ST1116A

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Variable Speed Double Coil Brushless DC Motor Driver

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China PAT.NO : ZL99207658.7
Other Patents are pending now, including USA 09/307,906, Taiwan 88202931, et al.

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Variable Speed Double Coil

Brushless DC Motor Driver

General Specifications

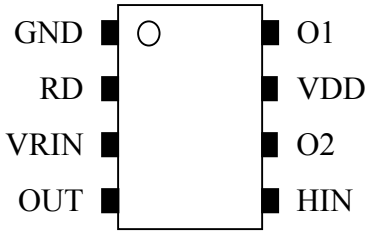
The device is a driver with variable speed control for two-phase unipolar driver of DC brushless fan motor applications. The device is intended to be used as an interface between a HALL effect latch and a double coil load. The device has functions such as driving, rotation detecting, lock protection, self-restart and speed control.

An open-drained rotation detecting output is low while the motor is turning and high impedance when the lock-state is detected.

Features and Benefits

- Variable fan speed control
- Motor starts at low speed
- Lock protection and automatic self-restart
- Rotation detection output
- High output sinking current capability
- Connectable direct to a HALL Latch IC
- Thin, highly reliable package (SOP-8)

Pin Assignment



Pin NO.	Pin Name	Description
1	GND	Ground
2	RD	Rotation detection output (open-drain)
3	VRIN	Input pin for variable speed control function
4	OUT	Output pin to control the external source driver
5	HIN	Input pin from Hall Latch IC
6	O2	Output sinking driver 2
7	VDD	Power supply
8	O1	Output sinking driver 1

Absolute Maximum Ratings (T_A=25℃)

Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{DD}	14	V
Input Voltage	V_{IN}	V_{DD}+0.4	V
Output Current at Lock	I_{OUT}	600	mA
Output Current at Operating	I_{OPR}	300	mA
Power Dissipation	P_D	0.44	W
Operating Temperature Range	T_A	-40 ~ 125	°C
Storage Temperature Range	T_S	-65 ~ 150	°C

Electrical Characteristic (T_A = 25℃ & V_{DD} = 12 V)

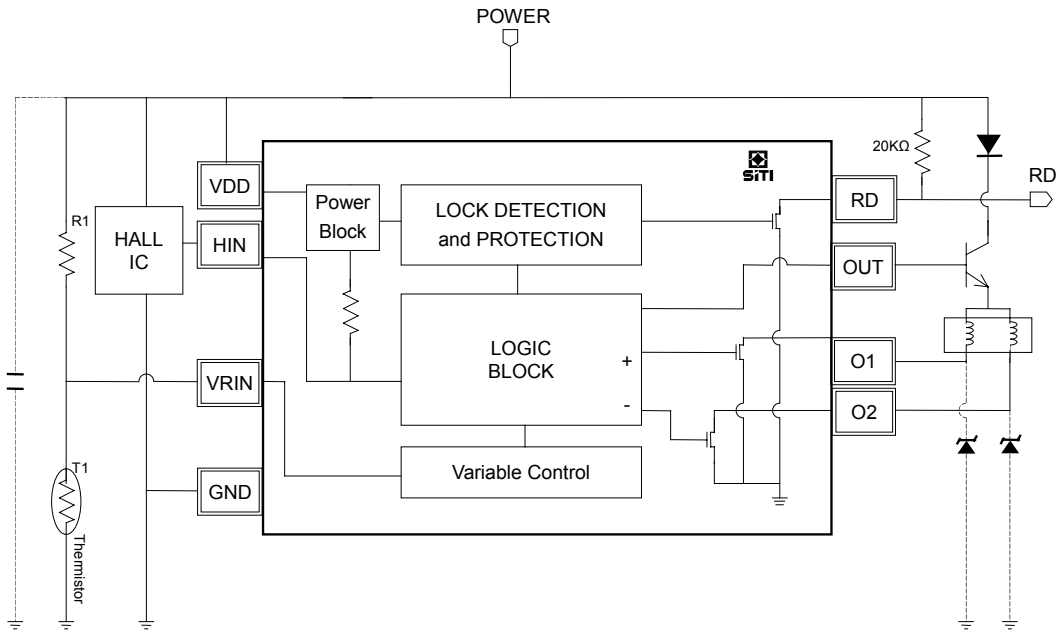
Characteristic	Sym.	Condition	Limit			Unit
			Min.	Typ.	Max.	
Supply Voltage	V_{DD}	Operating	3	12	14	V
Quiescent Current	I_{DD}	No load, All Inputs = 0V or V_{DD}	-	2.2	-	mA
HIN Input Terminal						
Input Voltage “H”	V_{IH}	-	0.8*V_{DD}	-	V_{DD}+0.4	V
Input Voltage “L”	V_{IL}	-	-0.4	-	0.2*V_{DD}	V
Input Current “H”	I_{IH}	V_{IN} = V_{DD}	-	-	±1	μA
O1 / O2 Output Terminal (T_J = 25℃)						
Output Voltage Low	V_{OL}	I_{OUT} = 250mA	-	0.4	-	V
RD Open-Drain Terminal (T_J = 25℃)						
Output Leakage Current	I_{Leak}	V_{RD} =12V	--	-	10	μA
Output Current	I_{RD}	V_{RD} = 0.4V	-	10	-	mA
Output Voltage High	V_{RDOH}	-	-	-	15	V
Automatic Self-Restart Circuit						
On Time	T_{ON}		-	156	-	ms
Duty Ratio	R_{DR}	T_{OFF} / T_{ON}	6	7	8	
OUT Terminal						
OUT Voltage High	V_{OUTH}	VRIN =4.5V	-	11.3	-	V
OUT Voltage Low	V_{OUTL}	VRIN =5.4V	-	3.1	-	V

Truth Table

- **Drivers Output**

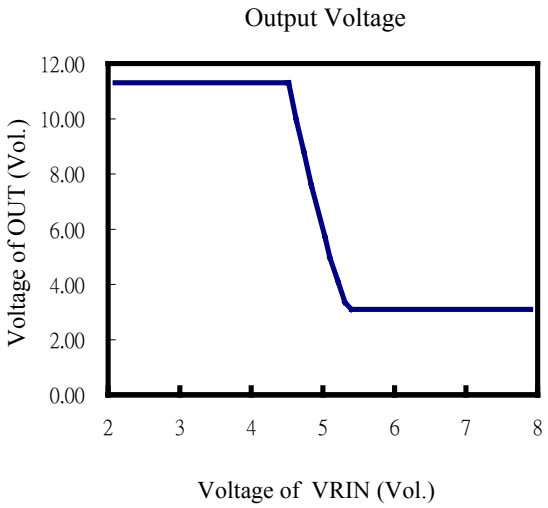
HIN	O1	O2
H	OFF	ON
L	ON	OFF

Block Diagram & Application Circuit

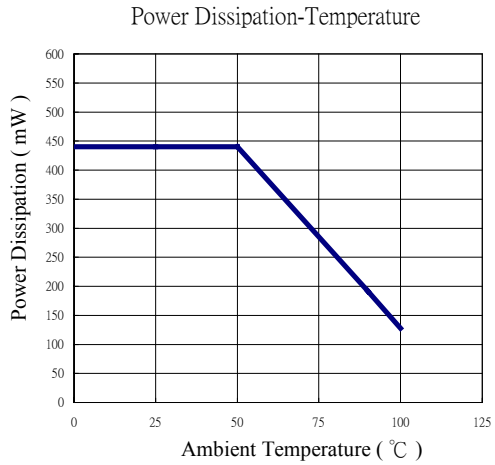


Application Notes

- The RD pin is an open-drained output of rotation detection. This pin connected with a pull-up resistor outputs a low level during motor drive and a high level when the motor is stopped.
- The output voltage of OUT pin depends on the input voltage of VRIN pin. The relationship between the typical output voltage and the voltage of VRIN pin is shown as following table:

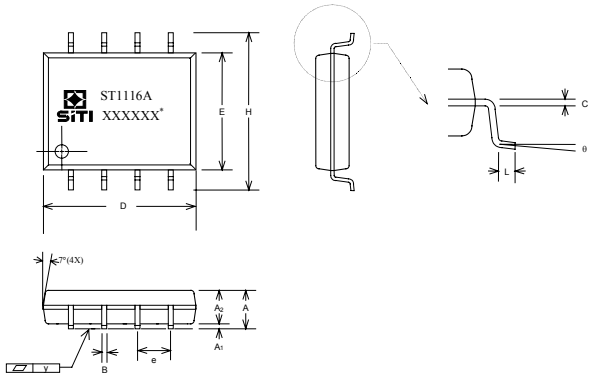


- The power dissipated by the IC varies widely with the supply voltage, the output current, and loading. It is important to ensure the application does not exceed the allowable power dissipation of the IC package. The recommended ***motor driver*** power dissipation versus temperature is depicted as follows:



Package Specifications (SOP-8)

(8-pin SOP)



SYMBOL	Dimensions in Millimeter			Dimensions in Inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.60	1.75	0.053	0.063	0.069
A_1	0.10	—	0.25	0.004	—	0.010
A_2	—	1.45	—	—	0.057	—
B	0.33	—	0.51	0.013	—	0.020
C	0.19	—	0.25	0.007	—	0.010
D	4.80	—	5.00	0.189	—	0.197
E	3.80	—	4.00	0.150	—	0.157
e	—	1.27	—	—	1.27	—
H	5.80	—	6.20	0.228	—	0.244
L	0.40	—	1.27	0.016	—	0.050
Y	—	—	0.10	—	—	0.004
θ	0°	—	8°	0°	—	8°

* The package marking "XXXX" is a lot number of ST1116A and therefore being subject to change.

The products listed herein are designed for ordinary electronic applications, such as electrical appliances, audio-visual equipment, communications devices and so on. Hence, it is advisable that the devices should not be used in medical instruments, surgical implants, aerospace machinery, nuclear power control systems, disaster/crime-prevention equipment and the like. Misusing those products may directly or indirectly endanger human life, or cause injury and property loss.

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