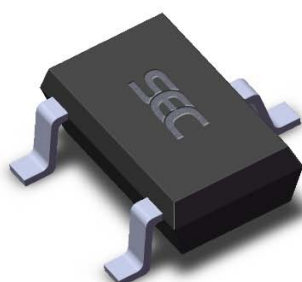


Features

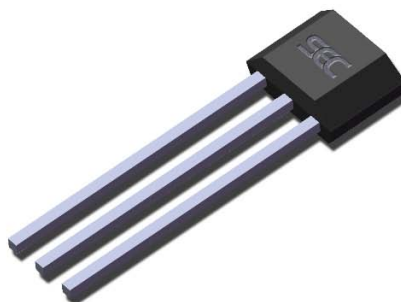
- Solid-State Reliability much better than reed switch
- Omnipolar, output switches with absolute value of North or South pole from magnet
- Wide operating voltage range from 3.5V to 24V
- High sensitivity for direct reed switch replacement applications

Applications

- Solid state switch
- Speed detection
- Interrupter
- Magnet proximity sensor for reed switch replacement



3 pin SOT23 (suffix SO)



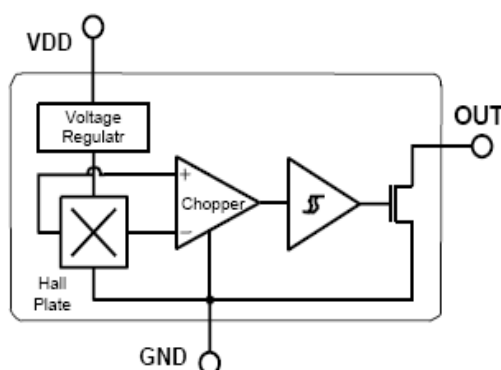
3 pin SIP (suffix UA)

General Description

The SS275 Omnipolar 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 output transistor of the SS275 will be latched on (B_{OP}) in the presence of a sufficiently strong South or North magnetic field facing the marked side of the package. The output will be latched off (B_{RP}) in the absence of a magnetic field.

The chopper stabilized amplifier uses switched capacitor techniques to eliminate the amplifier offset voltage, which, in bipolar devices, is a major source of temperature sensitive drift. CMOS makes this advanced technique possible. The CMOS chip is also much smaller than a bipolar chip, allowing very sophisticated circuitry to be placed in less space. The small chip size also contributes to lower physical stress and less power consumption.

Functional Block Diagram

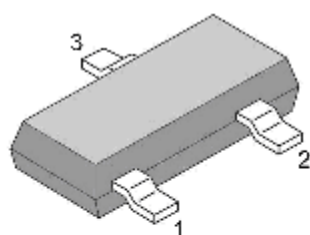


Glossary of Terms

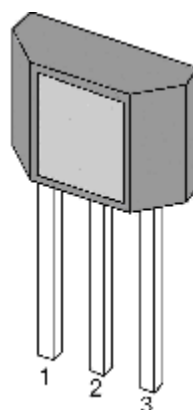
- MilliTesla (mT), Gauss Units of magnetic flux density: 1mT = 10 Gauss
- RoHS Restriction of Hazardous Substances
- ESD Electro-Static Discharge
- Operating Point (B_{OP}) Magnetic flux density applied on the branded side of the package which turns the output driver ON ($V_{OUT} = V_{DSon}$)
- Release 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 №	SIP Pin №	Name	Type	Function
1	1	V_{DD}	Supply	Supply Voltage pin
2	3	OUT	Output	Open Drain Output pin
3	2	GND	Ground	Ground pin



SOT-23



TO-92

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Supply Voltage(operating)	V_{DD}	28	V
Supply Current	I_{DD}	5	mA
Output Voltage	V_{OUT}	28	V
Output Current	I_{OUT}	10	mA
Operating Temperature Range	T_A	-40 to 150	°C
Storage Temperature Rang	T_S	-50 to 165	°C
ESD Sensitivity	-	4000	V

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

DC Electrical Characteristics

DC Operating Parameters: $T_A = 25^{\circ}\text{C}$, $V_{DD}=5\text{V}$.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating voltage	V_{DD}	Operating	3.5		24	V
Supply current	I_{DD}	$B < B_{RP}$			5	mA
Output Saturation Voltage	V_{DSon}	$I_{OUT} = 20\text{mA}$, $B > B_{OP}$			0.5	V
Output Leakage Current	I_{OFF}	$B < B_{RP}$ $V_{OUT} = 24\text{V}$		1	10	μA
Output Rise Time	t_r	$R_L = 1\text{k}\Omega$, $C_L = 20\text{pF}$		0.25		μs
Output Fall Time	t_f	$R_L = 1\text{k}\Omega$, $C_L = 20\text{pF}$		0.25		μs
Maximum Switching Frequency	FSW	---		10		KHz
Package Thermal Resistance	R_{TH}	Single layer (1S) Jedec board		301		$^{\circ}\text{C/W}$

Operating Parameters: $T_A = 25^{\circ}\text{C}$, $V_{DD}=5\text{VDC}$.

PARAMETER	Symbol	Min	Type	Max	Units
Operating Point	Bop	-	+/-35	+/-60	Gs
Release Point	Brp	+/-10	+/-20	-	Gs
Hysteresis	Bhys	-	15	-	Gs

ESD Protection

Human Body Model (HBM) tests according to: Mil. Std. 883F method 3015.7

Parameter	Symbol	Limit Values		Unit	Notes
		Min	Max		
ESD Voltage	V_{ESD}	± 2	± 4	kV	

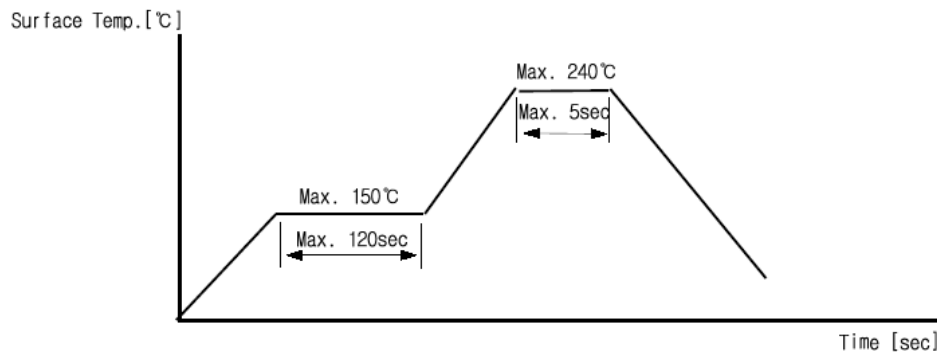
ESD Precautions

Electronic semiconductor products are sensitive to Electro Static Discharge (ESD). Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

Installation Comments

Consider temperature coefficients of Hall IC and magnetics , as well as air gap and life time variations. Observe temperature limits during wave soldering. Typical IR solder-reflow profile:

- No Rapid Heating and Cooling.
- Recommended Preheating for max. 2minutes at 150°C
- Recommended Reflowing for max. 5seconds at 240°C



Application Information

It is strongly recommended that an external bypass capacitor be connected (in close proximity to the Hall sensor) between the supply (V_{DD} Pin) and ground (GND Pin) of the device to reduce both external noise and noise generated by the chopper stabilization technique. As is shown in the following two figures, a 0.1 μ F capacitor is typical. For reverse voltage protection, it is recommended to connect a resistor or a diode in series with the V_{DD} pin. When using a resistor, three points are important:

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

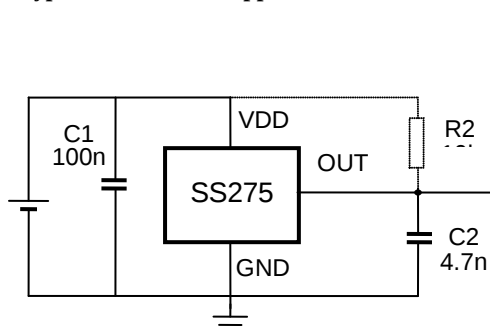
When using a diode, a reverse current cannot flow and the voltage drop is almost constant (~0.7V).

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

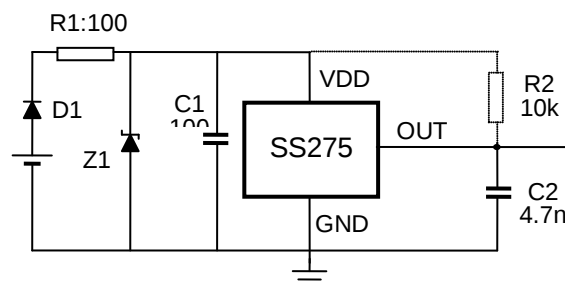
When a weak power supply is used or when the device is intended to be used in noisy environment, it is recommended that the second figure is used.

The low-pass filter formed by R1 and C1 and the Zener diode Z1 bypass the disturbances or voltage spikes occur-

Typical Three-Wire Application Circuit



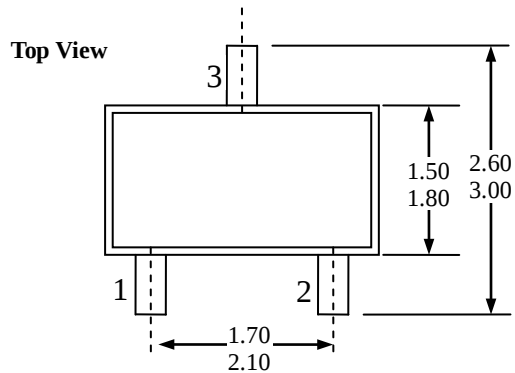
Automotive and Severe Environment Protection Circuit



ring on the device supply voltage V_{DD} . The diode D1 provides additional reverse voltage protection. Both solutions provide the required reverse voltage protection.

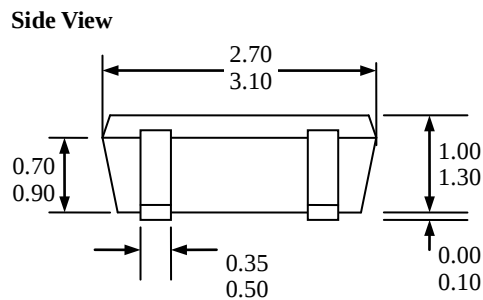
Package Information

Package SOT, 3-Pin SOT-23:

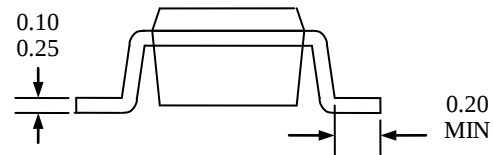


Notes:

- 1). PIN OUT: Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND
- 2). All dimensions are in millimeters ;

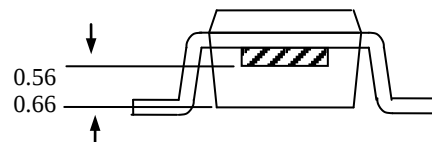
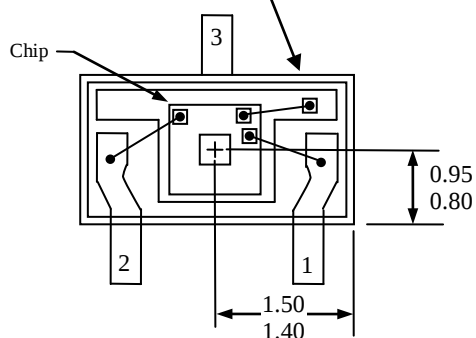


End View

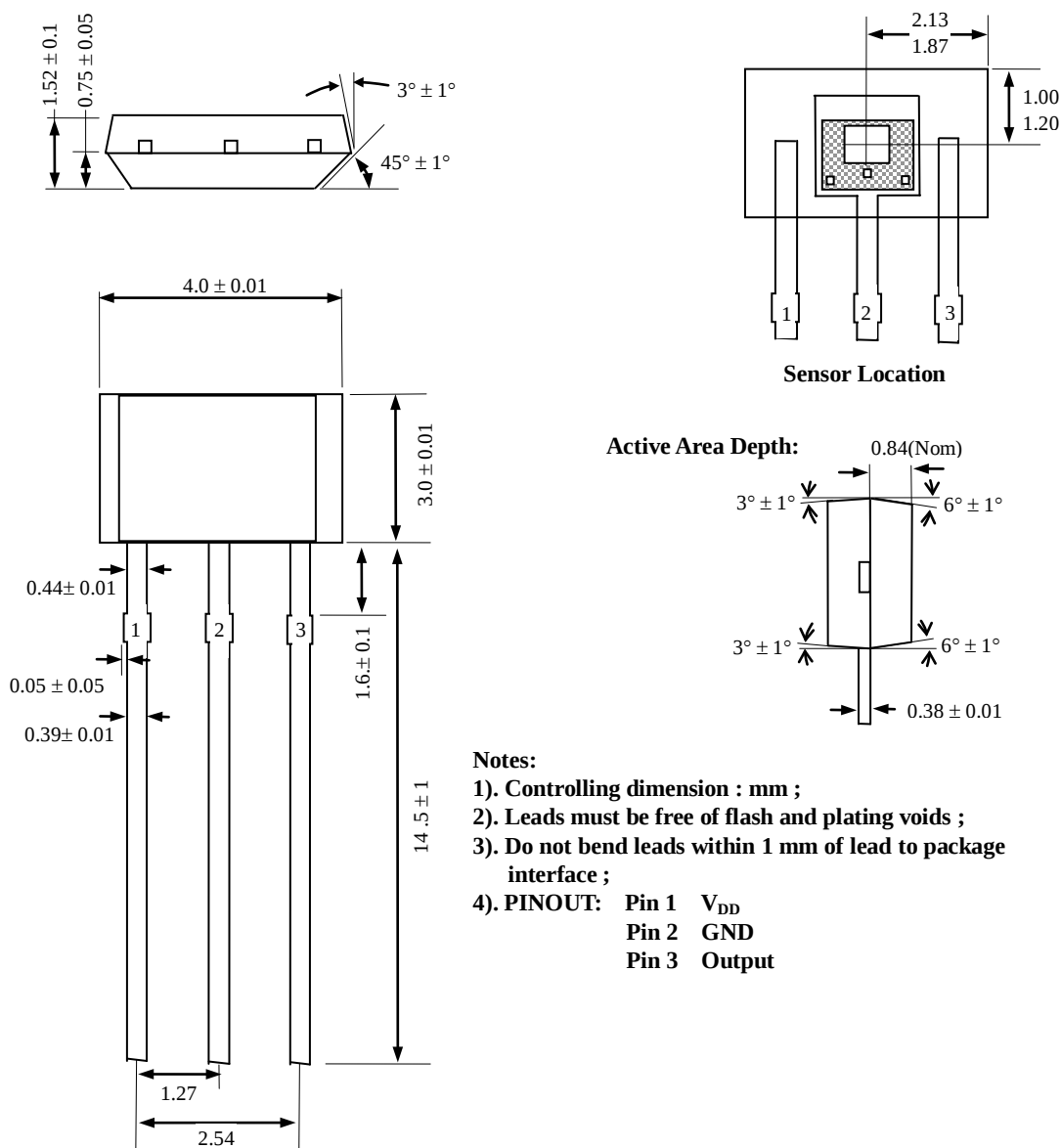


SOT-23 Package Hall Location

Bottom View of SOT-23 Package



Package UA, 3-Pin SIP:



Ordering Information

Part No.	Pb-free	Temperature Code	Package Code	Packing
SS275ESOT	YES	-40°C to 85°C	SOT-23	7-in. reel, 3000 pieces/ reel
SS275EUA	YES	-40°C to 85°C	TO-92	Bulk, 1000 pieces/ bag
SS275KSOT	YES	-40°C to 125°C	SOT-23	7-in. reel, 3000 pieces/ reel
SS275KUA	YES	-40°C to 125°C	TO-92	Bulk, 1000 pieces/ bag
SS275LSOT	YES	-40°C to 150°C	SOT-23	7-in. reel, 3000 pieces/ reel
SS275LUA	YES	-40°C to 150°C	TO-92	Bulk, 1000 pieces/ bag