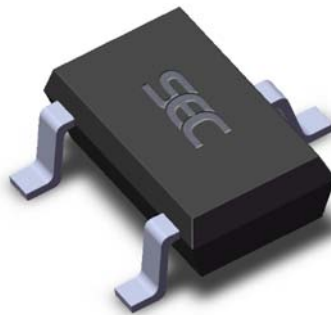


### Features and Benefits

- 4.5V to 24V Operation
- -40°C to 150°C Superior temperature operation
- Bipolar technology
- Open-collector 25 mA output
- Reverse battery protection
- Small Size SOT23 3L
- Solid-state reliability
- Resistant to physical stress
- Activate with small, commercially available Permanent magnets

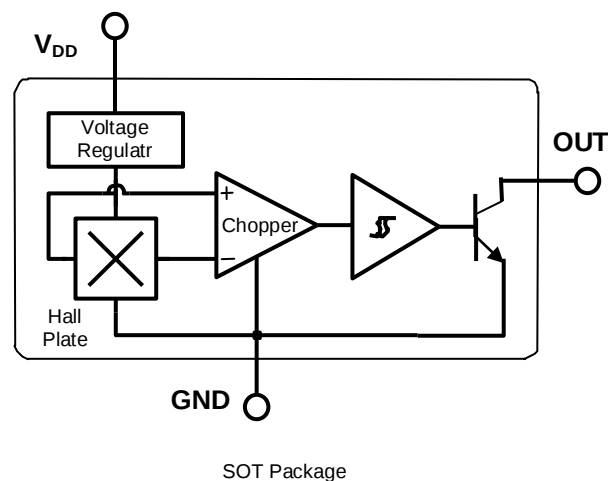
### Application Examples

- 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



### General Description

The SS118 is a unipolar Hall-effect sensor IC fabricated from bipolar 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-collector 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 integrated 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.

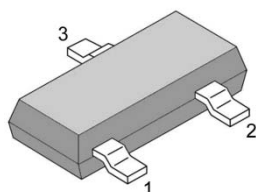
Thanks to its wide operating voltage range and extended choice of temperature range, it is quite suitable for use in automotive, industrial and consumer applications.

### Glossary of Terms

|                        |                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| MilliTesla (mT), Gauss | Units of magnetic flux density: 1mT = 10 Gauss                                                                                 |
| RoHS                   | Restriction of Hazardous Substances                                                                                            |
| Operating Point (BOP)  | Magnetic flux density applied on the branded side of the package which turns the output driver ON ( $V_{OUT} = V_{DSON}$ )     |
| Release Point (BRP)    | 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    |

### Temperature ratings

| 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  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 4.5\text{V}$  to  $24\text{V}$  (unless otherwise specified)

| Parameter                 | Symbol     | Test Conditions                         | Min | Typ  | Max | Units         |
|---------------------------|------------|-----------------------------------------|-----|------|-----|---------------|
| Supply Voltage            | $V_{DD}$   | Operating                               | 4.5 |      | 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

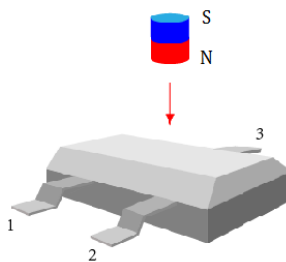
DC Operating Parameters  $V_{DD} = 4.5\text{V}$  to  $24\text{V}$  (unless otherwise specified)

| Package | Parameter       | Symbol     | Test Conditions                                     | Min  | Typ  | Max  | Units |
|---------|-----------------|------------|-----------------------------------------------------|------|------|------|-------|
| SO      | Operating Point | $B_{OP}$   | $T_A = 25^\circ\text{C}$ , $V_{DD} = 12\text{V DC}$ | -190 | -170 | -150 | G     |
|         | Release Point   | $B_{RP}$   |                                                     | -160 | -125 | -100 | G     |
|         | Hysteresis      | $B_{HYST}$ |                                                     |      | 45   |      | G     |

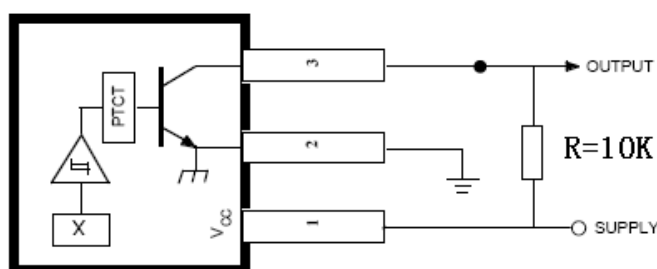
### Output Behavior versus Magnetic Pole

DC Operating Parameters  $T_A = -40^\circ\text{C}$  to  $150^\circ\text{C}$ ,  $V_{DD} = 4.5\text{V}$  to  $24\text{V}$  (unless otherwise specified)

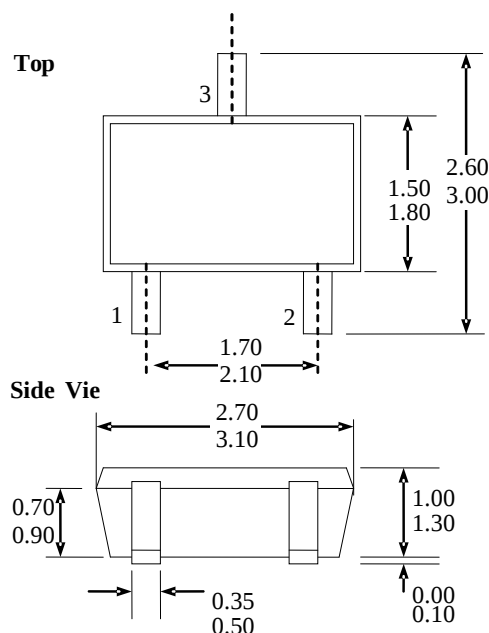
| Test Conditions (SO) | OUT  |
|----------------------|------|
| $B > B_{RP}$         | High |
| $B < B_{OP}$         | Low  |



### Application Information



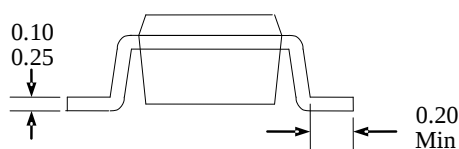
### Package SO, 3-Pin SOT-23:



Notes:

- 1). PINOUT: Pin 1  $V_{DD}$   
Pin 2 Output  
Pin 3 GND
- 2). All dimensions are in

**End**



### Ordering Information

| Part No.  | Pb-free | Temperature Code | Package Code | Packing                      |
|-----------|---------|------------------|--------------|------------------------------|
| SS118ESOT | YES     | -40°C to 85°C    | SOT-23       | 7-in. reel, 3000 pieces/reel |
| SS118KSOT | YES     | -40°C to 125°C   | SOT-23       | 7-in. reel, 3000 pieces/reel |
| SS118LSOT | YES     | -40°C to 150°C   | SOT-23       | 7-in. reel, 3000 pieces/reel |