High Voltage Hall Effect Switch Family

Alfa Electronics Co. Ltd



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

Package



3-pin TO92S

Applications

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

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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	lsink	40	mA
Output Voltage	Vout	70	V
Operating temperature range	Ta	-40~150	C
Storage temperature range	Ts	-40~165	C

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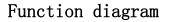
Electrical and magnetic characteristics (Ta=25°C, VDD =5.0V)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Units
Electrical characteristics						
Operating voltage	VDD		4.5		60	V
Supply current	IDD			3.5	7	mA
Leakage current	lle	Off condition			10	uA
Saturation voltage output	Vsat	lout=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 chai	racteristic	S				
		Pullup resistor =1kohms, Load cap=20pF				
Operate point	Вор	AH451		+/-45		Gauss
		AH452		+/-70		Gauss
		AH453		+/-100		Gauss
	Brp	Pullup resistor =1kohms, Load cap=20pF				
Release point		AH421		+/-20		Gauss
		AH422		+/-35		Gauss
		AH433		+/-50		Gauss
	Bhys	Pullup resistor =1kohms, Load cap=20pF				
Hysteresis		AH421		25		Gauss
		AH422		35		Gauss
		AH433		50		Gauss

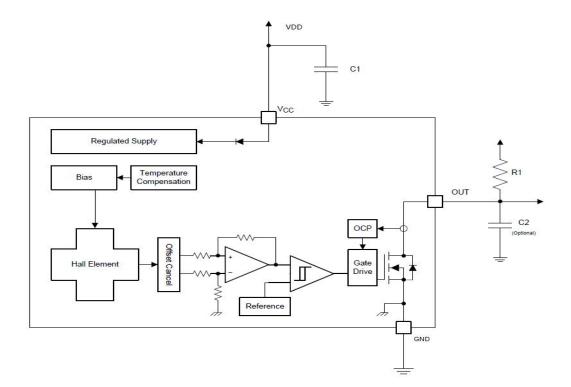
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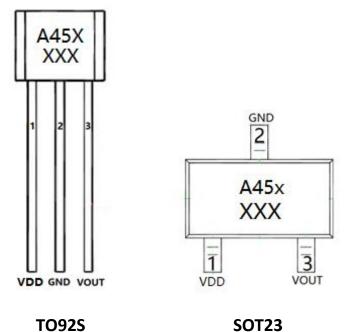
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AH45x Omnipolar Hall Effect switch family, designed with Bipolar technology, includes on-chip Hall element voltage generator, a voltage regulator for operation with supply voltages of 4.3 to 60V, reverse voltage protection, temperature compensation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

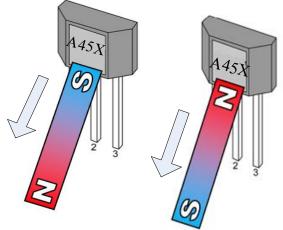


Pin orientation



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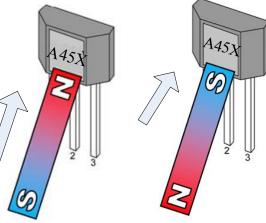
High Voltage Hall Effect Switch Family VDD = 5VApplication example:



Vout= High

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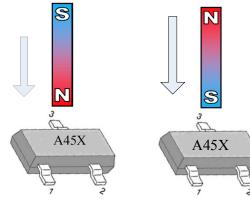
TO92S (AH45XUA)

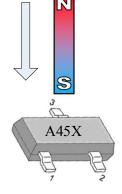


VOUT= LOW

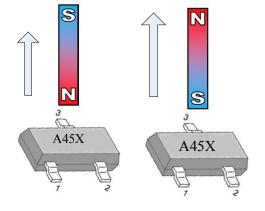
TO92S Pin description

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





Vout=High



VOUT= LOW

SOT23 (AH45XSU)

SOT23 Pin description

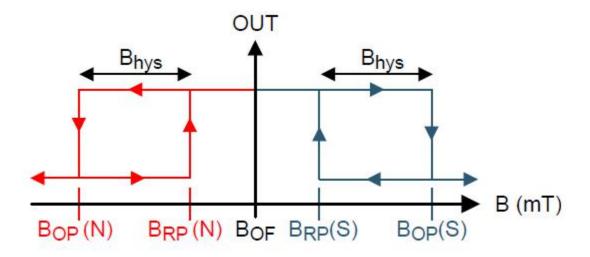
Name	Pin number	Description
VDD	1	Power supply,
Vout	2	Output
GND	3	Ground

High Voltage Hall Effect Switch Family

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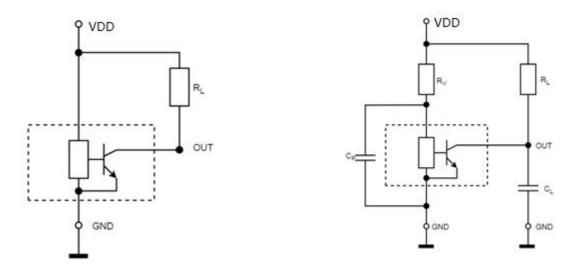


Output Behavior



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.

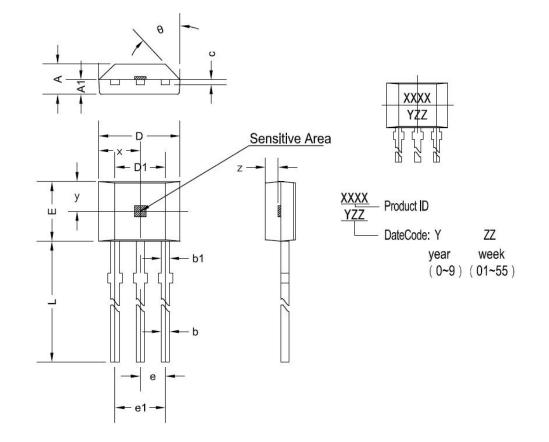
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Package dimensions

High Voltage Hall Effect Switch Family

TO92S



T092S dimensions

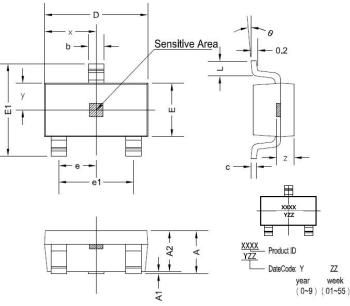
symbol	Size (mm)		Size (in inches)		
	minimum	maximum	minimum	maximum	
A	1.42	1.67	0.056	0.066	
A1	0.66	0.86	0.026	0.034	
b	0.35	0.56	0.014	0.022	
b1	0.4	0.55	0.016	0.022	
С	0.36	0.51	0.014	0.02	
D	3.9	4.2	0.154	0.165	
D1	2.97	3.27	0.117	0.129	
E	2.9	3.28	0.114	0.129	
е	1.270 TYP		0.050 TYP		
e1	2.44	2.64	0.096	0.104	
L	13.5	15.5	0.531	0.61	
Х	2.025TYP		0.080TYP		
у	1.545TYP		0.061TYP		
z	0.500TYP		0.020TYP		
θ	45°	TYP	45°TYP		

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SOT23



S0T23 dimensions

symbol	Size (mm)		Size (in inches)		
	minimum	maximum	minimum	maximu m	
А	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	
С	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	
е	0.950) TYP	0.037 TYP		
e1	1.8	2	0.071	0.079	
L	0.3	0.6	0.012	0.024	
х	1.460TYP		0.057TYP		
у	0.800TYP		0.032TYP		
Z	0.600TYP		0.024TYP		
θ	0°	8°	0°	8°	

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