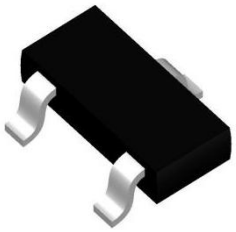
KTH1531FU

High sensitivity Latch Hall Switch



SOT-23-3L

TO-92S

Descriptions

The KTH1531FU is produced by CMOS technology with both high performance and high reliability. The temperature compensation circuitry improves stability of magnetic switch points over the whole operating range.

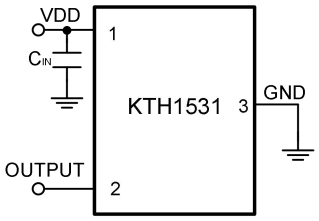
The Hall IC designed to respond to alternating north and south poles. While the magnetic flux density(B) is larger than operating point (BOP), the output will be turned on (Low), the output is held until the magnetic flux density(B) is lower than releasing point (BRP), then turn off (High).

The KTH1531FU family provides a variety of package to customers: SOT-23-3L for surface mount and TO-92S flat for through-hole mount. All package are RoHS compliant.

Features

- Magnetic Type: Latch
- Supply Voltage：1.6V~5.5V
- High Magnetic Sensitivity
  Bop=±20 Gauss Brp=∓20 Gauss
- Low power Consumption
  I=2.25 mA @VDD=1.8V (Typ.)
- Operating Temperature：-40℃~125℃
- High ESD Rating：HBM 8KV
- RoHS Compliant

Typical Application Circuit



Note: CIN is for stabilization and to strengthen the noise immunity, the recommended capacitance is 1uF typical and should be placed as close to the supply pin as possible.

Application

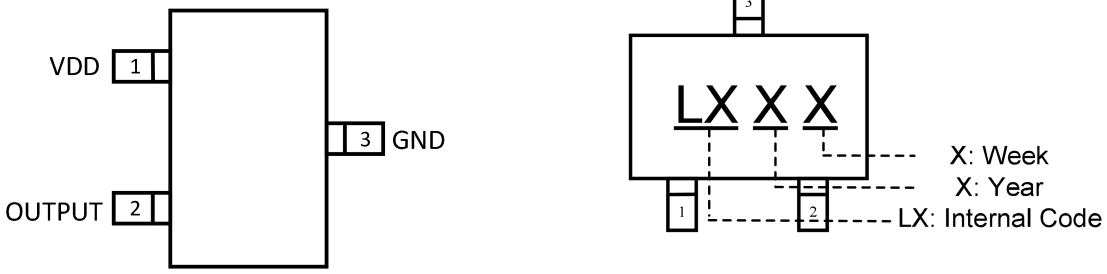
- Brushless DC Motor
- Speed Detection
- Level, proximity and position switches
- Magnetic Encoder

Order Information

Part Numbers	Number of Pins	Number of Pins	Operating Temperature	MSL level
KTH1531FU-ST3	3	SOT-23-3L	-40℃~125℃	1
KTH1531FU-TO3	3	TO-92S	-40℃~125℃	NA

Pin Descriptions

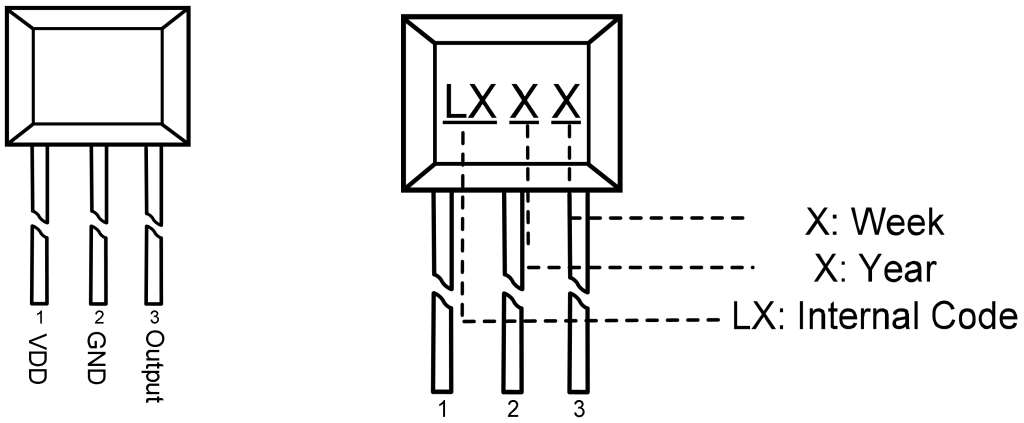
SOT-23-3L



Top view

Pin Name	Pin Number	Function
VDD	1	Power Supply Input
OUTPUT	2	Output pin
GND	3	Ground Pin

TO-92S



Top view

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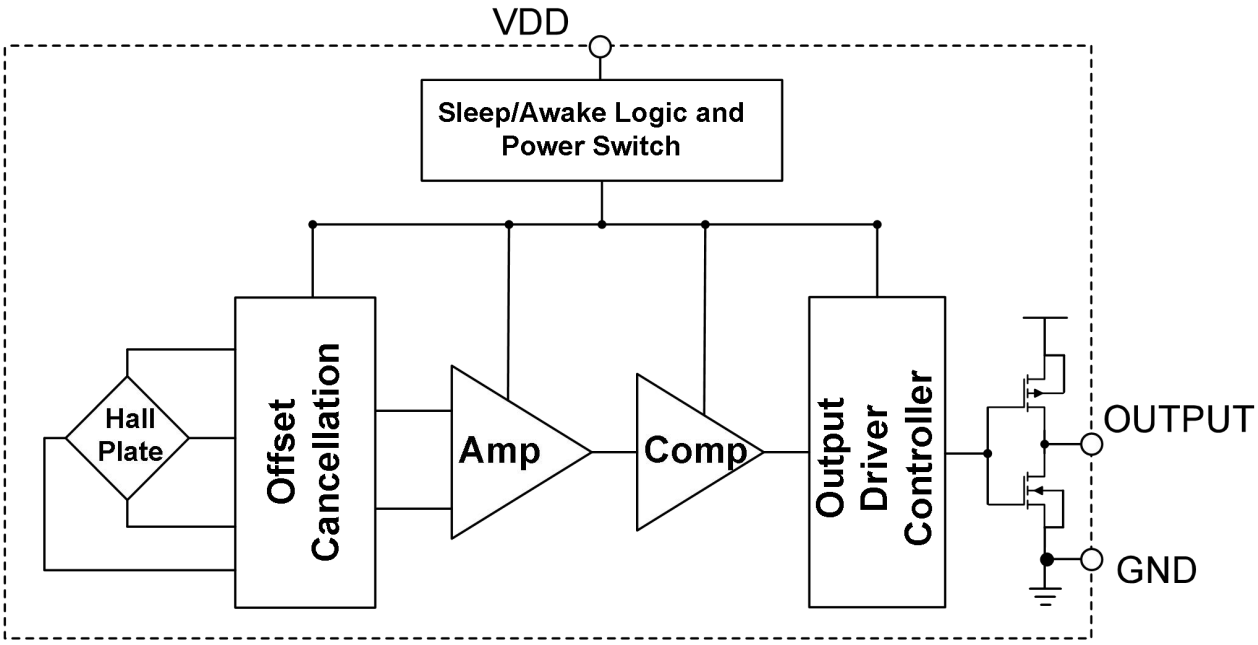
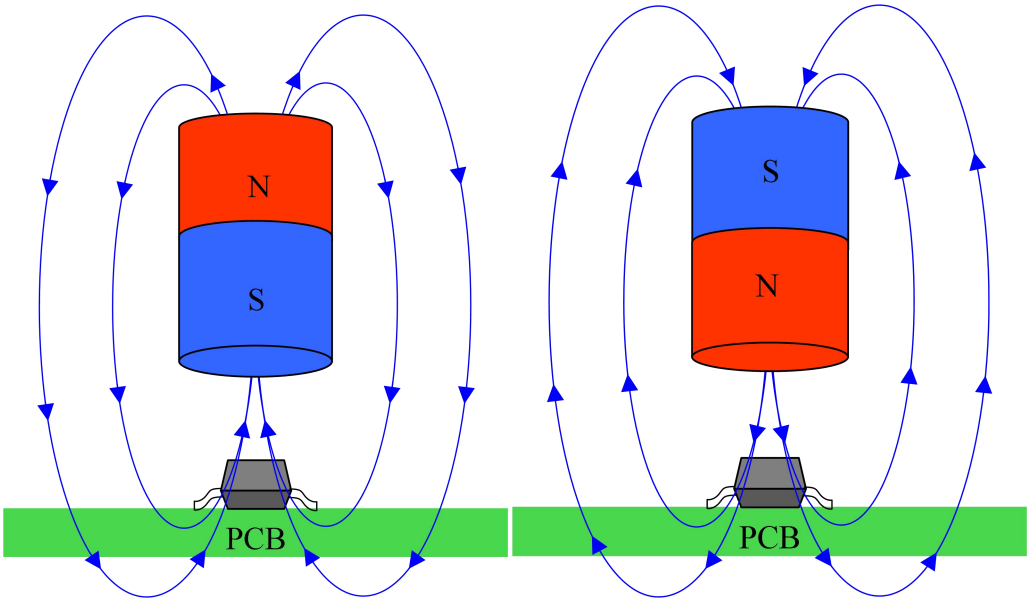
VDD	1	Power Supply Input
GND	2	Ground Pin
OUTPUT	3	Output Pin

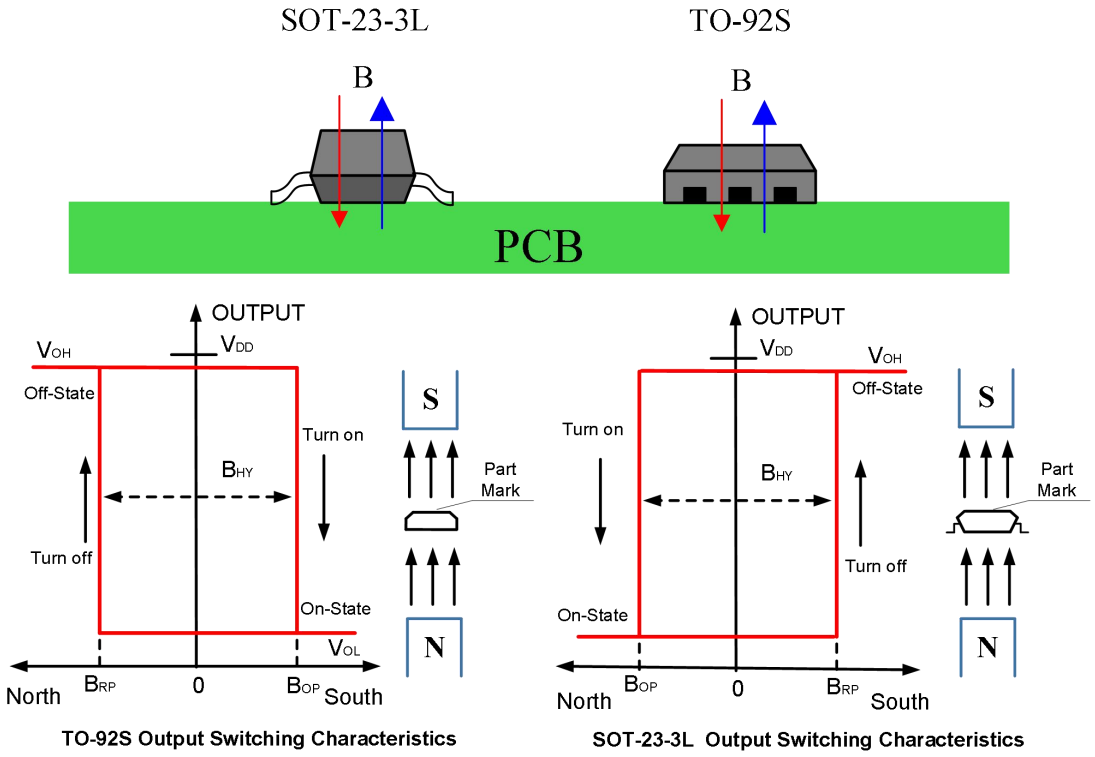
Block Diagram



Output Switching Characteristics

As shown in the figure below, when the South Pole of the magnet is near the top of the chip, the magnetic induction line passes from the bottom of the chip to the top. It is considered that the magnetic induction intensity B is positive at this time.When the North Pole of the magnet is near the top of the chip, the magnetic induction line passes from the top of the chip to the bottom, and the magnetic induction intensity B is considered to be negative.





TO-92S Output Switching Characteristics

SOT-23-3L Output Switching Characteristics

Product Name Structure

KTH1531 X X-XXX

- Package abbreviation：ST3：SOT-23-3L
  TO3：TO-92S
- Magnetic sensitivity：U： B_{OP}=20 Gauss
- Sampling Frequency：F： f = 40KHz

Absolute Maximum Ratings （@T_A=+25℃, unless otherwise specified）

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage Dissipation	6	V
V_{DD_REV}	V_{IN} Range	-0.3	V
I_{OUTPUT}	Output Current	5	mA
B	Magnetic Flux Density	Unlimited	Gauss
T_{STG}	Storage Temperature Range	-50～+150	℃
T_J	Maximum Junction Temperature	+150	℃
ESD HBM	Human Body Model ESD Capability	8000	V

Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum rated conditions for extended periods may affect device reliability.

Recommended Operating Range （@T_A=+25℃, unless otherwise specified）

Symbol	Parameter	Conditions	Value	Unit
V_{DD}	Supply Voltage	Operating	1.6～5.5	V
T_A	Operating temperature Range	Operating	-40～125	ºC

Electronics Characteristics （@T_A=+25℃, V_{DD}=1.8V, unless otherwise specified）

Symbol	Characteristics	Condition	Min.	Typ.	Max.	Unit
VDD	Supply Voltage	Operating	1.8	—	5.5	V
VOL	Output Low Voltage (On)	I_{OUT}=1mA	—	0.05	0.15	V
VOH	Output High Voltage (Off)	I_{OUT}=1mA	V_{DD}-0.15	V_{DD}-0.05	—	V
$I_{DD(AVG)}$	Average Supply Current	TA=+25℃， VDD=1.8V	—	2.25	—	mA
$I_{DD(AVG)}$	Average Supply Current	TA=+25℃， VDD=5.5V	—	2.75	—	mA
Fs	Sampling Frequency	TA=+25℃， VDD=1.8V	—	40K	—	Hz

Magnetic Characteristics （T_A=25℃, VDD=1.8V, unless otherwise noted）

Package Type : SOT-23-3L

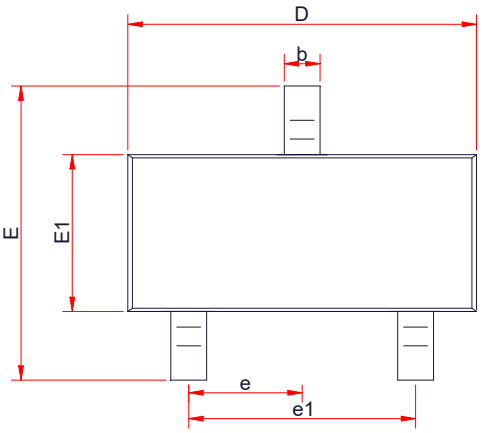
Symbol	Characteristics	Condition	Min.	Typ.	Max.	Unit
B_{OP}	Output Operation Point	TA=+25℃， VDD=1.8V	-28	-20	-12	Gauss
B_{RP}	Output Release Point	TA=+25℃， VDD=1.8V	12	20	28	
B_{HY} ($\|B_{OP}-B_{RP}\|$)	Hysteresis		-	40	-	

Package Type : TO-92S

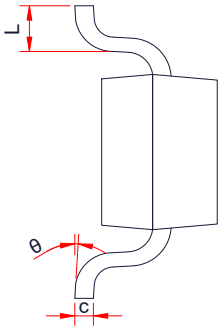
Symbol	Characteristics	Condition	Min.	Typ.	Max.	Unit
B_{OP}	Output Operation Point	TA=+25℃， VDD=1.8V	12	20	28	Gauss
B_{RP}	Output Release Point	TA=+25℃， VDD=1.8V	-28	-20	-12	
B_{HY} ($\|B_{OP}-B_{RP}\|$)	Hysteresis		-	40	-	

PACKAGE OUTLINE DIMENSIONS

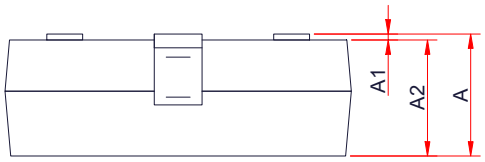
SOT-23-3L



TOP VIEW



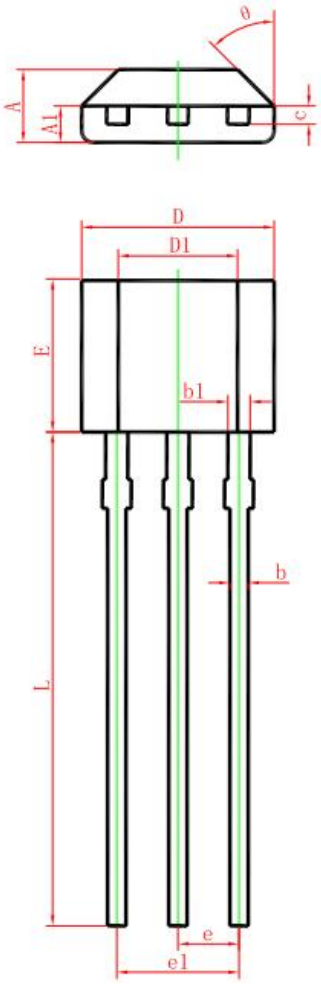
SIDE VIEW



SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	-	-	1.25
A1	0.00	-	0.1
A2	1.00	1.10	1.15
b	0.30	-	0.50
c	0.10	-	0.20
D	2.82	2.95	3.02
E	2.65	2.80	2.95
E1	1.50	1.65	1.70
e	0.125	0.95	1.05
e1	1.80	1.90	2.00
L	0.30	0.45	0.60
θ	0 °	-	8 °

TO-92S



Symbol	Dimensions in Millimeters	
	Min.	Max.
A	1.420	1.620
A1	0.660	0.860
b	0.330	0.480
B1	0.400	0.510
c	0.330	0.510
D	3.900	4.100
D1	2.280	2.680
E	3.050	3.250
e	1.270 TYP	
e1	2.440	2.640
L	15.100	15.500
θ	45° TYP	