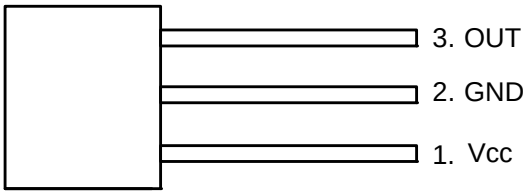
Device	Package Code	Packaging (Note 3)	Tube/Bulk		7" Tape and Reel		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix	
AH173-PL-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
AH173-PL-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
AH173-PL-B-A	P	SIP-3L	1000	-B	NA	NA	NA	NA	A
AH173-PL-B-B	P	SIP-3L	1000	-B	NA	NA	NA	NA	B
AH173-WL-7-A	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	A
AH173-WL-7-B	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	B
AH173-WG-7-A	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	A
AH173-WG-7-B	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	B

Notes:
1. SIP-3L is available in "Lead Free" product only.
2. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
3. 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.
4. Ammo Box is for SIP-3L Spread Lead.
5. Bulk is for SIP-3L Straight Lead.

Pin Assignment

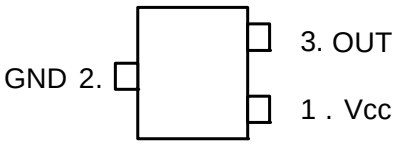
(1) SIP-3L

(Top View)



(2) SC59-3L (commonly known as SOT23 in Asia)

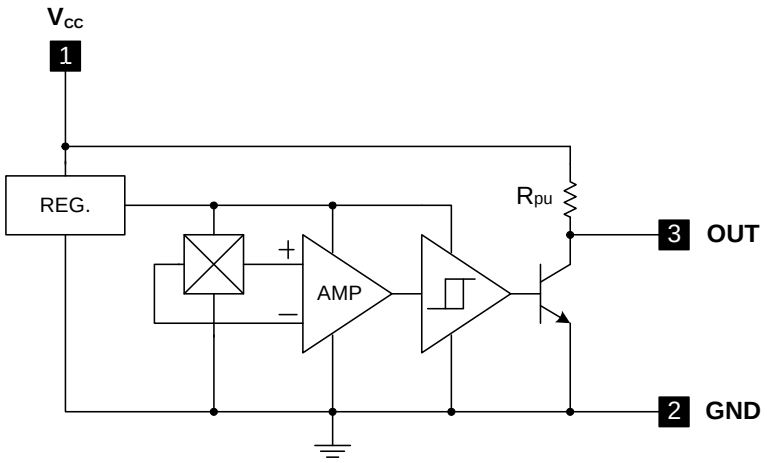
(Top View)



Pin Descriptions

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

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
Ts	Storage Temperature Range		-65~+150	°C
T_J	Maximum Junction Temperature		+150	°C
P_D	Power Dissipation	SIP-3L	550	mW
		SC59-3L	230	mW

Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage	Operating	3	20	V
T_A	Operating Ambient Temperature	Operating	-40	125	°C

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
Rpu	Internal Pull-up Resistor		7	10	13	KΩ
V_d	Dropout Voltage	$V_d = V_{CC} - V_{Ce}$	-	-	0.3	V

Magnetic Characteristics (T_A = 25°C, Vcc = 12V, Note 6)

(1mT = 10 Gauss)

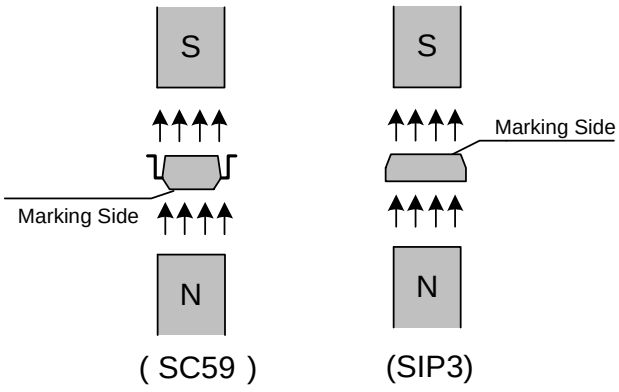
A grade

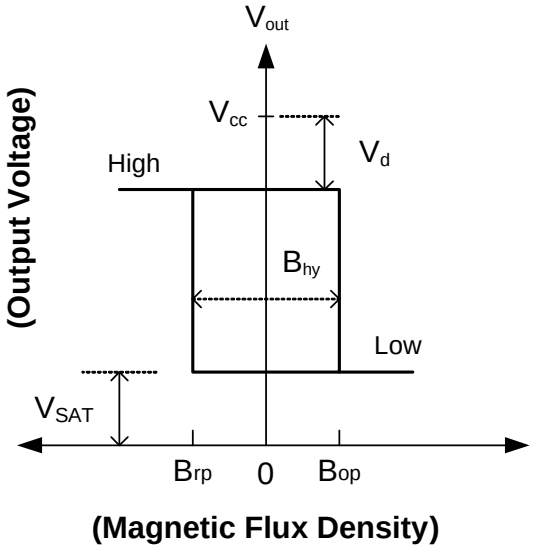
Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	15	-	60	Gauss
Brps(south pole to brand side)	Release Point	-60	-	-15	Gauss
Bhy(|Bopx – Brpx|)	Hysteresis	-	80	-	Gauss

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	-	80	-	Gauss

Notes: 6. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.

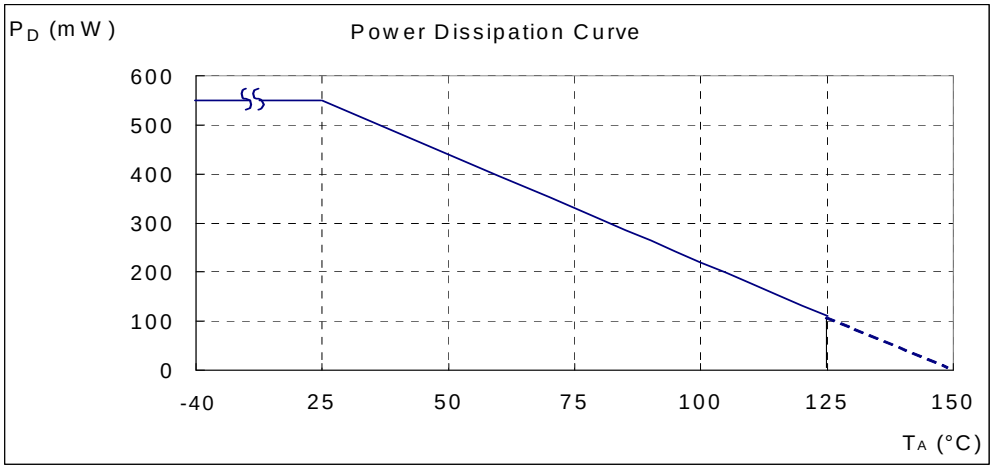




Performance Characteristics

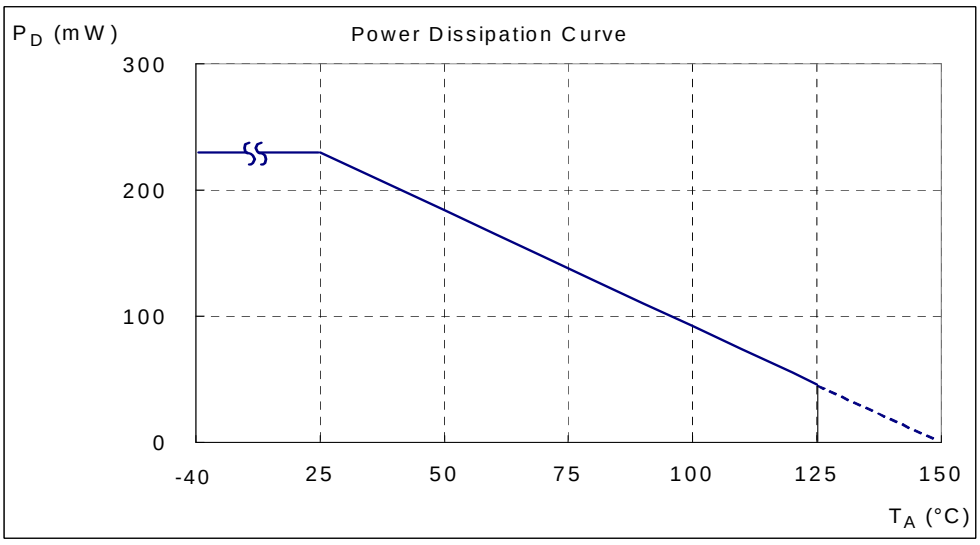
(1) SIP-3L

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



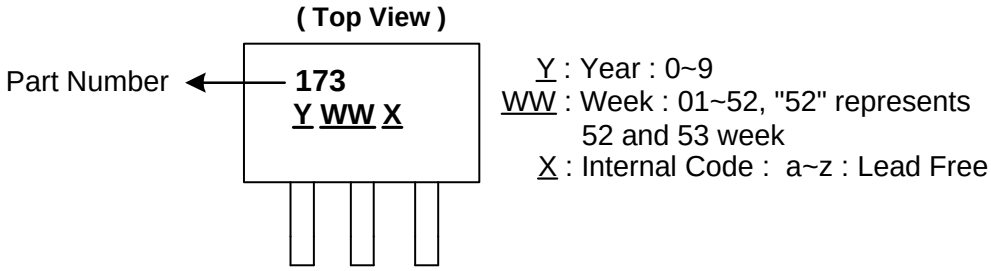
(2) SC59-3L (commonly known as SOT23 in Asia)

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

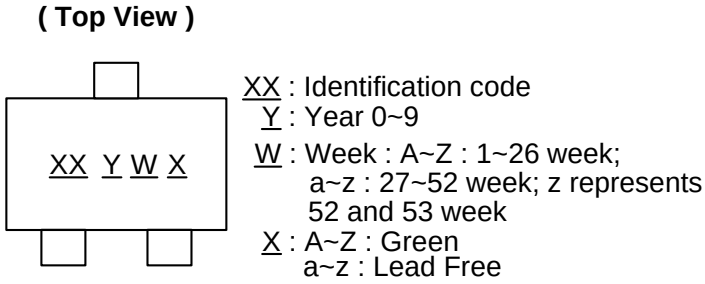


Marking Information

(1) SIP3-3L



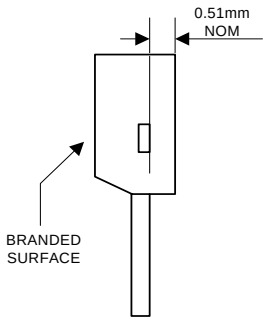
(2) SC59 (Commonly known as SOT23 in Asia)



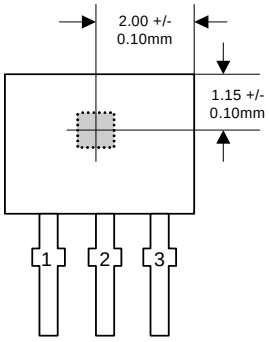
Part Number	Package	Identification Code
AH173	SC59-3L	J3

Package Information (All Dimensions in mm)

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

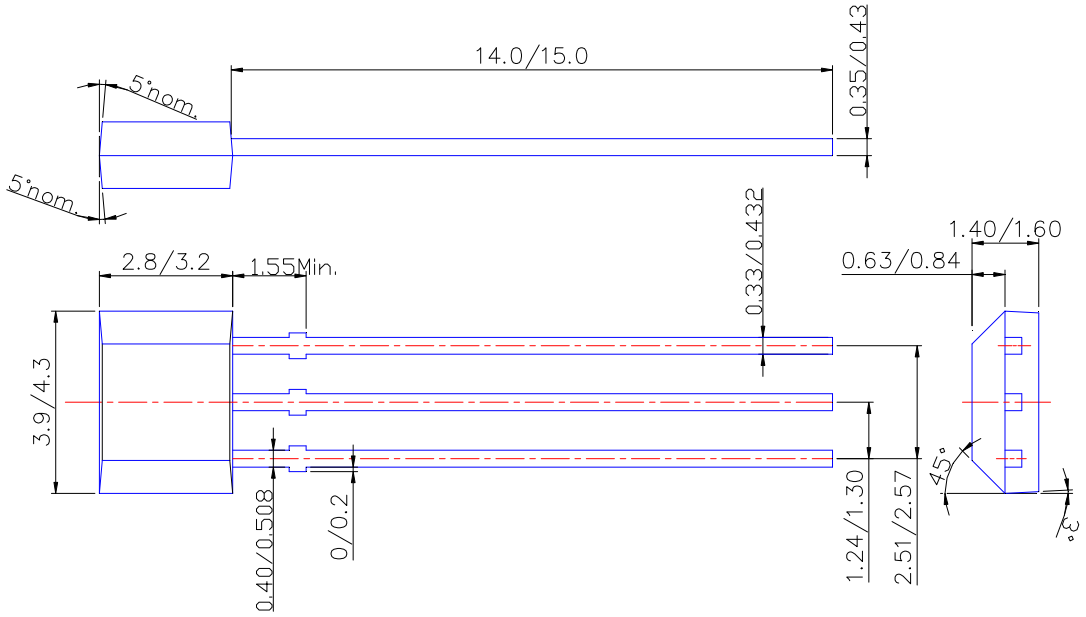


Active Area Depth



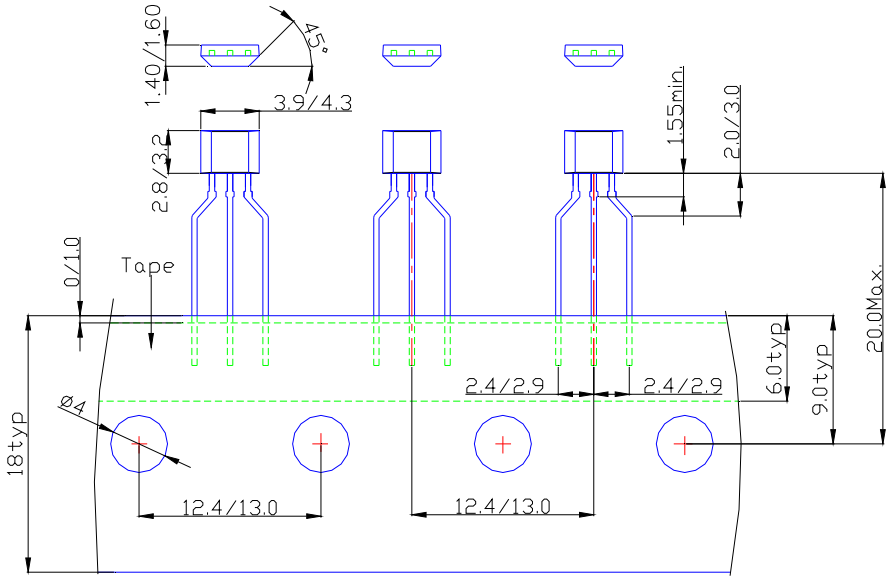
Sensor Location

Package Dimension

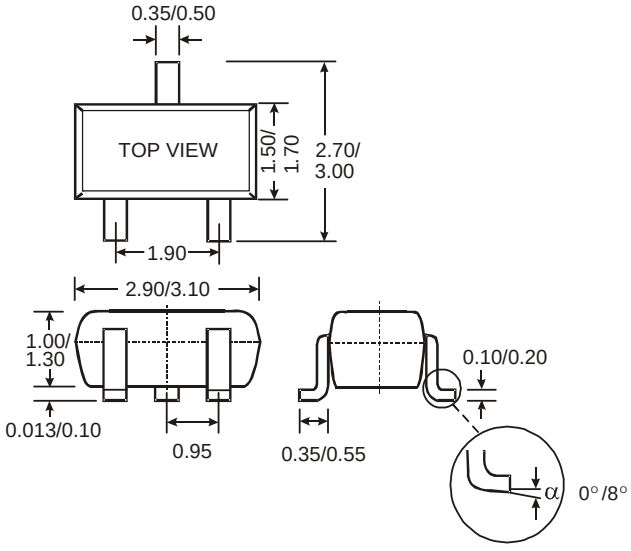


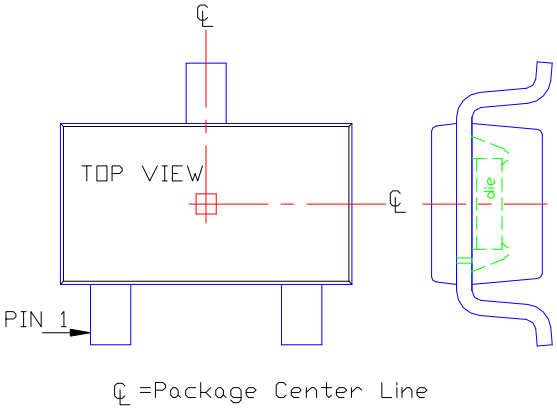
Package Information (Continued)

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



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





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