Micropower high sensitivity all-pole Hall sensors

1.Introduction

SL8631 is a low-power, highly sensitive bipolar Hall effect switch chip, designed and produced using CMOS technology. The chip integrates internal voltage regulator, Hall voltage generator, small signal amplifier, chopper stabilized regulator, Schmitt trigger, and CMOS output driver.

The chip features excellent temperature stability, strong stress resistance, high sensitivity, and operates within a voltage range of 1.8V to 5.5V. It is available in TO-92S through-hole packaging and SOT23-3L surface-mount packaging, both compliant with RoHS environmental standards.

3-pin SOT23

3-pin TO92S

2.Features

- push-pull output
- ESD performance up to: ±6kV
- operating voltage: 1.8V～5.5V
- operating frequency 20Hz
- micro-power all-pole

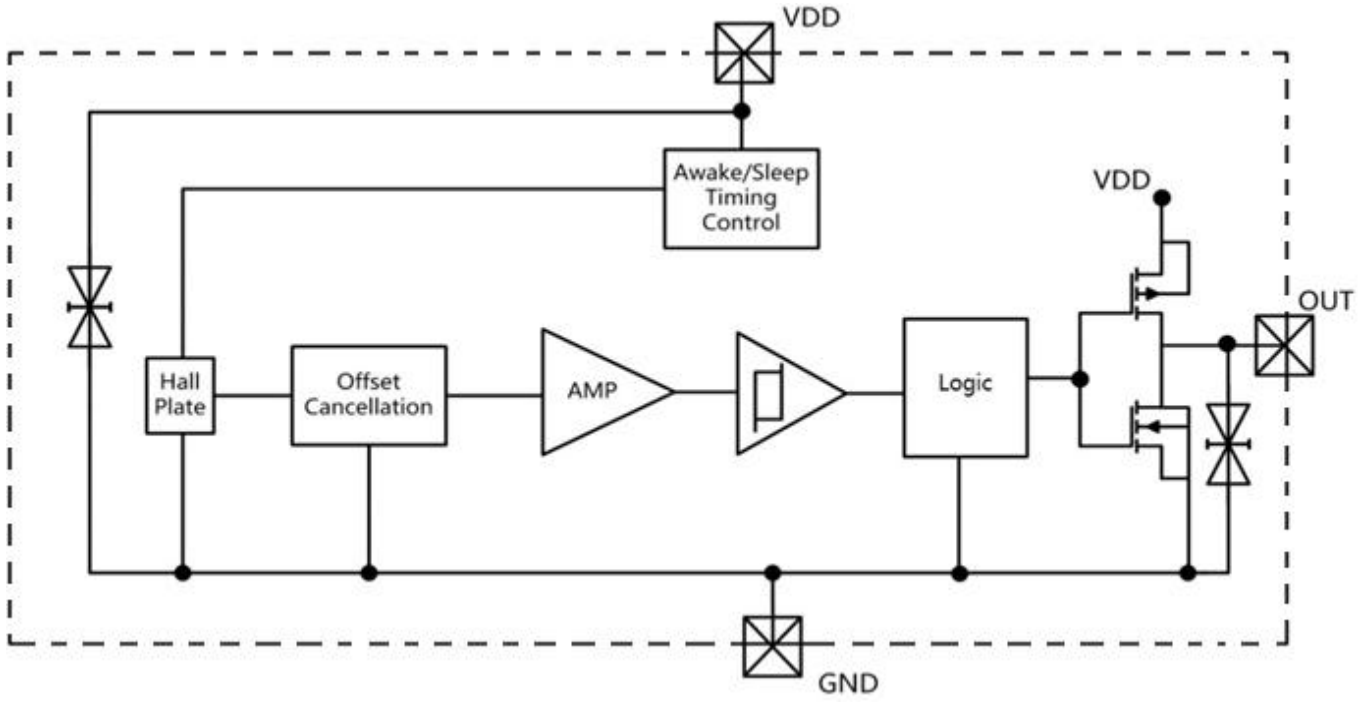
3.Fields of application

- solid state switches
- instrumentation
- laptop
- PDA

4.Product packaging

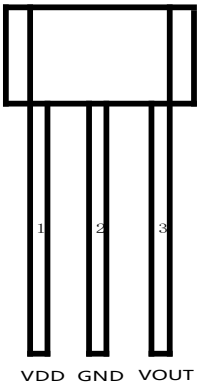
Partnumber	Package	Ambient, TA	Packing
SL8631-9	TO92S	-40℃～85℃	1000PCS/bag
SL8631-3	SOT23-3L	-40℃～85℃	3000PCS/reel

5.Functional block diagram

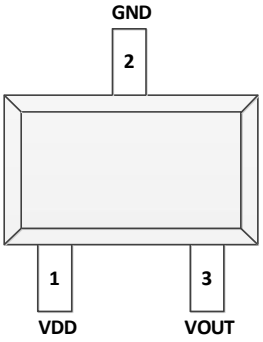


6.Pin Description

Number	Name	Function
1	V_{CC}	power supply
2	GND	ground
3	V_{OUT}	export



TO92S



SOT23-3L

7.Recommended Operating Condition

The absolute maximum ratings represent the chip's limit, exceeding which may result in permanent damage to the chip.

Symbol	Parameters	Numerical	Units
V_{DD}	supply voltage	6	V
V_{DDR}	reverse voltage	-0.3	V
I_{OUT}	output current	5	mA
V_{OUT}	output voltage	6	V
T_A	operating ambient temperature	-40～85	℃
T_S	storage temperature	-50～150	℃

8.ESD Parameters

Symbol	Description	Implementation Standard	Max	Units
V_{ESD}	Human Discharge Mode HBM	JEDEC JS-001-2017	6	kV

9.Electrical parameters

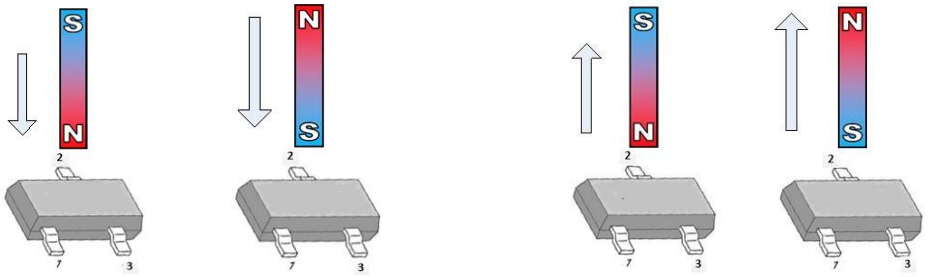
T_a=25℃，V_{CC} =3.0V

Symbol	Parameter	Min	Typ	Max	Units	Prerequisite
Electrical characteristics						
V_{DD}	operating voltage	1.8		5.5	V	at work
V_{OL}	saturation drop			0.2	V	I_{OUT}=1mA
I_{OUT}	output current			3	mA	
I_{DD}	average power supply current		0.6		μA	
F_W	operating frequency		20		Hz	
Magnetic characteristics						
B_{op}	operate point		-1		gauss	
B_{rp}	release point		-1		gauss	
B_{hys}	hysteresis		15		gauss	$\lvert B_{op}-B_{rp}\rvert$

10.Magnetoelectric conversion characteristics

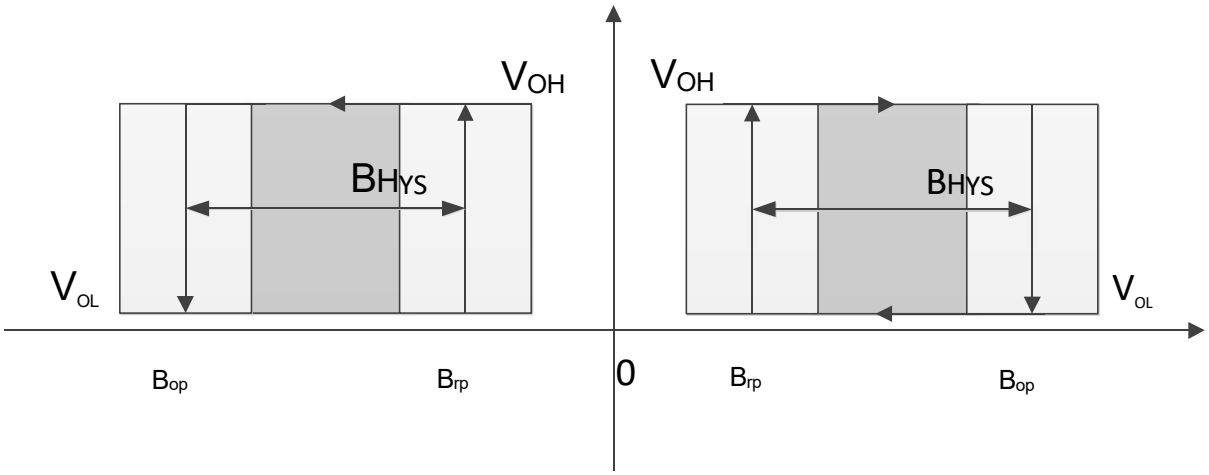
V_{OUT}=High V_{OUT}=Low

TO92S （SL8631-9）



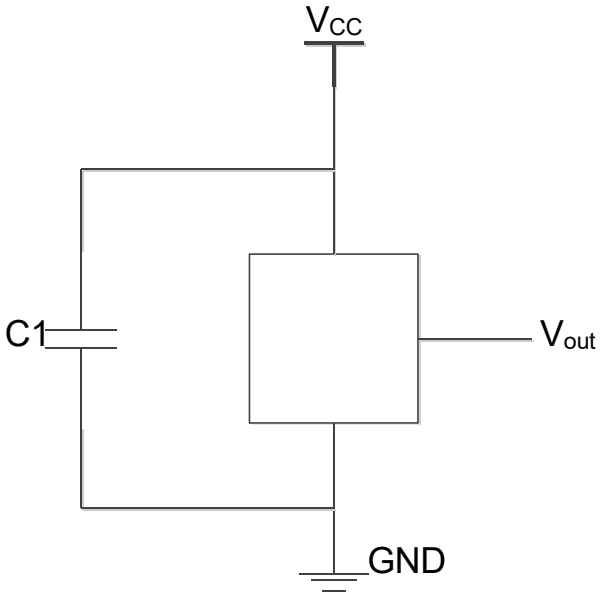
V_{OUT}=Low V_{OUT}=High

SOT23-3L （SL8631-3）



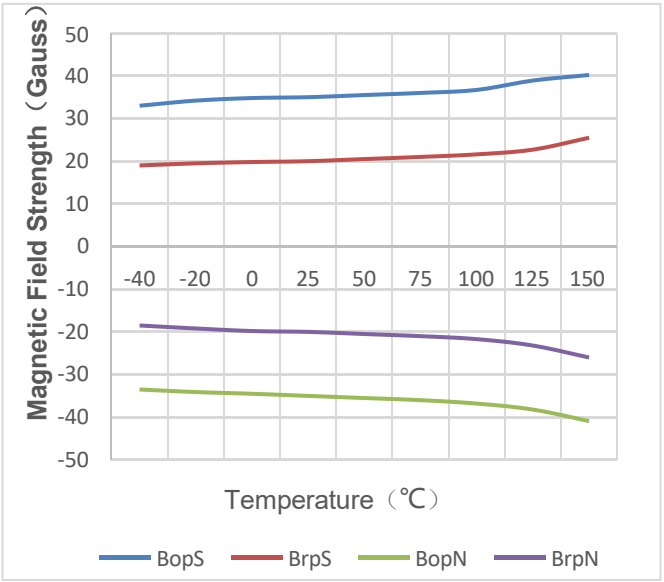
11.Application circuits

C1=2.2uF, place the capacitor as close as possible to the power pins of the chip.

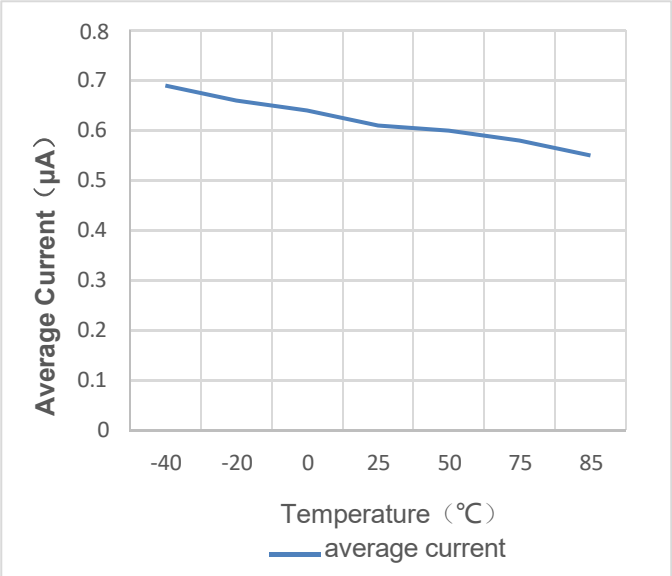


12.Characteristic curve

When V_{CC}=3.0V, the temperature-dependent curves of the chip's operating and release points vary.

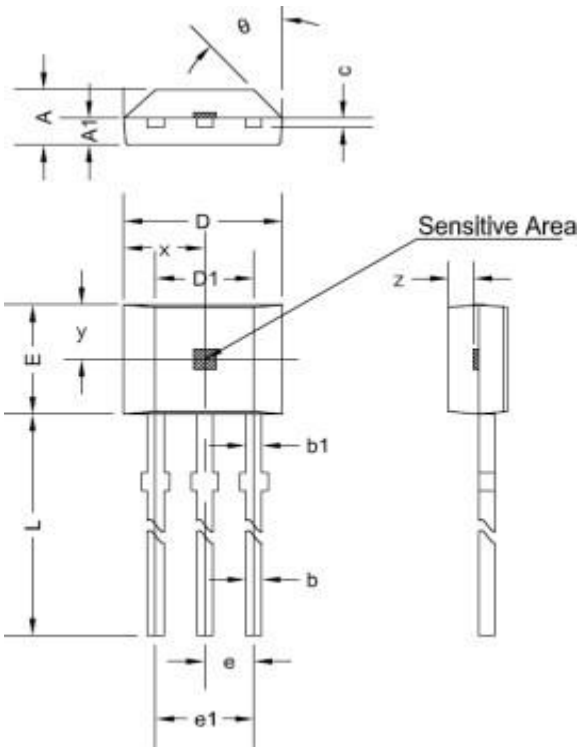


When V_{CC} is 3.0V, the average operating current of the chip varies with temperature according to the curve.



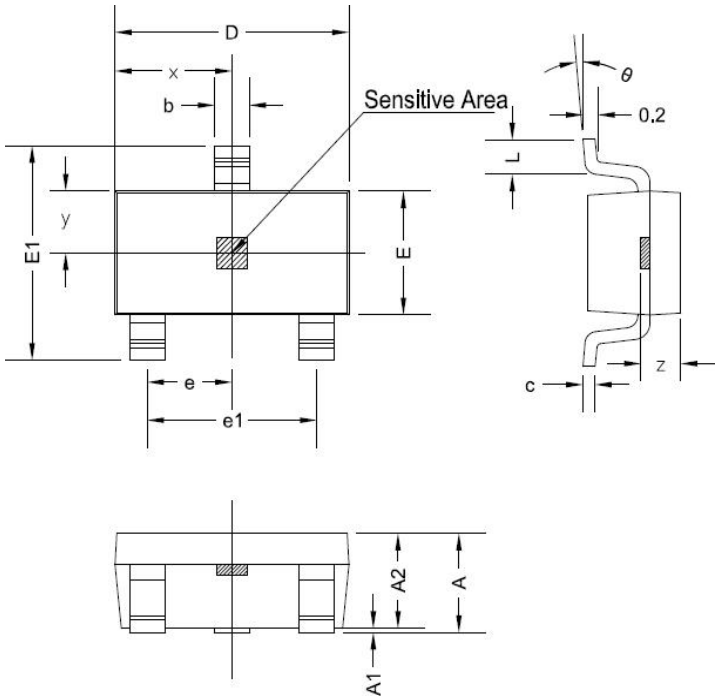
13.Package information

TO92S Package Size



Symbol	Size (mm)		Size (in inches)	
	Min	Max	Min	Max
A	1.42	1.67	0.056	0.066
A1	0.66	0.86	0.026	0.034
b	0.35	0.56	0.014	0.022
b1	0.4	0.55	0.016	0.022
C	0.36	0.51	0.014	0.02
D	3.9	4.2	0.154	0.165
D1	2.97	3.27	0.117	0.129
E	2.9	3.28	0.114	0.129
e	1.270 TYP		0.050 TYP	
e1	2.44	2.64	0.096	0.104
L	13.5	15.5	0.531	0.61
x	2.025TYP		0.080TYP	
y	1.545TYP		0.061TYP	
z	0.500TYP		0.020TYP	
θ	45˚TYP		45˚TYP	

SOT23 Package Size



Symbol	Size (mm)		Size (in inches)	
	Min	Max	Min	Max
A	1.05	1.25	0.041	0.049
A1	0	0.1	0	0.004
A2	1.05	1.15	0.041	0.045
b	0.3	0.5	0.012	0.02
c	0. 100	0.2	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.5	1.7	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.950 TYP		0.037 TYP	
e1	1.8	2	0.071	0.079
L	0.3	0.6	0.012	0.024
x	1.460TYP		0.057TYP	
y	0.800TYP		0.032TYP	
z	0.600TYP		0.024TYP	
θ	0˚	8˚	0˚	8˚