

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: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Package: SIP3, SOT23

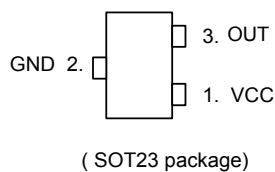
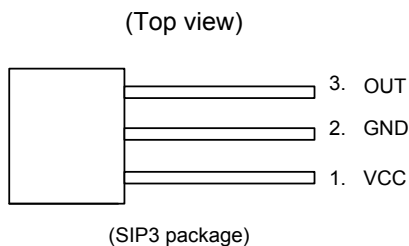
■ Applications

- Rotor position sensing
- Current switch
- Encoder
- RPM detection

■ 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 bandgap 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 $B < \text{Brp}$. When $B < \text{Brp}$, the OUT pin go into "off" state.

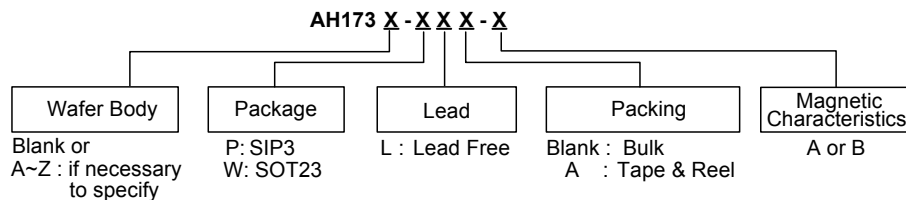
■ Pin Assignment



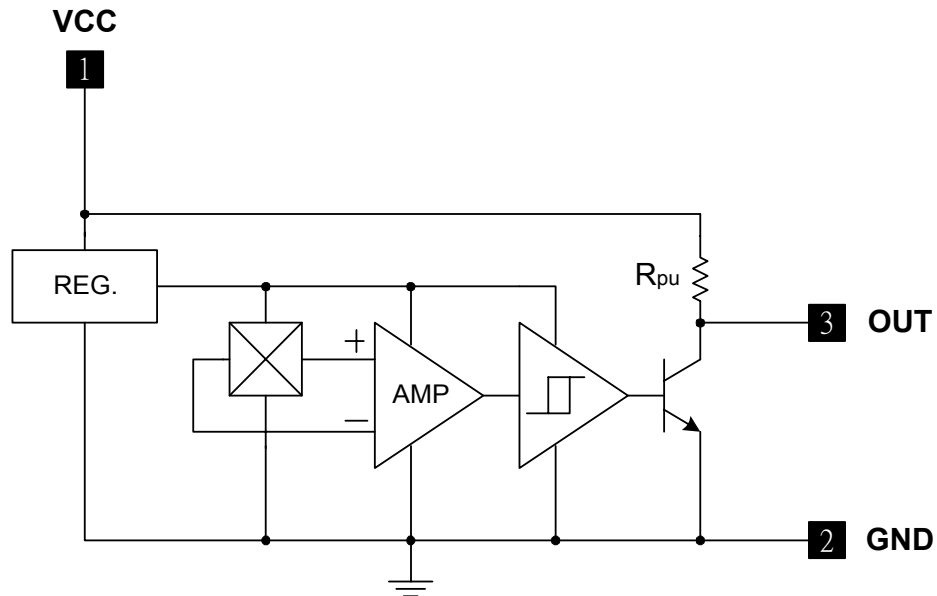
■ Pin Descriptions

Name	Description
VCC	Positive power supply
GND	Ground
OUT	Output stage

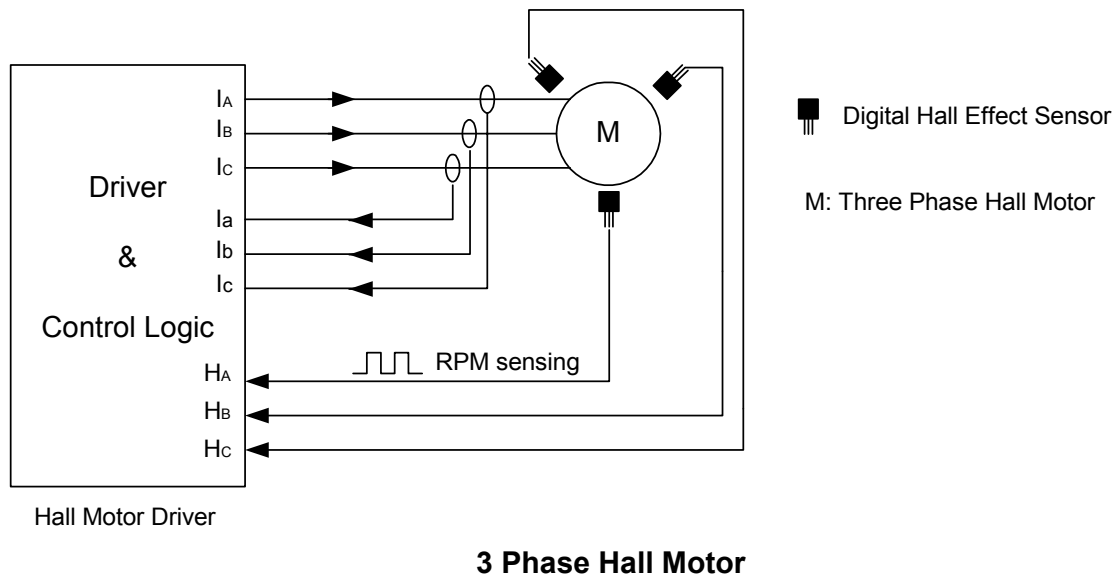
■ Ordering Information



■ Block Diagram



■ Functional Application Circuit



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■ Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Values	Unit
Supply Voltage	VCC	20	V
Output "off" Voltage	Vout (off)	20	V
Output "on" Current	Io (sink)	25	mA
Operating Temperature Range	Top	-40~+125	$^\circ\text{C}$
Storage Temperature Range	Tstg	-65~+150	$^\circ\text{C}$
Maximum Junction Temperature	Tj	+150	$^\circ\text{C}$
Power Dissipation	SIP	550	mW
	SOT23	230	mW

■ Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	Vcc		3	-	20	V
Output Saturation Voltage	Vout(sat)	VCC=12V, OUT "ON" Io =10mA	-	300	400	mV
Supply Current	Icc	VCC=12V, OUT "OFF"	-	3.5	6	mA
Internal Pull-up Resistor	Rpu		7	10	13	K Ω
Dropout Voltage	Vd	Vd = Vcc-Vce	-	-	0.3	V

■ Magnetic Characteristics (At $T_a = 25^\circ\text{C}$)

(1mT = 10 Gauss)

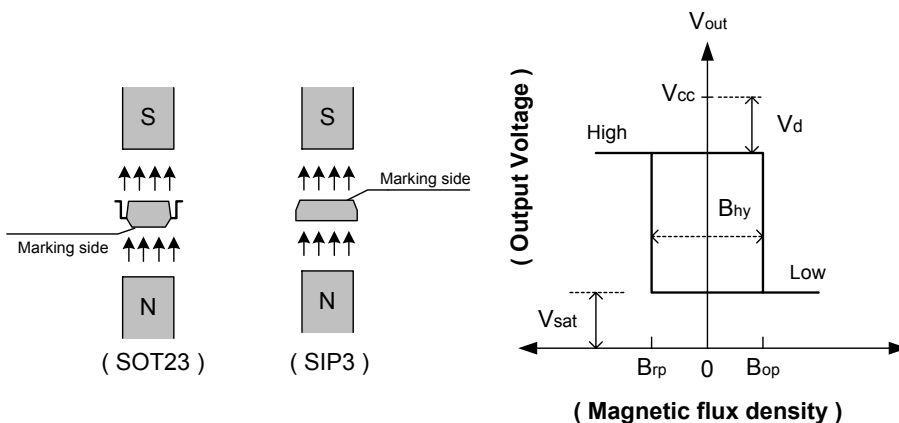
A grade

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operate Point	Bop	15	-	60	Gauss
Release Point	Brp	-60	-	-15	Gauss
Hysteresis	Bhy	-	80	-	Gauss

B grade

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operate Point	Bop	5	-	80	Gauss
Release Point	Brp	-80	-	-5	Gauss
Hysteresis	Bhy	-	80	-	Gauss

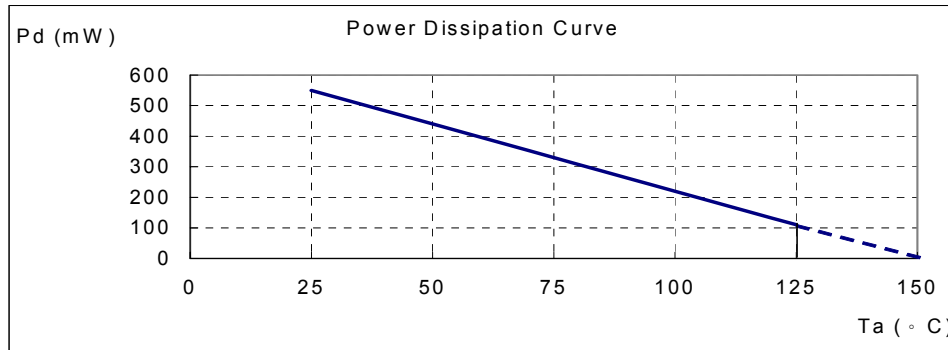
■ Operating Characteristics



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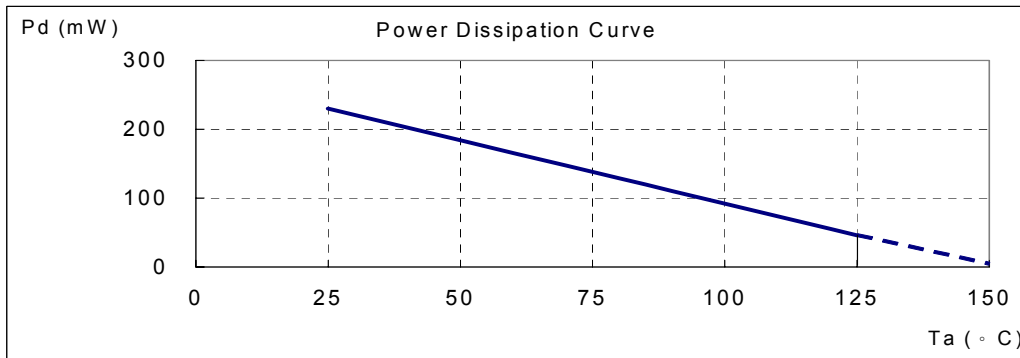
■ Performance Characteristics (SIP3)

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



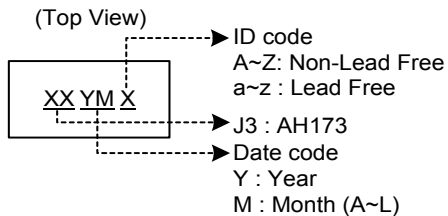
■ Performance Characteristics (SOT23-3)

Ta (°C)	25	50	60	70	80	85	90	100	110	120	125	130	140	150
Pd (mW)	230	184	166	147	129	120	110	92	74	55	46	37	18	0

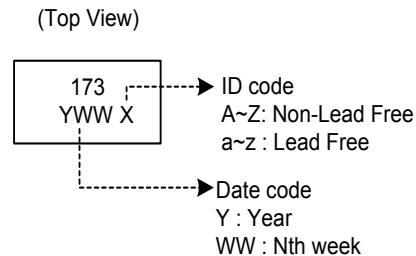


■ Marking Information

(1) SOT23



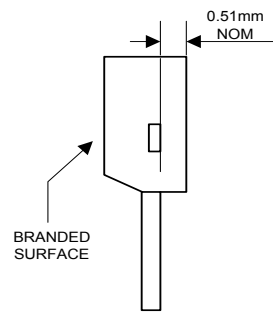
(2) SIP3



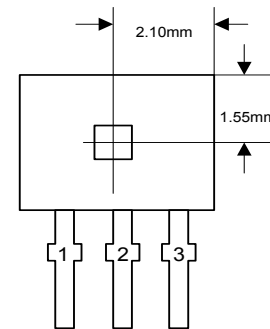
Internal Pull-up Hall Effect Latch For High Temperature

■ Package Information

(1) Package Type: SIP-3L

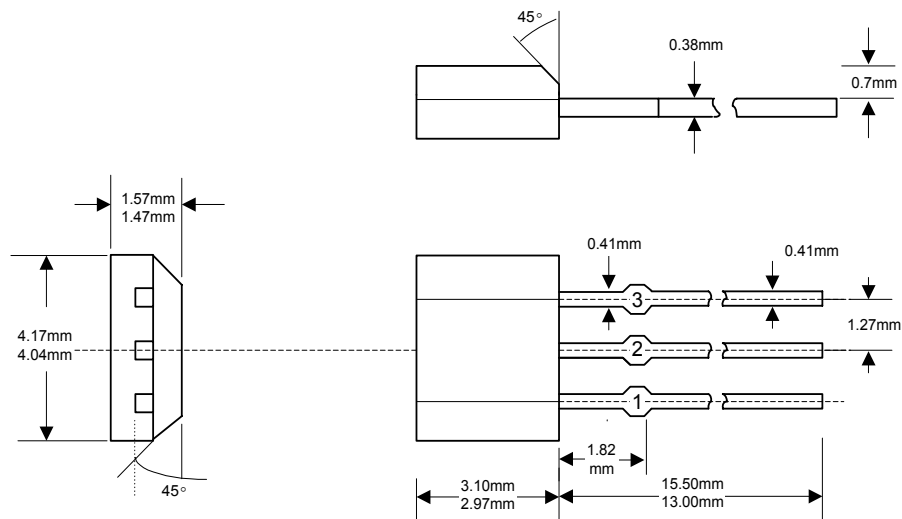


Active Area Depth



Sensor Location

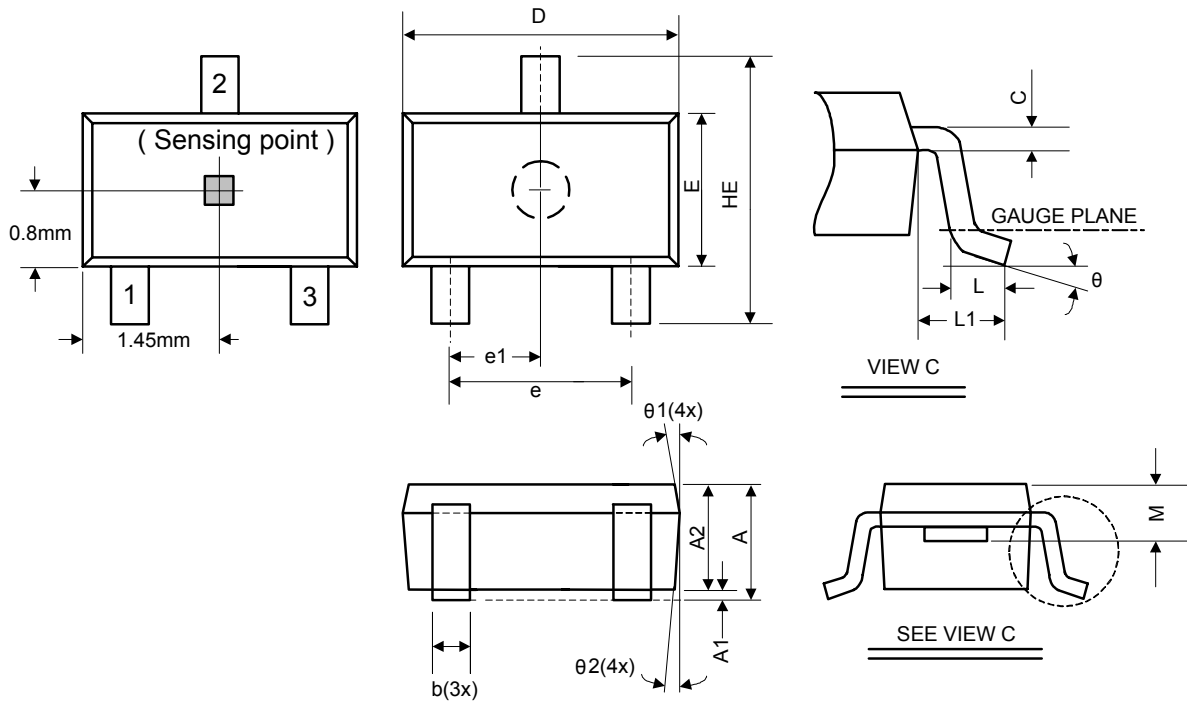
Package Dimension



Internal Pull-up Hall Effect Latch For High Temperature

■ Package Information (Continued)

(2) Package Type: SOT23-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	-	1.35	0.041	-	0.053
A1	0.05	-	0.15	0.002	-	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.50	0.010	-	0.020
C	0.08	-	0.20	0.003	-	0.008
D	2.70	2.90	3.00	0.106	0.114	0.118
E	1.50	1.60	1.70	0.059	0.063	0.067
HE	2.60	2.80	3.00	0.102	0.110	0.118
L	0.30	-	0.60	0.012	-	0.024
L1	0.50	0.60	0.70	0.020	0.024	0.028
M	0.73	0.78	0.83	0.029	0.031	0.033
e	1.80	1.90	2.00	0.071	0.075	0.079
e1	0.85	0.95	1.05	0.033	0.037	0.041
θ	0°	5°	10°	0°	5°	10°
θ_1	3°	5°	7°	3°	5°	7°
θ_2	6°	8°	10°	6°	8°	10°