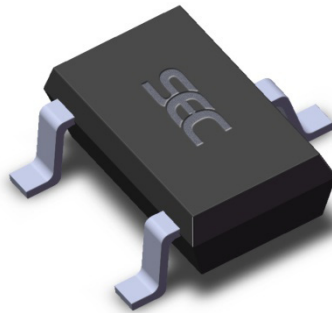


### Features and Benefits

- 3.5V to 24V Operation
- -40°C to 150°C Superior temperature operation
- CMOS technology
- Open-drain 25 mA output
- Reverse battery protection
- Small Size SOT23 3L
- Solid-state reliability
- Resistant to physical stress
- Activate with small, commercially available Permanent magnets

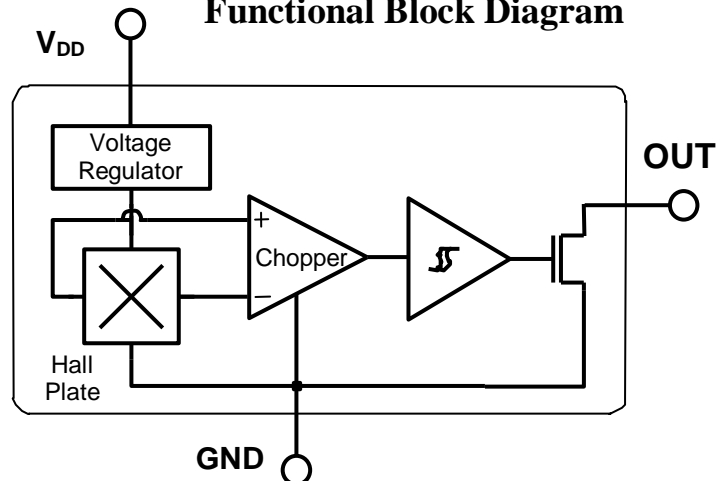
### Application Examples

- Automotive, Consumer and Industrial
- Solid-state switch
- Brushless DC motor commutation
- Speed detection
- Linear position detection
- Angular position detection
- Proximity detection



3 pin SOT23 (suffix SO)

### Functional Block Diagram



SIP Package	SOT Package
Pin 1 – V <sub>DD</sub>	Pin 1 – V <sub>DD</sub>
Pin 2 – GND	Pin 2 – OUT
Pin 3 – OUT	Pin 3 – GND

## General Description

The SS1368 is a unipolar Hall-effect sensor IC fabricated from CMOS technology. The device integrates a voltage regulator, reverse battery protection diode, Hall sensor with dynamic offset cancellation system, temperature compensation circuitry, small signal amplifier, Schmitt trigger and an open-drain output to sink up to 25 mA. With suitable output pull up, they can be used with bipolar or CMOS logic circuits.

These Hall-effect switches are monolithic integrat-

ed circuits with tighter magnetic specifications, designed to operate continuously over extended temperatures to +150°C, and are more stable with both temperature and supply voltage changes. The unipolar switching characteristic makes these devices ideal for use with a simple bar or rod magnet.

Thanks to its wide operating voltage range and extended choice of temperature range, it is quite suitable for use in automotive, industrial and consumer applications.

## Glossary of Terms

MilliTesla (mT), Gauss Units of magnetic flux density: 1mT = 10 Gauss

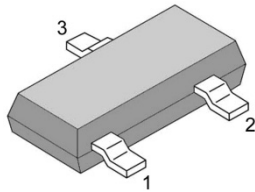
RoHS Restriction of Hazardous Substances

Operating Point ( $B_{OP}$ ) Magnetic flux density applied on the branded side of the package which turns the output driver ON ( $V_{OUT} = V_{DSon}$ )

Release Point ( $B_{RP}$ ) Magnetic flux density applied on the branded side of the package which turns the output driver OFF ( $V_{OUT} = \text{high}$ )

**Pin Definitions and Descriptions**

SOT Pin №	Name	Type	Function
1	V <sub>DD</sub>	Supply	Supply Voltage pin
2	OUT	Output	Open Drain Output pin
3	GND	Ground	Ground pin


**Absolute Maximum Ratings**

Parameter	Symbol	Value	Units
Supply Voltage	V <sub>DD</sub>	28	V
Supply Current	I <sub>DD</sub>	50	mA
Output Voltage	V <sub>OUT</sub>	28	V
Output Current	I <sub>OUT</sub>	50	mA
Storage Temperature Range	T <sub>S</sub>	-65 to 170	°C

Operating Temperature Range	Symbol	Value	Units
Temperature Suffix “E”	T <sub>A</sub>	-40 to 85	°C
Temperature Suffix “K”	T <sub>A</sub>	-40 to 125	°C
Temperature Suffix “L”	T <sub>A</sub>	-40 to 150	°C

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

## General Electrical Specifications

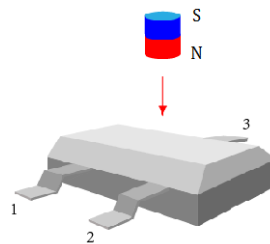
DC Operating Parameters  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 3.5\text{V to } 24\text{V}$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply Voltage	$V_{DD}$	Operating	3.5		24	V
Supply Current	$I_{DD}$	$B < B_{RP}$	4	5	7	mA
Output Saturation Voltage	$V_{DSon}$	$I_{OUT} = 20\text{mA}$ , $B > B_{OP}$		0.3	0.5	V
Output Leakage Current	$I_{OFF}$	$B < B_{RP}$ $V_{OUT} = 24\text{V}$		0.1	10	$\mu\text{A}$
Output Rise Time	$t_r$	$R_L = 820\Omega$ , $C_L = 20\text{pF}$		0.04	2.0	$\mu\text{s}$
Output Fall Time	$t_f$	$R_L = 820\Omega$ , $C_L = 20\text{pF}$		0.18	2.0	$\mu\text{s}$

## Magnetic Specifications

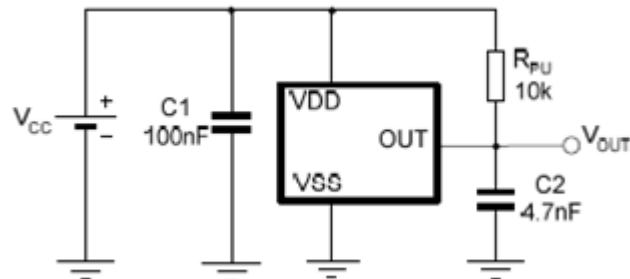
DC Operating Parameters  $V_{DD} = 3.5\text{V to } 24\text{V}$  (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating Point	$B_{OP}$	$T_a = 25^\circ\text{C}$ , $V_{DD} = 12\text{V DC}$	-190		-150	G
Release Point	$B_{RP}$		-160		-100	G
Hysteresis	$B_{HYS}$			45		G



## Application Information

Typical Three-Wire Application Circuit



For proper operation, a 100nF bypass capacitor should be placed as close as possible to the device between the V<sub>DD</sub> and ground pin.

For reverse voltage protection, it is recommended to connect a resistor or a diode in series with the V<sub>DD</sub> pin.

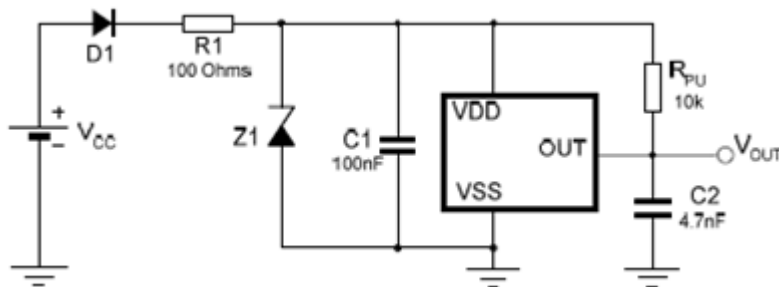
When using a resistor, three points are important:

- the resistor has to limit the reverse current to 50mA maximum ( $V_{CC} / R1 (\approx 50\text{mA})$ )
- the resulting device supply voltage V<sub>DD</sub> has to be higher than V<sub>DD</sub> min ( $V_{DD} = V_{CC} - R1 \cdot I_{DD}$ )
- the resistor has to withstand the power dissipated in reverse voltage condition ( $PD = V_{CC}^2 / R1$ )

When using a diode, a reverse current cannot flow and the voltage drop is almost constant ( $\approx 0.7\text{V}$ ).

Therefore, a 100Ω/0.25W resistor for 5V application and a diode for higher supply voltage are recommended.

Automotive and Harsh, Noisy Environments Three-Wire Circuit



When a weak power supply is used or when the device is intended to be used in noisy environment, it is recommended that figure above is used.

The low-pass filter formed by R1 and C1 and the Zener diode Z1 bypass the disturbances or voltage spikes occurring on the device supply voltage V<sub>DD</sub>. The diode D1 provides additional reverse voltage protection.

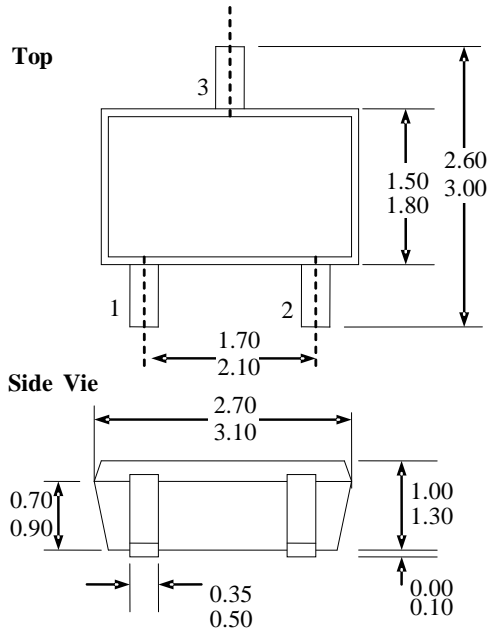
Both solutions provide the required reverse voltage protection.

## ESD Precautions

Electronic semiconductor products are sensitive to Electro Static Discharge (ESD).

Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

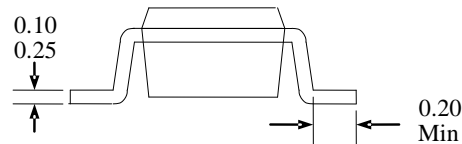
### Package SO, 3-Pin SOT-23:



#### Notes

- 1). PINOUT: Pin 1 V<sub>DD</sub>  
Pin 2 Output  
Pin 3 GND
- 2). All dimensions are in millimeters;

#### End



### Ordering Information

Part No.	Pb-free	Temperature Code	Package Code	Packing
SS1368ESOT	YES	-40°C to 85°C	SOT-23	7-in. reel, 3000 pieces/reel
SS1368KSOT	YES	-40°C to 125°C	SOT-23	7-in. reel, 3000 pieces/reel
SS1368LSOT	YES	-40°C to 150°C	SOT-23	7-in. reel, 3000 pieces/reel