PROLIFIC TECHNOLOGY INC.

PT3905T
Hall Driver IC with RD output

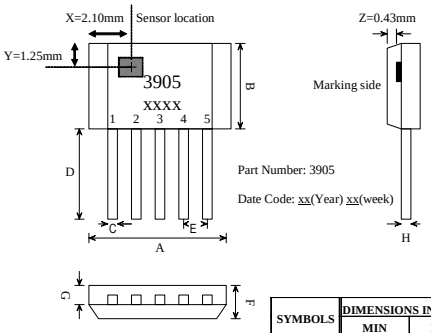
Applications

- 5V/12V double coils DC brushless motor
- Revolution counting
- Speed Measurement
- DC 3V~18V Operation Voltage

Features

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

Package: TO-92-5pin



1. VDD/DC power supply
2. O1/First output pin
3. O2/Second output pin
4. RD output
5. GND/DC ground

SYMBOLS	DIMENSIONS IN MILLIMETERS(mm)		
	MIN	NOM	MAX
A	5.12	5.22	5.32
B	3.55	3.65	3.75
C	0.35	0.38	0.41
D	14.00	14.30	14.60
E	0.925	0.95	0.975
F	1.45	1.55	1.65
G	0.75	0.80	0.85
H	0.35	0.38	0.41
SENSOR LOCATION			
X	1.95	2.10	2.25
Y	1.10	1.25	1.40
Z	0.37	0.43	0.49

Specifications

Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Conditions	Rating	Units
Maximum supply voltage	VDDmax		18	V
Allowable power dissipation	Pd		568*1	mW
Operating temperature	Ta		-30~+85	℃
Storage temperature	Ts		-50~+150	℃
Max. output current	I_{OMAX}	0.5sec	800*2	mA
Max. RD output current	I_{RDMAX}		20	mA
Thermal resistance	Raj		220	℃/W

*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

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

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Units
Supply Voltage	V_{DD}		3		18	V
Output Sink Voltage	$V_{DS(ON)}$	@ I_{OUT} =300mA	0.3	0.4	0.6	V
Output Voltage Clamp	V_{BV}			27		V
Supply Current	I_{DD}	Output open		5	10	mA
RD output voltage	V_{RD}				20	V
RD sink voltage	V_{DSRD}	I_{RD}=5mA		0.2	0.3	V
Shutdown Time	T_{SD}		1.75	2.1	2.8	S
Restart Time	T_{RS}		0.25	0.3	0.4	S
Magnetic Characteristics (T_A=+25°C, V_{DD}=12V)						
Operate Point	B_{OP}		-	15	35	G
Release Point	B_{RP}		-35	-15	-	G
Hysteresis	B_{HYS}		20	30	60	G

General Specifications

The PT3905T 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 3V 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 0.3 seconds. Then, it restarts to drive the motor after 2.1 seconds. Figure 1 shows the timing diagram between the hall input signal and driver's output state.

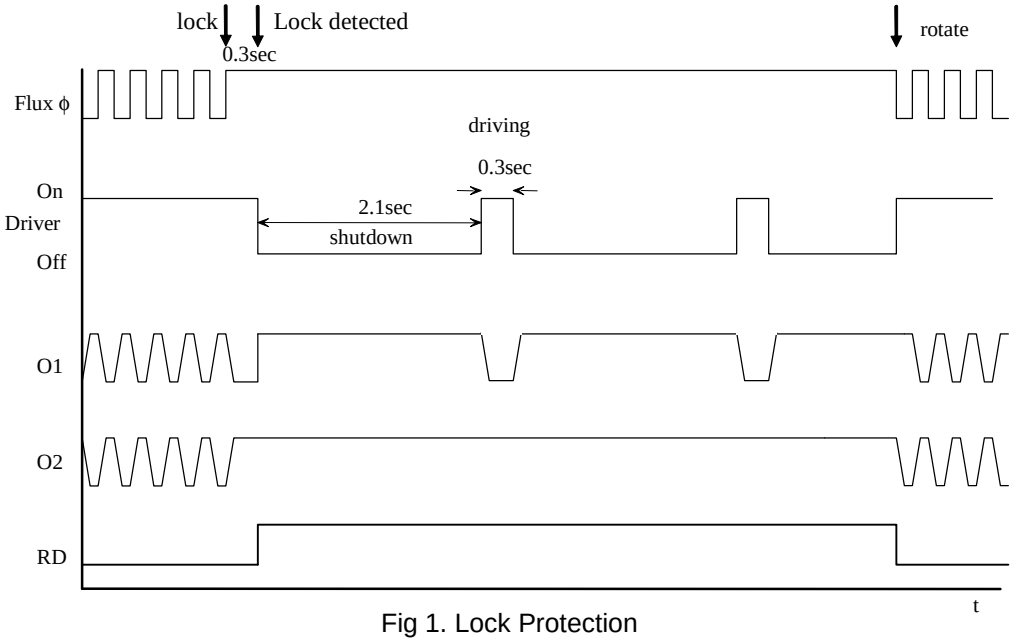


Fig 1. Lock Protection

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 +-30 Gauss.

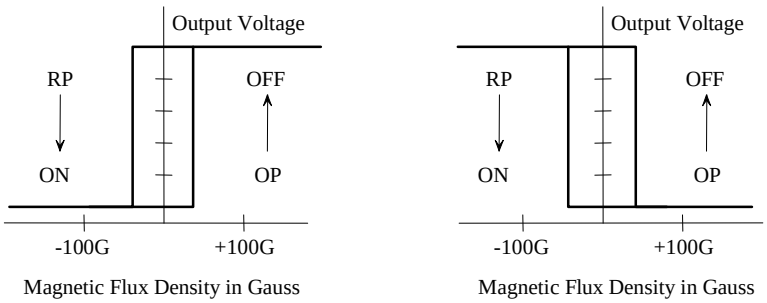


Fig 2. Magnetic Hysteresis Characteristics

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

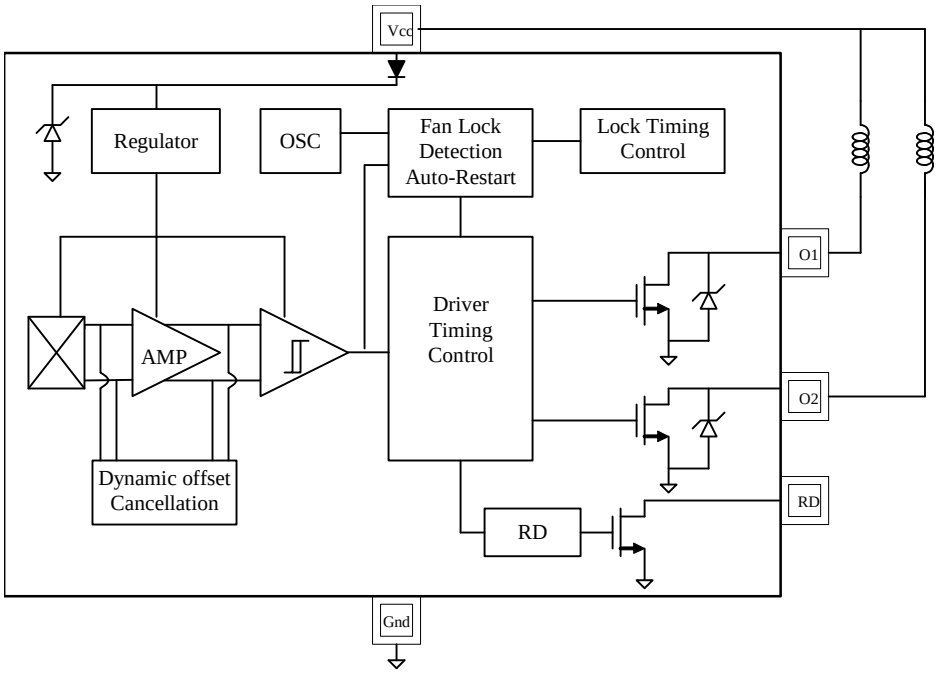
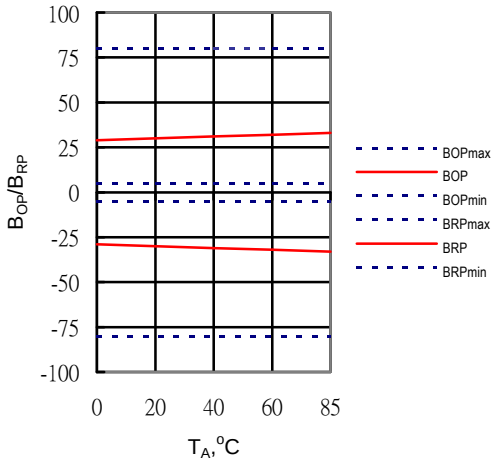
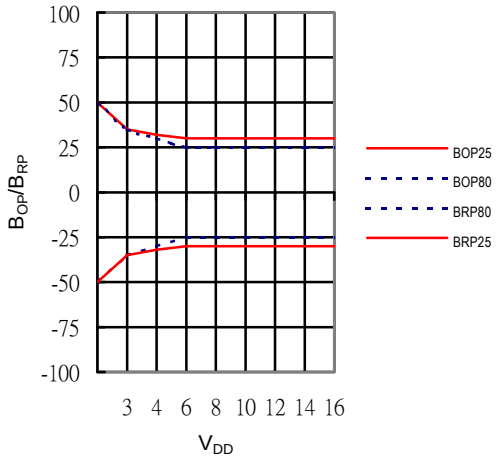


Fig. 3 PT3905T Hall IC Architecture

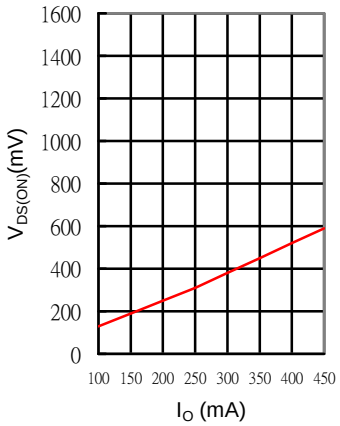
B_{OP}, B_{RP} versus temperature



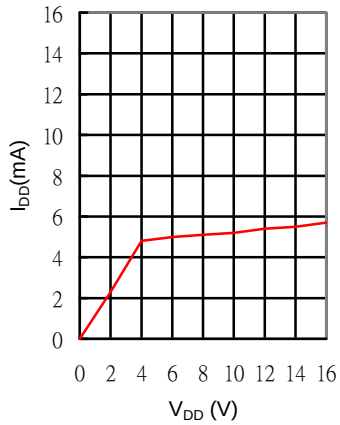
B_{OP}, B_{RP} versus supply voltage



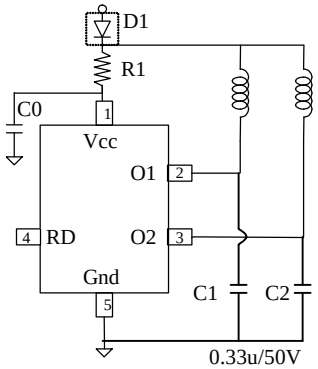
VDS(ON) versus I_O curremt



IDD versus power supply



Application circuits



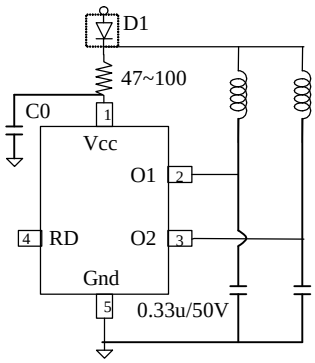
C0: decoupling capacitor 0.1uF~2.2uF (recommended)

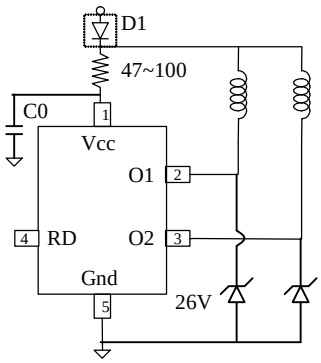
C1, C2: Filter capacitor 0.33uF (recommended)

R1: 47~100 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 zener diode need to be added as following circuit.





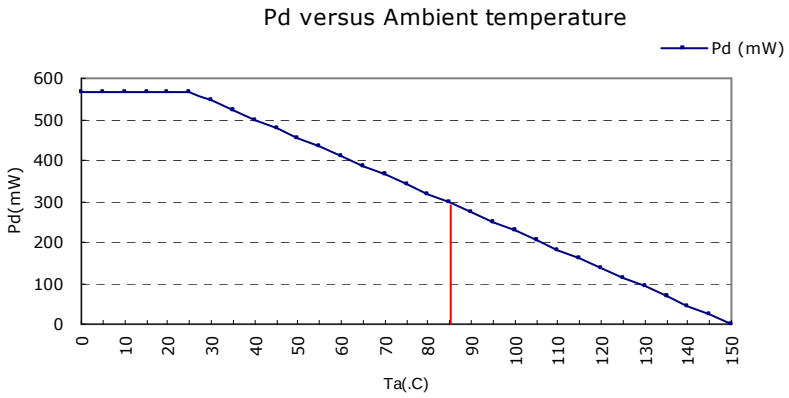


Fig 4. Pd vs ambient temperature

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