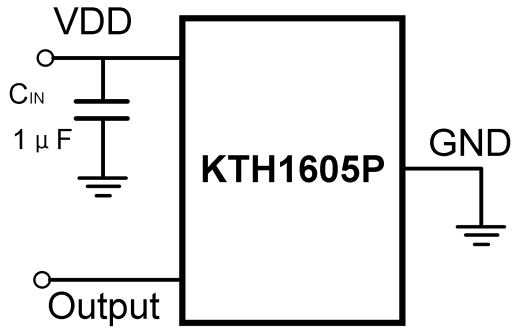
1 Features

- Low power Consumption
  700uA@1.8V
- Supply Voltage：1.6V~5.5V
- High Magnetic Sensitivity
  - B_{OP}=±22Gs B_{RP}=±16GS
  - B_{OP}=±33Gs B_{RP}=±23GS
  - B_{OP}=±46Gs B_{RP}=±34GS
- Magnetic Type: Omni-polar
- No External Pull-up Resistors Required
- Package：SOT-23-3L
  TO-92S
- Operating Temperature：-40℃~85℃
- High ESD Rating：HBM 8KV
- RoHS Compliant

2 Application

- Level, proximity and position switches
- Door, Lids and Tray Position Switches
- Water, electric and gas utility meters

3 Typical Application Circuit

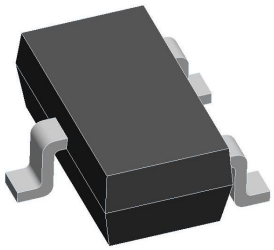


Note: C_{IN} is for stabilization and to strengthen the noise immunity, the recommended capacitance is 1 μ F typical and should be placed as close to the supply pin as possible.

4 Descriptions

The KTH1605P family 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. If the magnetic flux density perpendicular to the part marking surface is larger than operating point (BOP), the output will be turned on; if it is less than releasing point (BRP), the output will be turned off. Designed for battery powered consumer equipment, home applications and industrial applications, the average supply current is only 700μA at 1.8V. To support portable equipment the KTH1605P can operate over the supply range of 1.6V to 5.5V.

The KTH1605P family provides a variety of package to customers: SOT-23-3L, SOT-553 for surface mount and TO-92S flat for through-hole mount. All package are RoHS compliant.

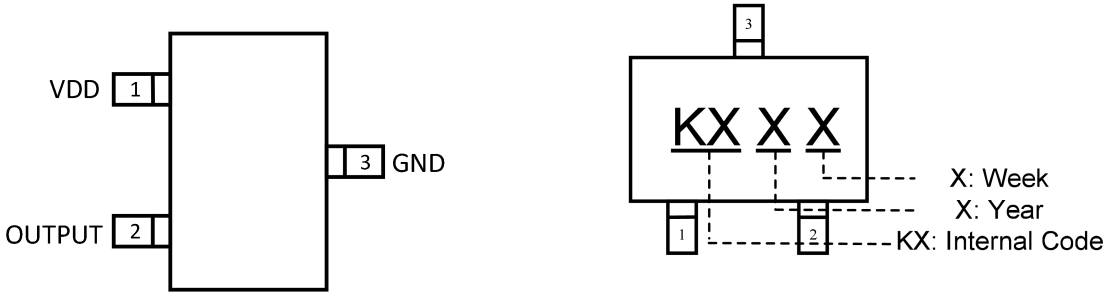


SOT-23-3L

TO-92S

5 Pin Descriptions

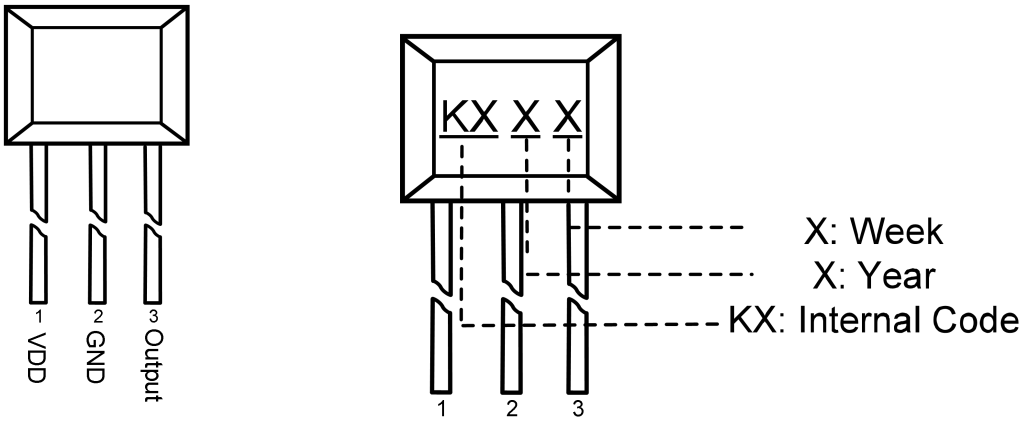
SOT-23-3L



Top view

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

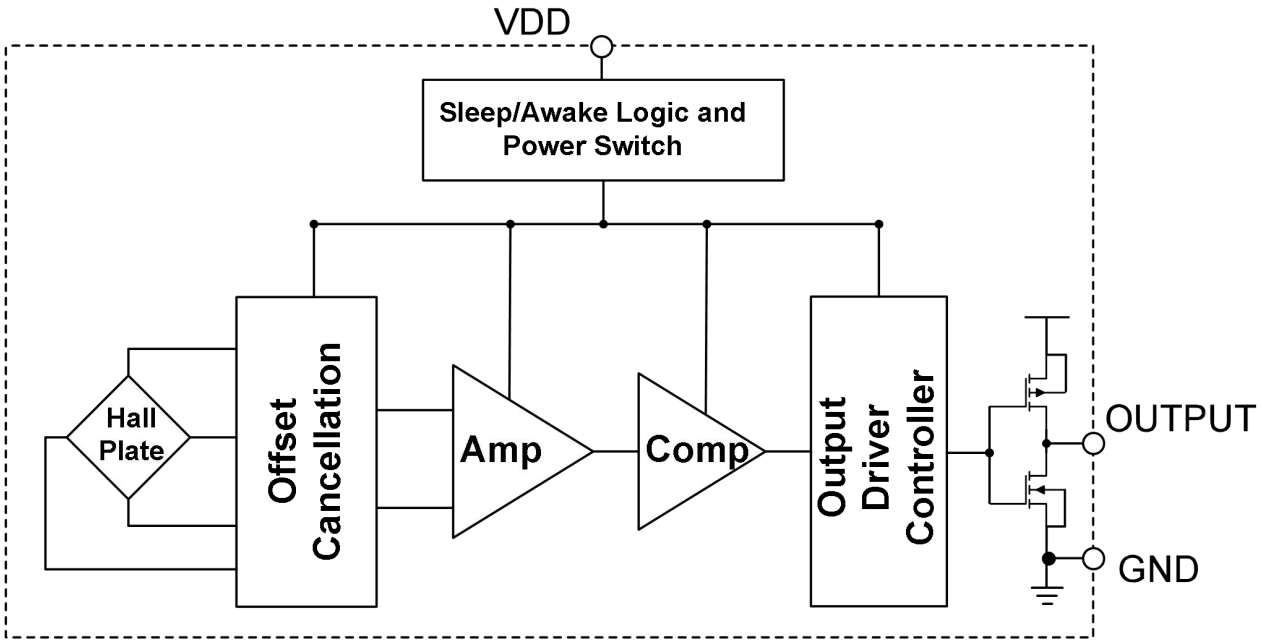
TO-92S



Top view

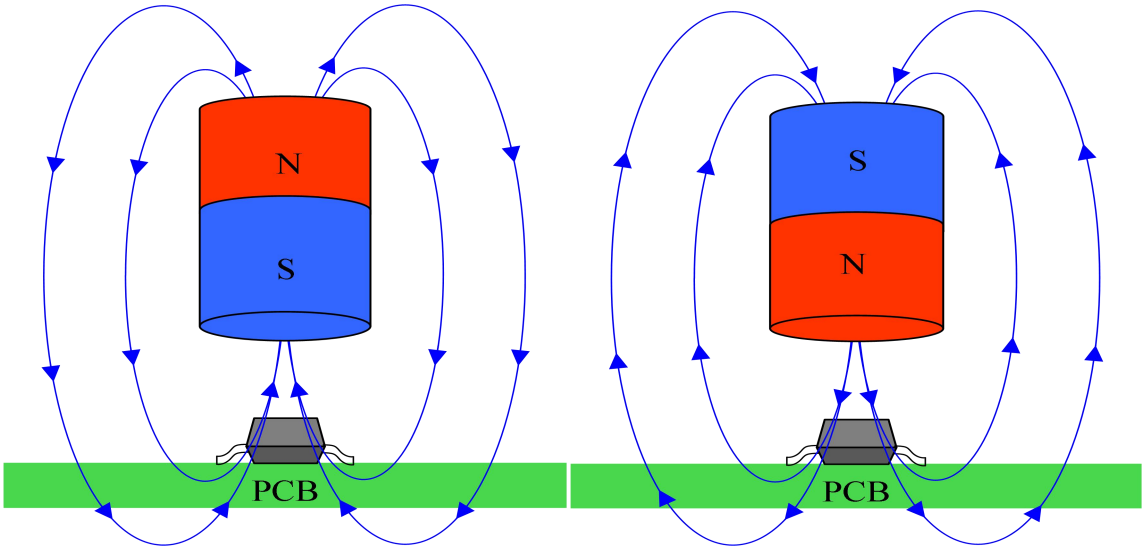
Pin Name	Pin Number	Function
VDD	1	Power Supply Input
GND	2	Ground Pin
OUTPUT	3	Output Pin

6 Block Diagram

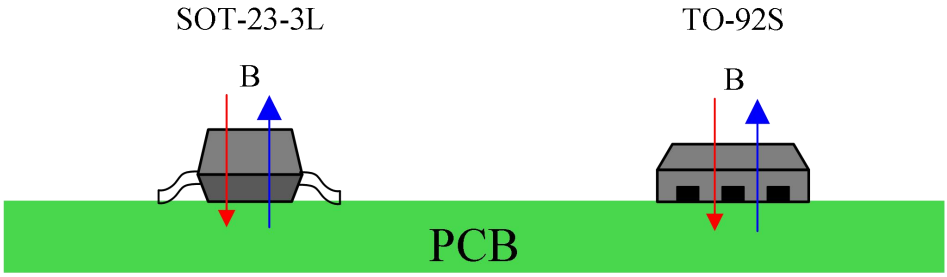


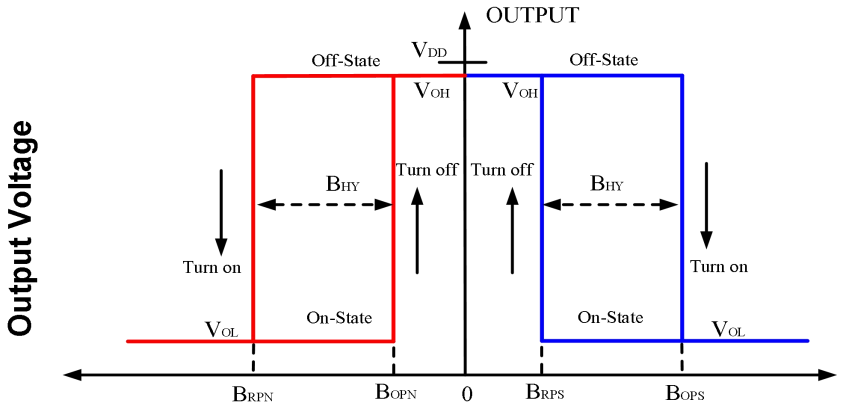
7 Output Switching Characteristics

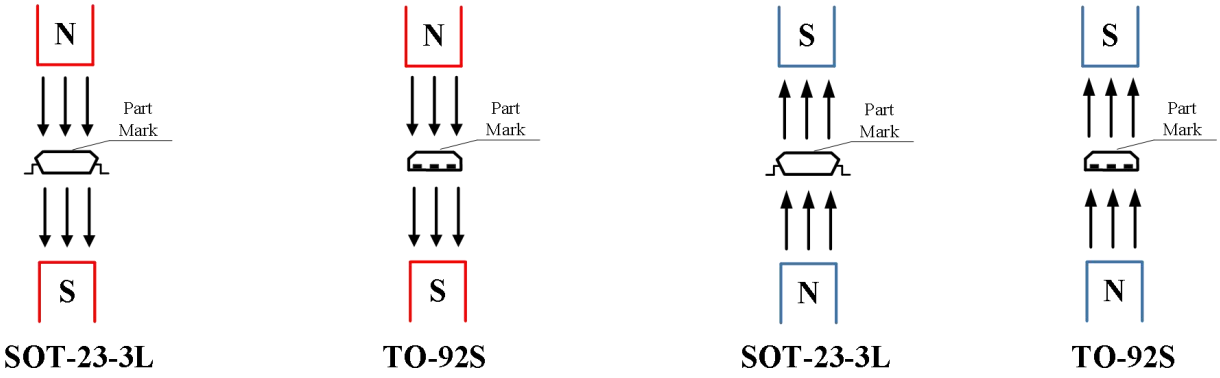
As shown in the figure below, when the South Pole of the magnet is near the top of the chip, the magnetic induction line passes from the bottom of the chip to the top. It is considered that the magnetic induction intensity B is positive at this time.When the North Pole of the magnet is near the top of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



As shown in the figure below, KTH1605P can detect the magnetic fields of the South Pole and the North Pole.







8 Product Name Structure

KTH1605P X -XXX

Package abbreviation：ST3：SOT-23-3L
TO3：TO-92S

Magnetic sensitivity：H: B_{OP}=46 Gauss
L： B_{OP}=33 Gauss
U： B_{OP}=22 Gauss

9 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	ºC
T_J	Maximum Junction Temperature	+150	ºC
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.

10 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	-40～85	ºC

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

KTH1605PX系列						
Symbol	**Parameter**	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
VDD	Supply Voltage	Operating	1.6	—	5.5	V
VOL	Output Low Voltage (On)	I_{OUT}=1mA	—	0.10	0.15	V
VOH	Output High Voltage (Off)	I_{OUT}=1mA	V_{DD}-0.15	V_{DD}-0.10	—	V
$I_{DD(AVG)}$	Average Supply Current	TA=+25℃， VDD=1.8V	—	700	—	uA
f	Switch Frequency	TA=+25℃， VDD=1.8V	—	5	—	KHz

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

Symbol	Characteristics	Condition	Min.	Typ.	Max.	Unit
KTH1605P H Series						
B_{OPS}	Output Operation Point	TA=+25℃， VDD=1.8V	40	46	52	Gauss
B_{RPS}	Output Operation Point	TA=+25℃， VDD=1.8V	26	34	38	
B_{OPN}	Output Release Point	TA=+25℃， VDD=1.8V	-52	-46	-40	
B_{RPN}	Output Release Point	TA=+25℃， VDD=1.8V	-38	-34	-26	
B_{HY} ($\|B_{OPX}\|$-$\|B_{RPX}\|$)	Hysteresis		-	12	-	

Symbol	Characteristics	Condition	Min.	Typ.	Max.	Unit
KTH1605P L Series						
B_{OPS}	Output Operation Point	TA=+25℃， VDD=1.8V	26	33	38	Gauss
B_{RPS}	Output Operation Point	TA=+25℃， VDD=1.8V	16	23	28	
B_{OPN}	Output Release Point	TA=+25℃， VDD=1.8V	-38	-33	-28	
B_{RPN}	Output Release Point	TA=+25℃， VDD=1.8V	-28	-23	-16	
B_{HY} ($\|B_{OPX}\|$-$\|B_{RPX}\|$)	Hysteresis		-	10	-	

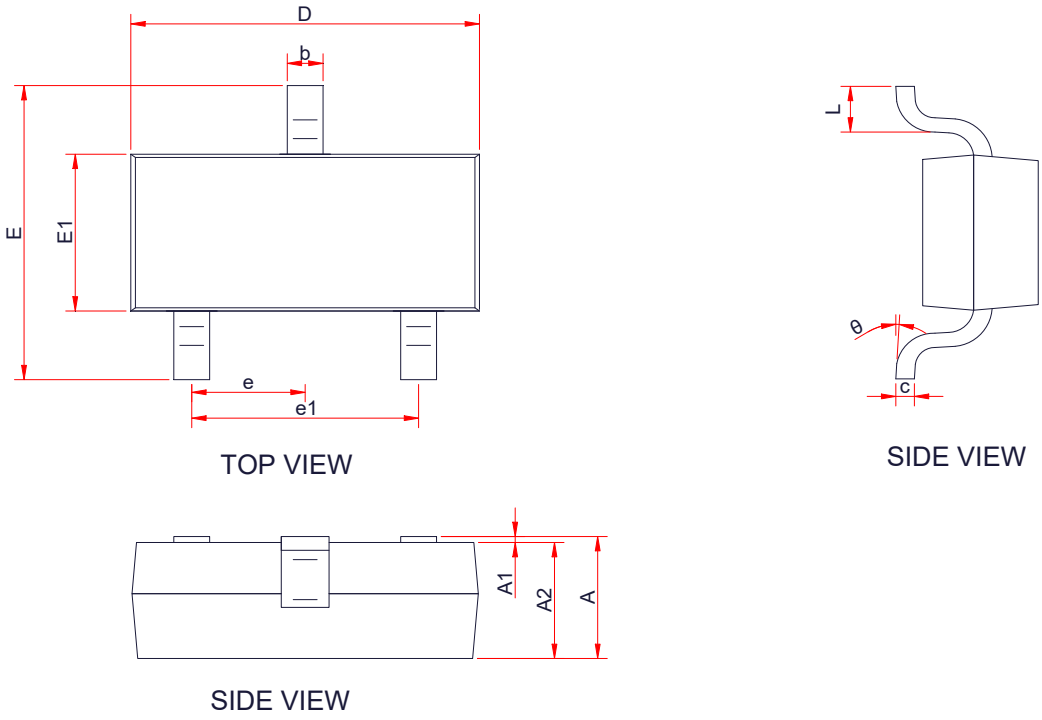
Symbol	Characteristics	Condition	Min.	Typ.	Max.	Unit
KTH1605P U Series						
B_{OPS}	Output Operation Point	TA=+22℃， VDD=1.8V	14	22	30	Gauss
B_{RPS}	Output Operation Point	TA=+22℃， VDD=1.8V	8	16	24	
B_{OPN}	Output Release Point	TA=+22℃， VDD=1.8V	-30	-22	-14	
B_{RPN}	Output Release Point	TA=+22℃， VDD=1.8V	-24	-16	-8	
B_{HY} ($\|B_{OPX}\|$-$\|B_{RPX}\|$)	Hysteresis		-	6	-	

Order Information

Part Numbers	Package	Number of Pins	Bop	Temperature
KTH1605PU-ST3	SOT-23-3L	3	22Gauss	-40℃~85℃
KTH1605PL-ST3	SOT-23-3L	3	33Gauss	-40℃~85℃
KTH1605PH-ST3	SOT-23-3L	3	46Gauss	-40℃~85℃
KTH1605PU-TO3	TO-92S	3	22Gauss	-40℃~85℃
KTH1605PL-TO3	TO-92S	3	33Gauss	-40℃~85℃
KTH1605PH-TO3	TO-92S	3	46Gauss	-40℃~85℃

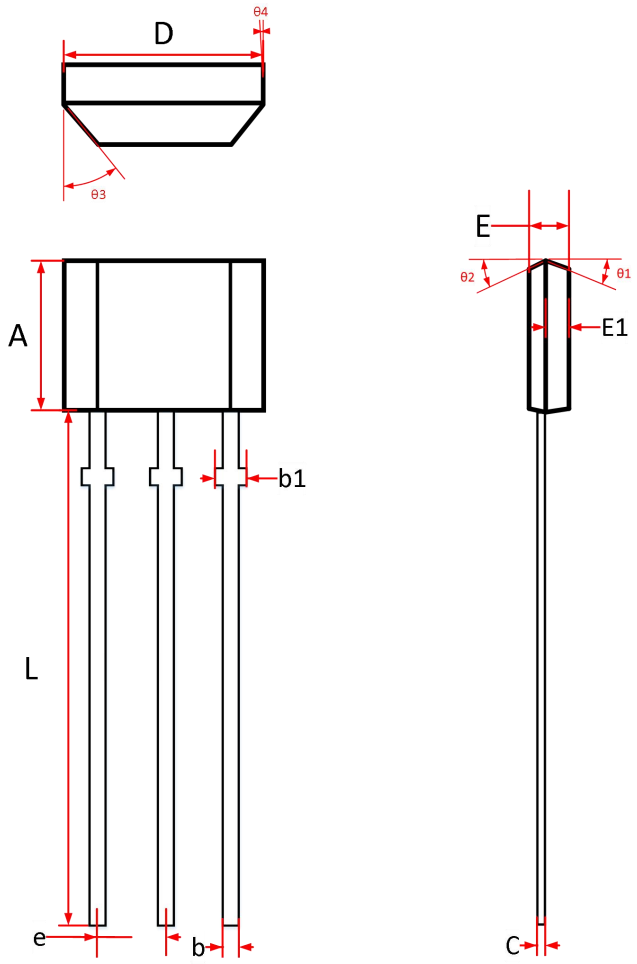
PACKAGE OUTLINE DIMENSIONS

SOT-23-3L



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	0.85	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.	Typ.	Max.
A	2.90	3.00	3.10
b	0.35	0.39	0.50
b1	0.40	0.44	0.55
C	0.36	0.38	0.45
D	3.90	4.00	4.10
E	1.42	1.52	1.62
E1		0.75	
e	1.27 TYP		
L	13.50	14.50	15.50
θ 1		6°	
θ 2		3°	
θ 3		45°	
θ 4		3°	