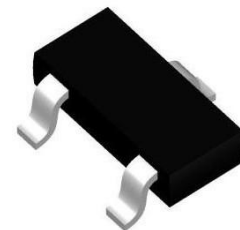


High sensitivity, latching Hall effect switch sensors.

Introduction

- The SL163X series is a low-power, latching Hall effect switch sensor. The chip incorporates temperature compensation circuitry and clock logic circuits to ensure stable operating points and switching frequencies.
- When a magnetic field B is applied, the chip outputs a low level when $|B| > |B_{OP}|$, and maintains this low level. It switches to a high level only when $|B| > |B_{RP}|$.
- It can operate within a supply voltage range of 1.8V to 5.5V and is available in standard SOT-23-3L and TO-92S packages.



SOT-23-3L

Features

- Latch mode of operation
- Wide operating voltage range: 1.8V~5.5V
- High magnetic field sensitivity
- ultra low threshold: $B_{op} = \pm 20$ gauss
 $B_{rp} = \mp 20$ gauss
- high threshold: $B_{op} = \pm 48$ gauss
 $B_{rp} = \mp 48$ gauss
- Average operating current $I = 2.25$ mA @ $V_{DD} = 1.8$ V (Typical values)
- Excellent ESD performance: HBM 8KV
- Operating Temperature Range: $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$
- RoHS compliant

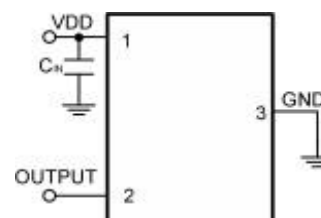


TO-92S

Typical application

- brushless motor
- speed measurement
- level detection
- proximity position switches

Application Circuit Schematic Diagram



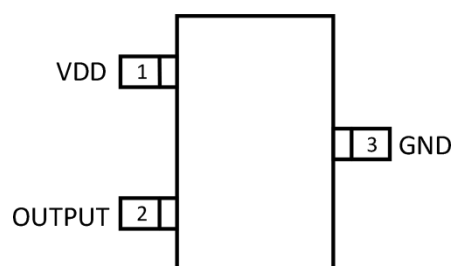
note: To filter out noise from the chip's power supply, a $1\mu\text{F}$ capacitor should be connected between the power and ground, with the capacitor placed as close as possible to the V_{DD} pin.

Ordering Information

Partnumber	Pin Number	Package Form	Operating Ambient 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

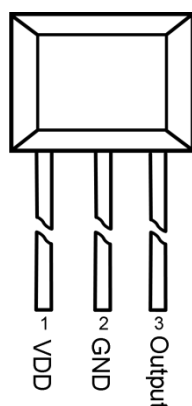
SOT-23-3L



Pin Structure (Top View)

Name	Number	Function
V _{DD}	1	power supply input
OUTPUT	2	output
GND	3	grounding

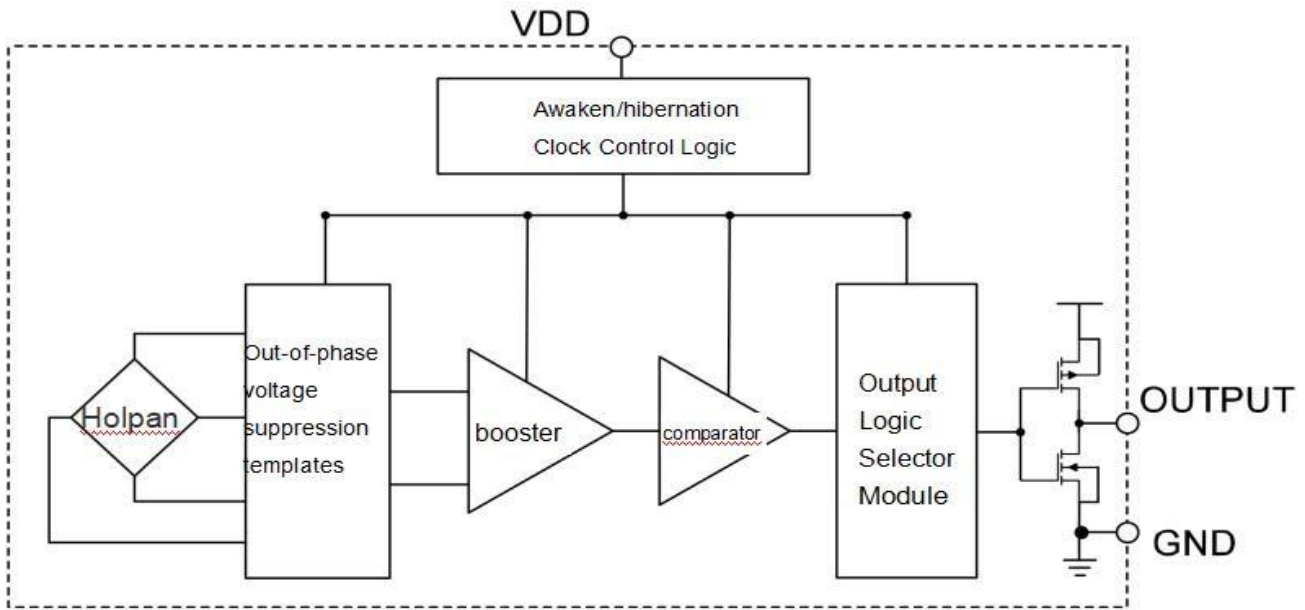
TO-92S



Pin Structure (Top View)

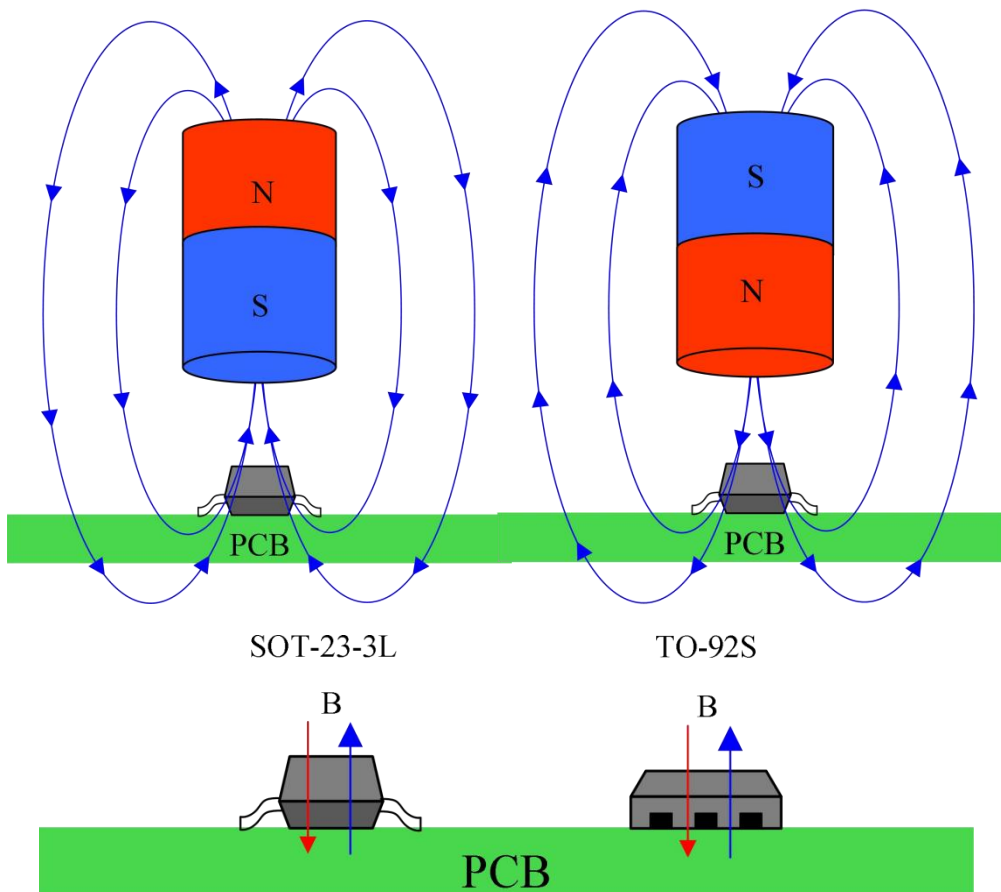
Name	Number	Function
V _{DD}	1	power supply input
GND	2	grounding
OUTPUT	3	output

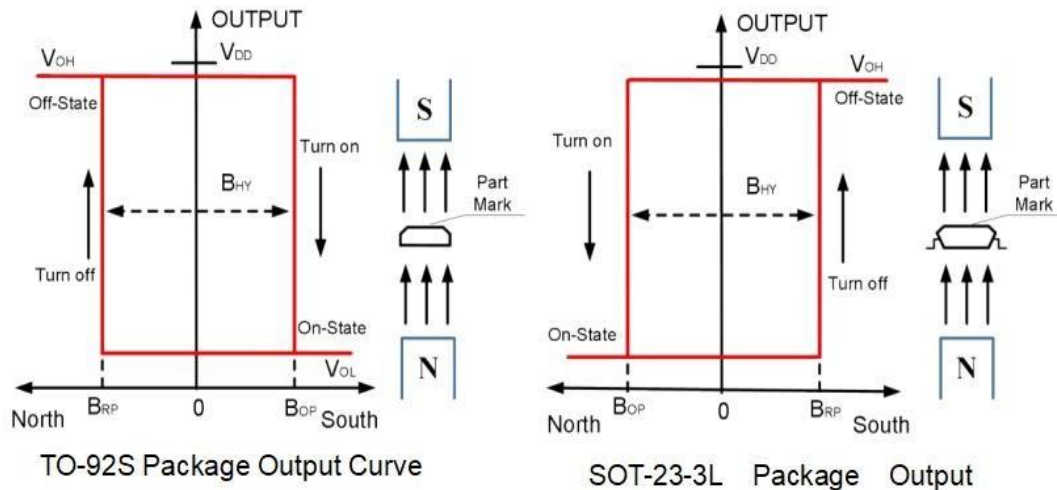
Function block diagram



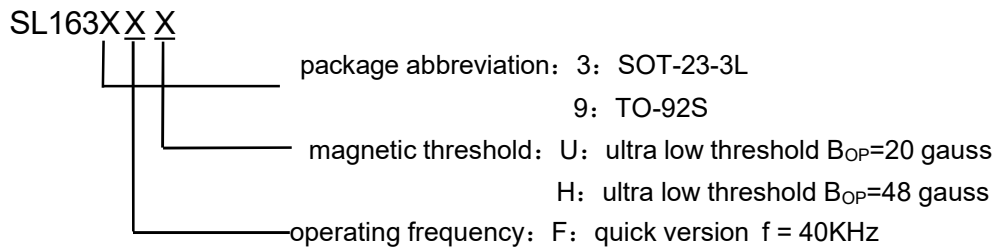
Output features

As shown in the diagram, when the south pole of a magnet approaches the top of the chip, magnetic flux lines pass from the bottom to the top of the chip. In this case, the magnetic induction strength B is considered positive. Conversely, when the north pole of a magnet approaches the top of the chip, magnetic flux lines pass from the top to the bottom of the chip, and the magnetic induction strength B is considered negative.





Model composition



Absolute Maximum Ratings (@ $T_A=+25^\circ\text{C}$ Unless otherwise specified)

Item	Parameter	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 flux density	unlimited	gauss
P_D	package power dissipation	400	mW
T_{STG}	storage temperature	-50~+150	$^\circ\text{C}$
T_J	maximum junction temperature	+150	$^\circ\text{C}$
ESD HBM	mannequin ESD capability	8000	V

note: Exceeding the absolute maximum ratings may cause permanent damage. Prolonged operation under absolute maximum conditions could affect the chip's reliability.

Reference working conditions (@ $T_A=+25^\circ\text{C}$ Unless otherwise specified)

Item	Function	Condition	Numeric	Unit
V_{DD}	supply voltage range	chip work	1.8~5.5	V
T_A	operating temperature range	chip work	-40~85	$^\circ\text{C}$

Electrical parameters (@ $T_A=+25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$ Unless otherwise specified)

Item	Function	Condition	Min.	Typ.	Item	Unit
V_{DD}	supply voltage	operating state	1.8	—	5.5	V
V_{OL}	output low level	$I_{OUT}=1\text{mA}$	—	0.05	0.15	V
V_{OH}	output high level	$I_{OUT}=1\text{mA}$	$V_{DD}-0.15$	$V_{DD}-0.05$	—	V
$I_{DD(AVG)}$	average current	$T_A=+25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	—	2.25	—	mA
$I_{DD(AVG)}$	average current	$T_A=+25^{\circ}\text{C}$, $V_{DD}=5.5\text{V}$	—	2.75	—	mA
F_s	switching frequency	$T_A=+25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	—	40K	—	Hz

Magnetic parameter (@ $T_A=+25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$ Unless otherwise specified)

Ultra Low Threshold Series SOT-23-3L Packaging Products

Item	Function	Condition	Min.	Typ.	Max.	Unit
B_{OP}	magnetic field operating point	$T_A=+25^{\circ}\text{C}$ $V_{DD}=1.8\text{V}$	-28	-20	-12	gauss
B_{RP}	magnetic field release point	$T_A=+25^{\circ}\text{C}$ $V_{DD}=1.8\text{V}$	12	20	28	
$B_{HY} (B_{OP}-B_{RP})$	hysteresis		-	40	-	

Ultra Low Threshold Series TO-92S Packaging Products

Item	Function	Condition	Min.	Typ.	Max.	Unit
B_{OP}	magnetic field operating point	$T_A=+25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	12	20	28	gauss
B_{RP}	magnetic field release point	$T_A=+25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	-28	-20	-12	
$B_{HY} (B_{OP}-B_{RP})$	hysteresis		-	40	-	

High Threshold Series SOT-23-3L Packaging Products

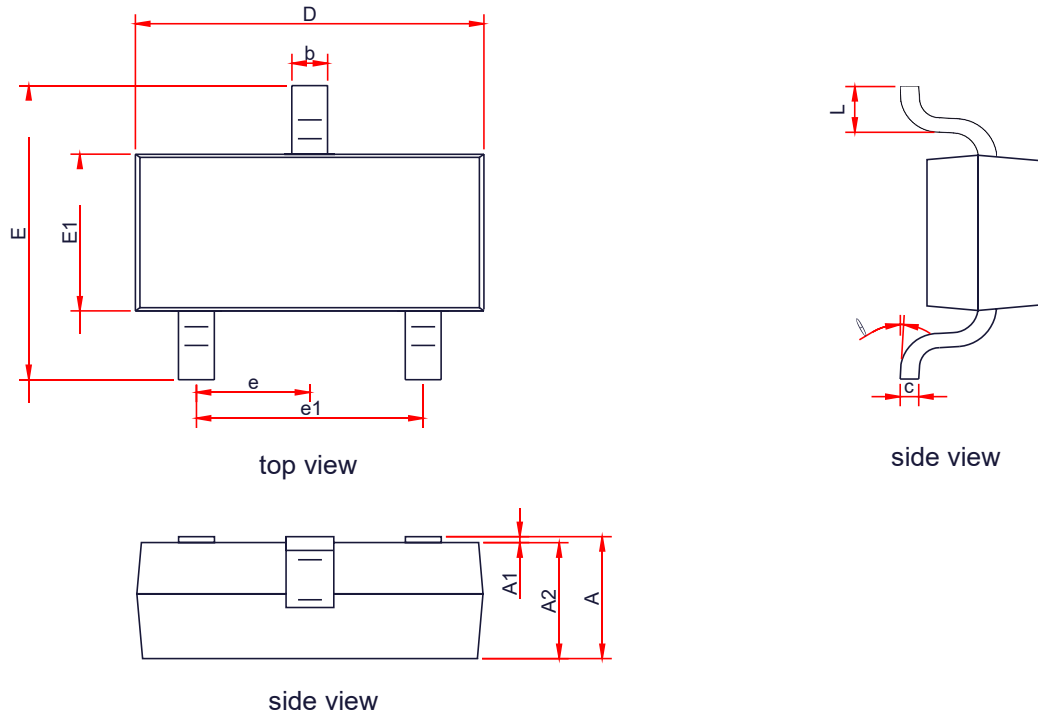
Item	Function	Condition	Min.	Typ.	Max.	Unit
B _{OP}	magnetic field operating point	T _A =+25°C, V _{DD} =1.8V	-56	-48	-40	gauss
B _{RP}	magnetic field release point	T _A =+25°C, V _{DD} =1.8V	40	48	56	
B _{HY} (B _{OP} -B _{RP})	hysteresis		-	96	-	

High Threshold Series TO-92S Packaging Products

Item	Function	Condition	Min.	Typ.	Max.	Unit
B _{OP}	magnetic field operating point	T _A =+25°C, V _{DD} =1.8V	40	-48	56	gauss
B _{RP}	magnetic field release point	T _A =+25°C, V _{DD} =1.8V	-56	48	-40	
B _{HY} (B _{OP} -B _{RP})	hysteresis		-	96	-	

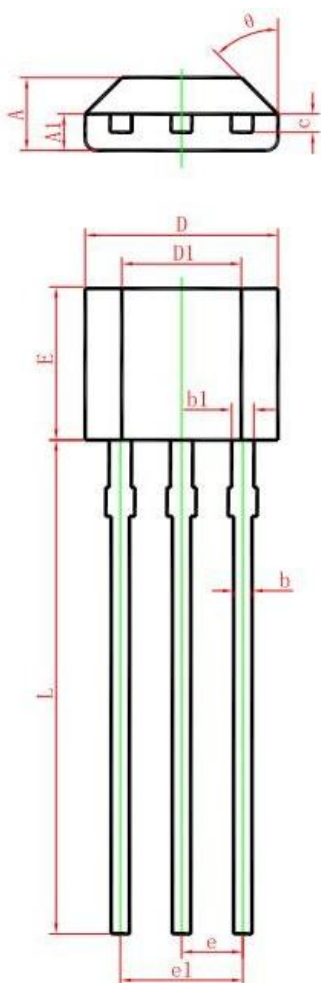
Package outline

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.	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	