

General Description

SDC1215 is a micropower integrated Hall switch designed to sense the applied magnetic flux density and give a digital output, which indicates the present condition of the magnitude sensed. The typical power consumption is below 4uW at 1.85V, so the micropower design is especially suitable for battery-operated systems such as cellular phones or laptop computers, in which power consumption is one major concern.

The magnetic switching points are precise and insensitive to process and temperature variations.

For SDC1215, the output will be at the “high” level when no magnetic field is applied.

Features

- Micropower consumption
- 1.65V~5.5V power supply
- Chopper amplifier based design: insensitive to noise and offset caused by process variations, operating temperature and mechanical stress
- Switching for both poles of a magnet(omnipolar)
- Digital output
- CMOS process
- Package: SOT-23-3, TO-92S

Applications

- Folding, sliding, rotary screen mobile phone
- Notebook computer, digital camera
- Position sensor switch

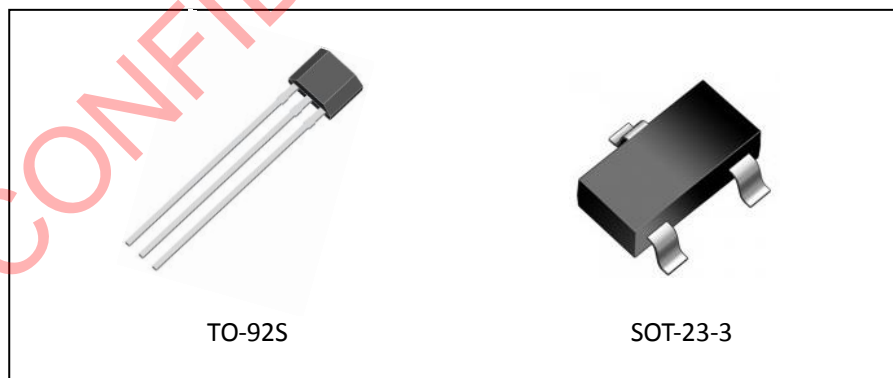
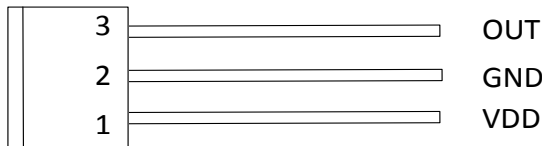


Figure 1. Package Type

Pin Configuration

Package: TO-92S



Package: SOT-23-3

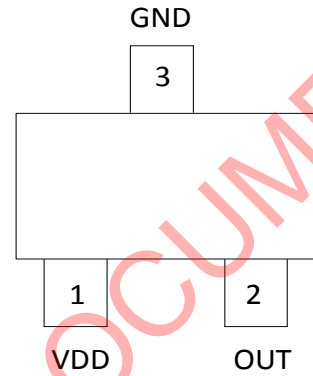


Figure 2. Pin Configuration

Pin Number		Pin Name	Function
SOT-23-3	TO-92S		
1	1	VDD	Power supply
3	2	GND	Ground
2	3	OUT	Output

Table 1. Pin Description

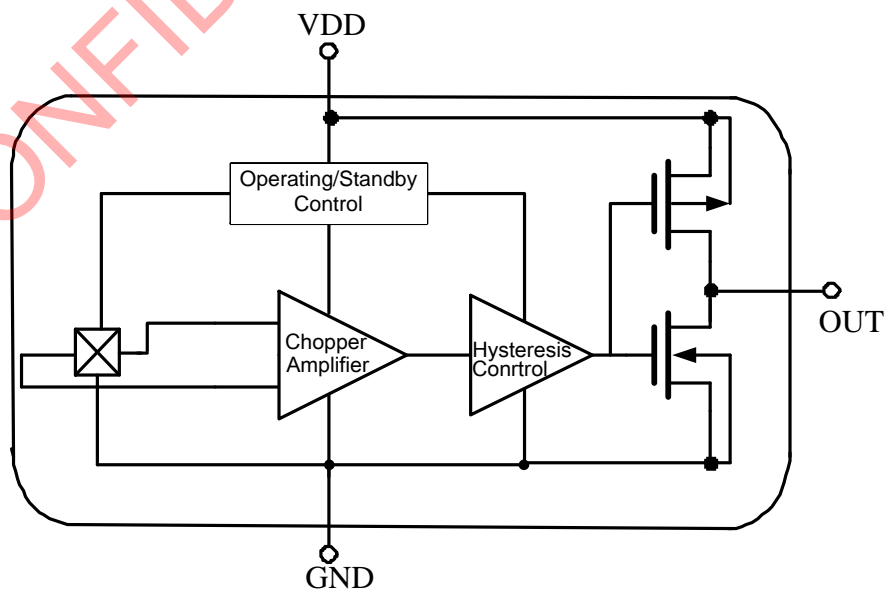
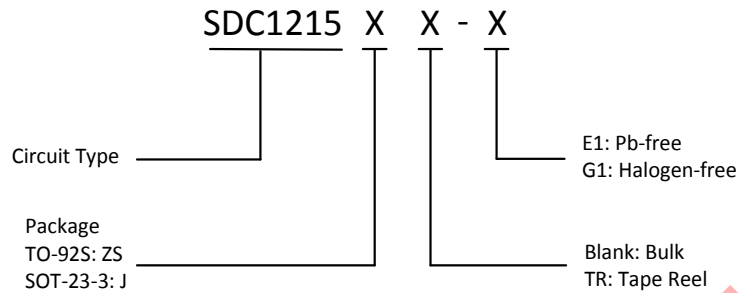
Functional Block Diagram


Figure 3. Functional Block Diagram

Ordering Information


Package	Temperature Range	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-free	Pb-free	Halogen-free	
TO-92S	-40°C~125°C	SDC1215ZS-E1	SDC1215ZS-G1	1215	1215G	Bulk
SOT-23-3		SDC1215JTR-E1	SDC1215JTR-G1	1215	1215G	Tape Reel

Absolute Maximum Ratings (Note: Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device.)

Parameter	Symbol	Conditions	Value	Unit
Storage temperature	T_S	-	-40~150	°C
Supply voltage	V_{DD}	-	1.6~6.0	V
Supply current	I_{DD}	-	-1~2.5	mA
Magnetic flux density	B	-	unlimited	GS
Maximum junction temperature	T_J	-	150	°C
Maximum lead soldering temperature	-	10 seconds	<260	°C
ESD,HBM model per Mil-Std-883H,Method 3015	HBM	-	4000	V
ESD,MM model per JEDEC EIA/JESD22-A115	MM	-	400	V
Latch-up test per JEDEC 78	-	-	200	mA

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

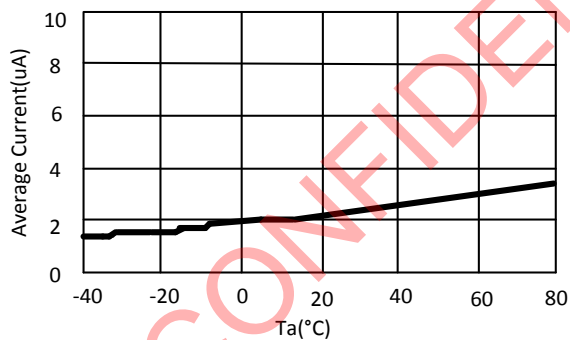
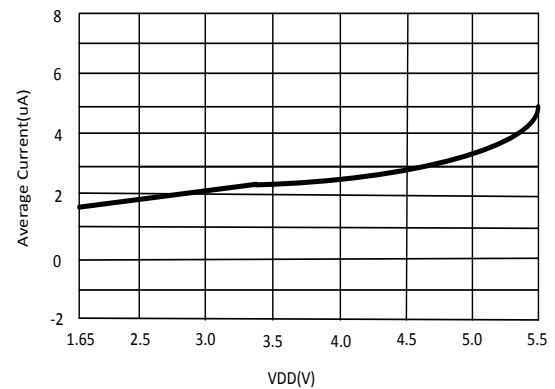
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply voltage range	V_{DD}	-	1.65	-	5.5	V
Output voltage range	V_{OUT}	-	-0.3	-	5.5	V
Operating temperature	T_a	-	-40	-	125	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics ($V_{DD}=3.3V$, $T_a=25^\circ C$, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Parameter						
Average supply current	I_{DD}	$V_{DD}=1.85V$	-	2	4	μA
Supply current(operating mode)	I_{ON}	$V_{DD}=3.3V$	-	1.5	-	mA
Supply current(stand-by mode)	I_{ST}	$V_{DD}=3.3V$	-	1.5	-	μA
Output saturation voltage	V_{SAT_HIGH}	$I_{OUT}=-2mA$	-	0.1	-	V
	V_{SAT_LOW}	$I_{OUT}=2mA$	-	0.1	-	V
Output leakage current	I_{LEAK}	$V_{OUT}=5.5V$	-	0.01	-	μA
Time of operating mode	t_{ON}	$V_{DD}=3.3V$	-	50	-	μs
Time of stand-by mode	t_{OFF}	$V_{DD}=3.3V$	-	90	-	ms

Table 4. Electrical Characteristics

Typical Performance Characteristics

 Figure 4. Average Current vs. Ambient Temperature
 ($V_{DD}=3.3V$)

 Figure 5. Average Current vs. Supply Voltage
 ($T_a=25^\circ C$)

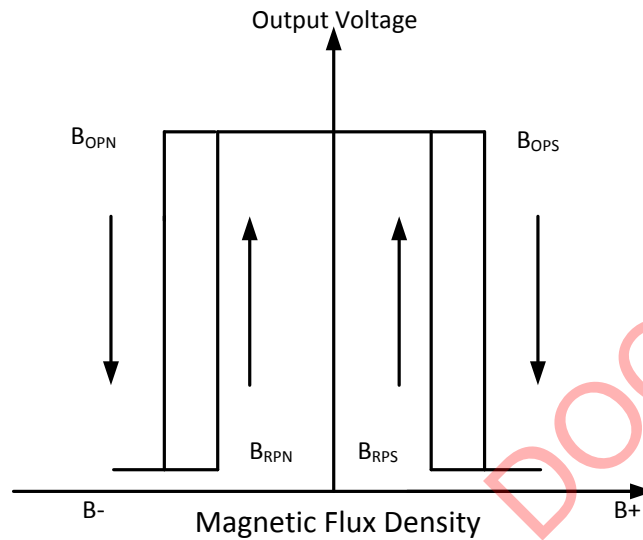
Magnetic Characteristics


Figure 6. Magnetic Characteristics

Grade A

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	B_{OP}	$V_{DD}=3.3V$	-	± 25	± 30	GS
Release point	B_{RP}	$V_{DD}=3.3V$	± 10	± 15	-	GS
Hysteresis	B_{HY}	$V_{DD}=3.3V$	-	10	-	GS

Grade B

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	B_{OP}	$V_{DD}=3.3V$	-	± 35	± 40	GS
Release point	B_{RP}	$V_{DD}=3.3V$	± 20	± 25	-	GS
Hysteresis	B_{HY}	$V_{DD}=3.3V$	-	10	-	GS

Grade C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	B_{OP}	$V_{DD}=3.3V$	-	± 50	± 55	GS
Release point	B_{RP}	$V_{DD}=3.3V$	± 35	± 40	-	GS
Hysteresis	B_{HY}	$V_{DD}=3.3V$	-	10	-	GS

Function Description

Power on Reset

Used to detect the power-up ramp and reset the digital circuits to attain correct operation as soon as the power is ready.

Oscillator and Sequencer

The built-in oscillator provides the clock signal, which is taken by the sequencer to determine the periods of the operating mode and the stand-by mode. Typically the operating time is about 50 μ s and the stand-by time is 90 ms. Using such a clocking scheme, the average power consumption is almost equal to the stand-by mode, which is under 4 μ W at 1.85V.

Bias Generator

Bias generator provides precise, temperature and process insensitive current sources for both the Hall plate and chopper amplifier. These current sources in turn guarantee proper operation of the chip and an accurate switching point.

Chopper Amplifier

In order to get a higher resolution, IC uses the chopper amplifier in the design. It can dynamically remove the offset and interference.

Hysteresis Control

This block determines the switching threshold of the Hall switch in different situations.

Typical Application

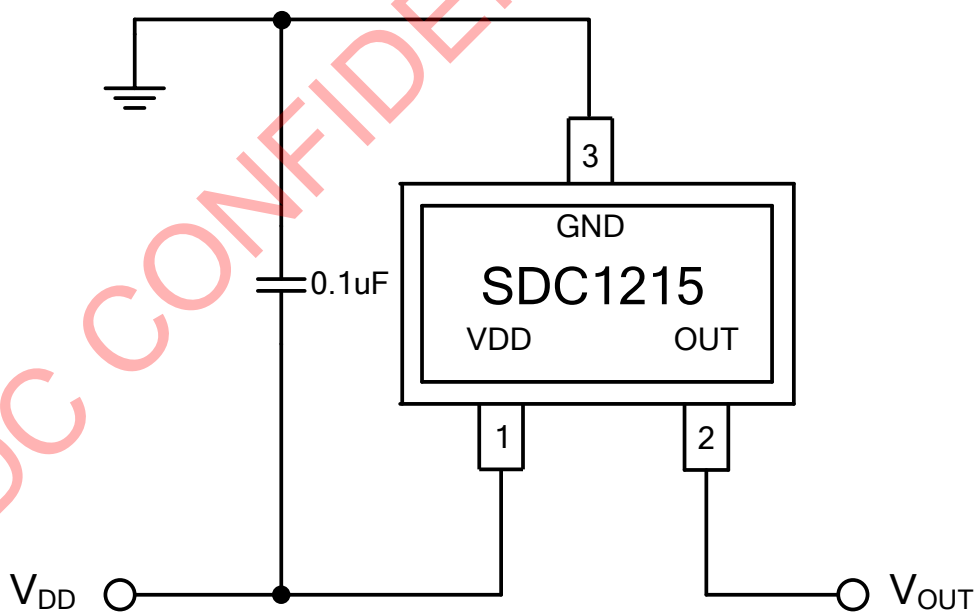
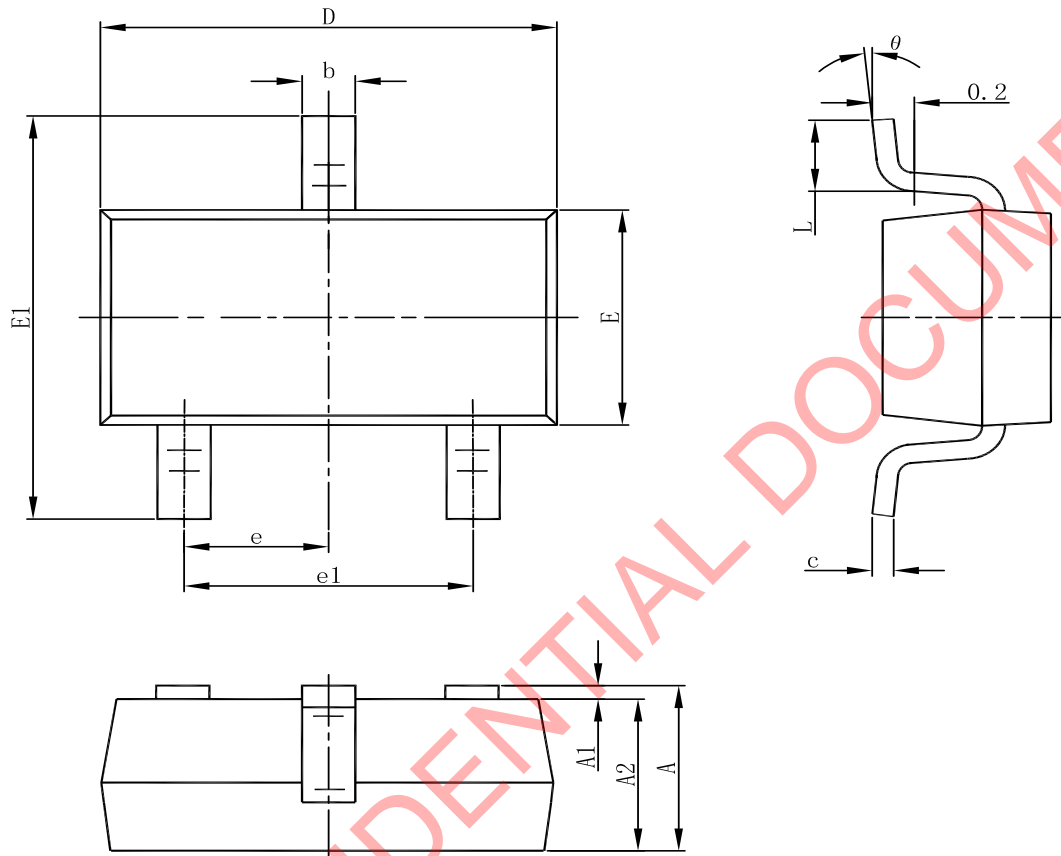
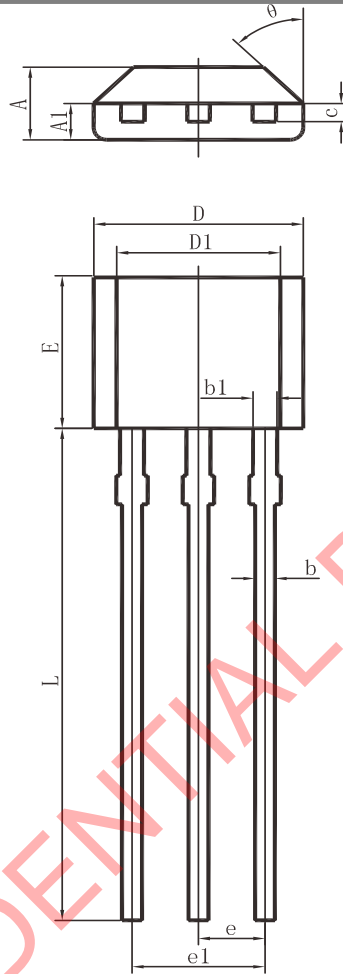


Figure 7. Typical Application

Package Dimension
SOT-23-3


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.800	3.020	0.110	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°

TO-92S


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.420	1.620	0.056	0.064
A1	0.660	0.860	0.026	0.034
b	0.350	0.480	0.014	0.019
b1	0.380	0.530	0.015	0.021
c	0.360	0.510	0.014	0.020
D	3.900	4.100	0.154	0.161
D1	2.970	3.270	0.117	0.129
E	2.900	3.100	0.116	0.124
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.500	14.900	0.580	0.596
θ	45° TYP.		45° TYP.	



Shaoxing Devechip Microelectronics Co., Ltd.

<http://www.sdc-semi.com/>

IMPORTANT NOTICE

Information in this document is provided solely in connection with Shaoxing Devechip Microelectronics Co., Ltd. (abbr. SDC) products. SDC reserves the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at anytime, without notice. SDC does not assume any responsibility for use of any its products for any particular purpose, nor does SDC assume any liability arising out of the application or use of any its products or circuits. SDC does not convey any license under its patent rights or other rights nor the rights of others.

© 2017 Devechip Microelectronics - All rights reserved

Contact us:

Headquarters of Shaoxing

Address: Tian Mu Road, No13,

Shaoxing city, Zhejiang province, China

Zip code: 312000

Tel: (86) 0575-8861 6750

Fax: (86) 0575-8862 2882

Shenzhen Branch

Address: 22A, Shangbu building, Nan Yuan Road, No.68,

Futian District, Shenzhen city, Guangdong province, China

Zip code: 518031

Tel: (86) 0755-8366 1155

Fax: (86) 0755-8301 8528