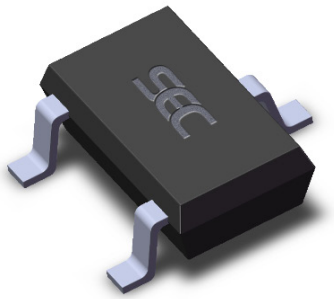
Features and Benefits

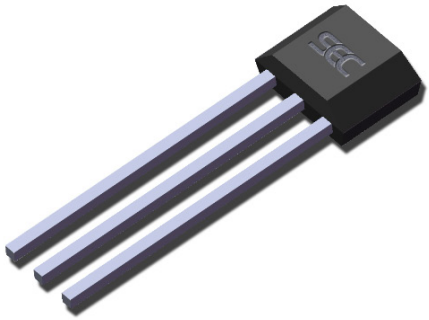
- CMOS Hall IC Technology
- Bipolar Output CMOS Multi-purpose latch
- Solid-State Reliability much better than reed switch
- Operation down to 2.5V
- Supply current down to 45μA, very low power consumption
- CMOS inverter output (no pull-up resistance)
- High sensitivity for direct reed switch replacement application

Application Examples

- Solid state switch
- Magneto-electric conversion switch
- Magnet proximity sensor for reed switch replacement in low duty cycle applications

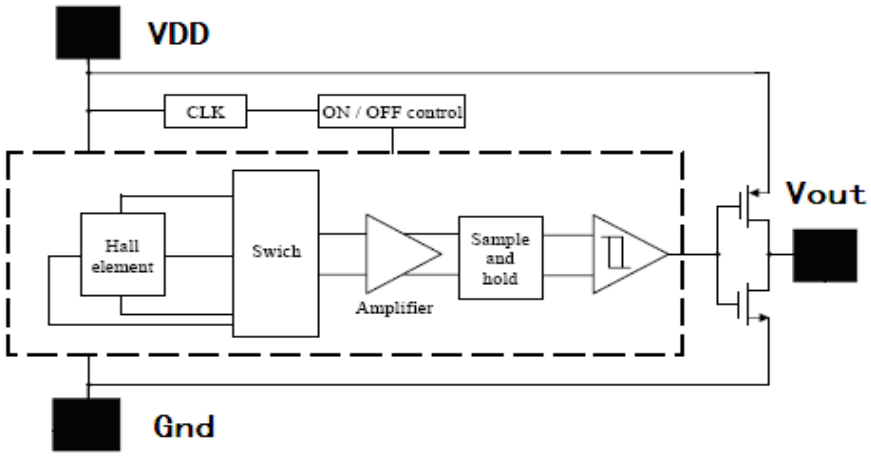


3 pin TSOT23 (suffix STT)



3 pin SIP (suffix UA)

Functional Block Diagram



General Description

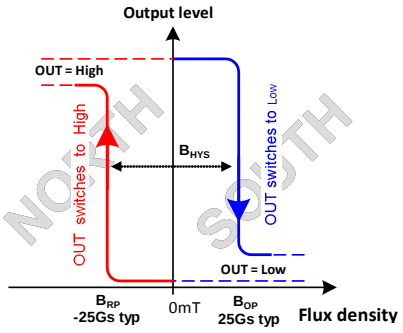
The SS2609 Hall effect sensor IC is fabricated from mixed signal CMOS technology. It incorporates advanced chopper-stabilization techniques to provide accurate and stable magnetic switch points.

The circuit design provides an internally controlled clocking mechanism to cycle power to the Hall element and analog signal processing circuits. This serves to place the high current-consuming portions of the circuit into a "Sleep" mode. Periodically the device is "Awakened" by this internal logic and the magnetic flux from the Hall element is evaluated against the predefined thresholds. If the flux density is above or below the B_{op}/B_{rp} thresholds then the output transistor is driven to change states accordingly. While in the "Sleep" cycle the output transistor is latched in its previous state. The design has been optimized for service in applications requiring extended operating lifetime in battery powered systems.

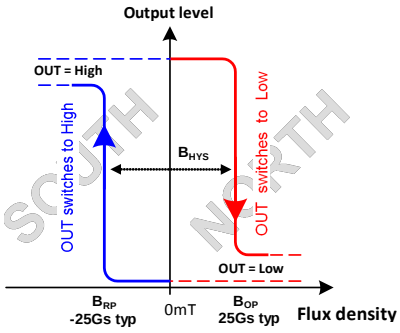
The output transistor of the SS2609 switches low (turns on) when a magnetic field perpendicular to the Hall sensor exceeds the operate point threshold (B_{OP}). After turn-on, the output voltage is V_{DS}. The device remains on if the south pole is removed (B→0). This l atching property defines the device as a magnetic memory. When the magnetic field is reduced below the release point, B_{RP}, the Output transistor turns off (goes high). The difference in the magnetic operate and release points is the hysteresis (B_{HYS}) of the device. This built-in hysteresis prevents output oscillation near the switching point, and allows clean switching of the output even in the presence of external mechanical vibration and electrical noise.

The TSOT-23 device is reversed from the UA package. The TSOT-23 output transistor will be latched on in the presence of a sufficiently strong North pole magnetic field applied to the marked face.

Glossary of Terms

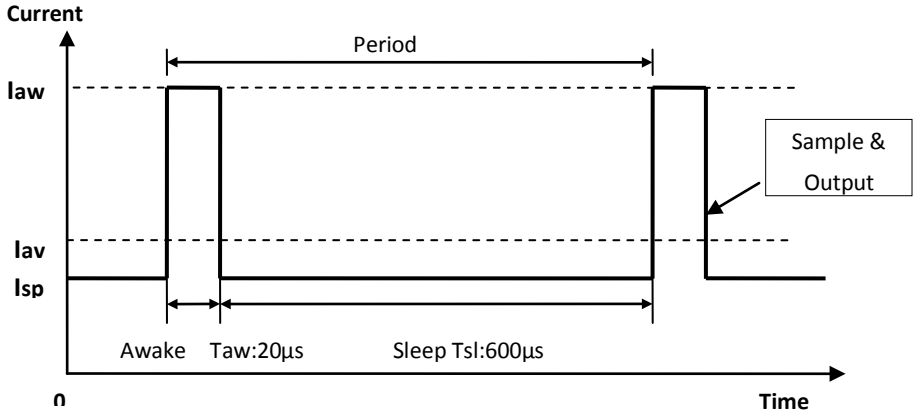


UA package - Latch characteristic



STT package - Latch characteristic

Internal Timing Circuit



Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Supply Voltage	V_{DD}	28	V
Supply Current	I_{DD}	50	mA
Output Voltage	V_{OUT}	28	V
Output Current	I_{OUT}	50	mA
Operating Temperature Range	T_A	-40 to 85	°C
Storage Temperature Rang	T_S	-50 to 150	°C
ESD Sensitivity	-	4000	V

Operating Temperature Range	Symbol	Value	Units
Temperature Suffix " E"	T_A	-40 to 85	°C
Temperature Suffix " K"	T_A	-40 to 125	°C
Temperature Suffix " L"	T_A	-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°C, V_{DD}= 2.5V to 5.5V (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating voltage	V_{DD}	Operating	2.5	3	5.5	V
Supply current	I_{DD}	Average		45		µA
Output Current	I_{OUT}			1.0		mA
Saturation Voltage	V_{SAT}	I_{OUT}=1mA			0.4	V
Awake mode time	T_{AW}	Operating		20		µS
Sleep mode time	T_{SL}	Operating			600	µS

Magnetic Specifications

DC Operating Parameters V_{DD} = 2.5 to 5.5V (unless otherwise specified)

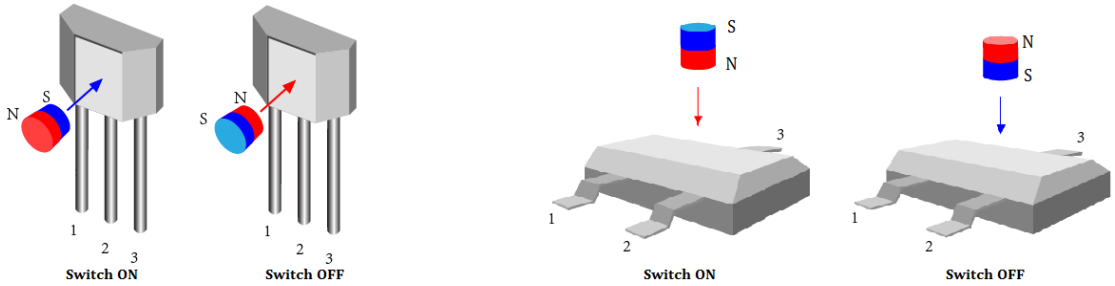
Package	Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
UA	Operating Point	B_{OP}	Ta=25°C V_{dd}=2.75V DC	5	25	40	G
	Release Point	B_{RP}		-40	-25	-5	G
	Hysteresis	B_{HYST}			40		G
SO	Operating Point	B_{OP}	Ta=25°C V_{dd}=2.75V DC	-40	-25	-5	G
	Release Point	B_{RP}		5	25	40	G
	Hysteresis	B_{HYST}			40		G

Output Behavior versus Magnetic Pole

DC Operating Parameters TA = -40°C to 150°C, V_{DD} = 2.5 to 5.5V (unless otherwise specified)

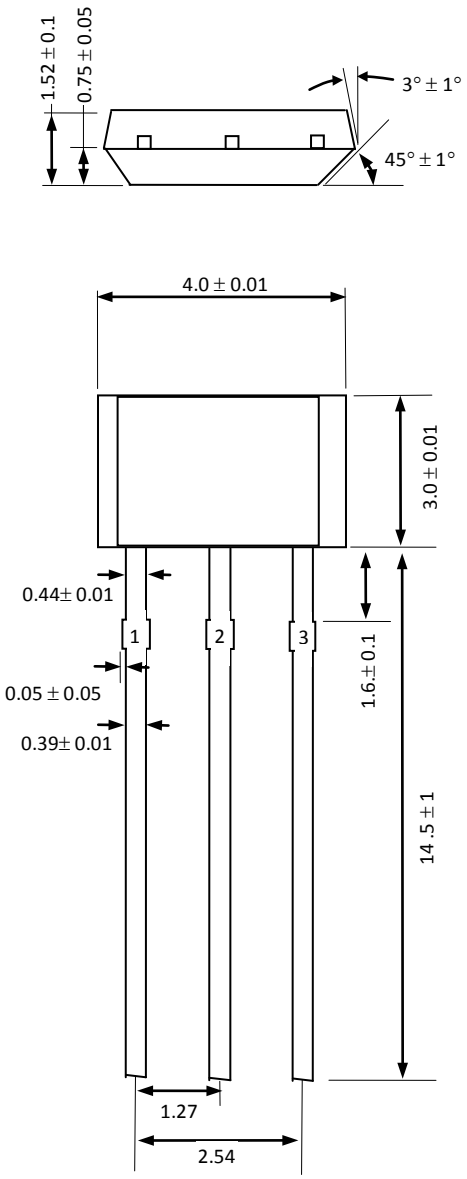
Test Conditions (UA)	Test Conditions (SO)	OUT
$B < B_{RP}$	$B > B_{RP}$	High
$B > B_{OP}$	$B < B_{OP}$	Low

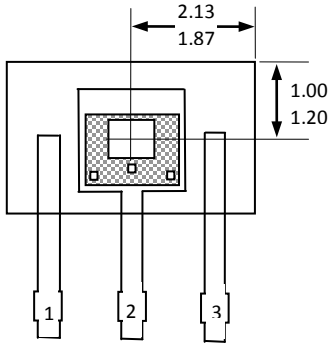
The SOT-23 device is reversed from the UA package. The SOT-23 output transistor will be turned on(drops low) in the presence of a sufficiently strong North pole magnetic field applied to the marked face and turned off(hoists high) in the presence of a sufficiently strong South pole magnetic field.



Package Information

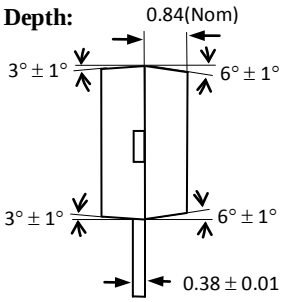
Package UA, 3-Pin SIP:





Sensor Location

Active Area Depth:



Notes:

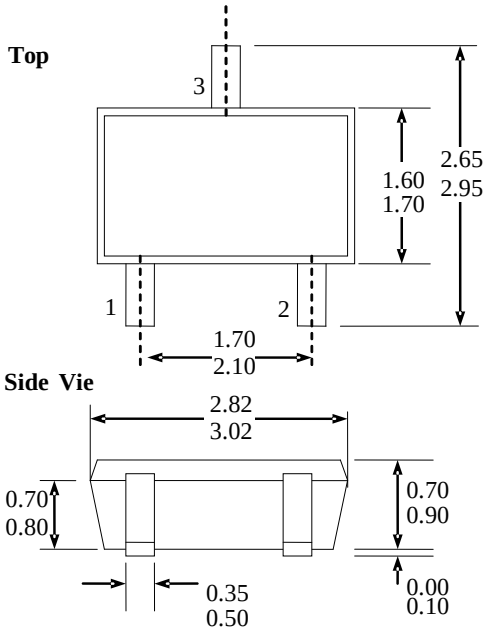
1). Controlling dimension : mm ;

2). Leads must be free of flash and plating voids ;

3). Do not bend leads within 1 mm of lead to package interface ;

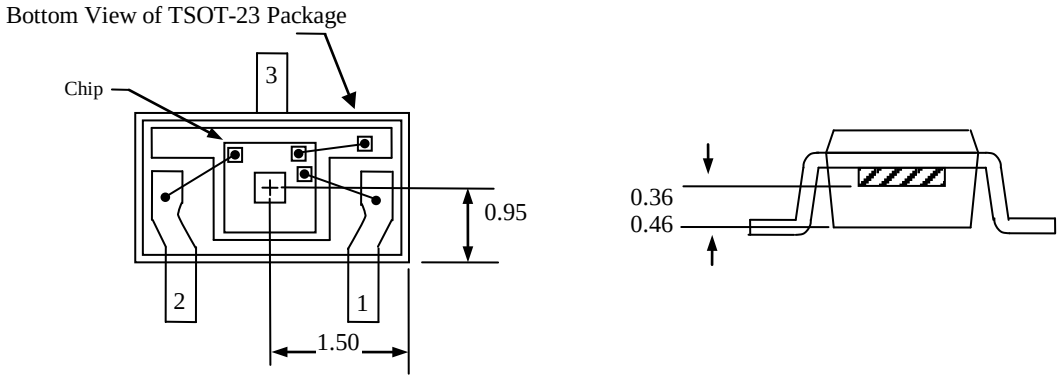
4). PINOUT: **Pin 1** V_{DD}
Pin 2 **GND**
Pin 3 **Output**

Package ST, 3-Pin TSOT-23:



Notes
1). PINOUT: Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND
2). All dimensions are in millimeters;

Hall Plate Location



Ordering Information

Part No.	Pb-free	Temperature Code	Package Code	Packing
SS2609ESTT	YES	-40°C to 85°C	TSOT-23	7-in. reel, 3000 pieces/ reel
SS2609EAU	YES	-40°C to 85°C	TO-92	Bulk, 1000 pieces/ bag
SS2609KSTT	YES	-40°C to 125°C	TSOT-23	7-in. reel, 3000 pieces/ reel
SS2609KAU	YES	-40°C to 125°C	TO-92	Bulk, 1000 pieces/ bag
SS2609LSTT	YES	-40°C to 150°C	TSOT-23	7-in. reel, 3000 pieces/ reel
SS2609LAU	YES	-40°C to 150°C	TO-92	Bulk, 1000 pieces/ bag