AH45X

Introduction

AH45x omnipolar Hall effect switch family, designed with Bipolar technology, is both south and north poles sensitive omnipolar Hall effect switch and includes on-chip Hall element voltage generator, a voltage regulator for operation with supply voltages of 4.5 to 60V, reverse voltage protection, temperature compensation circuitry, small-signal amplifier, Schmitt trigger and an open-collector output.

The sensor family is designed to respond to both south pole and north pole. 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.

AH45X offers a variety of packages, including TO-92, SOT-23. All packages are RoHS compliant.

Features

- Miniature construction
- Multiple sensitivity range of +/-45/20 Gauss , +/-70/35 Gauss, +/-100/50 Gauss (typ.)
- Wide voltage range of 4.5 Vdc to 60 Vdc
- Temperature range of -40 °C to 150 °C
- Open Collector Output

Applications

- Docking Detection
- Door Open and Close Detection
- Proximity Sensing
- Valve Positioning
- Pulse Counting

Package

3-pin SOT23

3-pin TO92S

Ordering information

Part number	Package	Packing	Ambient, T_A
AH451UA	TO92S	Bulk, 1000 pieces/bag	-40℃ to 150℃
AH452UA	TO92S	Bulk, 1000 pieces/bag	-40℃ to 150℃
AH453UA	TO92S	Bulk, 1000 pieces/bag	-40℃ to 150℃
AH451SU	SOT23	Tape&Reel, 3000 pieces/reel	-40℃ to 150℃
AH452SU	SOT23	Tape&Reel, 3000 pieces/reel	-40℃ to 150℃
AH453SU	SOT23	Tape&Reel, 3000 pieces/reel	-40℃ to 150℃

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.

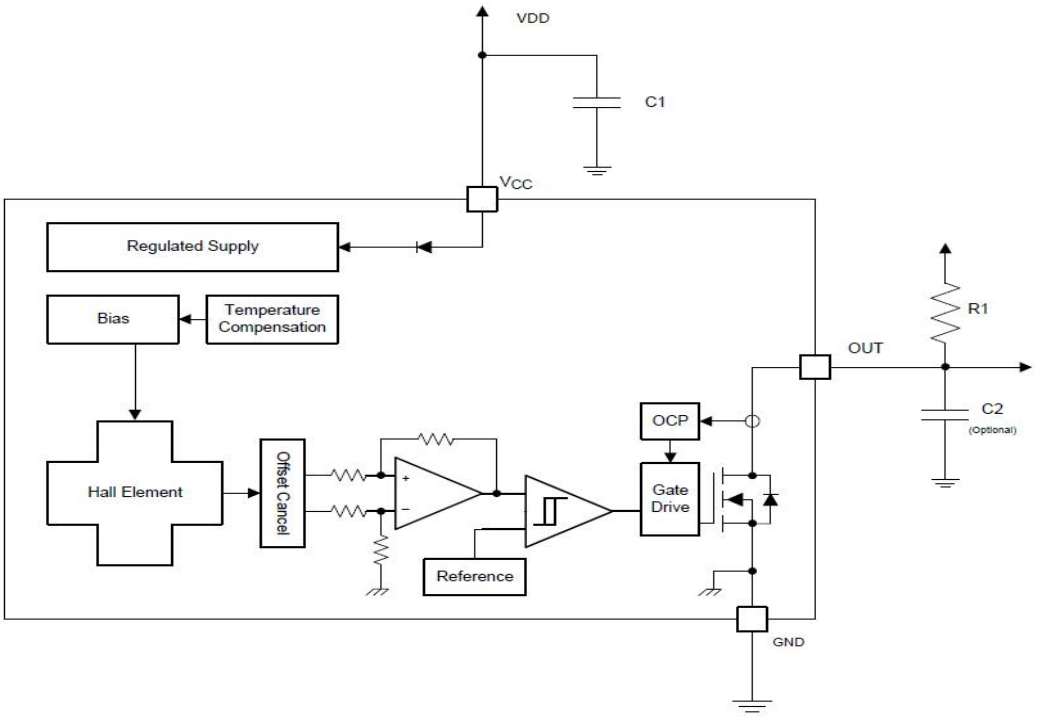
Parameter	Symbol	Value	Units
Supply voltage	VDD	70	V
Reverse voltage	VDD	-60	V
Output Sink Current	I_{sink}	40	mA
Output Voltage	Vout	70	V
Operating temperature range	T_a	-40~150	℃
Storage temperature range	T_s	-40~165	℃

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

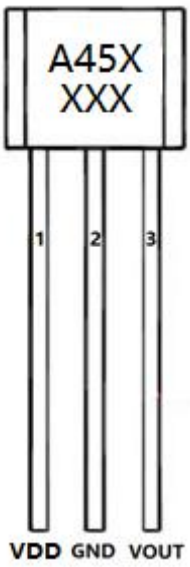
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Electrical characteristics						
Operating voltage	VDD		4.5		60	V
Supply current	IDD			3.5	7	mA
Leakage current	Ile	Off condition			10	uA
Saturation voltage output	Vsat	Iout=20mA, On condition			0.4	V
Output rising time	Tr	Pullup resistor =1kohms, Load cap=20pF			1	uS
Output falling time	Tf	Pullup resistor =1kohms, Load cap=20pF			1.5	uS
Magnetic characteristics						
Operate point	Bop	Pullup resistor =1kohms, Load cap=20pF				
		AH451		+/-45		Gauss
		AH452		+/-70		Gauss
		AH453		+/-100		Gauss
Release point	Brp	Pullup resistor =1kohms, Load cap=20pF				
		AH421		+/-20		Gauss
		AH422		+/-35		Gauss
		AH433		+/-50		Gauss
Hysteresis	Bhys	Pullup resistor =1kohms, Load cap=20pF				
		AH421		25		Gauss
		AH422		35		Gauss
		AH433		50		Gauss

Function diagram

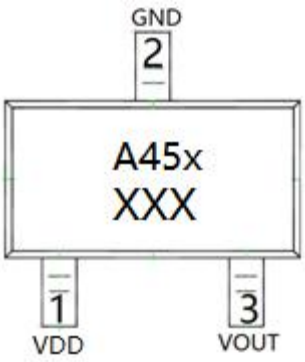
AH45x Omnipolar Hall Effect switch family, designed with Bipolar technology, includes on-chip Hall element voltage generator, a voltage regulator for operation with supply voltages of 4.3 to 60V, reverse voltage protection, temperature compensation circuitry, small-signal amplifier, Schmitt trigger and an open-collector output.



Pin orientation

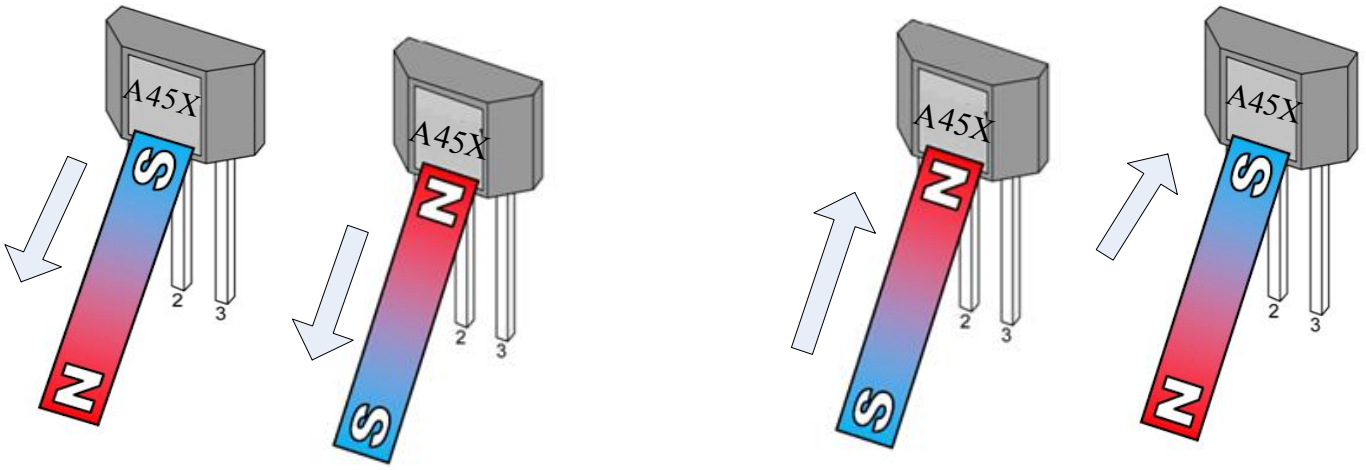


TO92S



SOT23

Application example: VDD =5V

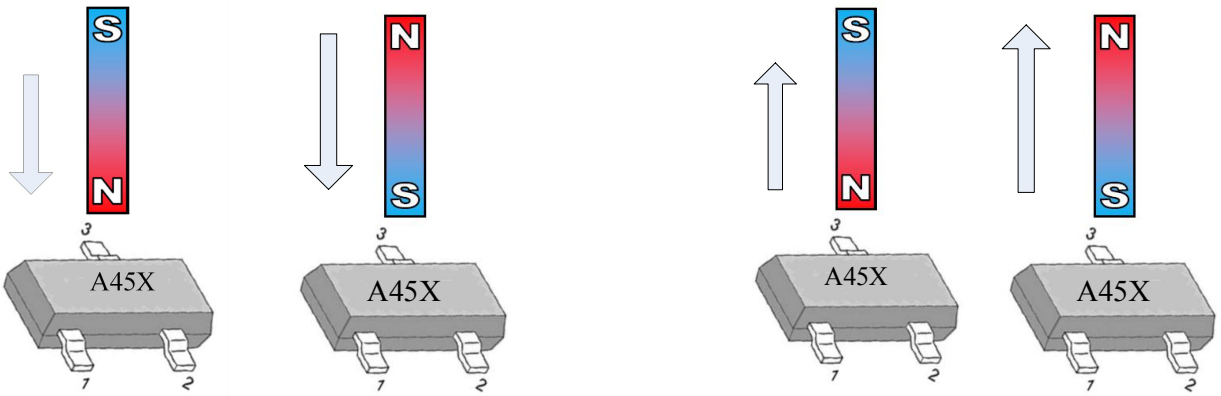


VOUT= High VOUT= Low

TO92S （AH45XUA）

TO92S Pin description

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



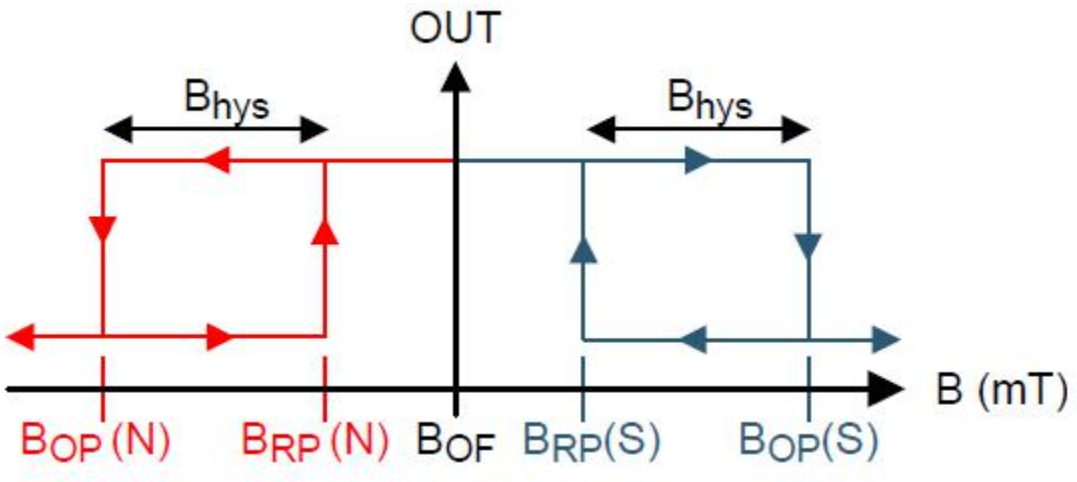
VOUT=High VOUT= Low

SOT23 （AH45XSU）

SOT23 Pin description

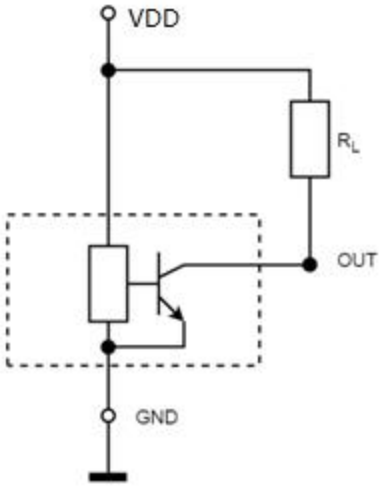
Name	Pin number	Description
VDD	1	Power supply,
Vout	2	Output
GND	3	Ground

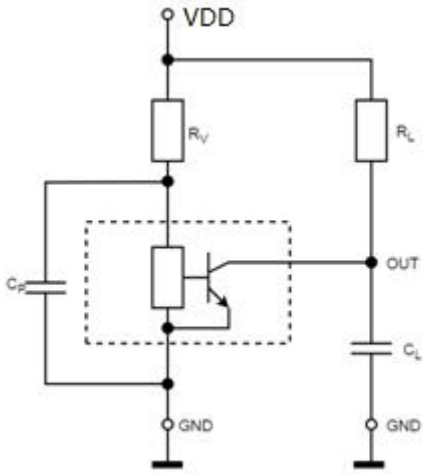
Output Behavior



Application Circuits

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



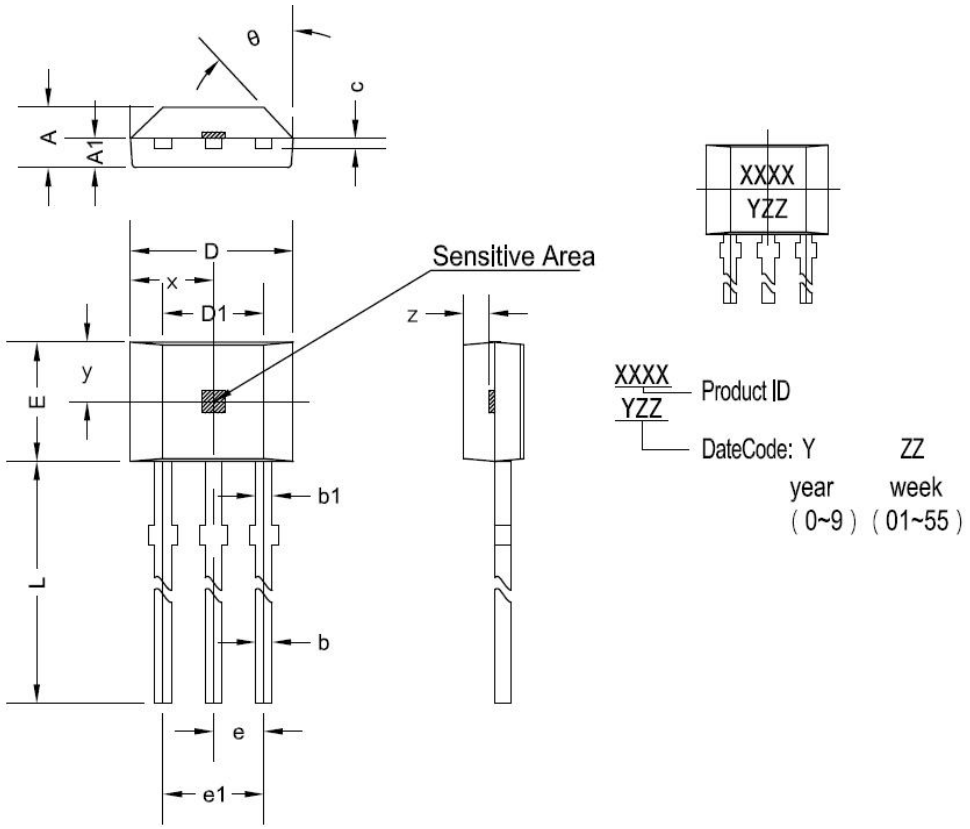


Case 1 of typical application circuit Case 2 of typical application circuit

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

Package dimensions

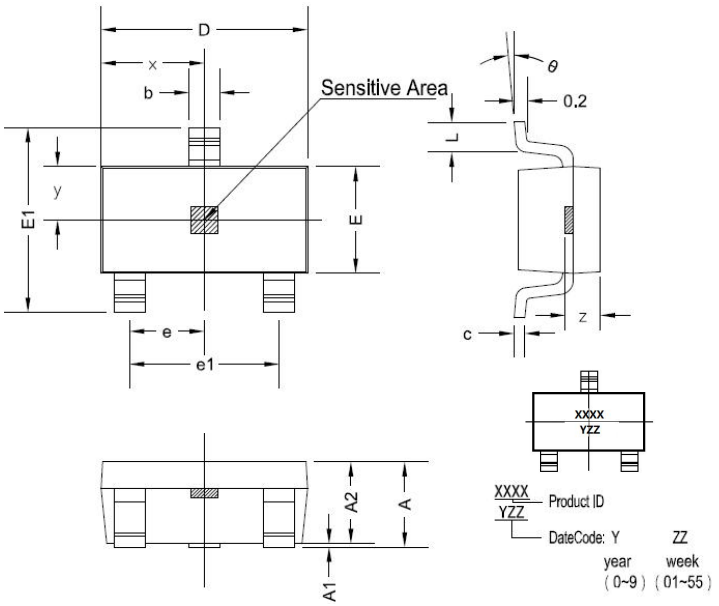
TO92S



TO92S 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°