MicroPower Hall-Effect Switch **SDC1215**

SDC6066

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

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

Applications

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

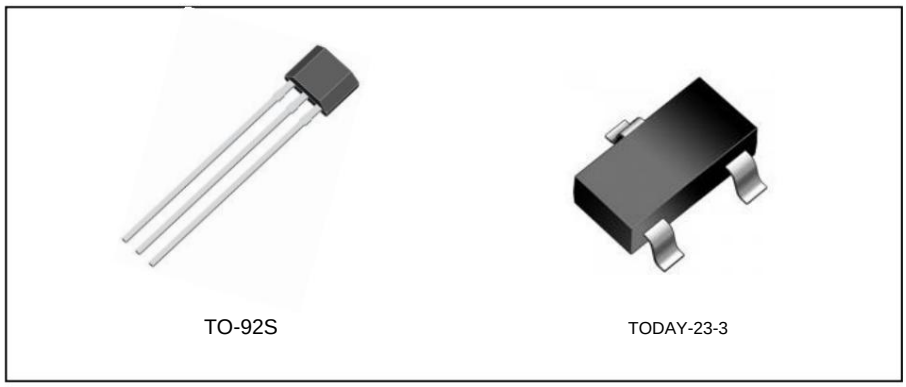


Figure 1. Package Type

Pin Configuration

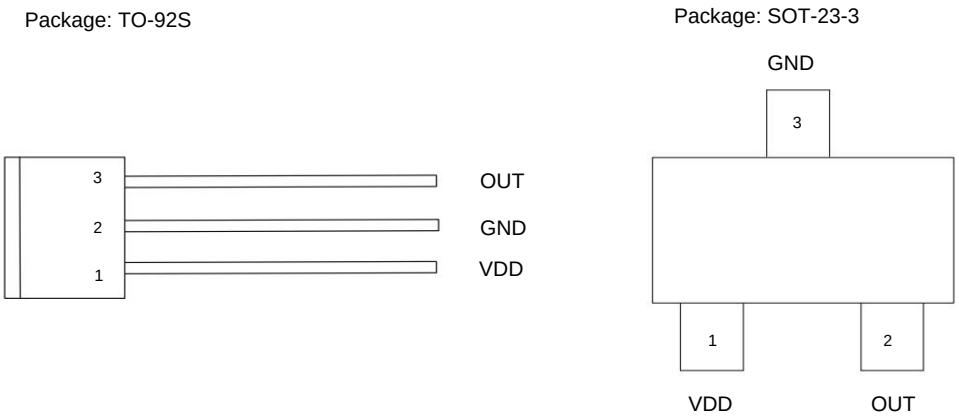


Figure 2. Pin Configuration

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

Table 1. Pin Description

Functional Block Diagram

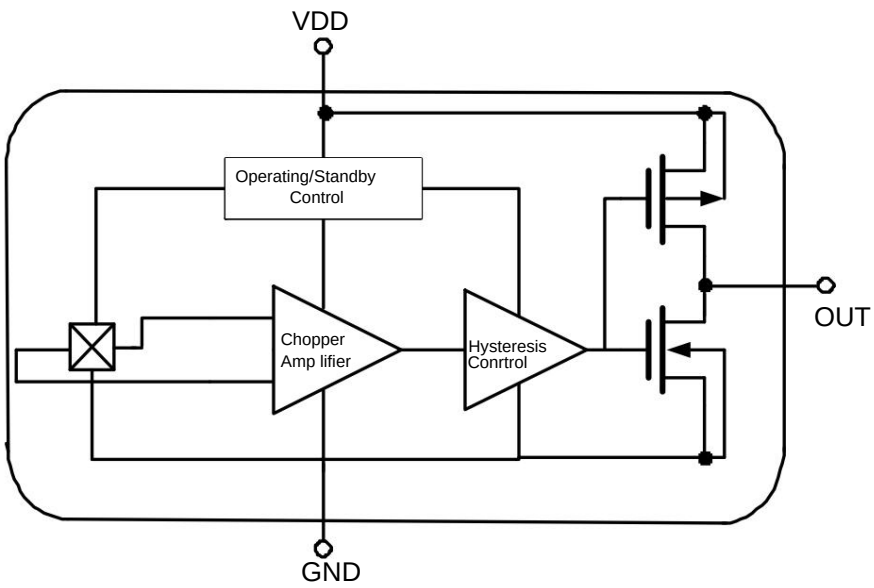
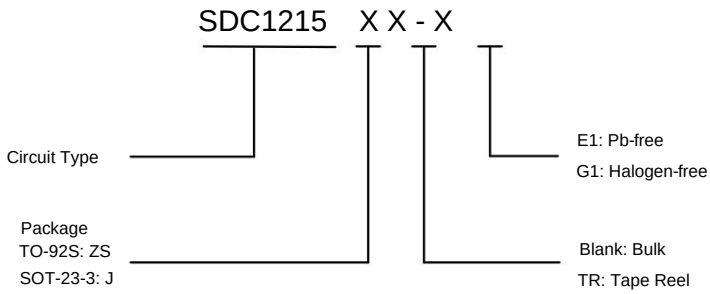


Figure 3. Functional Block Diagram

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
TODAY-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	TS	·	-40~150	°C
Supply voltage	VDD	·	1.6~6.0	V
Supply current	IDD	·	-1~2.5	mA
Magnetic flux density	B	·	unlimited	GS
Maximum junction temperature	TJ	·	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	VDD	·	1.65	·	5.5	V
Output voltage range	VOUT	·	-0.3	·	5.5	V
Operating temperature	Facing	·	-40	·	125	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics (VDD=3.3V, Ta=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Parameter						
Average supply current	IDD	VDD=1.85V		2	4	uA
Supply current(operating mode)	ION	VDD=3.3V		1.5		mA
Supply current(stand-by mode)	IS	VDD=3.3V		1.5		uA
Output saturation voltage	VSAT_HIGN	IOUT=-2mA		0.1		V
	VSAT_low	IOUT=2mA		0.1		V
Output leakage current	HAIR	VOUT=5.5V		0.01		uA
Time of operating mode	tON	VDD=3.3V		50		us
Time of stand-by mode	tOFF	VDD=3.3V		90		ms

Table 4. Electrical Characteristics

Typical Performance Characteristics

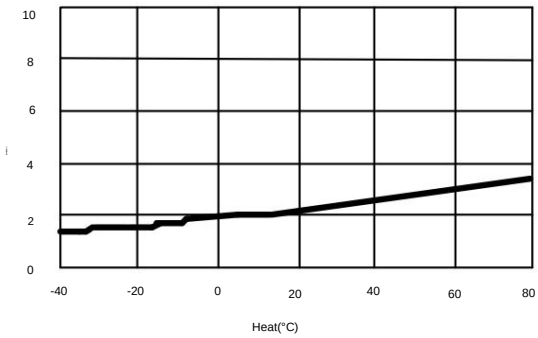


Figure 4. Average Current vs. Ambient Temperature

(VDD=3.3V)

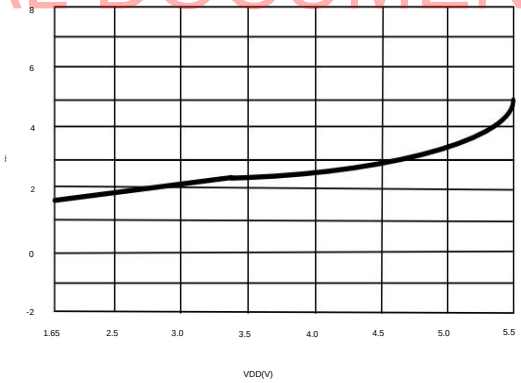


Figure 5. Average Current vs. Supply Voltage

(Ta=25°C)

Magnetic Characteristics

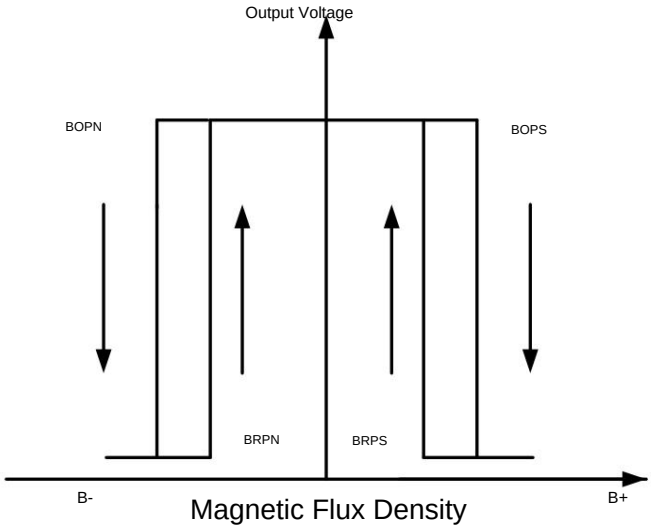


Figure 6. Magnetic Characteristics

Grade A

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	BOP	VDD=3.3V		±25	±30	GS
Release point	BRP	VDD=3.3V	±10	±15		GS
Hysteresis	WHY	VDD=3.3V		10		GS

Grade B

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	BOP	VDD=3.3V		±35	±40	GS
Release point	BRP	VDD=3.3V	±20	±25		GS
Hysteresis	WHY	VDD=3.3V		10		GS

Grade C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	BOP	VDD=3.3V		±50	±55	GS
Release point	BRP	VDD=3.3V	±35	±40		GS
Hysteresis	WHY	VDD=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 us 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 4uW 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 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

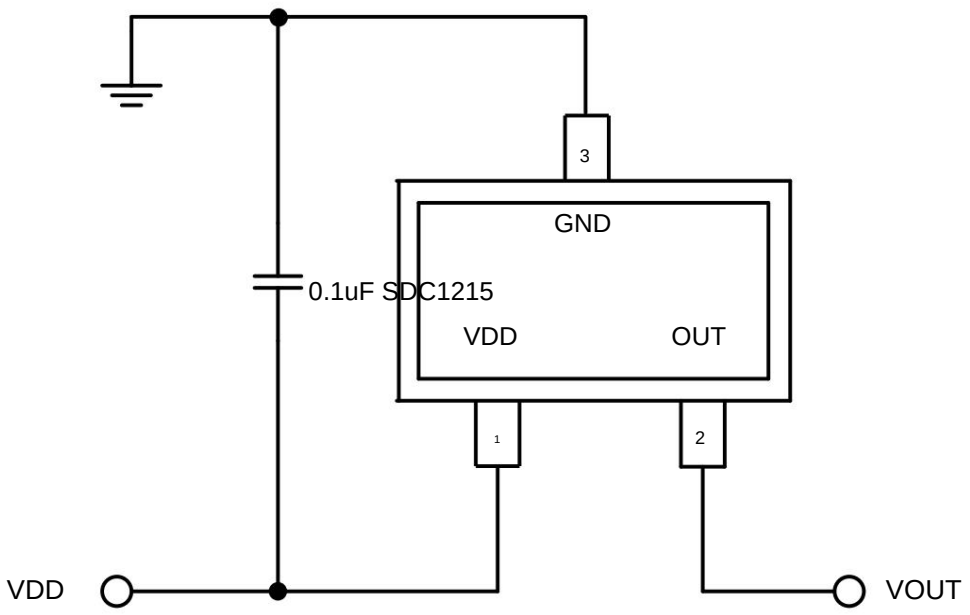
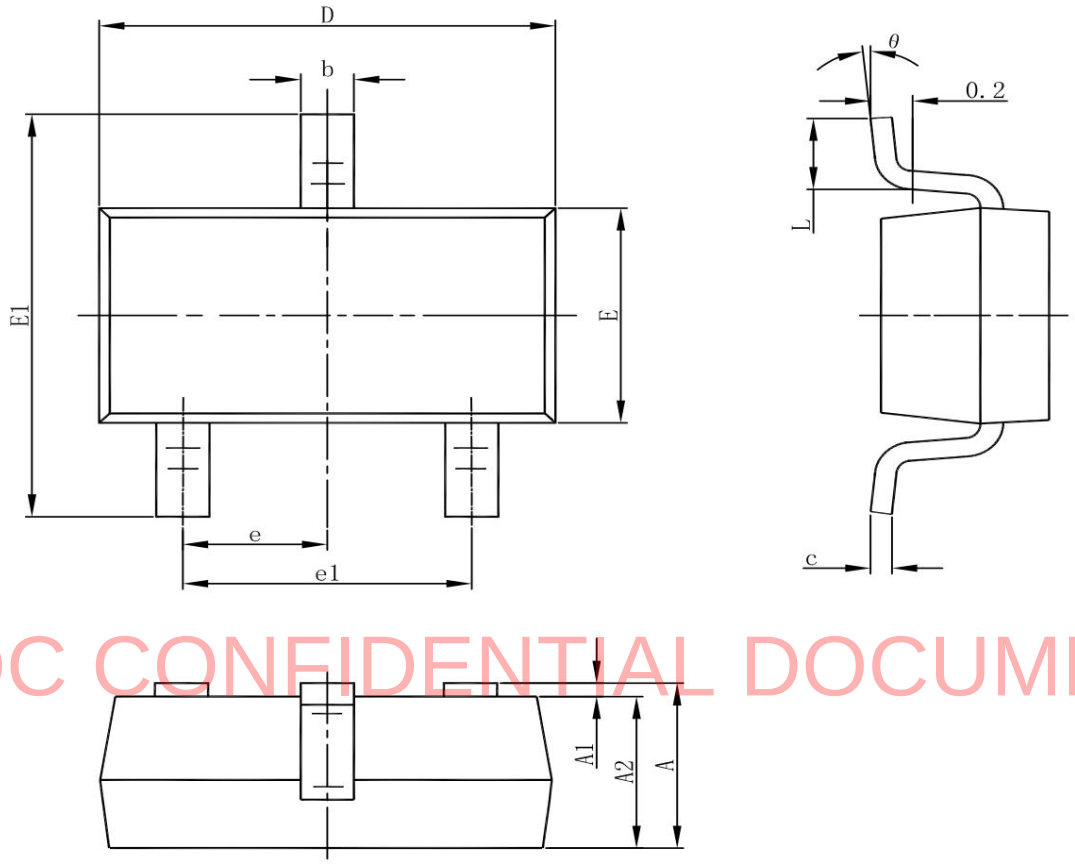


Figure 7. Typical Application

SDC6066

Package Dimension

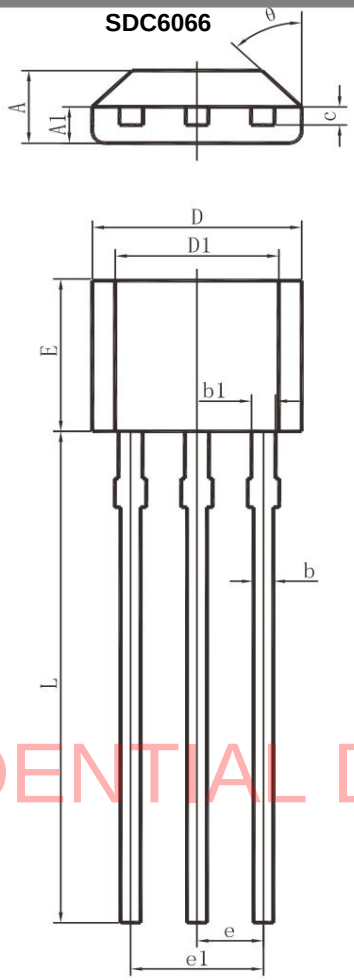
TODAY-23-3



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
ano	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
and	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
i	0°	8°	0°	8°

TO-92S

SDC6066



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 TYPE.		0.050 TYPE.	
e1	2.440	2.640	0.096	0.104
L	14.500	14.900	0.580	0.596
i	45° TYPE.		45° TYPE.	

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