

General Description

SDC213 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 10uW at 2.7V, 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 SDC213, the output will be at the "Low" level when no magnetic field is applied.

Features

- Micropower consumption
- 2.4V~4.5V 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

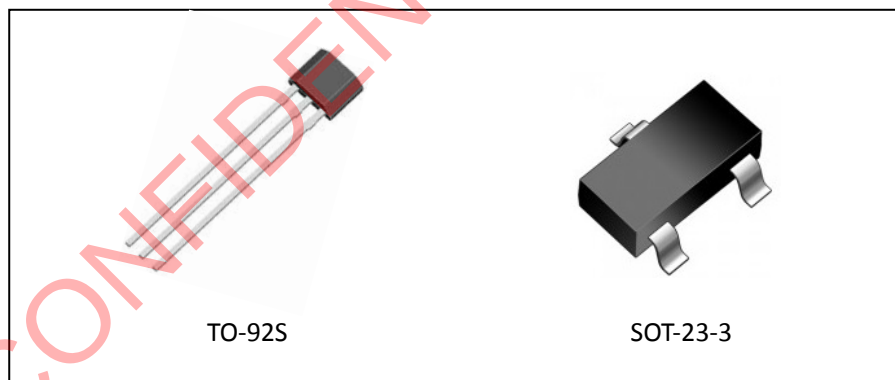
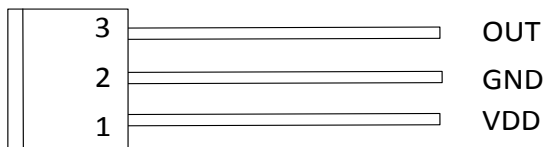


Figure 1. Package Type

Pin Configuration

Package: TO-92S



Package: SOT-23-3

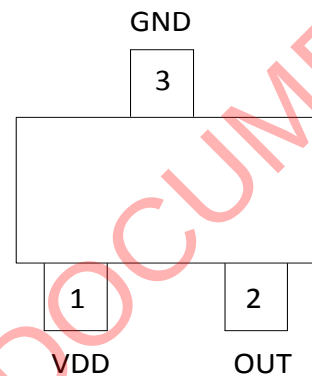


Figure 2. Pin Configuration

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

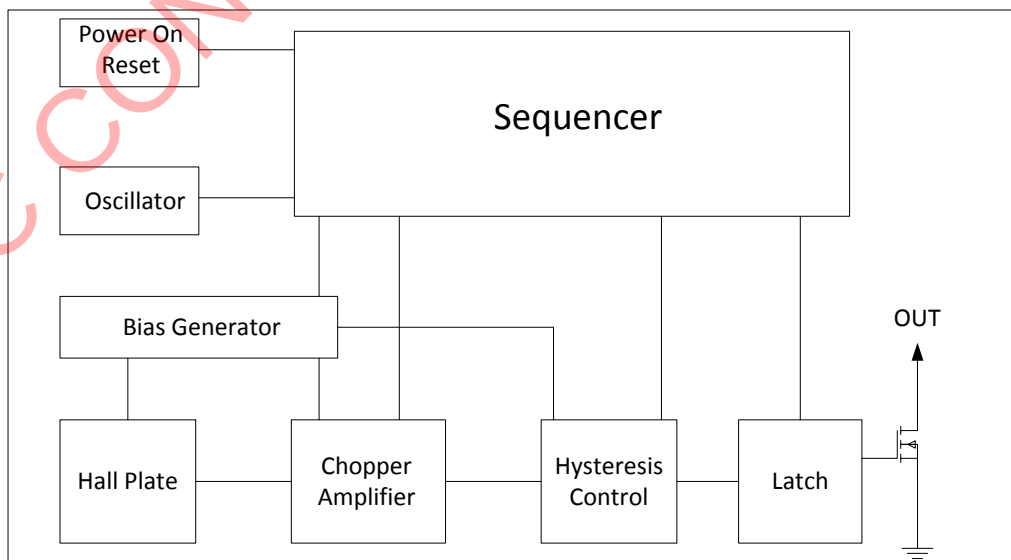
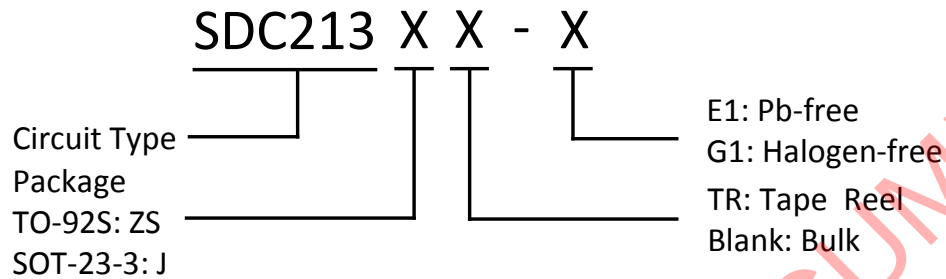
Functional Block Diagram


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~85°C	SDC213ZS-E1	SDC213ZS-G1	SDC213	SDC213G	Bulk
SOT-23-3		SDC213JTR-E1	SDC213JTR-G1	SDC213	SDC213G	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}	-	2.4~5.0	V
Supply current	I_{DD}	-	-1~2.5	mA
Magnetic flux density	B	-	-	GS
Maximum junction temperature	T_J	-	125	°C
Maximum lead soldering temperature	-	10 seconds	260	°C
ESD,HBM model per Mil-Std-883H,Method 3015	HBM	HBM	2000	V
ESD,MM model per JEDEC EIA/JESD22-A115	MM	MM	200	V
Latch-up test per JEDEC 78	-	-	200	mA

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

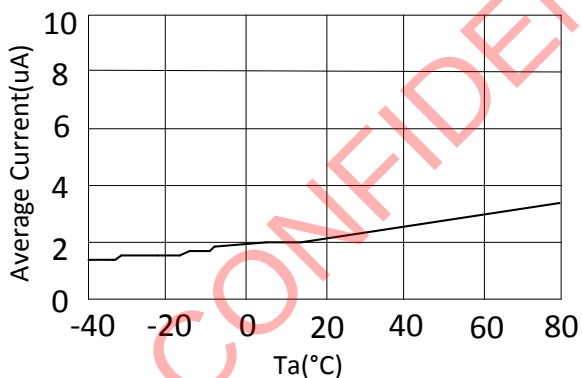
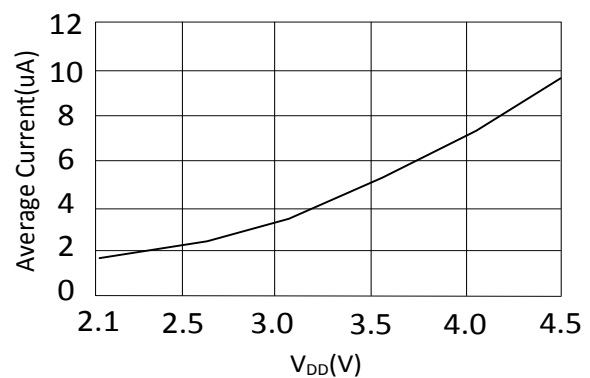
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply voltage range	V_{DD}	-	2.4	3.3	4.5	V
Output voltage range	V_{OUT}	-	-0.3	3.3	4.5	V
Ambient temperature	T_a	-	-40	25	85	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics (Ta=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Parameter						
Average supply current	I_{DD}	$V_{DD}=3.3V$	-	4.8	20	μA
Quiescent current(operating mode)	I_{ON}	$V_{DD}=3.3V$	-	1.1	-	mA
Quiescent current(stand-by mode)	I_{ST}	$V_{DD}=3.3V$	-	4.0	-	μA
Output saturation voltage	V_{SAT}	$I_{OUT}=2mA$	-	0.1	-	V
Output leakage current	I_{LEAK}	$V_{OUT}=4.5V$	-	0.01	-	μA
Time of operating mode	t_{ON}	$V_{DD}=3.3V$	-	70	-	μs
Time of stand-by mode	t_{OFF}	$V_{DD}=3.3V$	-	95	-	ms
Magnetic Characteristics						
Operating point	B_{OP}	$V_{DD}=3.3V$	-	30	35	GS
Release point	B_{RP}	$V_{DD}=3.3V$	15	20	-	GS
Hysteresis	B_{HY}	$V_{DD}=3.3V$	-	10	-	GS

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
 (Ta=25°C)

Magnetic Characteristics

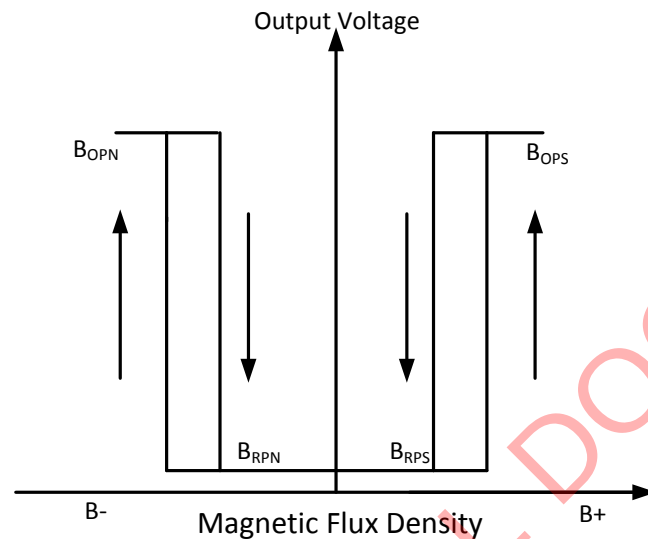


Figure 6. Magnetic Characteristics

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 70 μ s and the stand-by time is 95ms. Using such a clocking scheme, the average power consumption is almost equal to the stand-by mode, which is under 10uW at 2.7V.

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 a 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

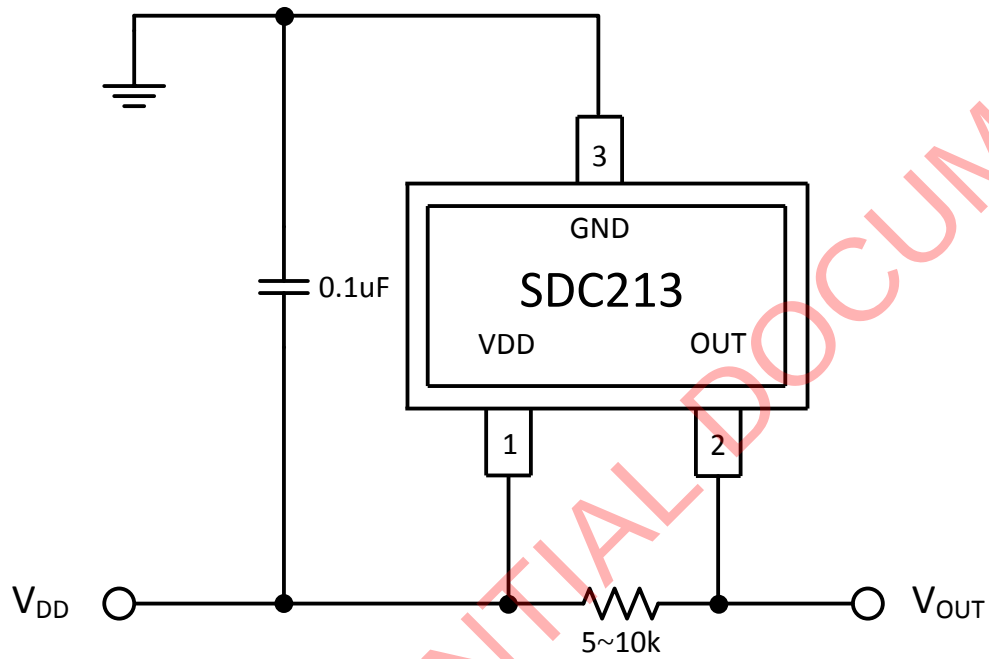
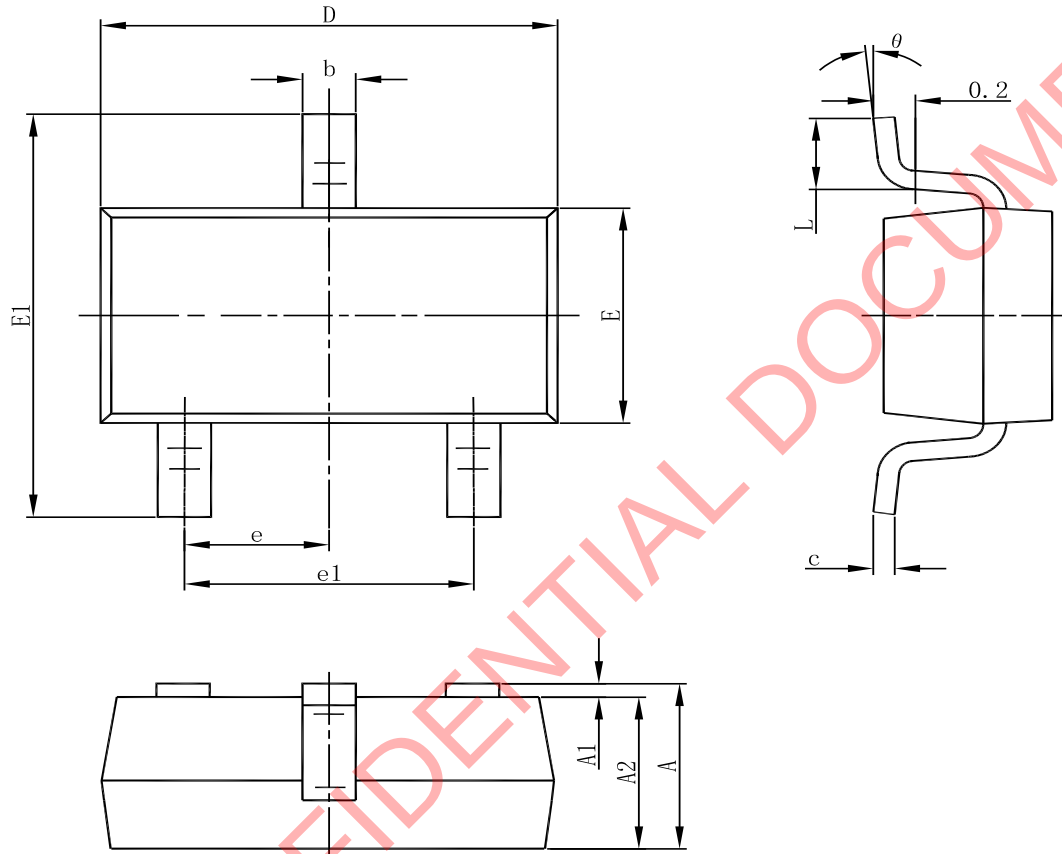
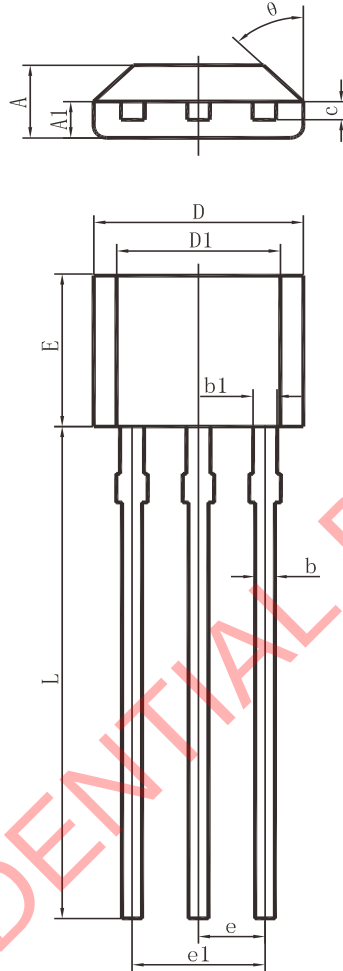


Figure 7. Typical Application

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
θ	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
theta	45° TYP.		45° TYP.	



Shaoxing Devechip Microelectronics Co., Ltd.

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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