Hall IC Fan Motor Driver

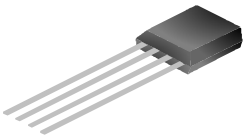
DESCRIPTION

SD1579 is a one-chip, two phase Hall IC fan driver use the advanced BICDMOS process. Power output stage using LDMOS transistors, with low Rdson, low power dissipation and capable of withstanding high output drive current.

The driver of the motor circuit built-in Locked-rotor protection circuit, with automatic restart function. Built-in voltage regulator circuit for the Hall sensor and amplifier circuit to provide internal power supply;

The dynamic compensation circuit capable of providing good consistency and very small magnetic shift of the window over the whole temperature range,.

Built-in Zener output as the output protection management and in the supply-side built-in reverse protection diodes, which can effectively prevent damage when the power supply circuit is reverse.



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APPLICATIONS

* Dual coils brush-less DC fan;
* Dual coils brush-less DC motor.

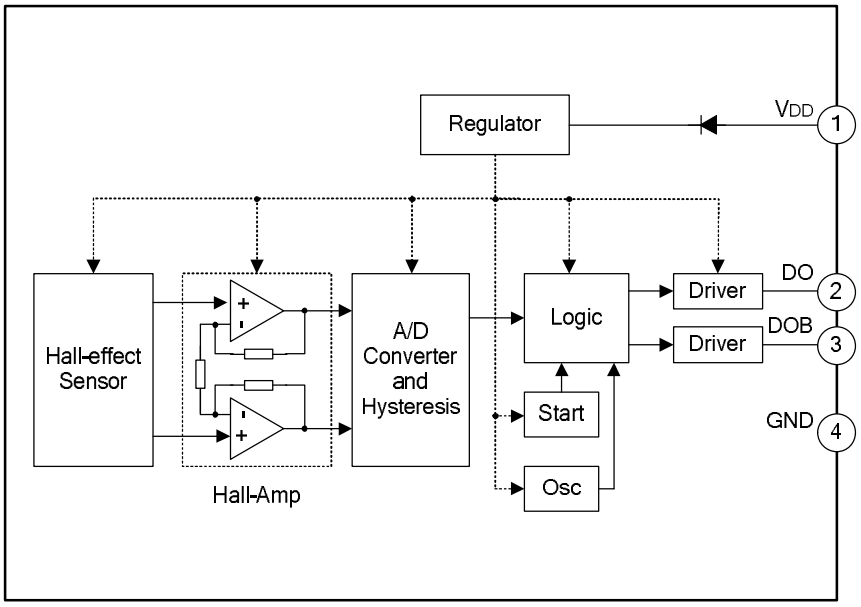
FEATURES

* Built-in lock protection circuit;
* Built-in Auto restart circuit;
* Built-in Hall sensor with high stability of the dynamic compensation circuit;
* Built-in Hall amplifier with hysteresis;
* Built-in Zener Diodes protect outputs circuit;
* Built-in Voltage Regulator circuit.
* Built-in Reverse-voltage protection diode
* Hall magnetic window, consistency and temperature stability;
* Wide operating voltage range, small quiescent current;
* Low Rdson, high drive current capability;

ORDERING INFORMATION

Part No.	Package	Marking	Material	Package Type
SD1579	TO-94	1579	Pb free	Bulk

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Ratings	Unit
VCC Maximum Supply Voltage	VCC max	30	V
Maximum Output Current (Fault)	Iout(AVE)	500	mA
	Iout(PEAK)	700	mA
Power Dissipation	Pd	550	mW
Operating Temperature Range	Tamb	-40 ~ 125	°C
Storage Temperature Range	Tstg	-55 ~ 150	°C
Maximum Junction Temperature	Tj	150	°C

Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

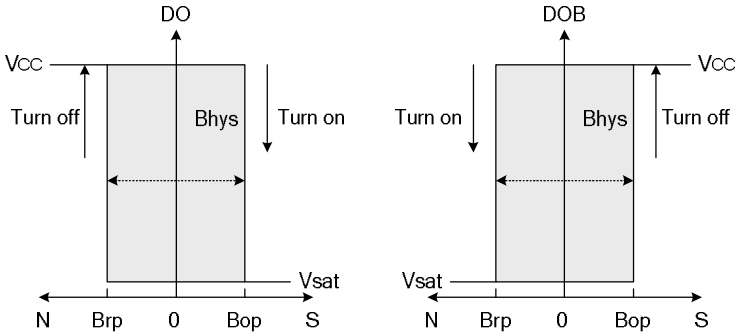
ELECTRICAL CHARACTERISTICS (Unless specified particularly Tamb=25°C, VCC=12V)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	VCC	Operating	~	12	28*	V
Supply Current	ICC	Operating	~	2.0	4.0	mA
Output Saturation voltage	VDSS	Iout=300 mA	~	210	300	mV
Output Saturation voltage	VDSS	Iout=500 mA	~	350	500	mV
Thermal Resistance	Rth	Operating		227		°C /W
Locked-Rotor Period	ton			0.5		S
Locked-Rotor Period	toff			3		S
Output Zener-breakdown Voltage	Vz		35	42	60	V

*Note: Please used in power dissipation limitation for all coil with different efficiency.

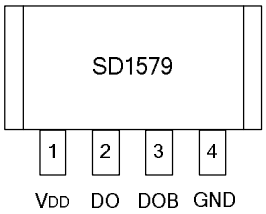
MAGNETIC CHARACTERISTICS (Unless specified particularly T_{amb}=25°C, V_{CC}=12V, 1mT=10Gauss)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Operate Point	Bop	Operating	10	30	60	GS
Release Point	BRP	Operating	-60	-30	-10	GS
Hysteresis	BHYS	Operating	~	60	~	GS



When flux B is over operation point Bop, Do is on and output low voltage, DOB is off and output high voltage. Every output is locking until the flux B is less than release point Brp, then DO and DOB switch the states.

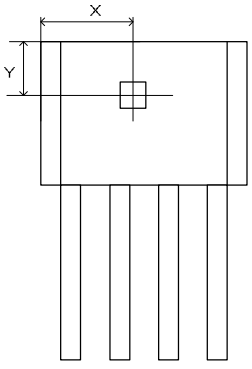
PIN CONFIGURATION



PIN DESCRIPTION

Pin No.	Pin Name	I/O	Description
1	V_{DD}	--	Power supply
2	DO	O	Driver Output pin
3	DOB	O	Driver Output pin
4	GND	--	Ground

HALL SENSOR LOCATION



	Value	Unit
X	2.3	mm
Y	1.09	mm

FUNCTION DESCRIPTION

This IC detects the rotation of the motor by hall signal, and adjusts lock detection ON time (T_{ON}) =0.5S and lock detection OFF time (T_{OFF})=3.0S by internal counter. The time (T_{NO}, T_{OFF}) sequence is shown below.

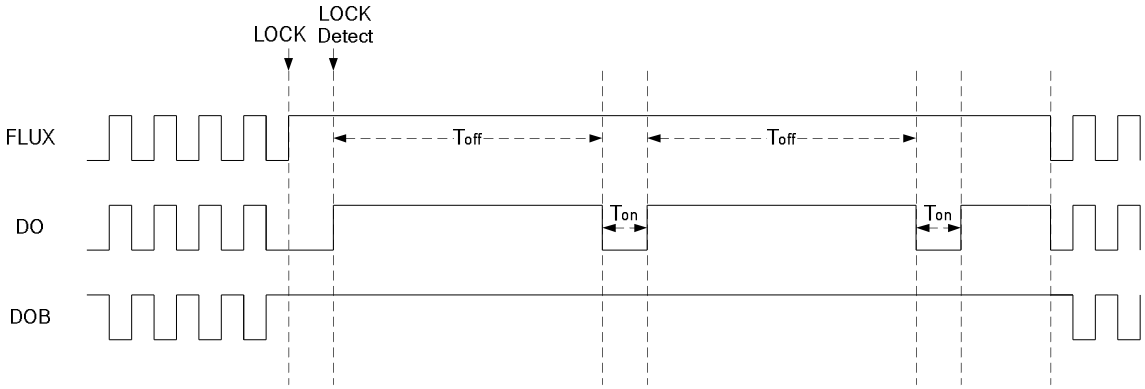
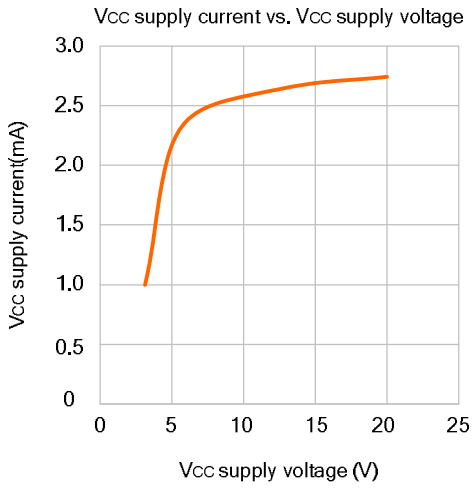
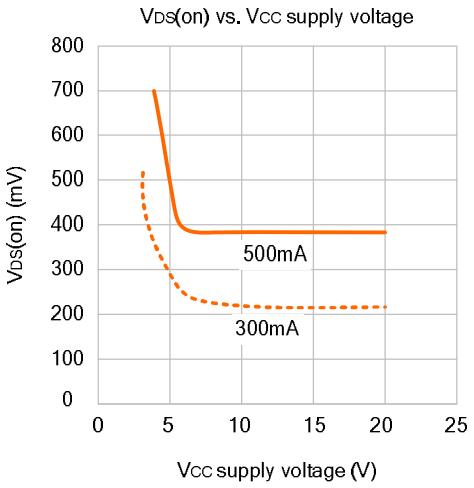
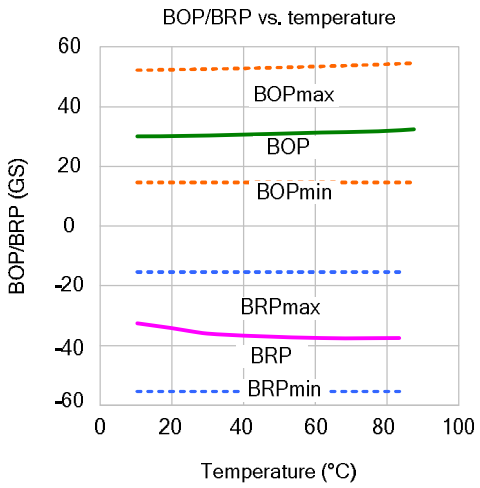
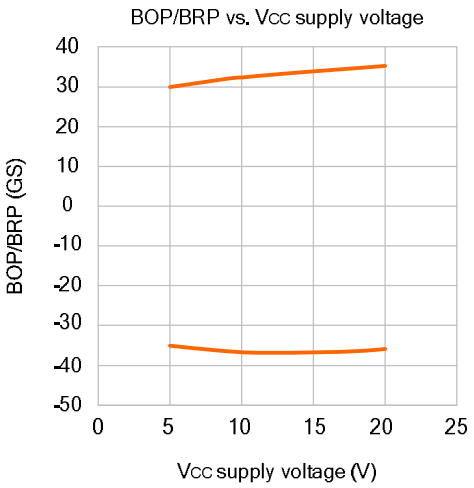


Fig 1. Lock Protection and Automatic Restart Waveform

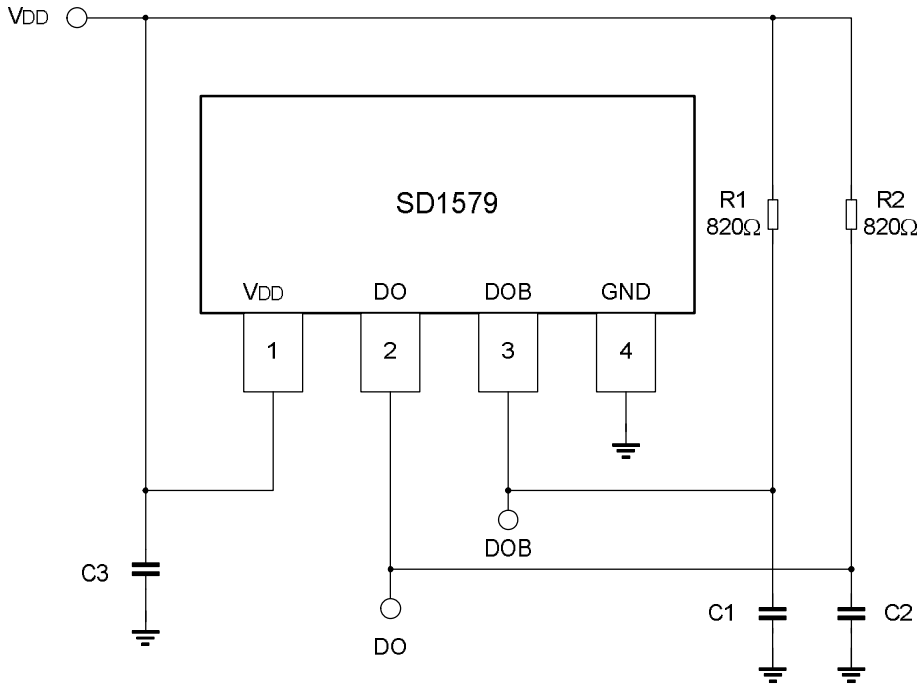




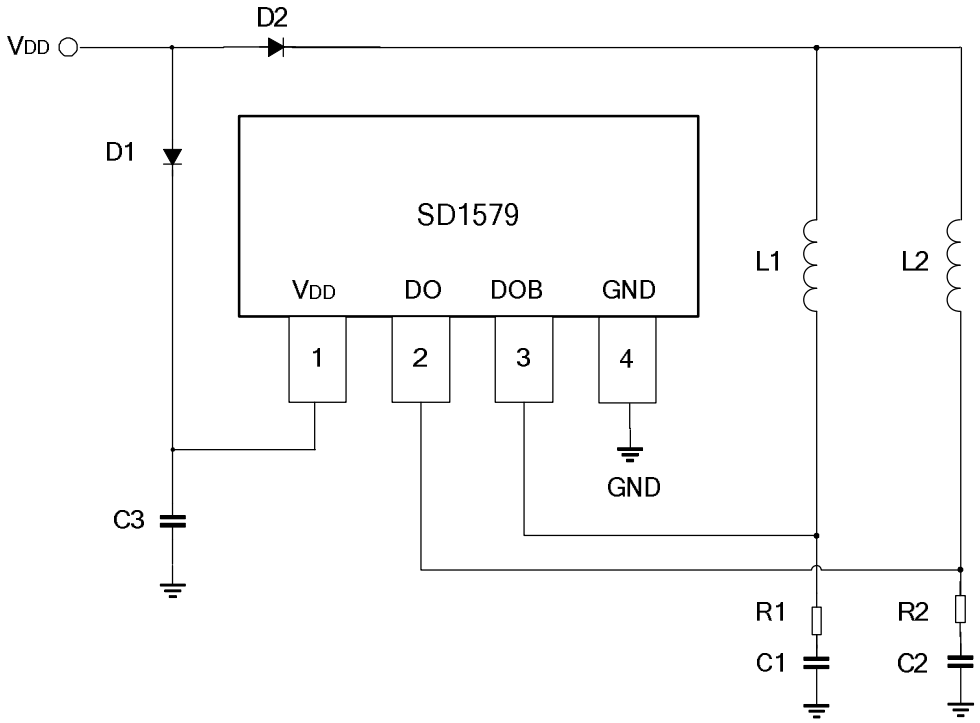




TEST CIRCUIT



TYPICAL APPLICATION CIRCUIT



APPLICATION INFORMATION

1. Back electromotive force causes regenerated current to V_{DD} line, therefore take a measure such as placing a capacitor between power supply and GND for routing regenerated current; In order to reduce the output DO and DOB side effects of induced electromotive force, need to increase a resistance-capacitance network at the output; in a typical application circuit diagram, R1 and R2 is typically 56 ohms; C1, C2 and C3 is typically 2.2uF; The value of R and C must match the actual coil;
2. Figure 2 is the normal working state, the current compose I_{CC} and I_{load} , power dissipation PC = V_{DD} * I_{CC} + V_O * I_{load} , Where Vo is the output voltage when DO or DOB turn on; It is need to be careful not to exceed its maximum power dissipation value dule to change of power supply voltage V_{DD} and the coil current I_{load}.
3. SD1579 has built-in reverse protection diodes, so D1 is no need; If you increase the D1 can better protect the chips, as shown in Figure 3; it should be noted that care should to taken to the two coils current when power voltage reversed, if 2*Vo * I_{load} > IC's power consumption, it may cause damage to IC;

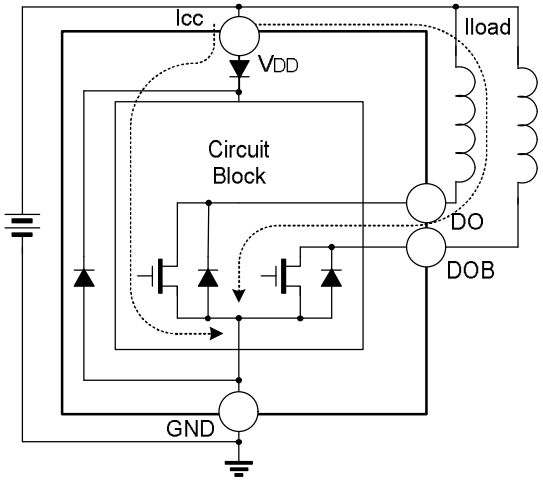


Fig.2 Normal working state

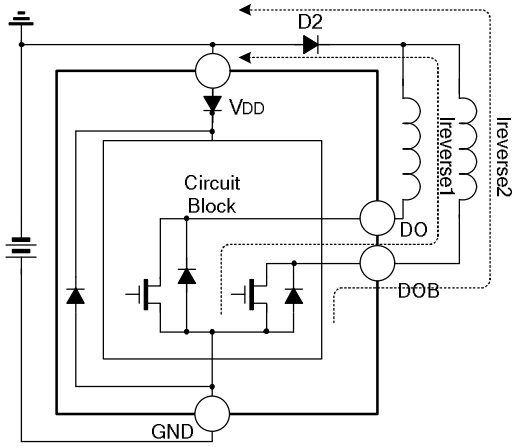


Fig.3 Reverse voltage state

4. Add a diode to coils can better protect the chip and the fans at reverse voltage state, as shown in Figure 4;

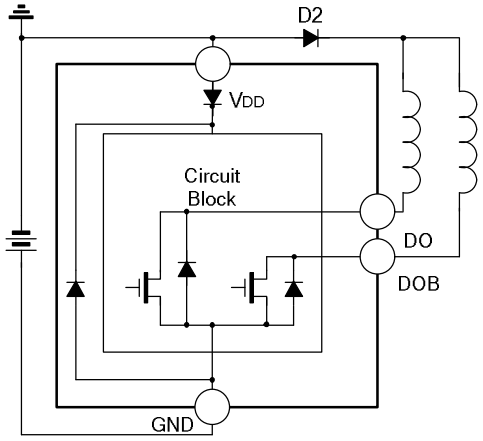
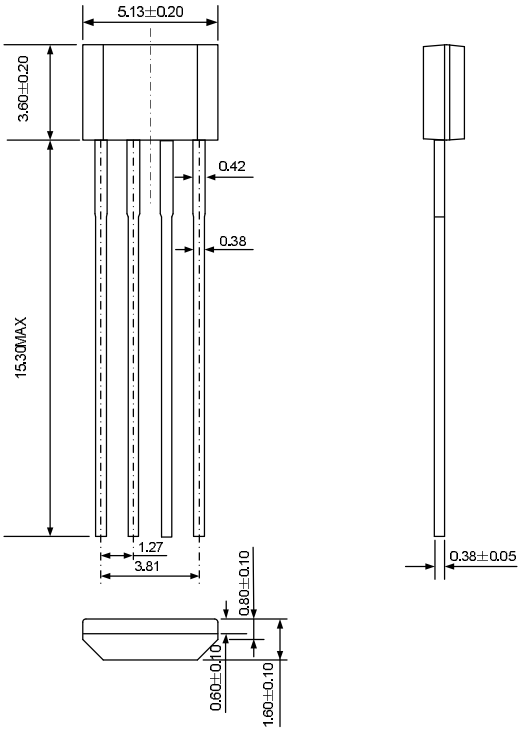


Figure 4 Add a diode to coils

PACKAGE OUTLINE

TO-94 UNIT: mm



MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed in antistatic/conductive containers for transportation.

Disclaimer:

- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without further notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
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