

Linear Hall-effect Sensors

SDC49E

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

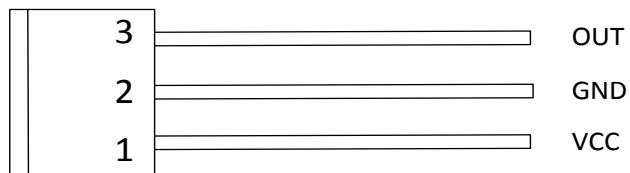


Figure 2. Pin Configuration

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

Table 1. Pin Description

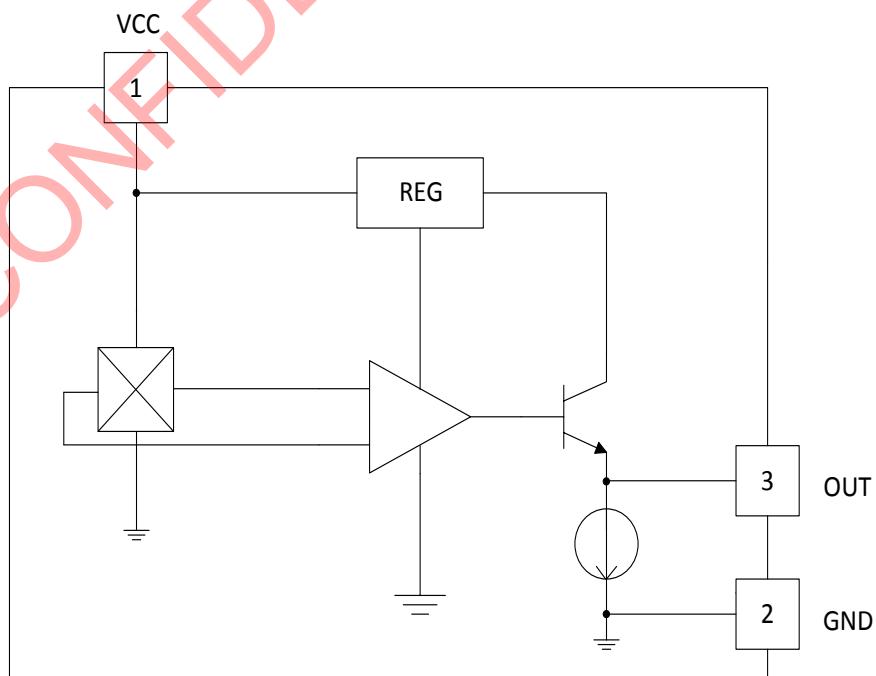
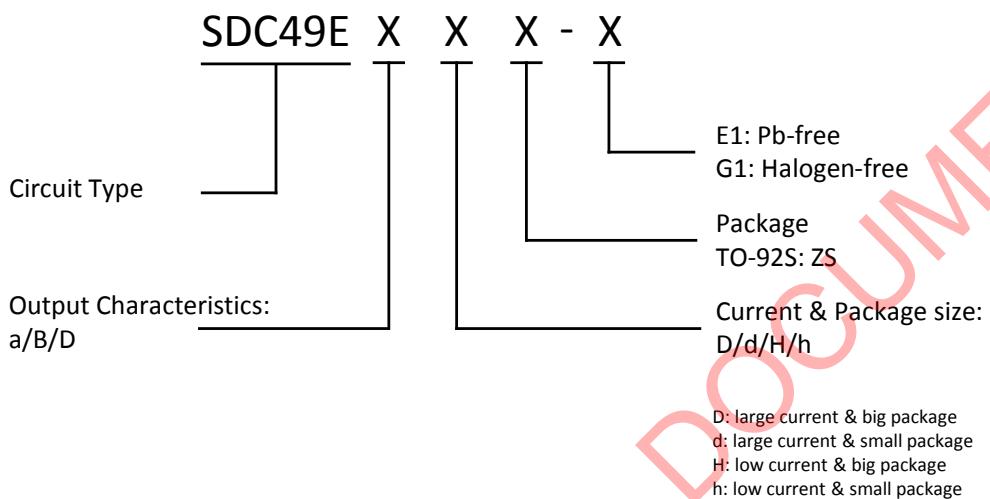
Functional Block Diagram

Figure 3. Functional Block Diagram

Linear Hall-effect Sensors
SDC49E
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

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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

Linear Hall-effect Sensors
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Electrical Characteristics (Ta=25°C, V_{CC} =5V, 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} =5.0V	SDC49Eh(H)	-	3.6	4.5	mA
			SDC49Ed(D)	-	6.8	10	
Quiescent output voltage	V _{OUT}	B=0GS		2.35	2.50	2.65	V
Sensitivity	Sens	B=0GS~±900GS		1.8	2.2	2.6	mV/GS
High output voltage	V _{OH}	B=1250GS		4.2	-	4.3	V
Low output voltage	V _{OL}	B=-1250GS		0.8	-	0.95	V
Output resistance	R _{OUT}	-		-	40	100	Ω
Noise	V _{NO}	BW=10Hz~10kHz		-	90	-	uV

Table 4. Electrical Characteristics

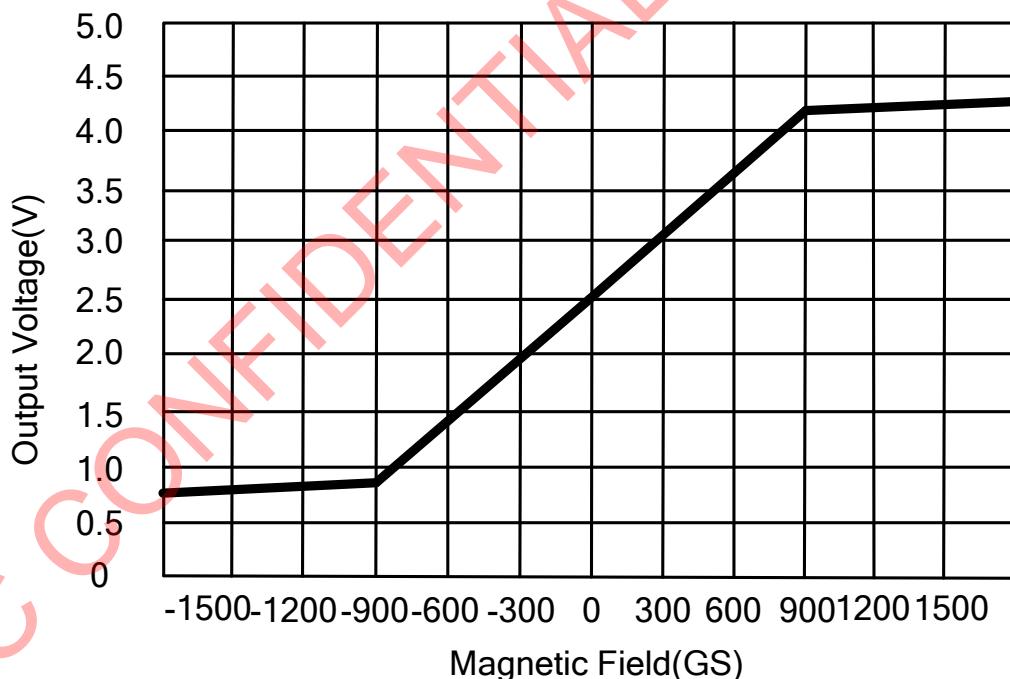
Typical Performance Characteristics (Ta=25°C, V_{CC} =5V, unless otherwise specified)


Figure 4. Output Voltage vs. Magnetic Field

Linear Hall-effect Sensors
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Grade a

Parameter		Symbol	Min	Max	Unit
High output voltage		V_{OH}	4.2	4.3	V
Low output voltage	SDC49Eh(H)	V_{OL}	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)	V_{OL}	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)	V_{OL}	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.

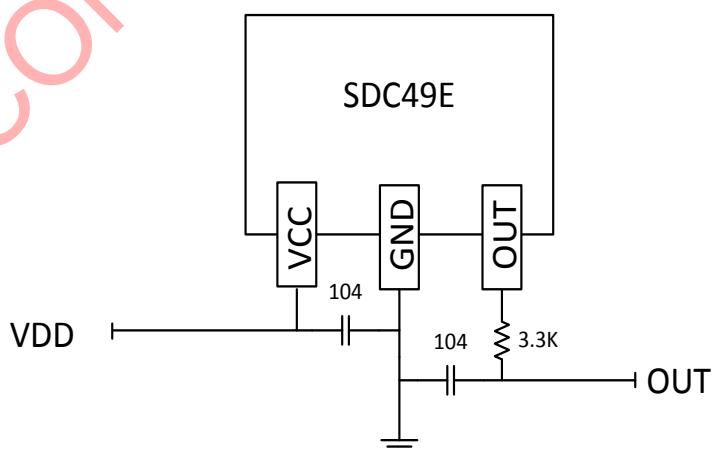
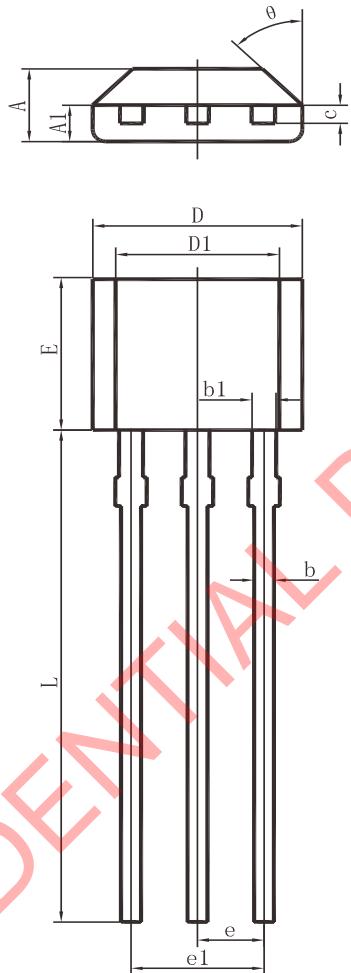
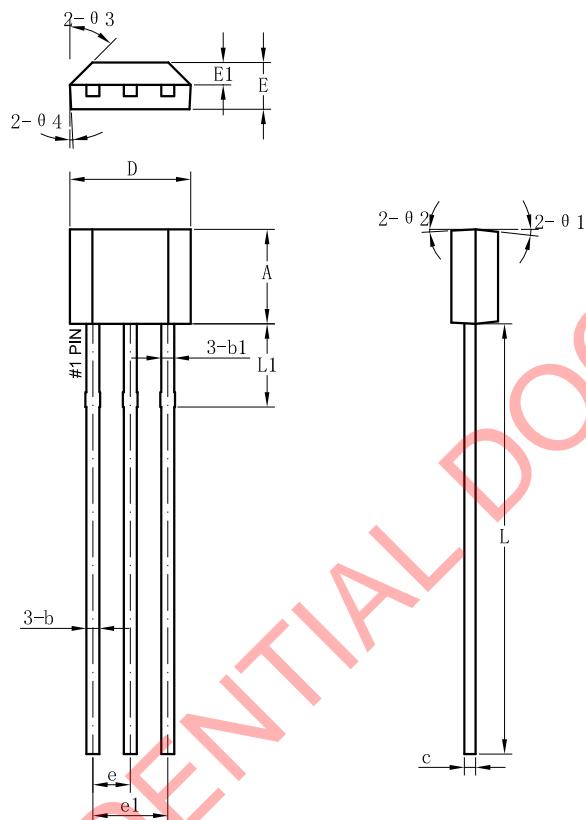
Typical Application


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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