Introduction

AH422, unipolar Hall effect switch, designed with Bipolar technology, is south sensitive unipolar Hall Effective switch and includes on-chip Hall element voltage generator, a voltage regulator for operation with supply voltages of 3.8 to 40V, temperature compensation circuitry, small-signal amplifier, Schmitt trigger and an open-collector output.

The sensor is designed to respond to South poles. While the magnetic flux density(B) is larger than operate point Bop, the output will be turned on with low output level. Then the output is held until the magnetic flux (B) is lower than release point Brp. The output will be turned off with high output level.

AH422 offers a variety of packages, including TO-92, SOT-23. All packages are RoHS compliant.

Features

- Miniature construction
- High sensitivity of 30/20Gauss (typ.)
- Wide voltage range of 3.8 Vdc to 40 Vdc
- Temperature range of -40 °C to 125 °C
- Highest ESD performance up to ±4 kV
- Open Collector Output

Applications

- BLDC Motor Commutation
- Flow sensor
- Position sensor
- Speed sensor
- Proximity sensor

Package

3-pin SOT23

3-pin TO92S

Ordering information

Part number	Package	Packing	Ambient, T_A
AH422UA	TO92S	Bulk, 1000 pieces/bag	-40℃ to 125℃
AH422SU	SOT23	Tape&Reel, 3000 pieces/reel	-40℃ to 125℃

Pin assignment

Pin number	Name	Function
1	VDD	Power supply
2	GND	Ground
3	Vout	Output

Absolute Maximum Ratings

The absolute maximum value is the limiting value when the chip is applied, above which the chip can be damaged. Although the function of the chip is not necessarily damaged when the absolute maximum value is exceeded, the reliability of the chip may be affected if the absolute maximum value is exceeded for a certain time.

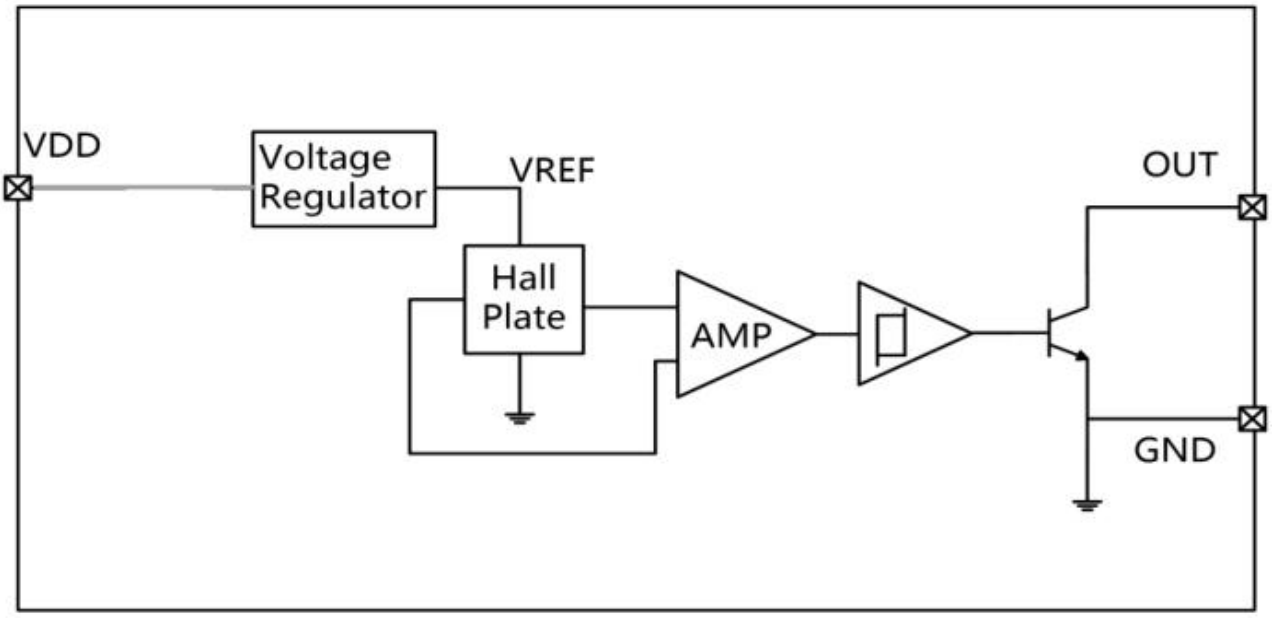
Parameter	Symbol	Value	Units
Supply voltage	VDD	60	V
Reverse voltage	VDD	-0.3	V
Output Sink Current	I_{sink}	40	mA
Output Voltage	Vout	60	V
Operating temperature range	T_a	-40~125	℃
Storage temperature range	T_s	-40~165	℃

Electrical and magnetic characteristics(Ta=25℃, VDD =5.0V)

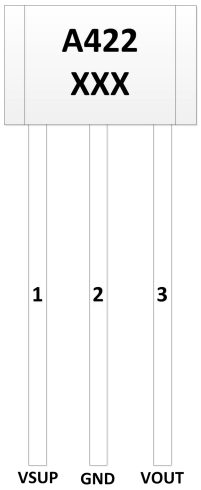
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Electrical characteristics						
VDD	Operating voltage		3.8		40	V
IDD	Supply current			6	9	mA
I_{le}	Leakage current	Off condition			10	uA
Vsat	Saturation voltage output	Iout=20mA, On condition			0.4	V
Tr	Output rising time	Pullup resistor =1kohms, Load cap=20pF			1	uS
T_f	Output falling time	Pullup resistor =1kohms, Load cap=20pF			1.5	uS
Magnetic characteristics						
Bop	Operate point	Pullup resistor =1kohms, Load cap=20pF	14	30	50	Gauss
Brp	Release point	Pullup resistor =1kohms, Load cap=20pF	5	20	35	Gauss
Bhys	Hysteresys	Pullup resistor =1kohms, Load cap=20pF	6	10	20	Gauss

Function diagram

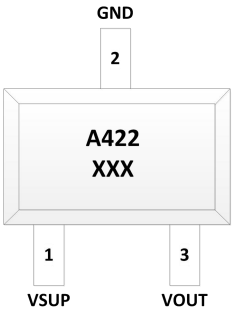
AH422, unipolar Hall Effect switch, designed with Bipolar technology, includes on-chip Hall element voltage generator, a voltage regulator for operation with supply voltages of 3.8 to 60V, temperature compensation circuitry, small-signal amplifier, Schmitt trigger and an open-collector output.



Pin orientation



TO92S



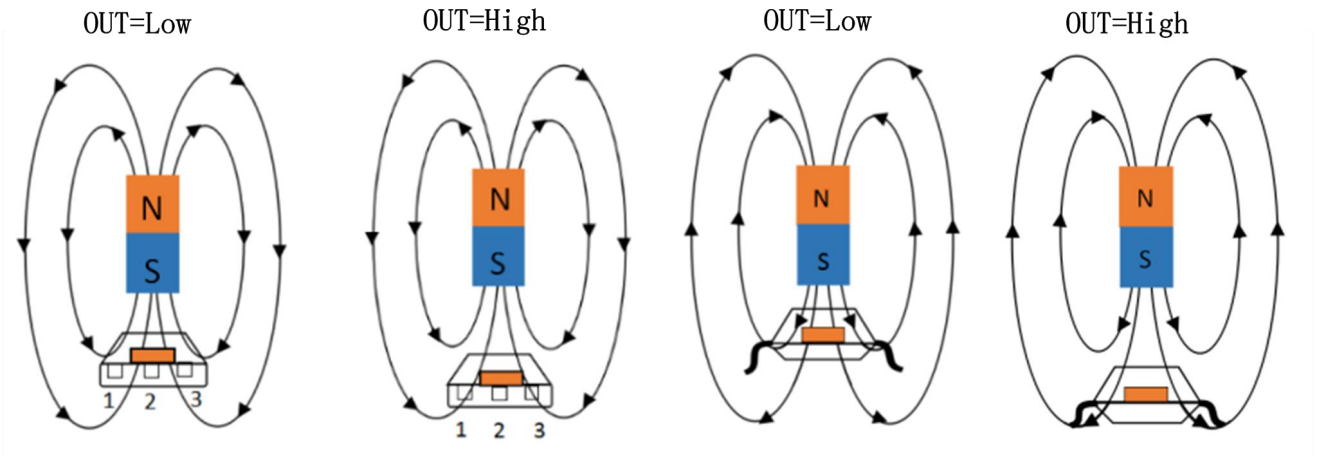
SOT23

Pin description

Name	Pin number	Description
VDD	1	Power supply
GND	2	Ground
Vout	3	Output

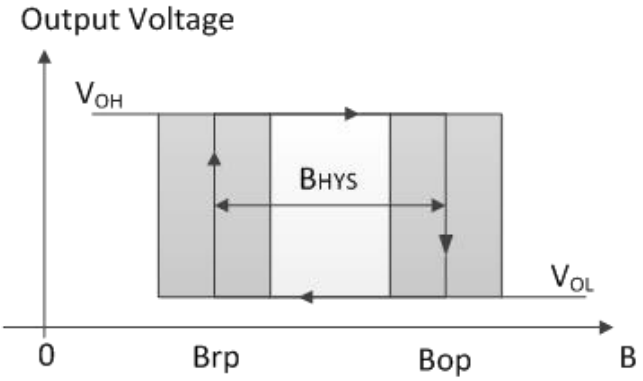
Application example: VDD =5V

A positive magnetic field is defined as a South pole near the marked side of the package.



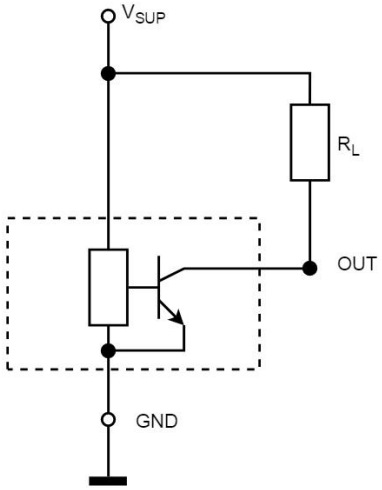
TO92S （AH422） **TO92S （AH422）** **SOT23（AH422）** **SOT23（AH422）**

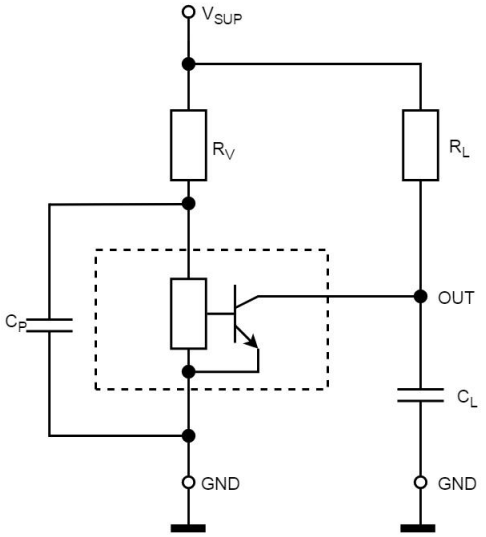
Output Behavior



AH422 output behavior

Application Circuits





Typical application circuit (see the following circuit) RL =4700 ohms

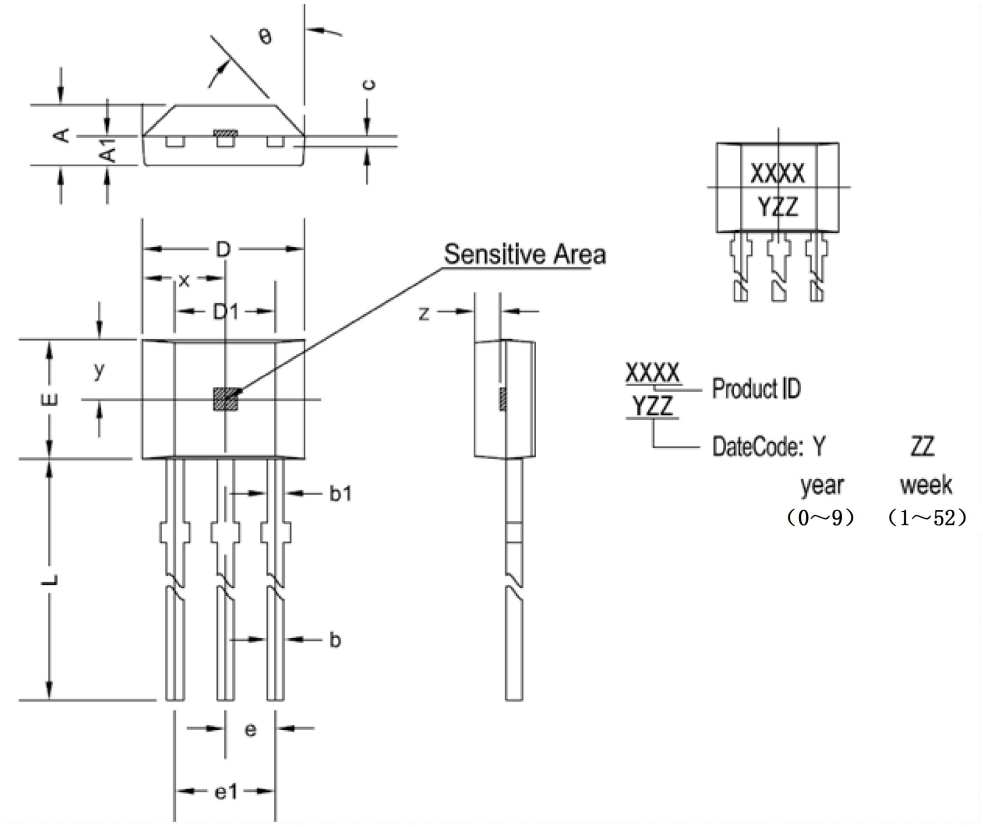
Case 1 of typical application circuit

Automotive and Harsh, Noisy Environments Three-Wire Circuit is show below. Here, RV =100 ohms, CP = 4.7 nF, and CL = 1 nF.

Case 2 of typical application circuit

Package dimensions

TO92S

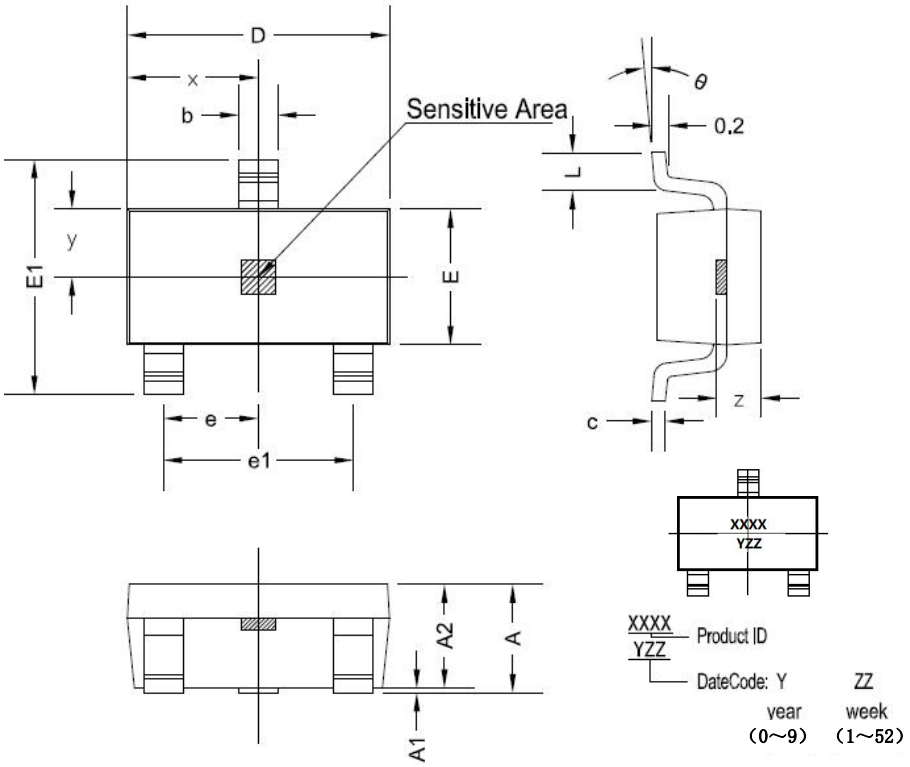


T092S dimensions

symbol	Size (mm)		Size (in inches)	
	minimum	maximum	minimum	maximum
A	1.42	1.67	0.056	0.066
A1	0.66	0.86	0.026	0.034
b	0.35	0.56	0.014	0.022
b1	0.4	0.55	0.016	0.022
C	0.36	0.51	0.014	0.02
D	3.9	4.2	0.154	0.165
D1	2.97	3.27	0.117	0.129
E	2.9	3.28	0.114	0.129
e	1.270 TYP		0.050 TYP	
e1	2.44	2.64	0.096	0.104
L	13.5	15.5	0.531	0.61
x	2.025TYP		0.080TYP	
y	1.545TYP		0.061TYP	
z	0.500TYP		0.020TYP	

θ	45°TYP	45°TYP

SOT23



SOT23 **dimensions**

symbol	Size (mm)		Size (in inches)	
	minimum	maximum	minimum	maximum
A	1.05	1.25	0.041	0.049
A1	0	0.1	0	0.004
A2	1.05	1.15	0.041	0.045
b	0.3	0.5	0.012	0.02
c	0. 100	0.2	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.5	1.7	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.950 TYP		0.037 TYP	
e1	1.8	2	0.071	0.079
L	0.3	0.6	0.012	0.024
x	1.460TYP		0.057TYP	
y	0.800TYP		0.032TYP	
z	0.600TYP		0.024TYP	
θ	0°	8°	0°	8°