

High sensitivity, latching Hall switch sensor

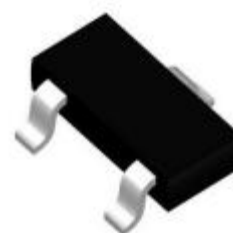
Overview

The SL163X series is a low-power, latching Hall switch sensor. The chip has built-in temperature compensation circuit and clock logic circuit to ensure the stable operating point and switching frequency of the chip. When magnetic field B is applied, when $|B| > |BOP|$, the chip outputs a low level and maintains a low level. Until $|B| > |BRP|$, the chip outputs a high level.

It can operate in the supply voltage range of 1.8V to 5.5V and adopts standard SOT-23-3L and TO-92S packages.

Features

- Latching mode of operation
- Wide operating voltage range: 1.8V~5.5V
- High magnetic field sensitivity
 - Ultra-low threshold: $Bop = \pm 20$ Gauss $Brp = 20$ Gauss
 - High Threshold: $Bop = \pm 48$ Gauss $Brp = 48$ Gauss
- Average operating current $I = 2.25$ mA @ $VDD = 1.8$ V (Typical Value)
- Excellent ESD performance: HBM 8KV
- Operating temperature range: $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$
- RoHS compliant

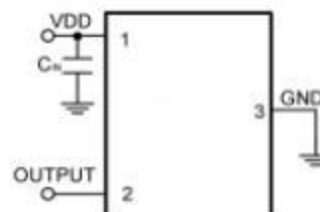


SOT-23-3L



TO-92S

Application Circuit Schematic



Typical Applications

- Brushless Motor
- Speed Detection
- Liquid level detection
- Proximity position switch

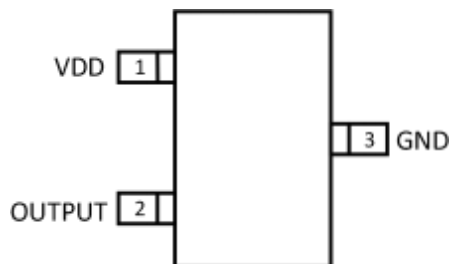
Note: In order to filter out the noise at the chip power supply end, a $1\mu\text{F}$ capacitor needs to be connected between the power supply and the ground, and the capacitor should be as close to the VDD pin as possible.

Ordering Information

Model	Pin number	Pickage	Operating temperature	MSL Level
SL1633FU	3	SOT-23-3L	$-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	3
SL1639FU	3	TO-92S	$-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	NA
SL1633FH	3	SOT-23-3L	$-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	3
SL1639FH	3	TO-92S	$-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	NA

Pin definition and marking information

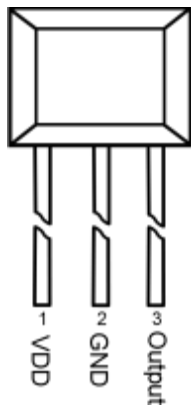
SOT-23-3L



Pin structure (top view)

Pin Name	Pin number	Functional Description
VDD	1	Power input
OUTPUT	2	Output
GND	3	Ground

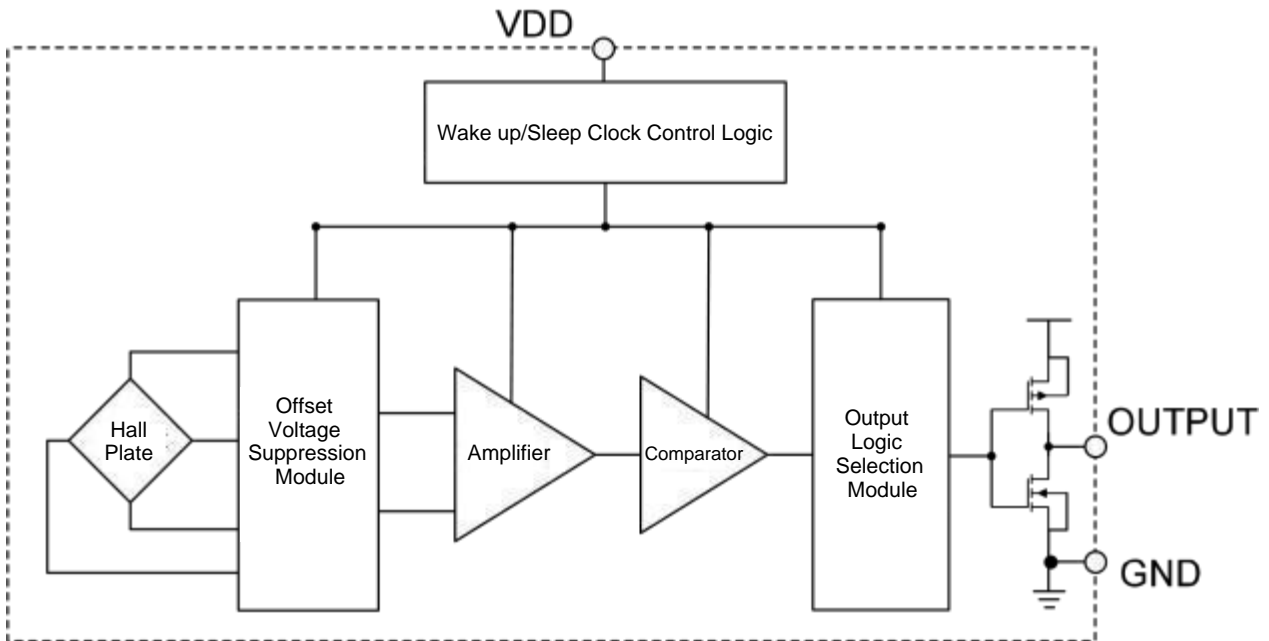
TO-92S



Pin structure (top view)

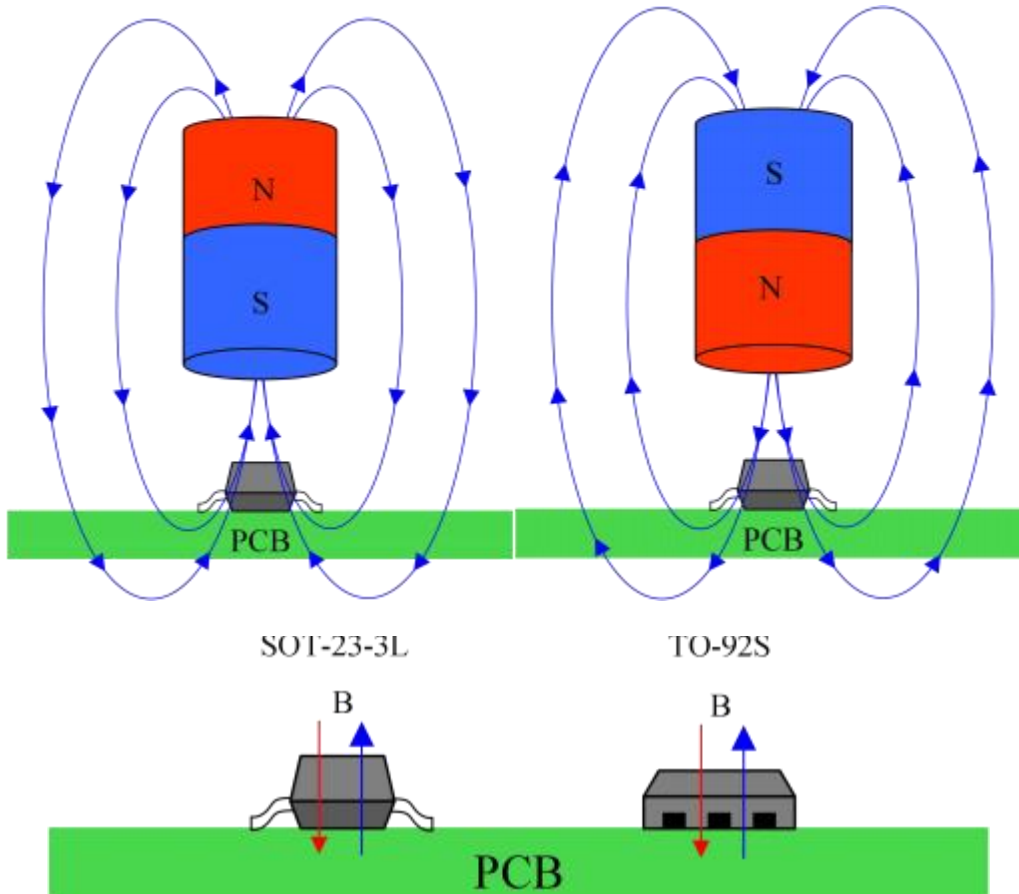
Pin Name	Pin number	Functional Description
VDD	1	Power input
OUTPUT	2	Ground
GND	3	Output

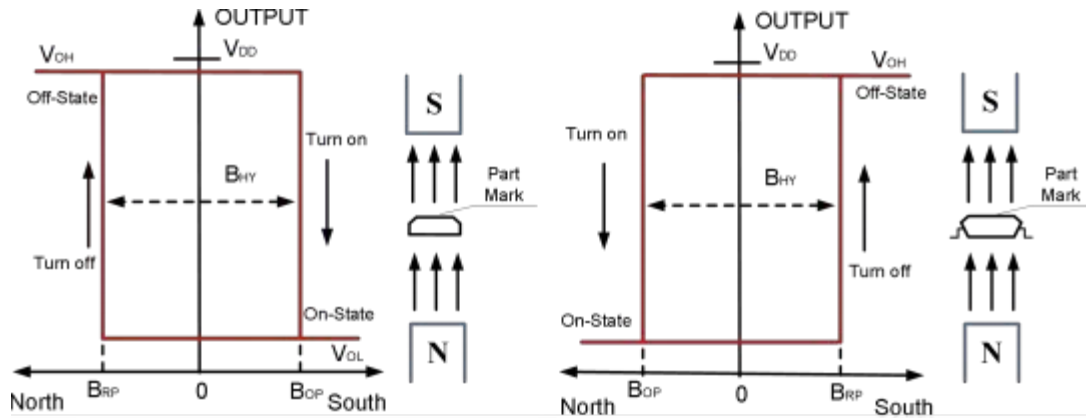
Functional Block Diagram



Output Characteristics

As shown in the figure below, when the south pole of the magnet is close to the top of the chip, the magnetic flux lines pass from the bottom to the top of the chip, and the magnetic induction intensity B is considered to be positive at this time; when the north pole of the magnet is close to the top of the chip, the magnetic flux lines pass from the top to the bottom of the chip, and the magnetic induction intensity B is considered to be negative at this time.



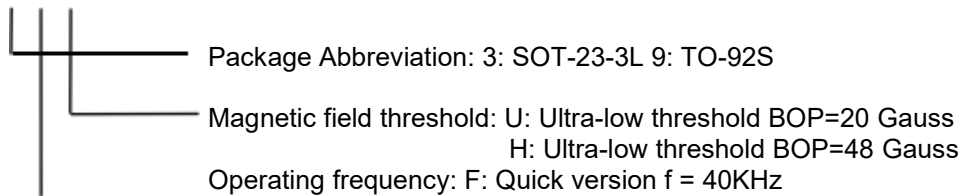


TO-92S Package product output curve

SOT-23-3L Package product output curve

Product model composition

SL163XX X



Absolute Maximum Ratings (@TA=+25°C, unless otherwise specified)

Project	Explanation	Numeric	Unit
V _{DD}	Supply voltage	6	V
V _{DD_REV}	Reverse supply voltage	-0.3	V
I _{OUTPUT}	Output drive current	5	mA
B	Magnetic induction intensity	No limit	Gauss
P _D	Package power consumption	400	mW
T _{STG}	Storage temperature range	-50~+150	oC
T _J	Maximum temperature resistance of the node	150	oC
ESD HBM	Human Body Model ESD Capability	8000	V

Note: Stresses exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Reference working conditions (@TA=+25°C, unless otherwise specified)

Project	Parameter Description	Working conditions	Numeric	Unit
V _{DD}	Supply voltage range	Chip work	1.8~5.5	V
T _A	Operating temperature range	Chip work	-40~85	oC

Electrical parameters (@TA=+25°C, VDD=1.8V unless otherwise specified)

Project	Parameter description	Working conditions	Min	Typ	Max	Parameter
V _{DD}	Supply voltage	Working status	1.8	—	5.5	V
V _{OL}	Output low level	I _{OUT} = 1mA	—	0.05	0.15	V
V _{OH}	Output high level	I _{OUT} = 1mA	V _{DD} -0.15	V _{DD} -0.05		V
I _{DD(AVG)}	Average current	TA=+25°C , VDD=1.8V	—	2.25	—	mA
I _{DD(AVG)}	Average current	TA=+25°C , VDD=5.5V	—	2.75	—	mA
F _s	Switching frequency	TA=+25°C , VDD=1.8V	—	40K	—	Hz

Magnetic parameters (@TA=+25°C, VDD=1.8V unless otherwise specified)

Ultra-low threshold series SOT-23-3L packaged products

Project	Parameter description	Working conditions	Min	Typ	Max	Unit
B _{OP}	Magnetic field operating point	TA=+25°C , VDD= 1.8V	-28	-20	-12	Gauss
B _{RP}	Magnetic field release point	TA=+25°C , VDD= 1.8V	12	20	28	
B _{HY} (B _{OP} -B _{RP})	Hysteresis		-	40	-	

Ultra-low threshold series TO-92S packaged products

Project	Parameter description	Working conditions	Min	Typ	Max	Unit
B _{OP}	Magnetic field operating point	TA=+25°C , VDD= 1.8V	12	20	28	Gauss
B _{RP}	Magnetic field release point	TA=+25°C , VDD= 1.8V	-28	-20	-12	
B _{HY} (B _{OP} -B _{RP})	Hysteresis		-	40	-	

High threshold series SOT-23-3L packaged products

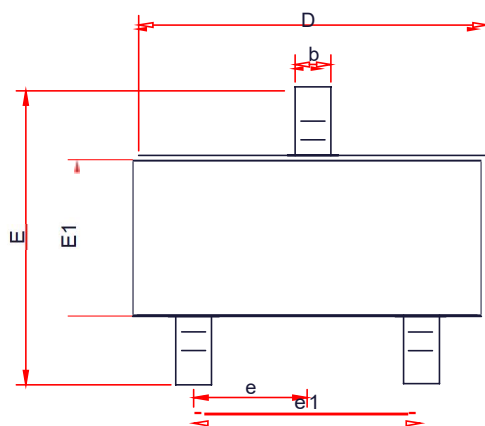
Project	Parameter description	Working conditions	Min	Typ	Max	Unit
B _{OP}	Magnetic field operating point	TA=+25°C , VDD= 1.8V	-56	-48	-40	Gauss
B _{RP}	Magnetic field release point	TA=+25°C , VDD= 1.8V	40	48	56	
B _{HY} (B _{OP} -B _{RP})	Hysteresis		-	96	-	

High threshold series TO-92S packaged products

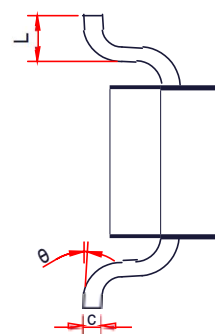
Project	Parameter description	Working conditions	Min	Typ	Max	Unit
B _{OP}	Magnetic field operating point	TA=+25°C , VDD= 1.8V	40	-48	56	Gauss
B _{RP}	Magnetic field release point	TA=+25°C , VDD= 1.8V	-56	48	-40	
B _{HY} (B _{OP} -B _{RP})	Hysteresis		-	96	-	

Package Dimensions

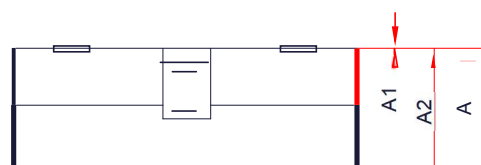
SOT-23-3L



TOP VIEW



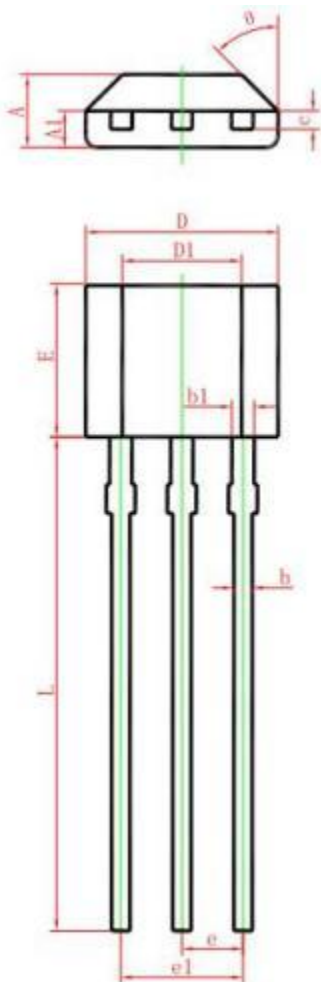
SIDE VIEW



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	0.85	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.	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	