



PT3911(N) Hall Driver IC

Applications

- 5V/12V/24V double coils DC brushless motor
- Revolution counting
- Speed Measurement
- DC 2.7V~28V Operation Voltage

Features

- Soft switching output driver
- Built-in hall sensor
- Motor locked protection and automatic restart
- Built-in hysteresis comparator
- Built-in protection zener diode
- High balance and low thermal drift magnetic sensing
- Low power consumption and high driving efficiency
- ESD 8KV

Specifications

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Conditions	Rating	Units
Maximum supply volatge	VDDmax		28 ^{*3}	V
Allowable power dissipation	Pd		568 ^{*1}	mW
Operating temperature	Ta		-40~+85	°C
Storage temperature	Ts		-50~+150	°C
Max. output current	Iomax	0.5sec	700 ^{*2}	mA
Thermal resistance	Raj		220	°C/W
Junction temperature	Tj		150	°C

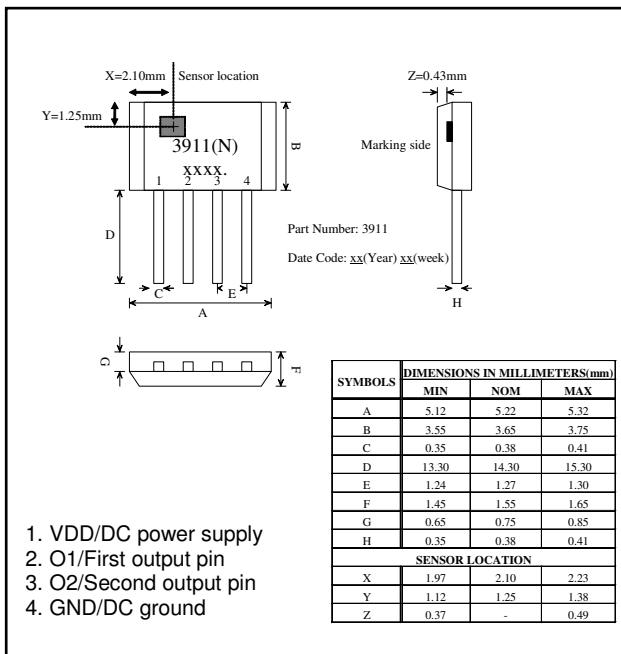
*1: Reduced by 4.5mW for each increase in Ta of 1°C over 25°C When mounted on 50mm x 50mm x 1.6mm glass epoxy board

*2: Should not exceed Pd

*3: Need a serial resistor

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Package: TO-92-4pin



Electrical Characteristics (T_A=+25°C, V_{DD}=12V)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Units
Supply Voltage	V _{DD}		2.7		28*	V
Output Sink Voltage	V _{DS(ON)}	@ I _{OUT} =300mA	0.5	0.6	0.8	V
Output Voltage Clamp	V _{BV}		48			V
Supply Current	I _{DD}	Output open		6	13	mA
Shutdown Time	T _{SD}		2.1	2.5	3.15	S
Restart Time	T _{RS}		0.30	0.36	0.45	S

Magnetic Characteristics (T_A=+25°C, V_{DD}=12V)

Operate Point	B _{OP}		5	15	35	G
Release Point	B _{RP}		-35	-15	-5	G
Hysteresis	B _{HYS}		20	30	60	G

* Need a serial resistor for 24V application

General Specifications

The PT3911(N) is designed for magnetic actuating using a bipolar magnetic field. The built-in dynamic offset cancellation of pre-amplifier stage achieves optimal symmetrical magnetic sensing. The output driver provides a linear drive to eliminate switching noise. This Hall effect IC is optimal for DC brushless fan application. The supply voltage range is from 2.7V to 28V and the output current is 400mA.

Lock Protection

In order to protect the motor, the driver IC will be shutdown to drive the coil when the motor is locked over 0.36 seconds. Then, it restarts to drive the motor after 2.5 seconds. Figure 1 shows the timing diagram between the hall input signal and driver's output state.

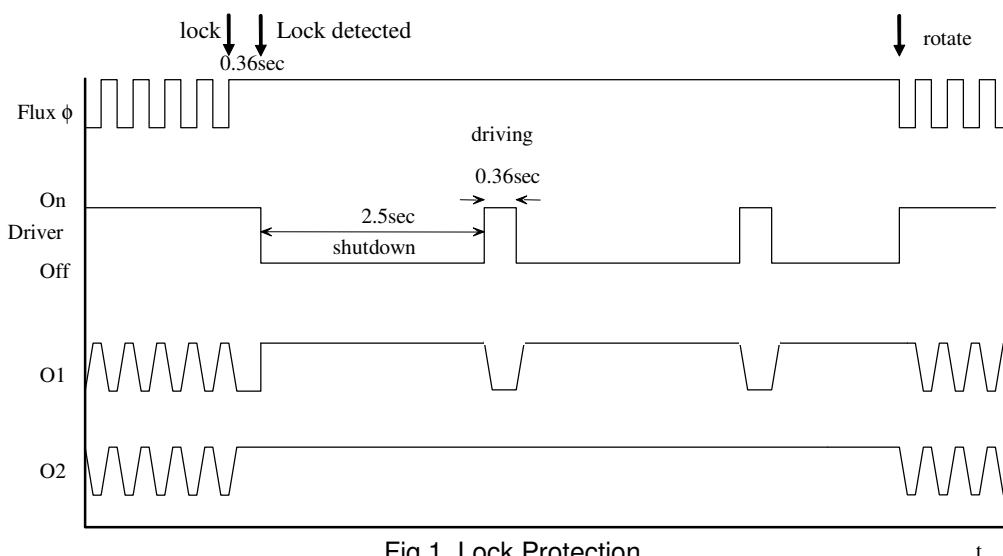


Fig 1. Lock Protection

Hall Sensor

This Hall effect sensor IC integrates the sensor, pre-amplifier with dynamic offset cancellation and the hysteresis comparator in single chip. The hysteresis characteristic is illustrated in Fig. 2 and the threshold of the magnetic flux density is ± 15 Gauss.

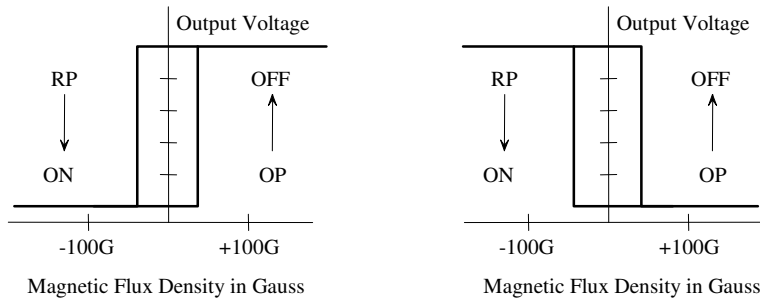


Fig 2. Magnetic Hysteresis Characteristics

The Hall IC architecture block diagram is shown in Fig. 3.

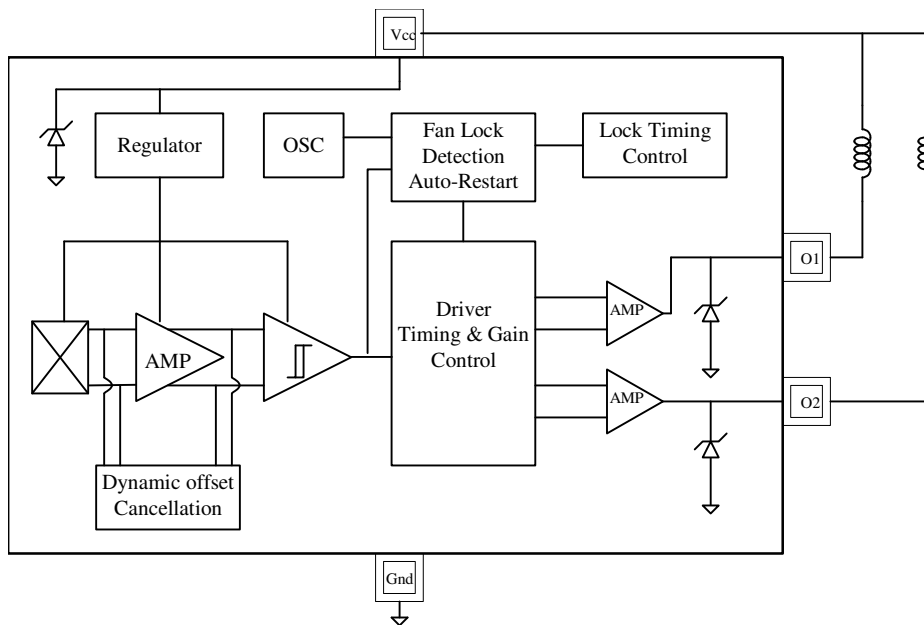
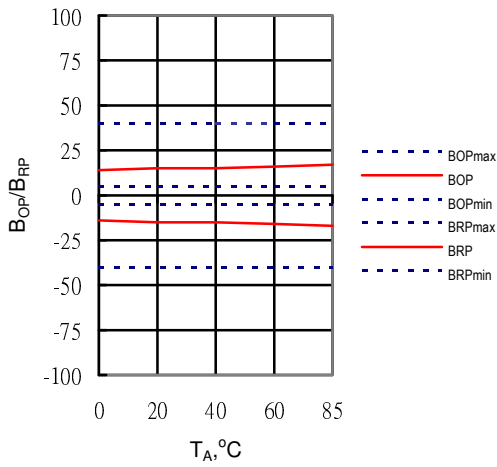
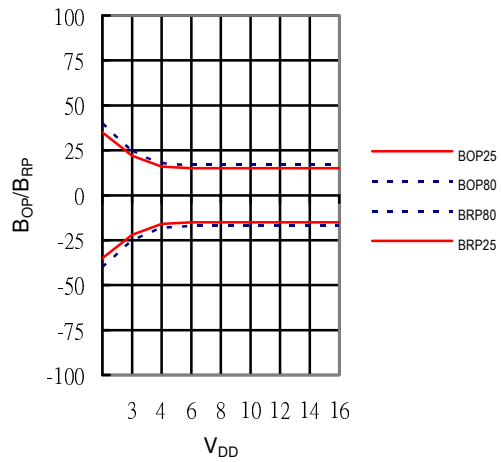
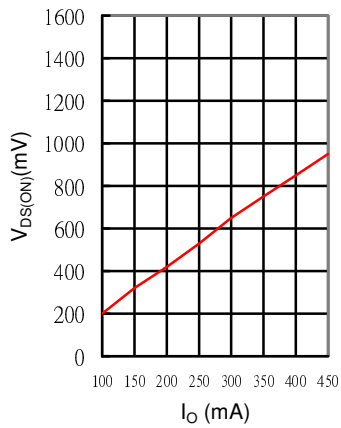
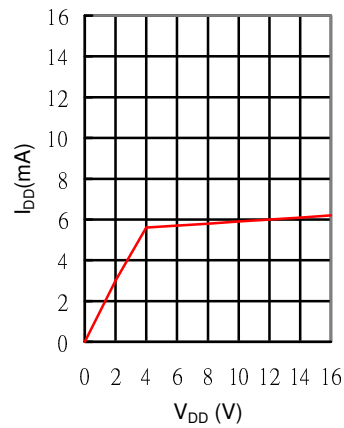
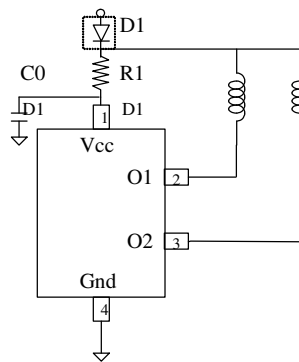


Fig. 3 Hall IC Architecture

B_{OP}, B_{RP} versus temperature

B_{OP}, B_{RP} versus supply voltage

V_{DS(ON)} versus I_O current

I_{DD} versus power supply


Application circuits



C0: decoupling capacitor 0.1uF~2.2uF (recommended)

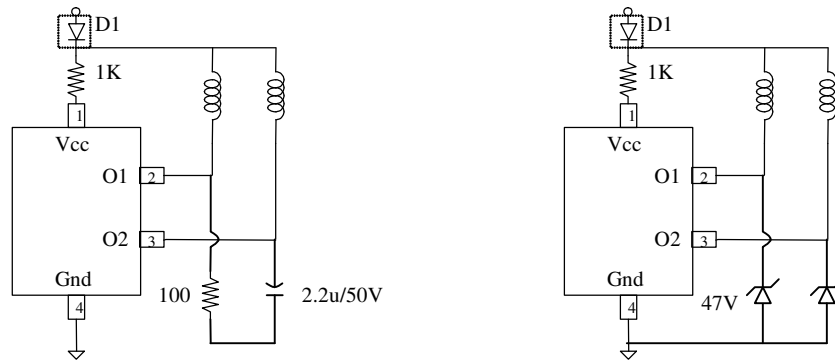
R1: 1K ohm, 1/2W (for 24V fan), 47 ohm (for 5V/12V fan)

Note1:

The 24V fan application needs to refer 24V application circuit.

Note2:

The voltage of pin2 and pin3 must be < 50V. If the voltage of pin2 and pin3 are > 50V because of the greater BEMF caused from coil, the external RC or zener diode is recommended as following circuit.



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