

General Description

The SDC141 is a lock-type switch hall IC. It's composed of power reverse protection circuit, high stable voltage regulator, hall voltage generator, a differential amplifier, schmitt trigger and open collector output. Change of magnetic field can be converted into digital signal. It can be used for brushless DC three-phase motors, brushless DC fans, and speed measurement occasions.

Features

- Operating voltage: 4V to 24 V
- Built-in temperature compensation circuit
- Built-in power reverse protection
- Operating temperature: -55°C~150°C
- Open collector output
- 20mA(MAX) output sink current
- Operating speed: 0~100kHz above
- Package: TO-92S, SOT23-3

Applications

- Three-phase brushless DC motor
- Brushless DC fan
- Tachometer
- Speed measurement

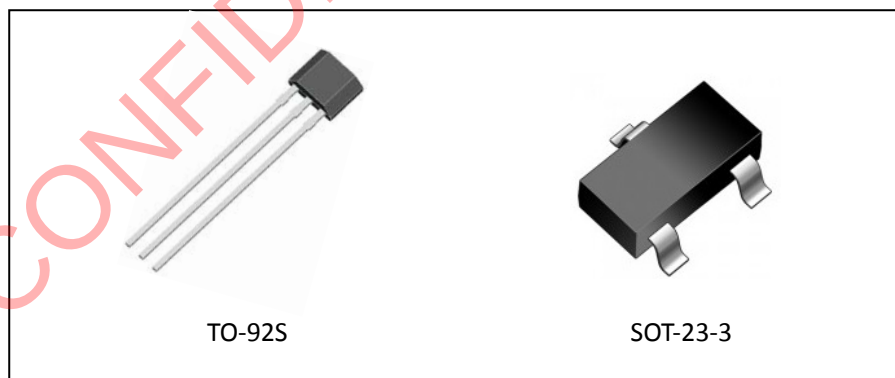
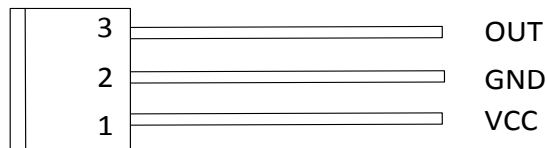


Figure 1. Package Type

Pin Configuration

Package: TO-92S



Package: SOT-23-3

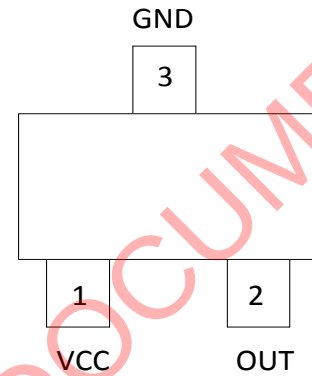


Figure 2. Pin Configuration

Pin Number		Pin Name	Function
SOT-23-3	TO-92S		
1	1	VCC	Supply voltage pin
3	2	GND	Ground pin
2	3	OUT	Output pin

Table 1. Pin Description

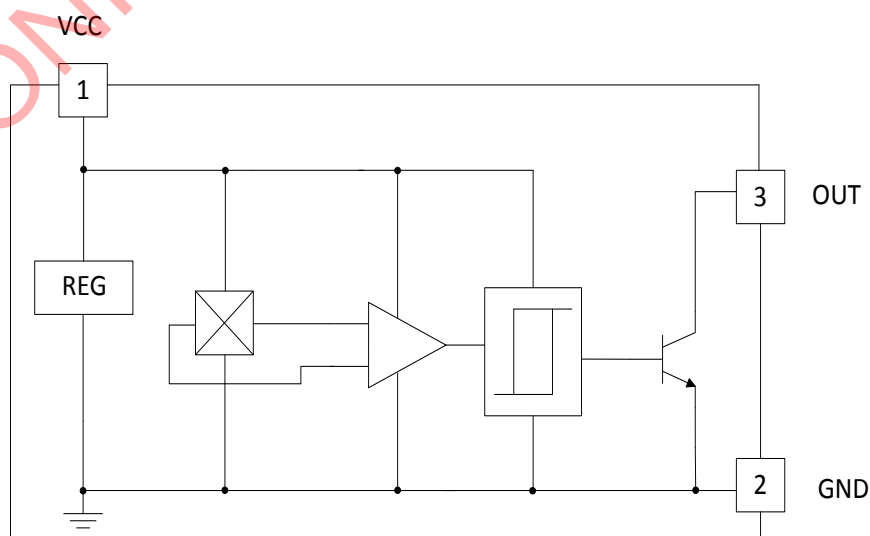
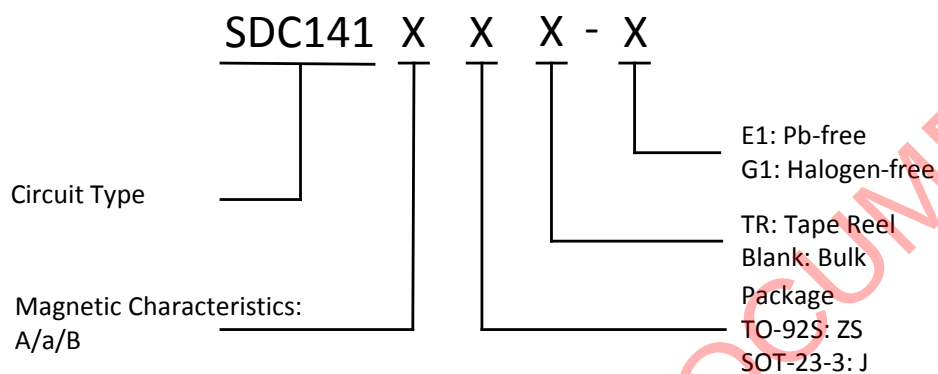
Functional Block Diagram


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	-55°C~150°C	SDC141AZS-E1	SDC141AZS-G1	S41	S41G	Bulk
		SDC141aZS-E1	SDC141aZS-G1	S41	S41G	Bulk
		SDC141BZS-E1	SDC141BZS-G1	S41	S41G	Bulk
SOT-23-3		SDC141AJTR-E1	SDC141AJTR-G1	S41	S41G	Tape Reel
		SDC141aJTR-E1	SDC141aJTR-G1	S41	S41G	Tape Reel
		SDC141BJTR-E1	SDC141BJTR-G1	S41	S41G	Tape Reel

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}	30	V
Magnetic flux density	B	-	mT
Output breakdown voltage	V_{CE}	60	V
Output current	I_{OL}	40	mA
Storage temperature range	T_S	-55 to 170	°C
Power dissipation	P_D	550	mW
Maximum junction temperature	T_J	150	°C
ESD,HBM model per MIL-STD-883H Method 3015.8	HBM	6000	V
ESD,MM model per JEDEC EIA/JESD22-A115	MM	600	V
Latch-up per JEDEC78	-	200	mA

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Power supply	V_{CC}	4	24	V
Operation temperature	T_a	-55	150	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics ($T_a=25^{\circ}\text{C}$, $V_{CC}=4.5\text{V}$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply voltage	V_{CC}	-	4	-	24	V
Output saturation voltage	V_{OUT}	$I_{OUT}=20\text{mA}$, $B>B_{OP}$	-	200	400	mV
Output leakage current	I_{OFF}	$V_{CE}=30\text{V}$, $B<B_{RP}$	-	0.1	10	μA
Supply current	I_{CC1}	$V_{CC}=4.5\text{V}$, output open	-	2.5	5	mA
	I_{CC2}	$V_{CC}=24\text{V}$, output open	-	4.0	6	mA
Output rise time	t_r	R_L to VCC, C_L to GND $R_L=820\Omega$, $C_L=20\text{pF}$	-	0.25	1.5	μs
Output fall time	t_f	R_L to VCC, C_L to GND $R_L=820\Omega$, $C_L=20\text{pF}$	-	0.50	1.5	μs

Table 4. Electrical Characteristics

Magnetic Characteristics ($V_{CC}=4.5\text{V}$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating point	B_{OP}	$T_a=120^{\circ}\text{C}$	15	65	110	GS
		$T_a=25^{\circ}\text{C}$	10	50	90	GS
Release point	B_{RP}	$T_a=120^{\circ}\text{C}$	-110	-65	-15	GS
		$T_a=25^{\circ}\text{C}$	-90	-50	-10	GS
Hysteresis	B_H	$T_a=120^{\circ}\text{C}$	120	130	140	GS
		$T_a=25^{\circ}\text{C}$	90	100	110	GS

Table 5. Magnetic Characteristics

Note: when S pole of magnetic is faced to the marked side of IC, the magnetic field is positive.

Grade A

Parameter	Symbol	Min	Max	Unit
Operate point	B_{OP}	35	75	GS
Release point	B_{RP}	-140	-15	GS

Grade a

Parameter	Symbol	Min	Max	Unit
Operate point	B_{OP}	75	140	GS
Release point	B_{RP}	-140	-15	GS

Grade B

Parameter	Symbol	Min	Max	Unit
Operate point	B_{OP}	15	35	GS
Release point	B_{RP}	-140	-15	GS

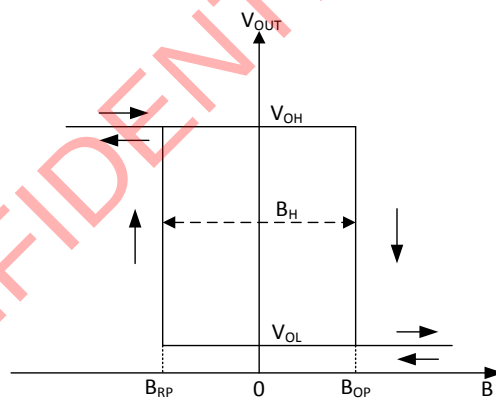


Figure 4. Magnetic Characteristics

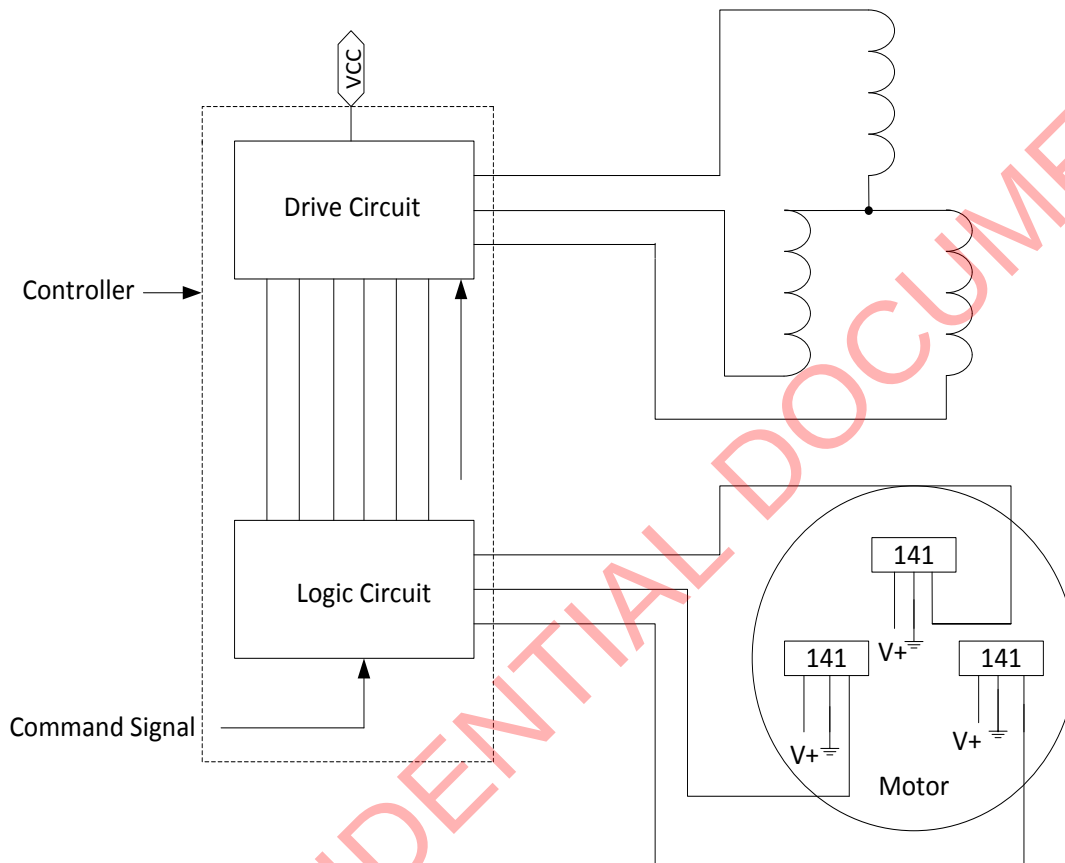
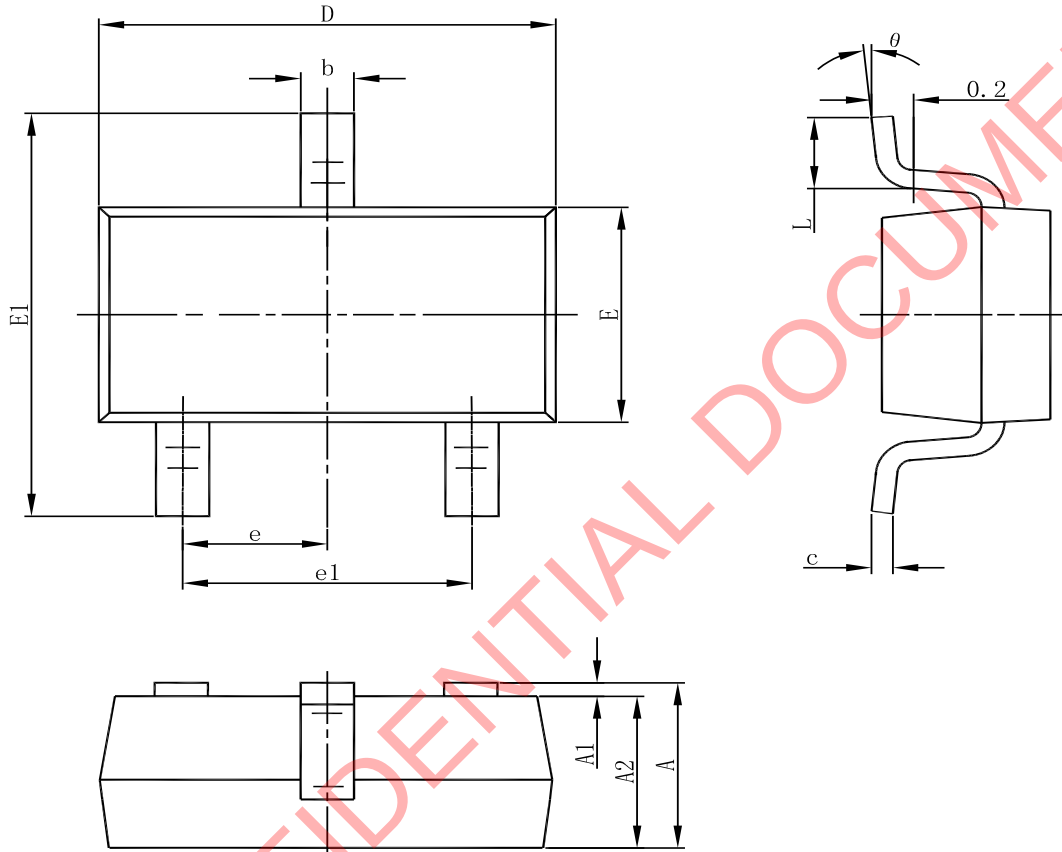
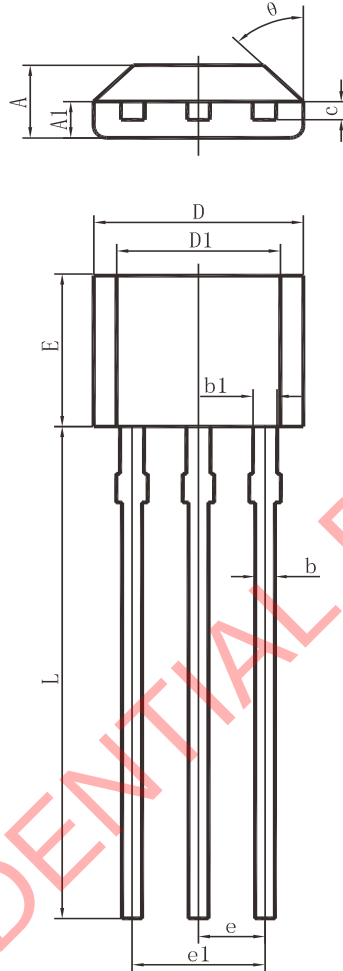
Typical Application


Figure 5. Typical Application

Package Dimensions
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	2.820	3.020	0.111	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
θ	45° TYP.		45° TYP.	



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