



PT3907

High output current Fan IC

Applications

- 5V/12V double coils DC brushless motor
- Revolution counting
- Speed Measurement
- DC 2.7V~18V Operation Voltage

Features

- Soft switching output driver
- Built-in hall sensor
- Motor locked protection and automatic restart
- Built-in power reverse protection
- Built-in hysteresis comparator
- Built-in protection zener diode
- High sensitivity and low thermal drift magnetic sensing
- High driving capability

Specifications

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Conditions	Rating	Units
Maximum supply voltage	VDDmax		18	V
Allowable power dissipation	Pd		658 ^{*1}	mW
Operating temperature	Ta		-40~+85	°C
Storage temperature	Ts		-50~+150	°C
Max. output current	I _{OMAX}	0.5sec	800 ^{*2}	mA
Thermal resistance	Θ _{aj}		190	°C/W
Maximum Junction temperature	T _{jmax}		150	°C

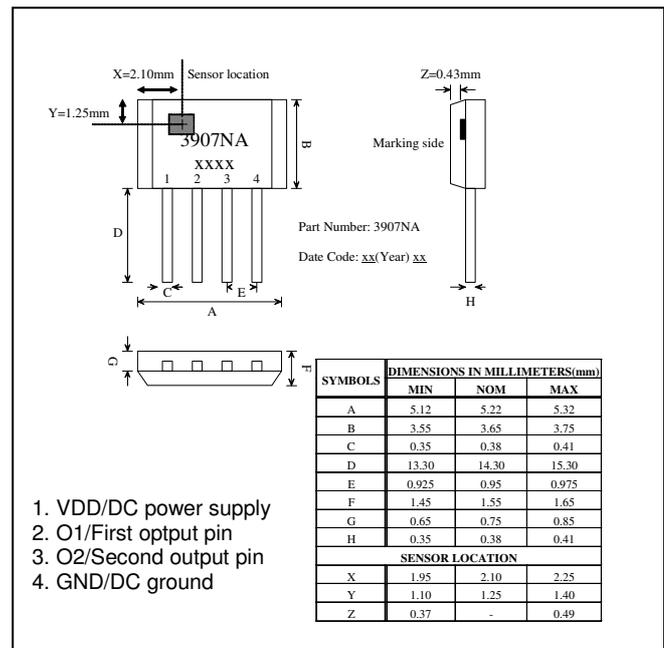
*1: Reduced by 5.2mW for each increase in Ta of 1°C over 25°C When mounted on 50mm x 50mm x 1.6mm glass epoxy board

*2: Should not exceed Pd

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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		18	V
Output Sink Voltage	V _{DS(ON)}	@ I _{OUT} =300mA	0.3	0.4	0.5	V
Output Voltage Clamp	V _{BV}			27		V
Supply Current	I _{DD}	Output open		5	10	mA
Shutdown Time	T _{SD}		2.1	2.45	2.8	S
Restart Time	T _{RS}		0.3	0.35	0.4	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

General Specifications

The PT3907 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 18V.

Lock Protection

In order to protect the motor, the driver IC will be shutdown to drive the coil when the motor is locked over 0.35 seconds. Then, it restarts to drive the motor after 2.45 seconds. Figure 1 shows the timing diagram between the hall input signal and driver's output state.

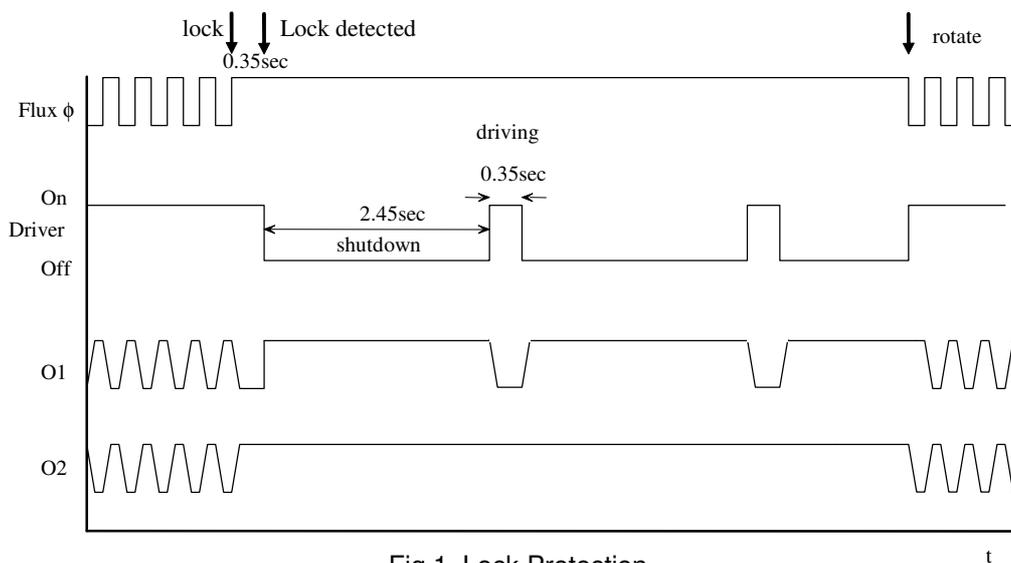


Fig 1. Lock Protection

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.

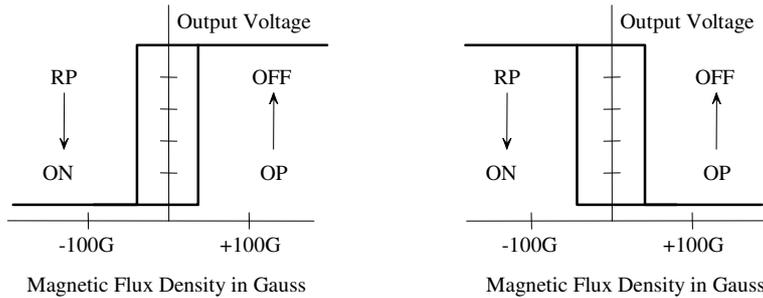


Fig 2. Magnetic Hysteresis Characteristics

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

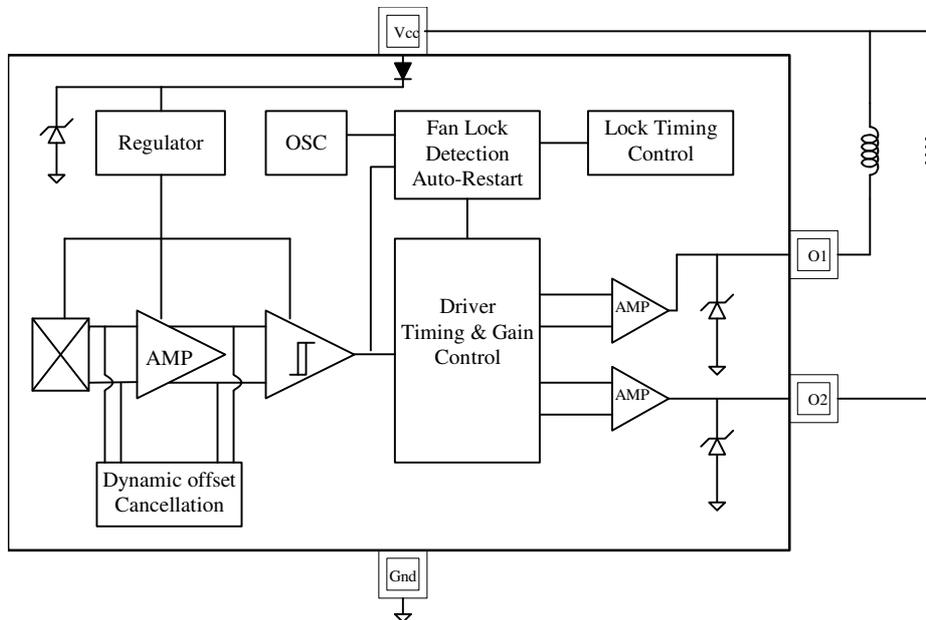
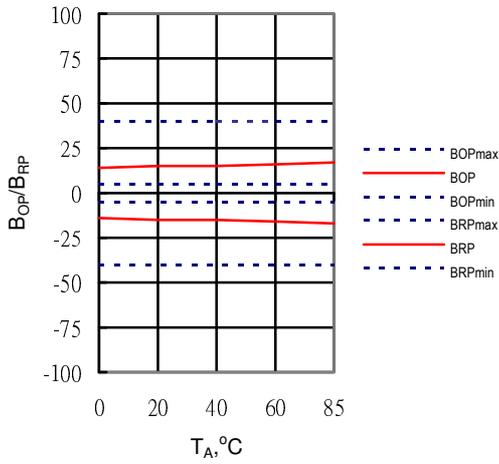
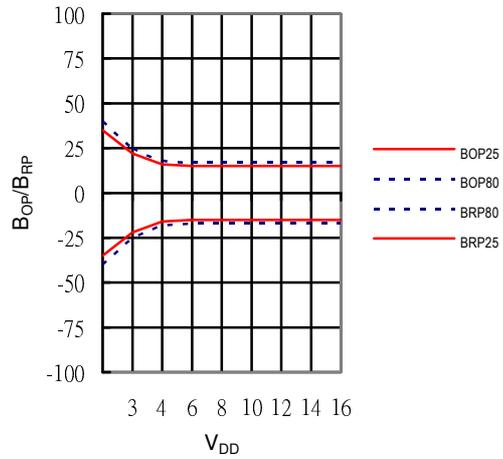
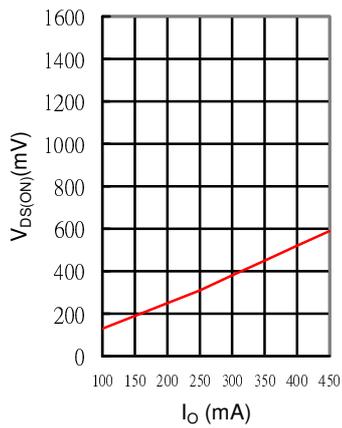
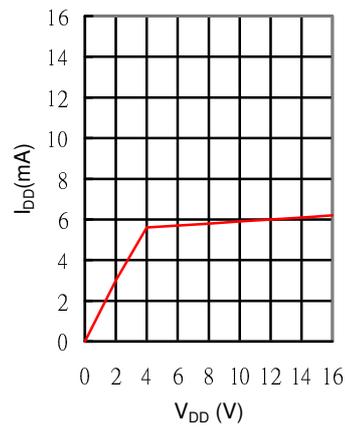
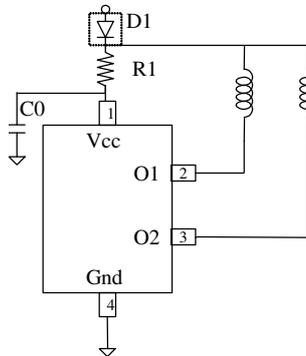


Fig. 3 PT3907NA Hall IC Architecture

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

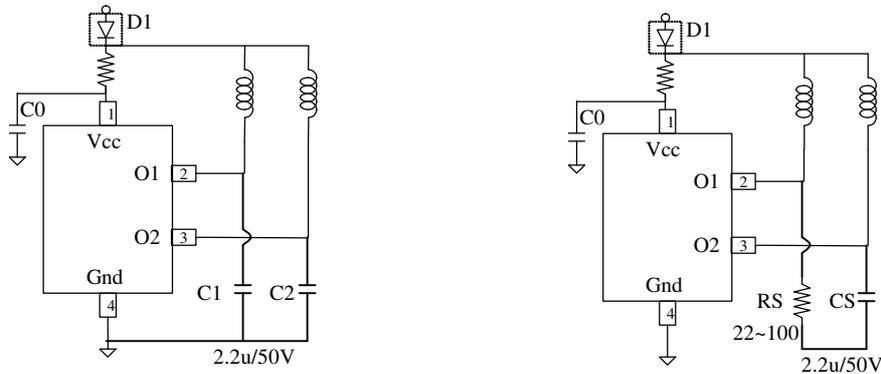


C0: decoupling capacitor 0.1uF~2.2uF (recommended)

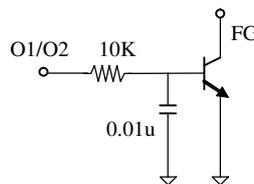
R1: 33~47 ohm, 1/2W (recommended)

Note:

The voltage of pin2 and pin3 must be < 30V. If the voltage of pin2 and pin3 are > 30V because of the greater BEMF caused from coil, the external capacitor or snubber circuit need to be added as following circuit.



FG output



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