



# PT3921 Single coil Hall Driver IC

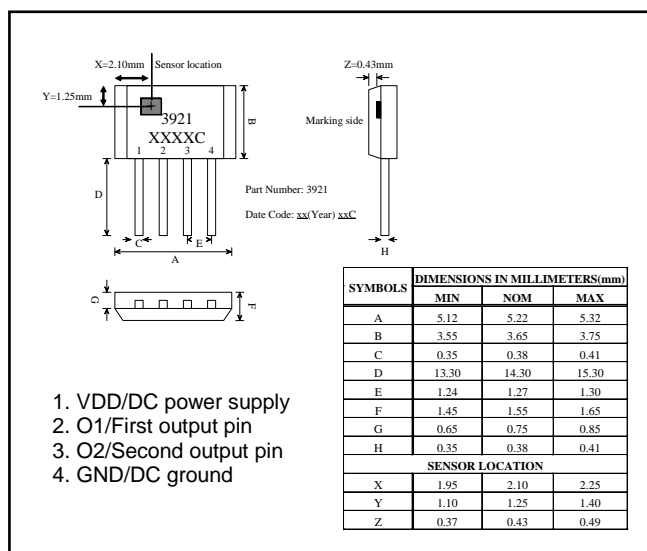
## Applications

- Single coil DC brushless motor
- Support pre-driver application

## Features

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

## Package: TO-92-4pin



## Specifications

### Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Conditions	Rating	Units
Maximum supply voltage	VDDmax		17	V
Allowable power dissipation	Pd		568 <sup>*1</sup>	mW
Operating temperature	Ta		-40~+100	°C
Storage temperature	Ts		-50~+150	°C
Max. output current	Iomax	0.5sec	800 <sup>*2</sup>	mA
Junction Temperature	Tj		150	°C
Thermal resistance	Raj		220	°C/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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**PROLIFIC TECHNOLOGY INC.**

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**Electrical Characteristics (T<sub>A</sub>=+25°C, V<sub>DD</sub>=12V)**

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Units
Supply Voltage	V <sub>DD</sub>		2.4		16	V
Output High Voltage	V <sub>OH(ON)</sub>	@ I <sub>OUT</sub> =300mA	V <sub>DD</sub> -0.6	V <sub>DD</sub> -0.4		V
Output Low Voltage	V <sub>OL(ON)</sub>	@ I <sub>OUT</sub> =300mA		0.3	0.4	V
Output Voltage Clamp	V <sub>BV</sub>		18			V
Supply Current	I <sub>DD</sub>	Output open		6	10	mA
Shutdown Time	T <sub>SD</sub>		2.1	2.8	3.5	S
Restart Time	T <sub>RS</sub>		0.3	0.4	0.5	S

**Magnetic Characteristics (T<sub>A</sub>=+25°C, V<sub>DD</sub>=12V)**

Operate Point	B <sub>OP</sub>		-	15	35	G
Release Point	B <sub>RP</sub>		-35	-15	-	G
Hysteresis	B <sub>HYS</sub>		20	30	60	G

**General Specifications**

The PT3921 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 2.4V to 16V 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 0.4 seconds. Then, it restarts to drive the motor after 2.8 seconds. Figure 1 shows the timing diagram between the hall input signal and driver's output state.

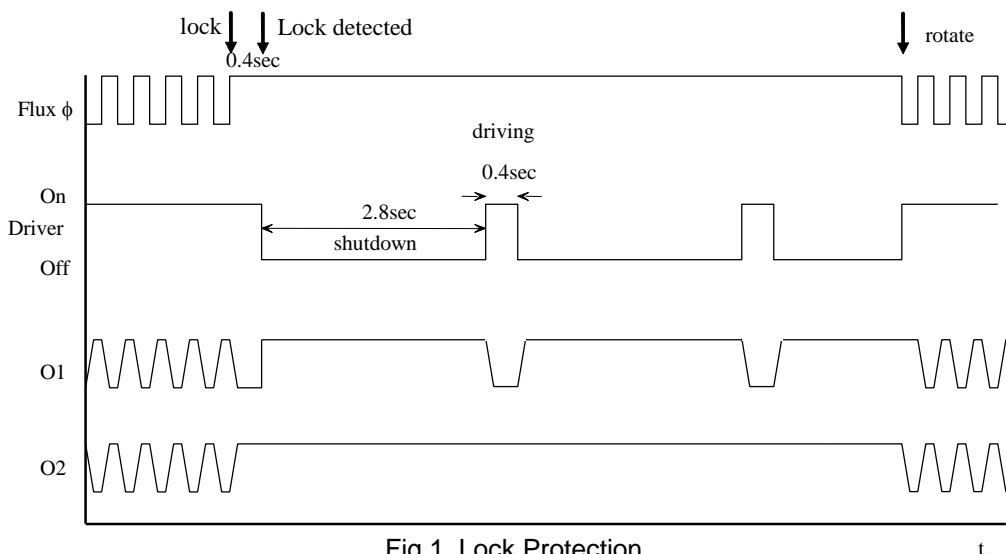


Fig 1. Lock Protection

### 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  $\pm 15$  Gauss.

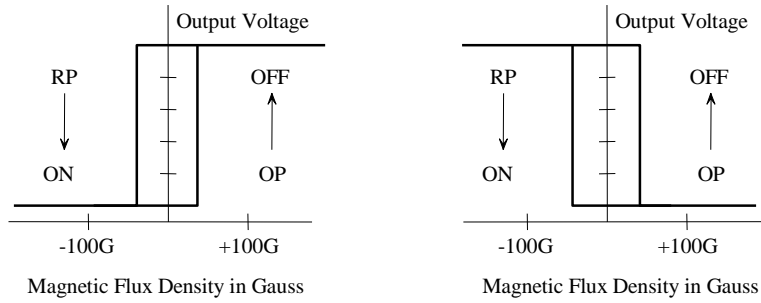


Fig 2. Magnetic Hysteresis Characteristics

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

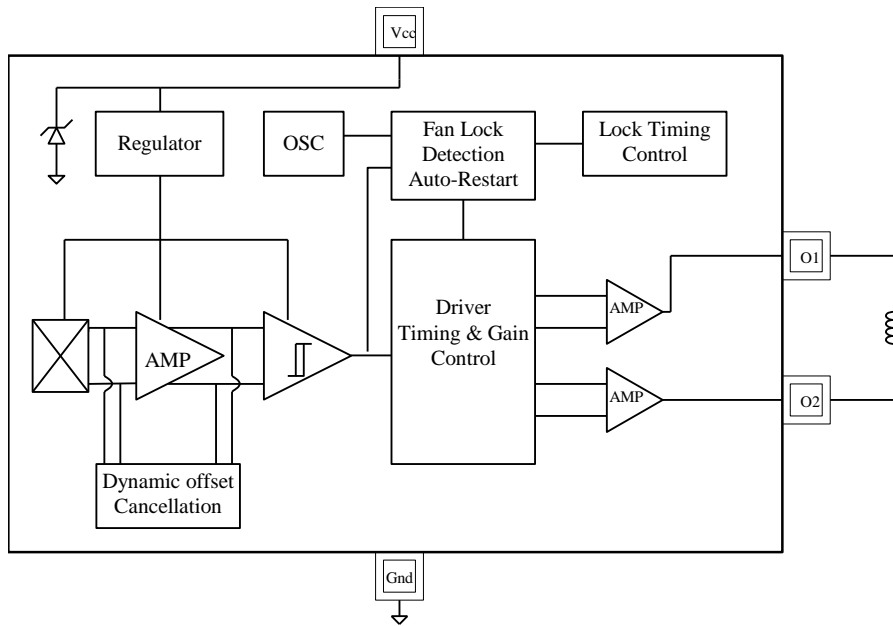
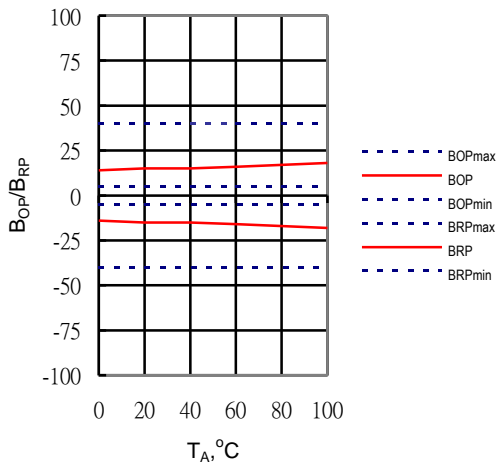
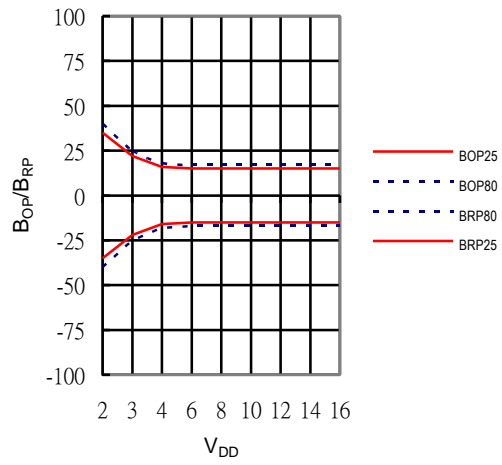
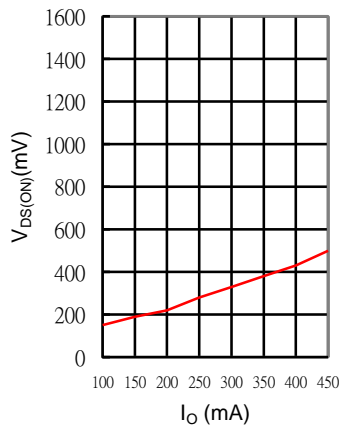
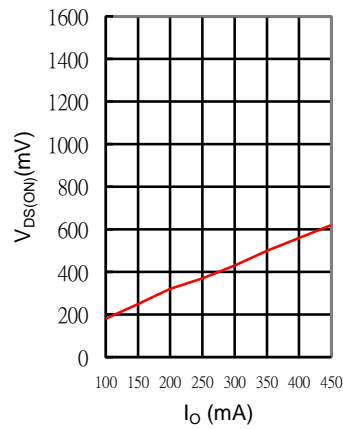
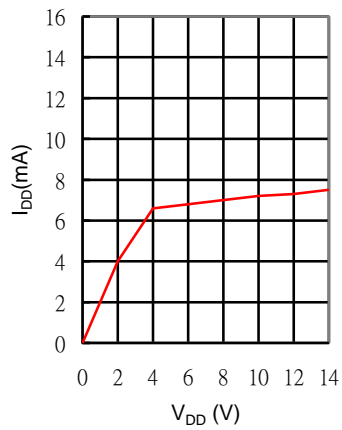
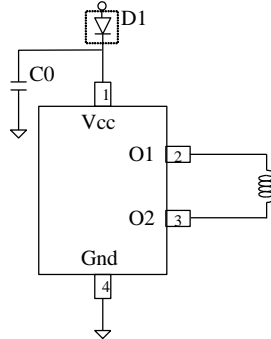


Fig. 3 Hall IC Architecture

**B<sub>OP</sub>, B<sub>RP</sub> versus temperature**

**B<sub>OP</sub>, B<sub>RP</sub> versus supply voltage**

**VOL(ON) versus I<sub>O</sub> current**

**VOH(ON) versus I<sub>O</sub> current**

**IDD versus power supply**


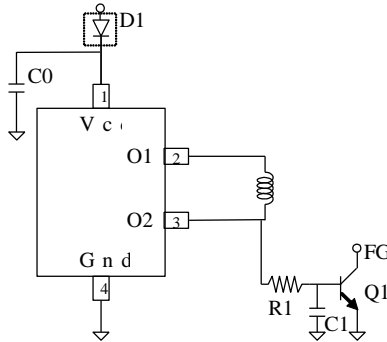
**Application circuits**

**5V/12V application**



C0: decoupling capacitor 1nF or 0.01uF

**FG output circuit**



R1: Bias resistor 10K for Q1

C1: Filter capacitor 0.01uF

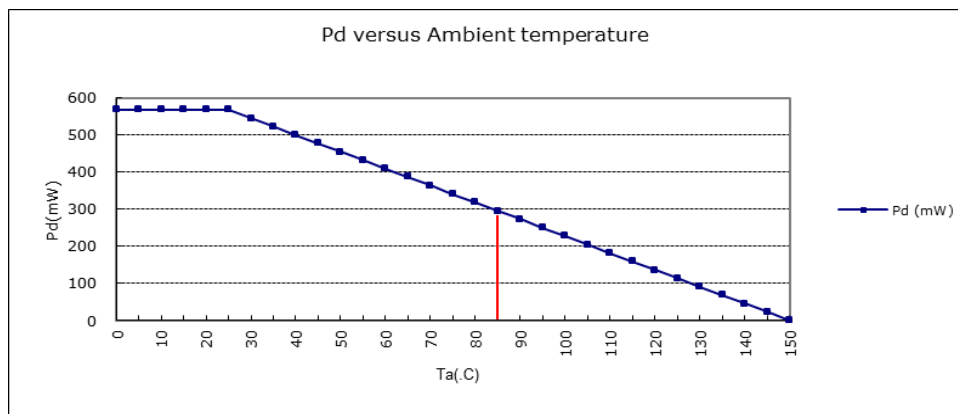
**Order information**

Part Number	Temperature Range	Package Type	Package Qty	MOQ
PT3921E2OBG7P1	-40°C~+100°C	TO-92-4L	1000 pcs/Bag	20K EA/BOX

**Thermal resistance**

Parameter	Symbol	Conditions	Rating	Units
Allowable power dissipation	$P_d$		568 <sup>1</sup>	mW
Junction to ambient thermal resistance	$\theta_{JA}$		190	°C/W
Junction to case thermal resistance	$\theta_{JC}$		60	°C/W
Maximum junction temperature	$T_J$		150	°C

\*1: Reduced by 6.67mW for each increase in  $T_a$  of 1°C over 25°C When mounted on 50mm x 50mm x 1.6mm glass epoxy board



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