PROLIFIC TECHNOLOGY INC.

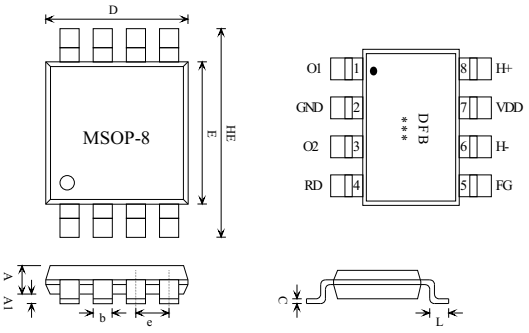
# PT-30DFB
## H - Bridge Driver

## Applications
- Single coils DC brushless motor.
- DC 2.0V~18V.

## Features
- Single-phase full-wave driver
- Motor lock protection and automatic restart
- Connectable direct to Hall element
- Built-in hysteresis comparator
- Frequency Generation output
- Rotate Detection (Alarm) output
- Low power consumption and high driving efficiency

## Input devices
- Hall IC or Hall Element

## Package: MSOP8




Unit: mm

| SYMBOLS | DIMENSIONS IN MILLIMETERS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A1 | 0.00 | - | 0.20 |
| A | 0.76 | 0.86 | 0.97 |
| b | 0.15 | 0.20 | 0.30 |
| C | 0.13 | 0.15 | 0.23 |
| D | 2.90 | 3.0 | 3.10 |
| E | 2.90 | 3.0 | 3.10 |
| HE | 4.80 | 4.90 | 5.10 |
| e | - | 0.65 | - |
| L | 0.40 | 0.53 | 0.66 |

**Pin Description**

| Name | Pin | Description | Type |
|---|---|---|---|
| O1 | 1 | First output pin | O |
| GND | 2 | DC ground | P |
| O2 | 3 | Second output pin | O |
| RD | 4 | Rotation Detector(Alarm) | O |
| FG | 5 | Frequency Generation | O |
| H- | 6 | Hall element input(-) | I |
| VDD | 7 | DC power supply | P |
| H+ | 8 | Hall element input(+) | I |

## Specifications

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

| Parameter | Symbol | Conditions | Ratings | Units |
|---|---|---|---|---|
| Maximum supply voltage | $V_{DD}^{max}$ | | 18 | V |
| Allowable power dissipation | Pd | | 450* | mW |
| Operating temperature | Ta | | -30 ~ +100 | °C |
| Storage temperature | Ts | | -55 ~ +150 | °C |
| Output current | $I_{Out}$ | Continoue | 400 | mA |
| | | Peak | 600 | mA |

* On 50mm x 50mm x 1.6mm glass epoxy board




PROLIFIC TECHNOLOGY INC.
7F, No.48, Sec.3, Nan Kang Rd., Nan Kang, Taipei, 115, Taiwan




Date:Jan. 2002

**Electrical Characteristics**

| Characteristic | Symbol | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | | 2 | | 18 | V |
| Output low-level Voltage | $V_{OL}$ | $I_O$=200mA | | 0.4 | 0.5 | V |
| Output High-level Voltage | $V_{OH}$ | $I_O$=200mA | $V_{CC}$-0.5 | $V_{CC}$-0.4 | | V |
| Output Breakdown Voltage | $V_{BV}$ | | 18 | 22 | 30 | V |
| Input offset voltage | $V_{OS}$ | | -6 | 0 | 6 | mV |
| Supply Current | $I_{DD}$ | Output open | | 3 | 10 | mA |
| FG/RD flow-in Current | $I_{FG}$/$I_{RD}$ | Pull-high resistor is 470ohm@12V | | 25 | | mA |
| FG/RD Supply Voltage | | | | | 30 | V |
| FG Frequency | | Same with Hall input signal | | | | |

**Truth Table**

| H+ | H- | State | O1 | O2 | FG | RD |
|---|---|---|---|---|---|---|
| H | L | Rotate | H | L | H | L |
| L | H | Rotate | L | H | L | L |
| H | L | Lock | L | L | H | H |
| L | H | Lock | L | L | H | H |

## 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.

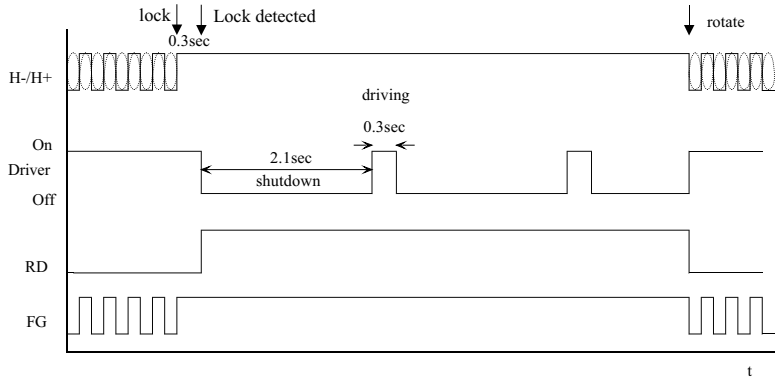



Fig 1. Lock Protection

## Rotation Frequency and Detector

This driver IC outputs the FG and RD signal for some special application. For FG application, the driver IC will generate square wave to indicate the motor rotation frequency. For RD application, the driver IC will output a high signal to indicate the stop of the motor and a low signal to indicate the normal operation of the motor. (See Fig. 1)

## Pre-Amplifier

This driver IC integrates signal amplifier and the hysteresis comparator in this chip. The hysteresis comparator uses the hysteresis characteristic to eliminate noisy oscillations at output of the comparator.

The driver IC architecture block diagram is shown in Fig. 2.

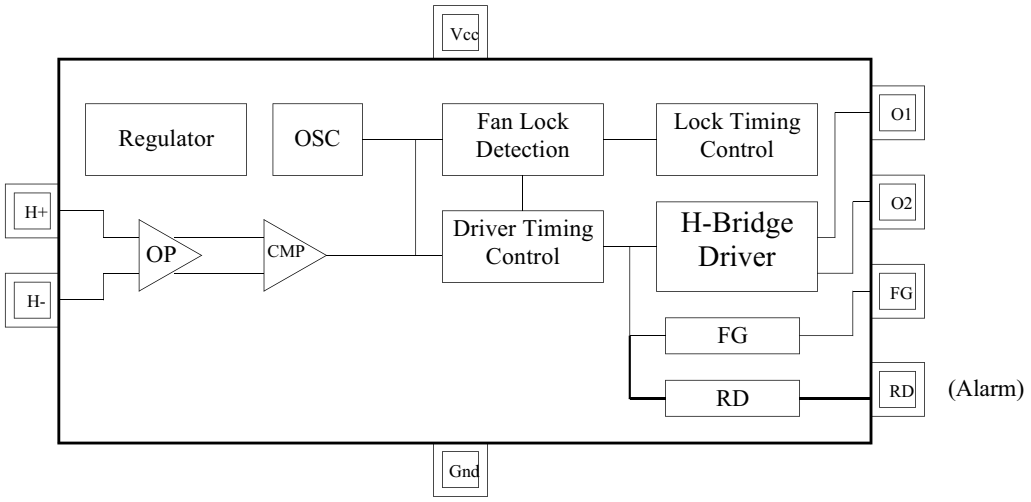
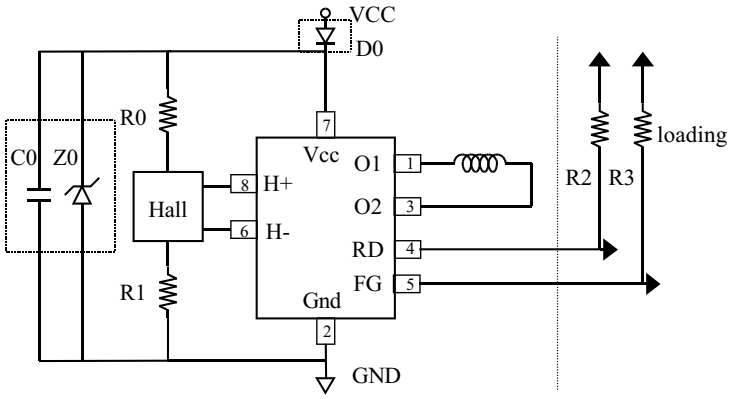



Fig. 2. Driver IC Architecture

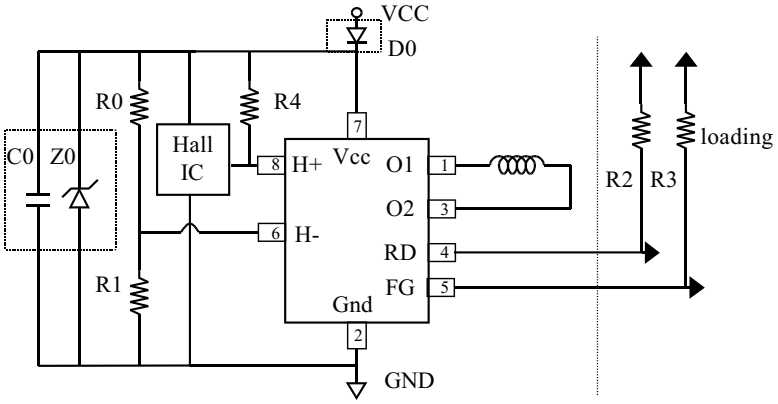
## Application circuits/ Single coil

### ✶Hall element input



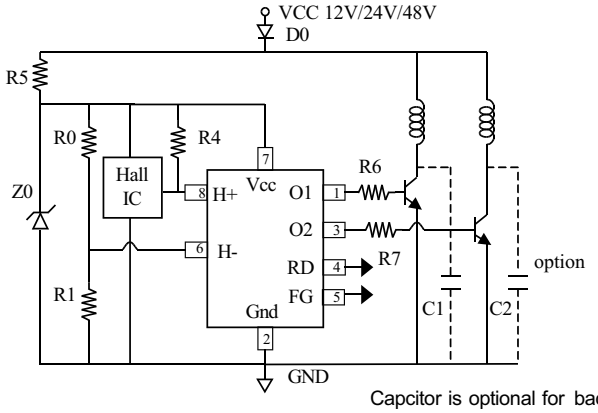

R0, R1: depend on hall device Spec. R0=R1 is recommended
R2, R3: open drain loading
Z0: optional zener diode, depend on VCC, if VCC= 12V, Vz=12V~18V.
C0: optional decoupling capacitor 0.1uF

### ✶Hall IC input




R0, R1, R4: 10K
R2, R3: open drain loading
Z0: optional zener diode, depend on VCC, if VCC= 12V, Vz=12V~18V.
C0: optional decoupling capacitor 0.1uF

## *12V(high driving capability)/24V/48V Application circuits*




R0, R1, R4: 10K
R2, R3: open drain loading
R5: 560,1/2W(for24V); 1.8K,1W(for48V); none( for 12V)
Z0: Zener diode, Vz=12V~18V.

### Note:

D0: general diode 1/2W, (optional)
Z0: Vz=12V zener diode 1/2W
R5: 560,1/2W(for 24V) ; 1.8K,1W(for 48V); none(for 12V)
R0,R1,R4 : 10K
R6,R7 : 2K, 1/8W(for 0.4A output); 1K, 1/8W(for 0.8A output), 560, 1/4W(for 1.5A output)
Q1, Q2: depend on driving capability requirement
Ex. 2222A(40V, 0.6A, 0.3W ), 2SD1782/SSTA06(80V, 0.5A, 0.3W), 2SD1768S(80V, 1A, 0.5W), 2SC4132(120V, 2A 0.5W), 2SD1760(50V, 3A 1W) ..
C1,C2 : 2.2uF, 50V(optional), or suitable Vz Zener diode