# AH375

## SINGLE PHASE HALL EFFECT LATCH

## Features

- 2.2V to 20V DC Operation Voltage
- Temperature Compensation
- Wide Operating Voltage Range
- Open Drain Pre-Driver
- 25mA Maximum Sinking Output Current
- Lead Free Package: SIP3 (Note 1) and SC59 (Commonly known as SOT23 in Asia)
- SC59: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/RoHS Compliant (Note 2)

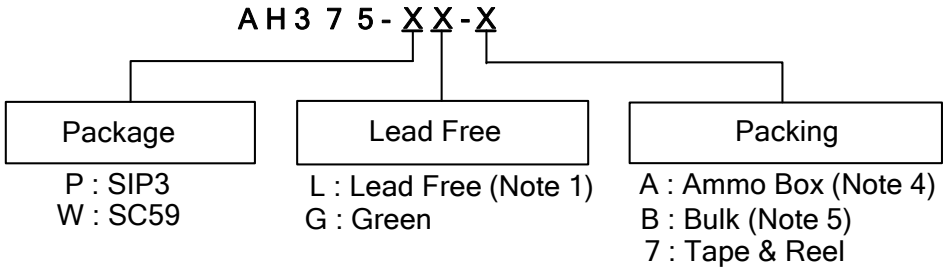
## General Description

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 is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range.
If a magnetic flux density larger than threshold Bop, DO is turned on (low). The output state is held until a magnetic flux density reversal falls below Brp causing DO to be turned off (high).

## Applications

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

## Ordering Information

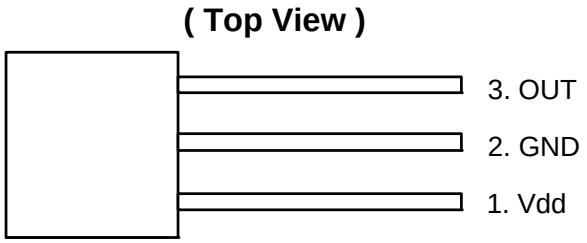



| Device | Package Code | Packaging (Note 3) | Bulk | | 7" Tape and Reel | | Ammo Box | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | Part Number Suffix | Quantity | Part Number Suffix | Quantity | Part Number Suffix |
| AH375-PL-A | P | SIP3 | NA | NA | NA | NA | 4000/Box | -A |
| AH375-PL-B | P | SIP3 | 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 |

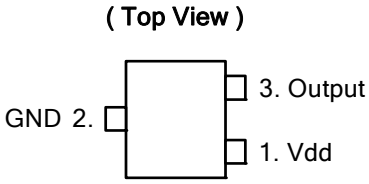
Notes:
1. SIP3 is available in "Lead Free" product only.
2. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see *EU Directive 2002/95/EC Annex Notes*.
3. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
4. Ammo Box is for SIP3 Spread Lead.
5. Bulk is for SIP3 Straight Lead.

## Pin Assignment

**(1) SIP3**



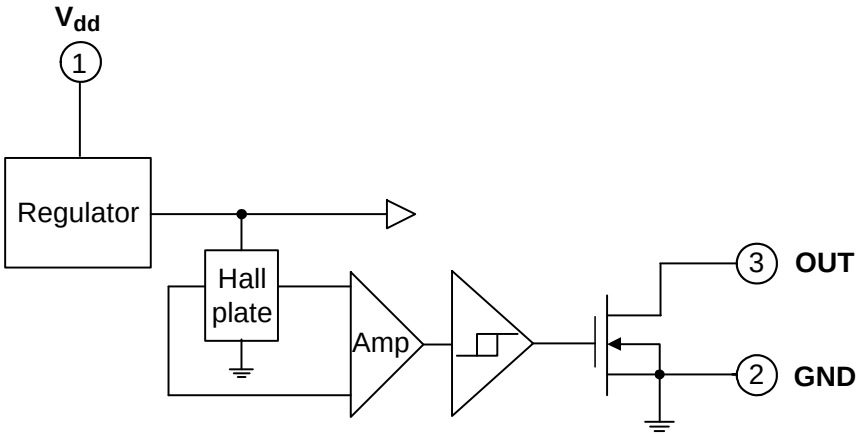

**(2) SC59**



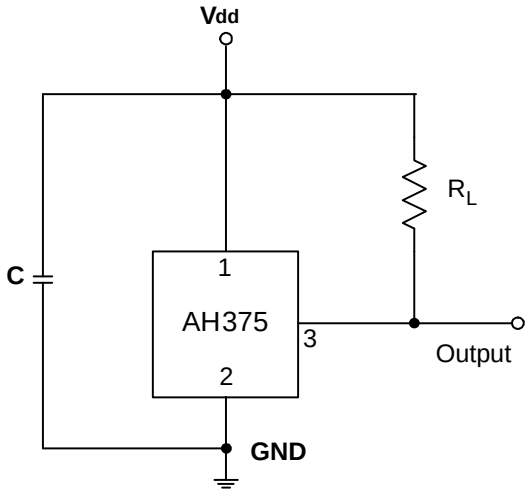

## Pin Descriptions

| Name | P/I/O | Pin # | Description |
|---|---|---|---|
| $V_{dd}$ | P | 1 | Positive Power Supply |
| GND | P | 2 | Ground |
| OUT | O | 3 | Output Pin |

## Block Diagram



## Typical Application Circuit




## 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 |
| $T_{ST}$ | Storage Temperature Range | | -65~+150 | °C |
| $T_{J(MAX)}$ | Maximum Junction Temperature | | 150 | °C |
| $P_D$ | Package Power Dissipation | SIP3 | 550 | mW |
| | | SC59 | 230 | |
| $\theta_{JC}$ | Thermal Resistance | SIP3 | 227 | °C/W |
| | | SC59 | 543 | |

## Recommended Operating Conditions

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| Vdd | Supply Voltage (Note 6) | Operating | 2.2 | 20 | V |
| $T_A$ | Operating Ambient Temperature | Operating | -40 | 125 | °C |

Notes: 6. 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.

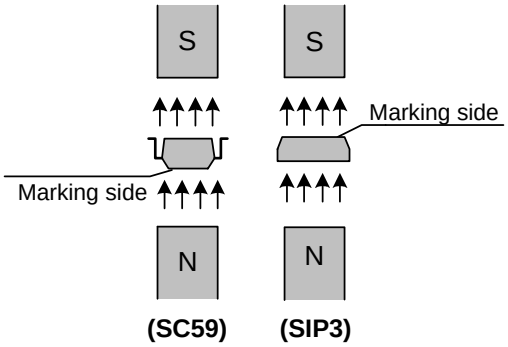
## Electrical Characteristics ($T_A$ = + 25°C, $V_{dd}$ = 12V)

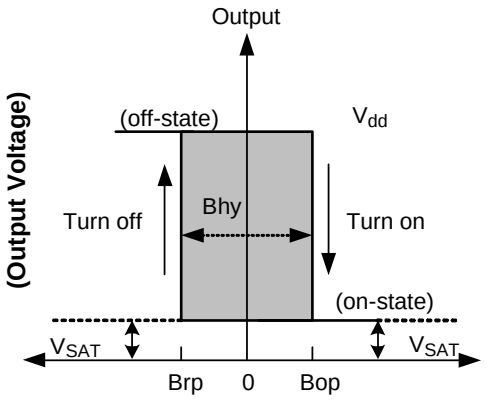
| Symbol | Characteristic | Test Conditions | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{ds(SAT)}$ | Output Saturation Voltage | $I_{out}$ = 20mA | - | 300 | 700 | mV |
| $I_{off}$ | Output Leakage Current | $V_{DD}$ = 14V | - | <0.1 | 10 | uA |
| $I_{dd}$ | Supply Current | Output Open | - | 2 | 4 | mA |

## Magnetic Characteristics ($T_A$ = 25°C, $V_{dd}$ = 2.5V to 20V)

(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 |



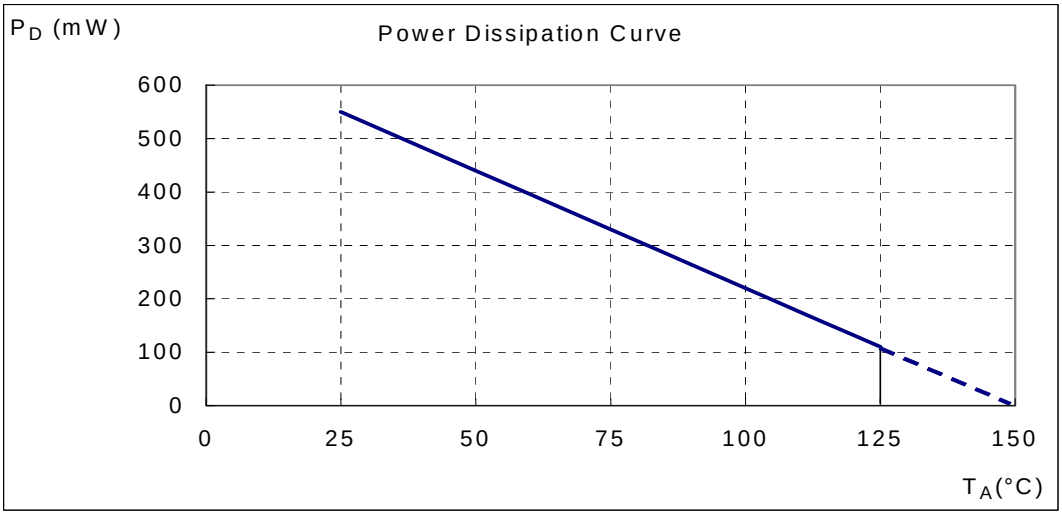




**(Magnetic Flux Density B)**

## Performance Characteristics

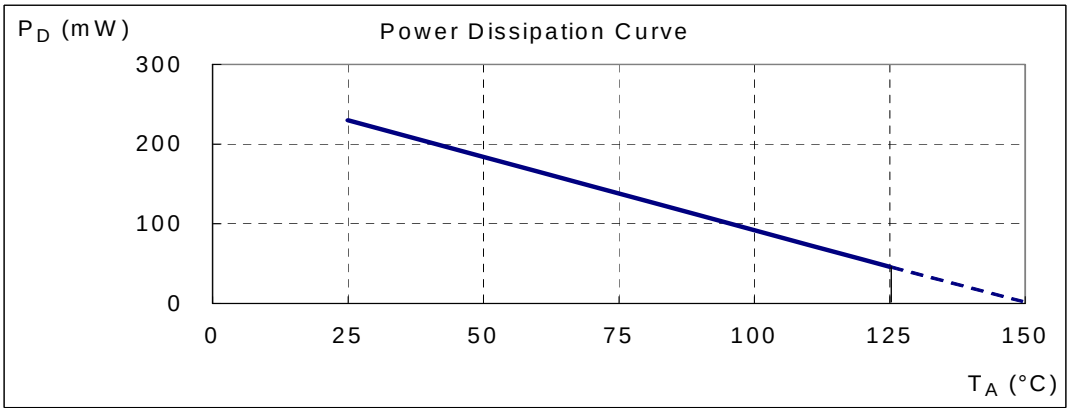
### (1) SIP3

| $T_A$ (°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)

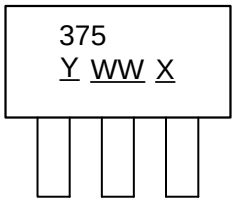
| $T_A$ (°C) | 25 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 125 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $P_D$ (mW) | 230 | 184 | 166 | 147 | 129 | 110 | 92 | 74 | 55 | 46 | 37 | 18 | 0 |



## Marking Information

**(1) SIP3**

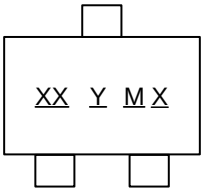
**( Top View )**




Y : Year : "07"= 2007
"08"= 2008
WW : Nth Week 01~52
X : Internal code
a~z : Lead Free

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

**( Top View )**

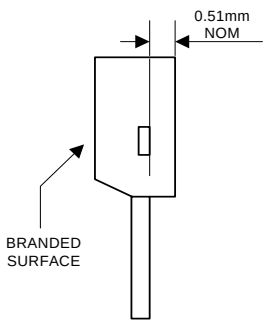



XX : P3 : AH375
Y : Year 0~9
M : Month A~L
X : Internal code
a~z : Lead Free
A~Z : Green

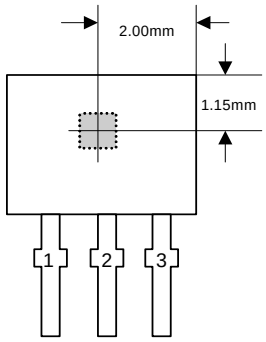
| Part Number | Package | Identification Code |
|---|---|---|
| AH375 | SC59 | P3 |

## Package Information (All Dimensions in mm)

**(1) Package Type: SIP3 for Bulk only**

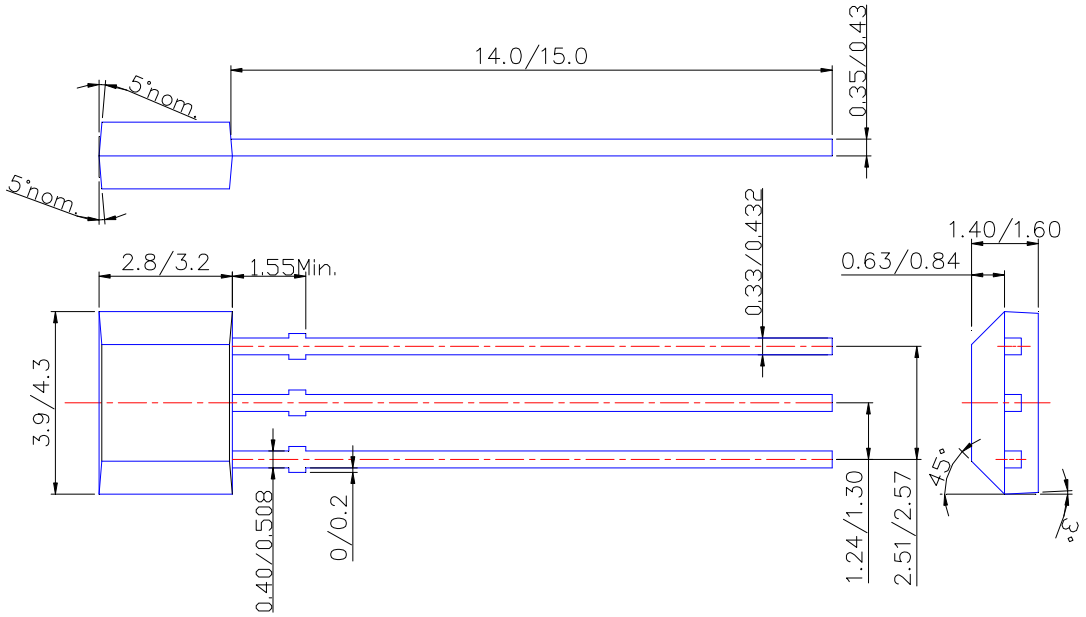



Active Area Depth



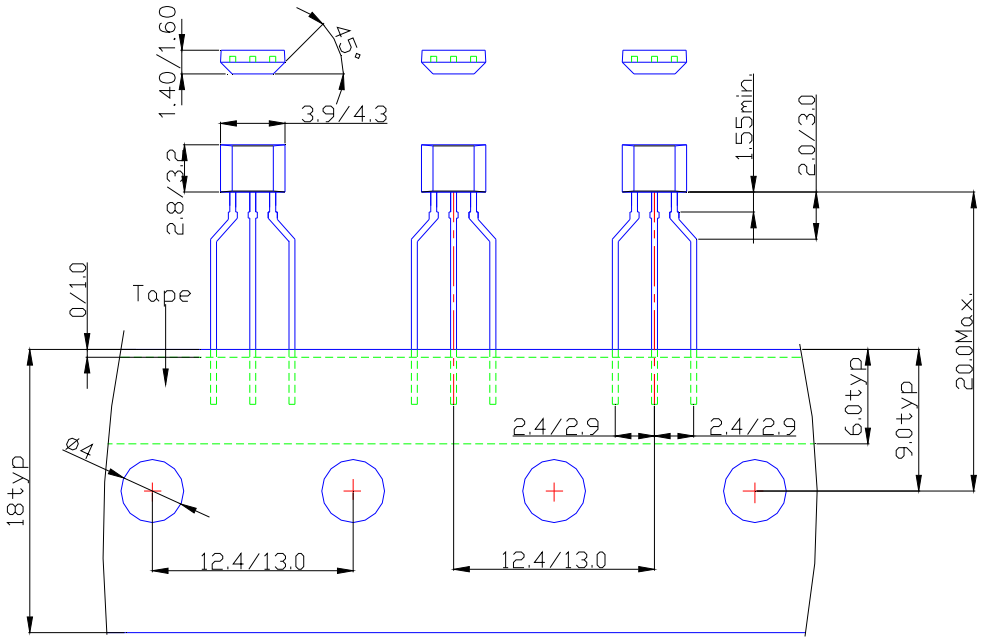

Sensor Location

**Package Dimension**

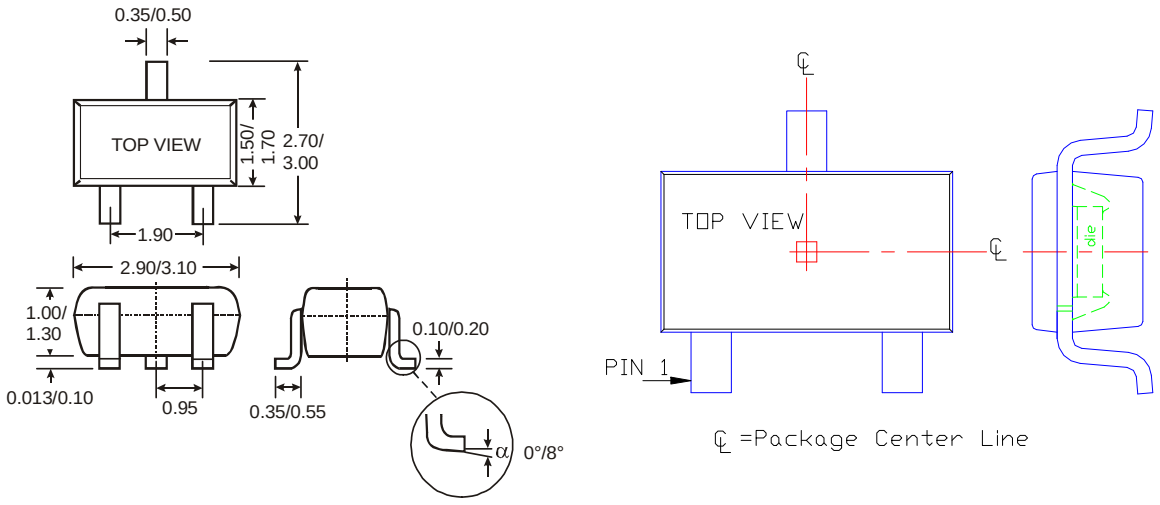


## Package Information (Continued)

**(2) Package Type: SIP3 for Ammo Pack-only**




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



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