Two-Phase DC Fan Driver with FG SDC211

General Description

The SDC211 is a chip that is composed of Hall sensor and output coil drivers, it's applied to two phase DC motor. The high sensitivity of Hall effect sensor is suitable for motors from mini-type CPU coolers to DC fans. Typical operation current is 250mA and operating voltage range is wide. FG signal provides a square waveform output for the detection of the motor speed.

Features

- Built-in Hall sensor/drivers
- Wide operating voltage range: 4.0V~20V
- Output sink current up to 250mA
- Low quiescent supply current under 5mA
- Built-in FG output
- Package: TO-94

Applications

- Dual coils brushless DC motor
- Dual coils brushless DC fan
- Revolution counting
- Speed measurement

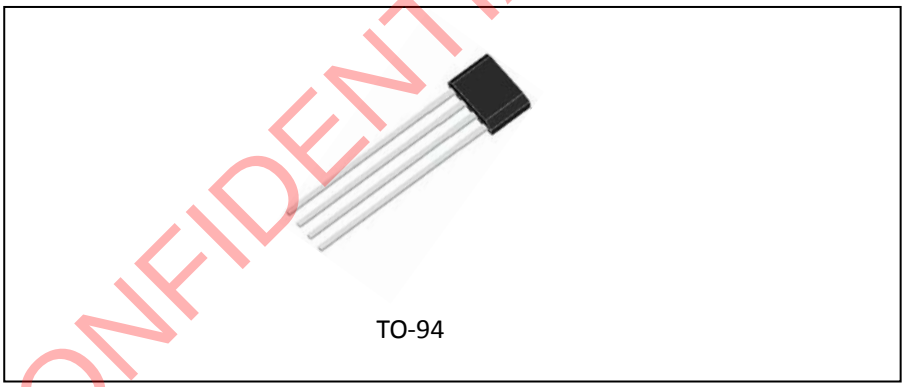


Figure 1. Package Type

Pin Configuration

Package: TO-94

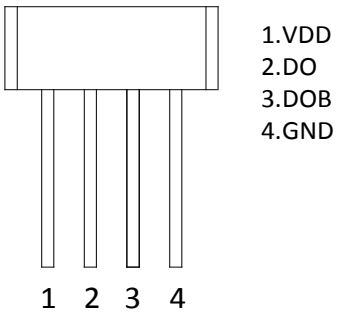


Figure 2. Pin Configuration

Pin Number	Pin Name	Function
1	FG	Rotation speed output (O.C)
2	DO/VCC	Coil driver output/Power input
3	DOB/VCC	Coil driver output/Power input
4	GND	IC ground

Table1. Pin Description

Functional Block Diagram

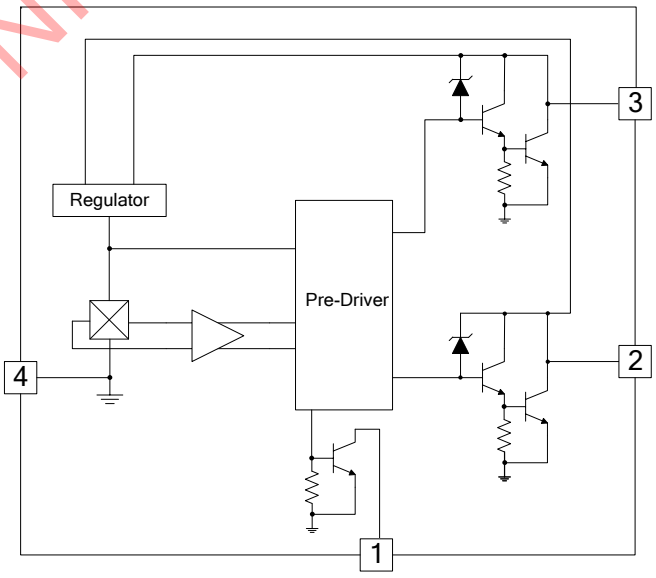
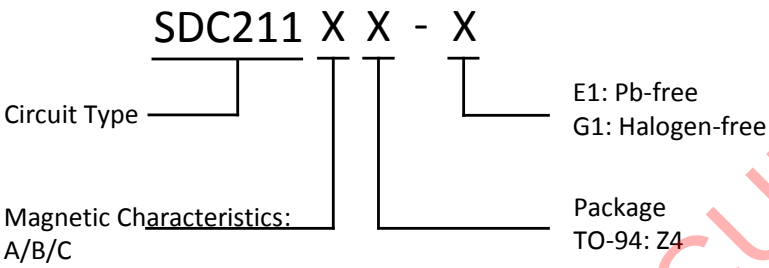


Figure 3. Functional Block Diagram

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-free	Pb-free	Halogen-free	
TO-94	-20°C~85°C	SDC211AZ4-E1	SDC211AZ4-G1	211	211G	Bulk
		SDC211BZ4-E1	SDC211BZ4-G1	211	211G	Bulk
		SDC211CZ4-E1	SDC211CZ4-G1	211	211G	Bulk

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

Parameter		Symbol	Value	Units
Supply Voltage		V_{CC}	24	V
Output Voltage		V_{OUT}	24	V
Magnetic flux density		B	unlimited	GS
Output current	Continuous	I_{out}	250	mA
	Hold		400	
	Peak		700	
Storage temperature range		T_S	-65~150	°C
Package power dissipation		P_D	550	mW
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
Maximum junction temperature		T_J	150	°C

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Power supply	V_{CC}	4.0	20	V
Operation temperature	Ta	-20	85	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics (Ta=25°C, V_{CC}=12V, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating voltage	V_{CC}	-	4.0	12	20	V
Quiescent supply current	I_{CC}	V_{CC}=20V,B>150GS,V_{DOB}=V_{CC} (or B<-150GS,V_{DO}=V_{CC})	-	2.5	7.0	mA
DO/DOB saturation voltage	V_{SAT}	B>150GS,V_{DOB}=V_{CC},I_{DO}=200mA (or B<-150GS,V_{DO}=V_{CC},I_{DOB}=200mA)	-	-	1.2	V
FG leakage current	I_{OFF}	B>150GS,V_{DOB}=V_{CC}, V_{FG}=20V	-	-	1	uA
FG saturation voltage	V_{FG}	B<-150GS, V_{DO}=V_{CC},I_{FG}=5mA	-	0.2	0.5	V
Rise time	t_r	R_L=820Ω, C_L=20pF	-	0.5	10	us
Fall time	t_f	R_L=820Ω, C_L=20pF	-	0.5	1.5	us
Switch time	Δt	R_L=820Ω, C_L=20pF	-	0.5	1.0	us

Table 4. Electrical Characteristics

Magnetic Characteristics (Ta=25°C, V_{CC}=12V, unless otherwise specified)

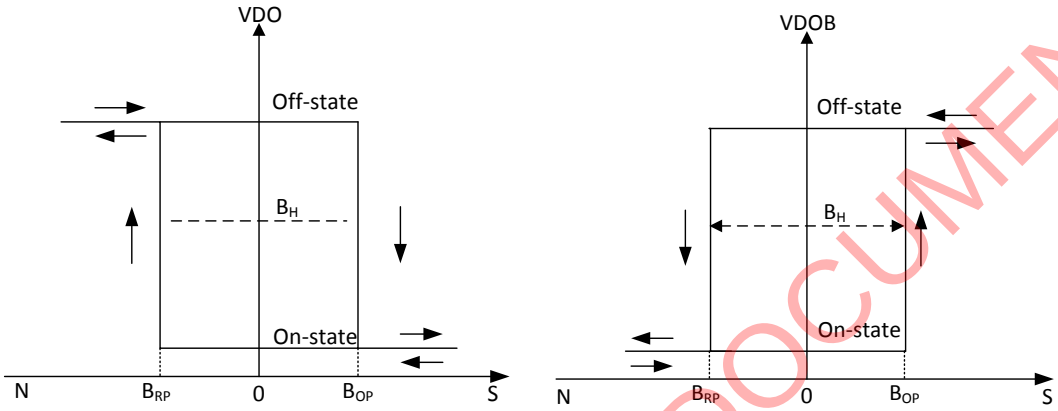


Figure 4. Magnetic Characteristics

Grade A

Parameter	Symbol	Min	Max	Unit
Operate point	B_{OP}	10	50	GS
Release point	B_{RP}	-50	-10	GS

Grade B

Parameter	Symbol	Min	Max	Unit
Operate point	B_{OP}	-	70	GS
Release point	B_{RP}	-70	-	GS

Grade C

Parameter	Symbol	Min	Max	Unit
Operate point	B_{OP}	-	90	GS
Release point	B_{RP}	-90	-	GS

Table 5. Magnetic Characteristics

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

Typical Application

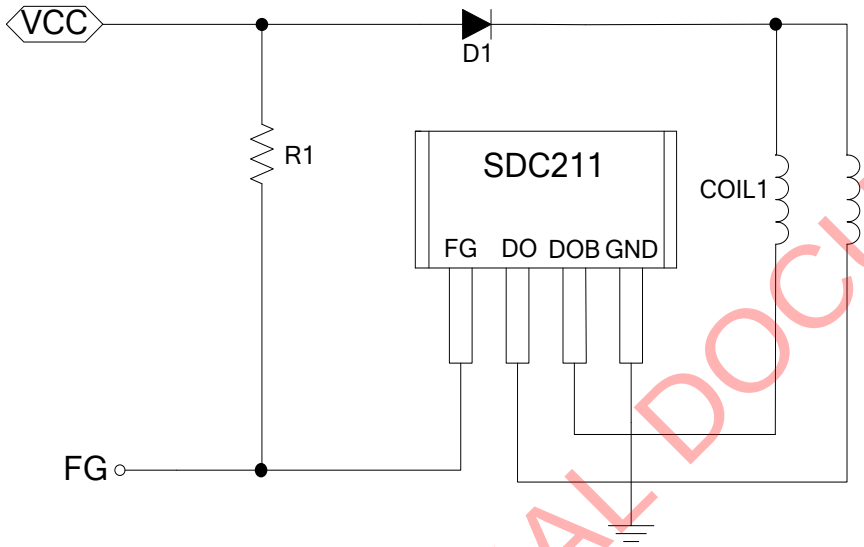
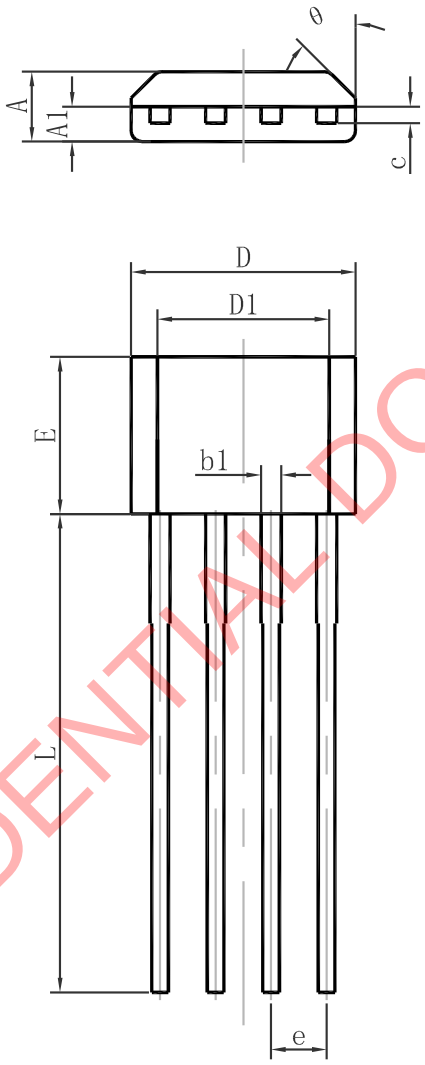


Figure 5. Typical Application

Package Dimension

TO-94



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.800	0.055	0.071
A1	0.700	0.900	0.028	0.035
b1	0.380	0.550	0.015	0.022
C	0.360	0.510	0.014	0.020
D	5.050	5.350	0.202	0.214
D1	4.550	4.850	0.128	0.194
E	3.450	3.750	0.136	0.148
e	1.270 TYP.		0.050 TYP.	
L	14.300	14.700	0.572	0.588
θ	10°TYP.		10°TYP.	

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