

General Description

The SDC49E series linear Hall-effect sensors are small, versatile that are operated by the magnetic field from a permanent magnet or an electromagnet. The linear output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. The integrated circuitry features low noise output, which makes it unnecessary to use external filtering. It also includes thin film resistors to provide high temperature stability and accuracy.

Features

- Extremely sensitive Low dissipation
- Low-noise output virtually eliminates the need for filtering
- Flat response up to 23 kHz
- Wide operating voltage range: 2.3V~6.5V.
- Responds to either positive or negative gauss
- Excellent temperature characteristics

Applications

- Motor control
- Current sensing
- Position sensing
- Rotary encoder

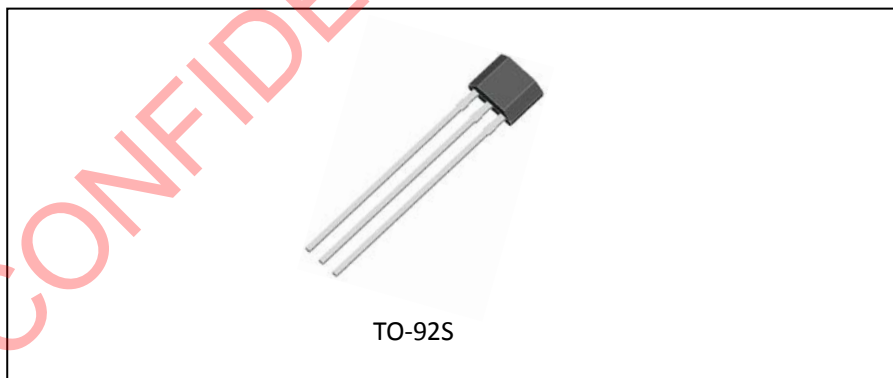


Figure 1. Package Type

Pin Description

Package: TO-92S

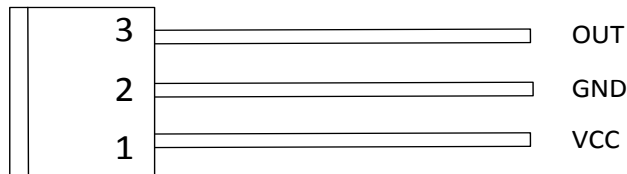


Figure 2. Pin Configuration

Pin Number	Pin Name	Function
1	VCC	Power supply pin
2	GND	GND pin
3	OUT	Output pin

Table 1. Pin Description

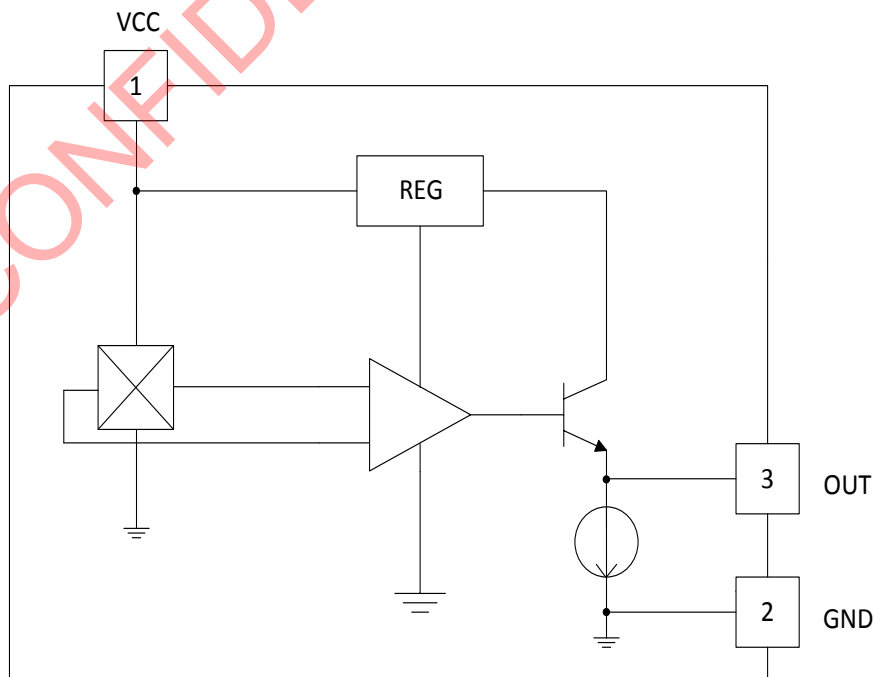
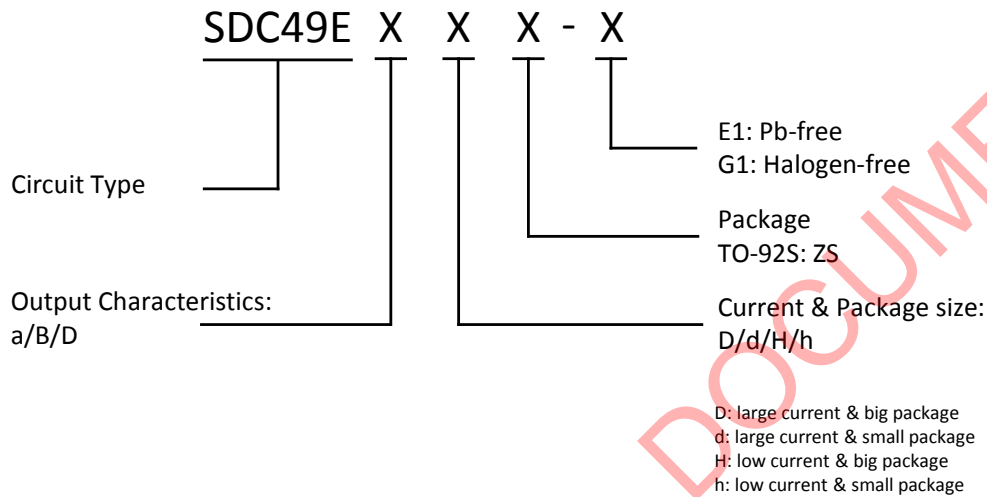
Functional Block Diagram


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	-20°C~85°C	SDC49EaDZS-E1	SDC49EaDZS-G1	49E	49EG	Bulk
		SDC49EBDZS-E1	SDC49EBDZS-G1	49E	49EG	Bulk
		SDC49EDDZS-E1	SDC49EDDZS-G1	49E	49EG	Bulk
		SDC49EadZS-E1	SDC49EadZS-G1	49E	49EG	Bulk
		SDC49EBdZS-E1	SDC49EBdZS-G1	49E	49EG	Bulk
		SDC49EDdZS-E1	SDC49EDdZS-G1	49E	49EG	Bulk
		SDC49EaHZS-E1	SDC49EaHZS-G1	49E	49EG	Bulk
		SDC49EBHZS-E1	SDC49EBHZS-G1	49E	49EG	Bulk
		SDC49EDHZS-E1	SDC49EDHZS-G1	49E	49EG	Bulk
		SDC49EahZS-E1	SDC49EahZS-G1	49E	49EG	Bulk
		SDC49EBhZS-E1	SDC49EBhZS-G1	49E	49EG	Bulk
		SDC49EDhZS-E1	SDC49EDhZS-G1	49E	49EG	Bulk

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

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	7	V
Output Voltage	V_{OUT}	7	V
Storage temperature	T_S	-65 to 150	°C
Maximum Junction Temperature	T_J	150	°C
ESD, HBM model per Mil-Std-883, Method 3015	HBM	2000	V
ESD, MM model per JEDEC EIA/JESD22-A115	MM	200	V
Latch-up test per JEDEC 78	-	200	mA
Package power dissipation	P_d	550	mW

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Power supply	V_{CC}	2.3	6.5	V
Operation temperature	T_a	-20	85	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics ($T_a=25^\circ\text{C}$, $V_{CC}=5\text{V}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Supply voltage	V_{CC}	-	2.3	-	6.5	V	
Supply current	I_{CC}	$V_{CC}=5.0\text{V}$	SDC49Eh(H)	-	3.6	4.5	mA
			SDC49Ed(D)	-	6.8	10	
Quiescent output voltage	V_{OUT}	$B=0\text{GS}$	2.35	2.50	2.65	V	
Sensitivity	Sens	$B=0\text{GS}\sim\pm 900\text{GS}$	1.8	2.2	2.6	mV/GS	
High output voltage	V_{OH}	$B=1250\text{GS}$	4.2	-	4.3	V	
Low output voltage	V_{OL}	$B=-1250\text{GS}$	0.8	-	0.95	V	
Output resistance	R_{OUT}	-	-	40	100	Ω	
Noise	V_{NO}	$BW=10\text{Hz}\sim 10\text{kHz}$	-	90	-	μV	

Table 4. Electrical Characteristics

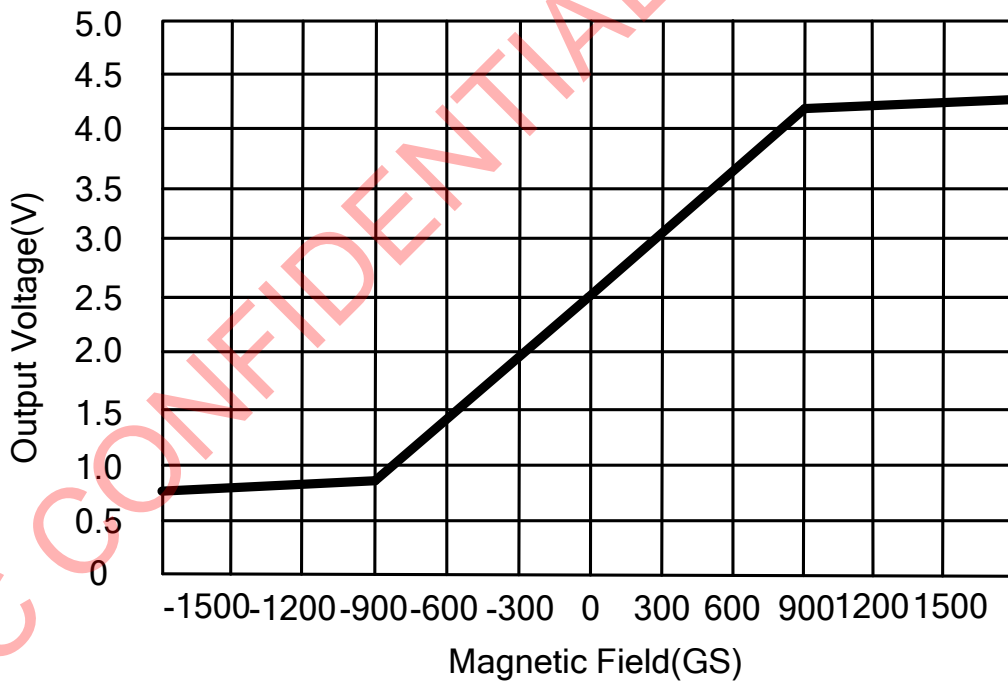
Typical Performance Characteristics ($T_a=25^\circ\text{C}$, $V_{CC}=5\text{V}$, unless otherwise specified)


Figure 4. Output Voltage vs. Magnetic Field

Grade a

Parameter	Symbol	Min	Max	Unit
High output voltage	V_{OH}	4.2	4.3	V
Low output voltage	SDC49Eh(H)	0.865	0.9	V
	SDC49Ed(D)	0.85	0.9	

Grade B

Parameter	Symbol	Min	Max	Unit
High output voltage	V_{OH}	4.2	4.3	V
Low output voltage	SDC49Eh(H)	0.9	0.95	V
	SDC49Ed(D)	0.9	0.95	

Grade D

Parameter	Symbol	Min	Max	Unit
High output voltage	V_{OH}	4.2	4.3	V
Low output voltage	SDC49Eh(H)	0.8	0.865	V
	SDC49Ed(D)	0.8	0.85	

Operation Theory

The output null voltage ($B=0GS$) is nominally one-half the supply voltage. A south magnetic pole, presented to the branded face of the Hall-effect sensors will drive the output higher than the null voltage level. A north magnetic pole will drive the output below the null level.

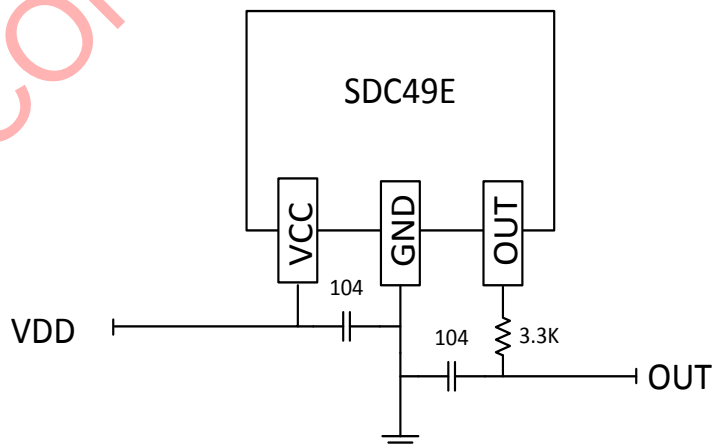
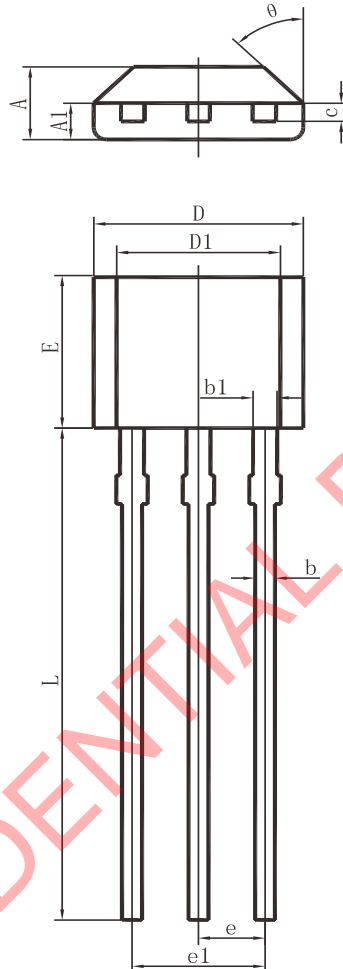
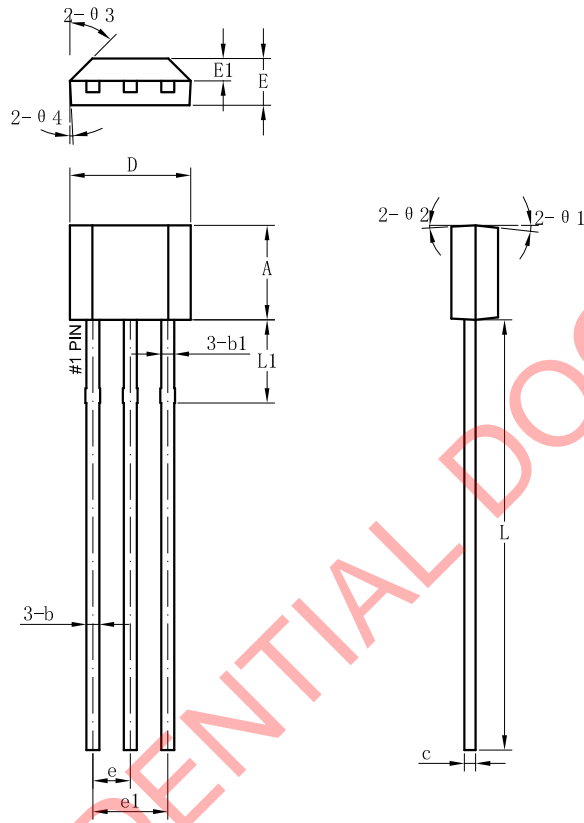
Typical Application


Figure 5. Typical Application

Package Dimensions
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.	

TO-92S (Big Package Size)


Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	3.08	3.18	3.28
b	0.38	0.44	0.56
b1	-	0.44	-
c	0.36	0.38	0.51
D	4.0	4.1	4.2
E	1.47	1.57	1.67
E1	-	0.76	-
e	-	1.27	-
e1	-	2.54	-
L	13.5	14.5	15.5
L1	-	2.8	-
θ1	6°		
θ2	3°		
θ3	45°		
θ4	3°		

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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