


UNISONIC TECHNOLOGIES CO.,

F6908

LINEAR INTEGRATED CIRCUIT

SINGLE-PHASE FULL-WAVE MOTOR DRIVER FOR FAN MOTOR

DESCRIPTION

UTC **F6908** is a single-phase full-wave motor driver for fan motor suitable for 5V and 12V operations.

FEATURES

- * Soft switching drive for low noise
- * Lock detection and automatic restart function
- * Thermal shut-down protection



SOP-8

*Pb-free plating product number: F6908L

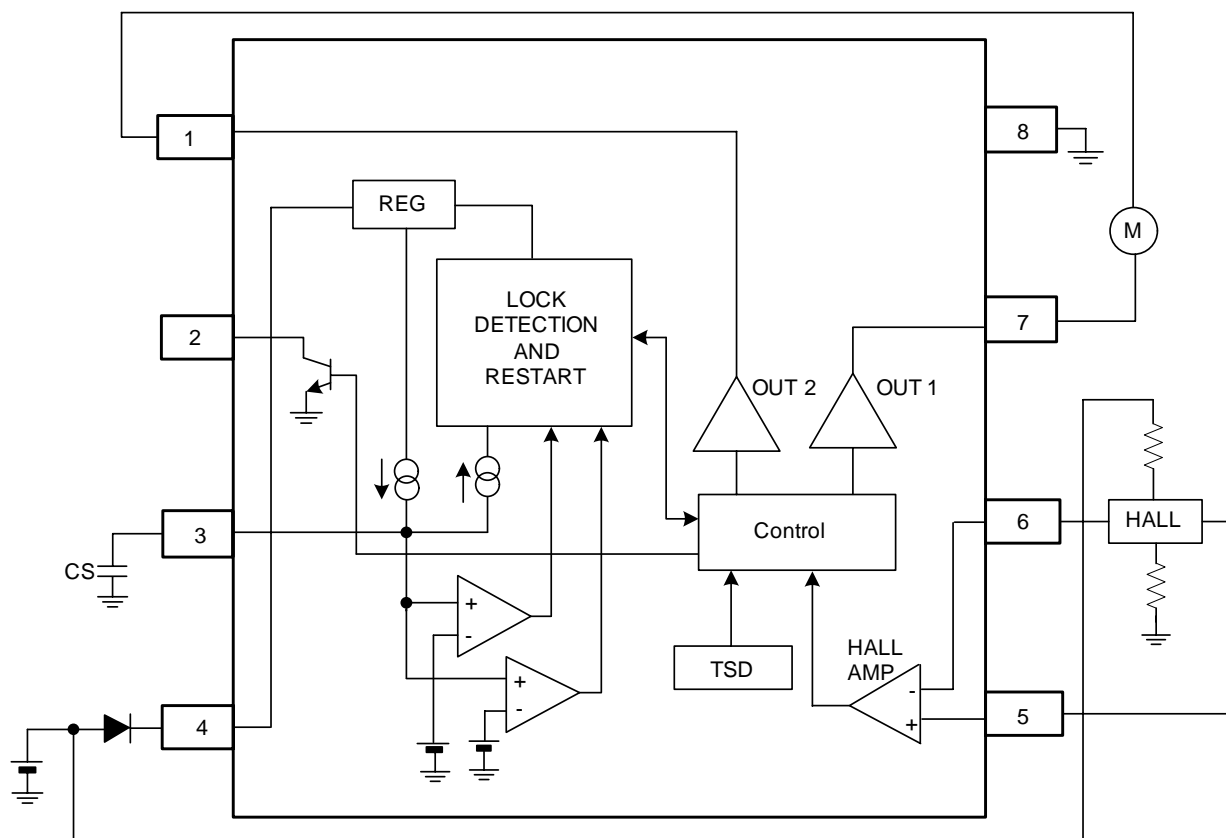
PIN DESCRIPTION

| PIN NO. | PIN NAME | FUNCTION |
|---------|-----------------|---|
| 1 | OUT2 | Output 2 |
| 2 | HO | Hall signal output pin |
| 3 | LD | Capacitor terminal for Lock detection, Auto restart |
| 4 | V _{CC} | Power supply pin |
| 5 | H+ | Hall signal input pin + |
| 6 | H- | Hall signal input pin - |
| 7 | OUT1 | Output 1 |
| 8 | GND | GROUND |

ORDERING INFORMATION

| Order Number | | Package | Packing |
|--------------|-------------------|---------|-----------|
| Normal | Lead Free Plating | | |
| F6908-S08-R | F6908L-S08-R | SOP-8 | Tape Reel |
| F6908-S08-T | F6908L-S08-T | SOP-8 | Tube |

■ BLOCK DIAGRAM



■ HALL SIGNAL INPUT-OUTPUT TRUTH TABLE

| H+ | H- | OUT1 | OUT2 | HO |
|----|----|------|------|----|
| H | L | H | L | H |
| L | H | L | H | L |

Condition: LD=0V

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------------------|------------------|------------|------|
| Supply Voltage | V _{CC} | 15 | V |
| Output Voltage | V _{OUT} | 15 | V |
| Hall Signal Output Voltage | V _{HO} | 15 | V |
| Output Current | I _{OUT} | 0.7* | A |
| Hall Signal Output Current | I _{HO} | 15 | mA |
| Power Dissipation | P _D | 680 ** | mW |
| Operating Temperature | T _{OPR} | -40 ~ +100 | °C |
| Junction Temperature | T _J | +125 | °C |
| Storage Temperature | T _{STG} | -40 ~ +150 | °C |

* This value is not to be over P_D and ASO.

** To use at temperature above Ta = 25°C reduce 5.5 mW/°C. (On 70.0mm×70.0mm×1.6mm glass epoxy board)

The device is guaranteed to meet performance specification within 0°C ~ 70°C operating temperature range and assured by design from -40°C ~ 100°C, characteristic and correlation with static process control.

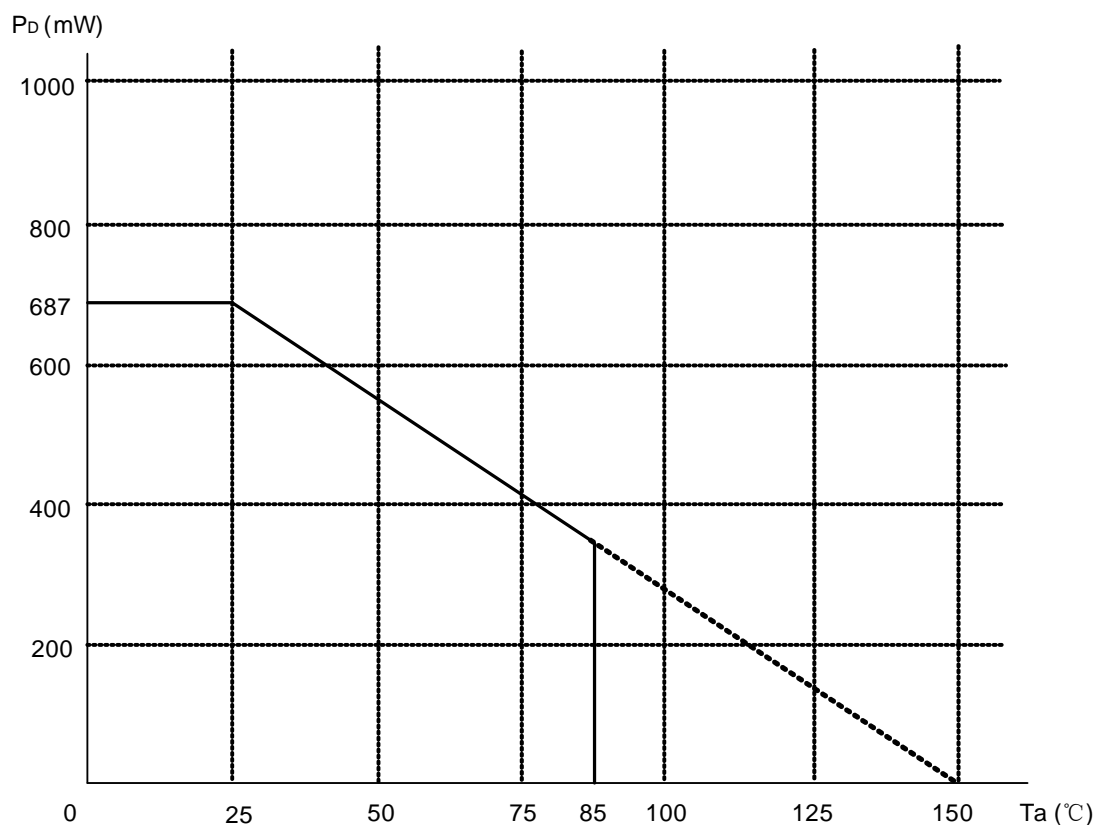
■ RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------|-----------------|---------|------|
| Supply Voltage | V _{CC} | 3 ~ 14 | V |

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified Ta = 25°C, V_{CC} = 5V)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------------|---|------|------|------|------|
| Clamp Voltage of Capacitor for Lock Detection | V _{LDCL} | | 1.14 | 1.80 | 2.47 | V |
| Reference Voltage of Capacitor for Lock Detection | V _{LDCLP} | | 0.47 | 0.76 | 1.06 | V |
| Output Voltage L | V _{OL} | I _{OUT} =200mA | | 0.2 | 0.3 | V |
| Output Voltage H | V _{OH} | I _{OUT} =200mA | 3.9 | 4.1 | | V |
| "HO" Terminal Voltage L | V _{HOL} | I _{HO} =5mA | | 0.3 | 0.5 | V |
| Supply Current | I _{CC} | At output: OFF | 1.5 | 3.4 | 8.7 | mA |
| Charge Current of Capacitor for Lock Detection | I _{LDC} | V _{LD} =1.1V | 1.50 | 2.75 | 4.50 | μA |
| Discharge Current of Capacitor for Lock Detection | I _{LDD} | V _{LD} =1.1V | 0.24 | 0.48 | 0.90 | μA |
| "HO" Terminal Leak Current | I _{HOL} | V _{HO} =15V | | 0 | 50 | μA |
| Charge-Discharge Current Ratio of Capacitor for Lock Detection | R _{CD} | r _{CD} =I _{LDC} /I _{LDD} | 4.2 | 5.7 | 9.5 | |
| Hall Input Offset Voltage | H _{OFFS} | | -10 | | 10 | mV |
| Hall Input-Output Gain | G _{HO} | | 320 | 500 | 680 | |
| Thermal Shutdown | | | | 140 | | °C |
| TSD Hysteresis | TSD | | | 25 | | °C |

■ POWER DERATING CURVE



To use at temperature above Ta=25°C reduce 5.5mW/°C
(On 70.0mm×70.0mm×1.6mm glass epoxy board)

■ LOCK DETECT CIRCUIT, AUTOMATIC RESTART CIRCUIT

Charge and discharge time at motor lock condition varies with the value of external capacitor at LD terminal, and is given by the following equation.

$$T_{ON} \text{ (Charge time)} = \frac{C \times (V_{LDCL} - V_{LDCP})}{I_{LDC}}$$

$$T_{OFF} \text{ (Discharge time)} = \frac{C \times (V_{LDCL} - V_{LDCP})}{I_{LDD}}$$

C: Capacitor at LD pin

The following value shows charge time and discharge time at C=0.47μF for reference.

Charge time = 0.18S (Output: ON)

Discharge time = 1.02S (Output: OFF)

■ SHOWS TIMING CHART OF LD PIN

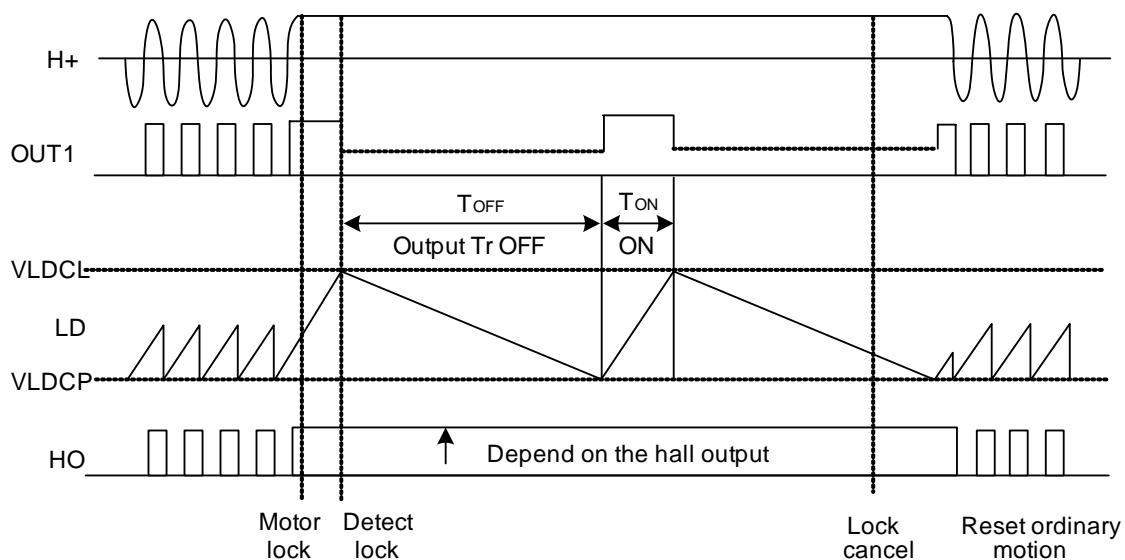


Fig.1 Timing chart (LD terminal, HO terminal)

■ CAUTIONS

(1) Power dissipation

IC power dissipation varies widely with supply voltage, output current and application of IC. Please pay attention not to exceed the allowable power rating.

(2) Hall signal input terminals (H+, H-)

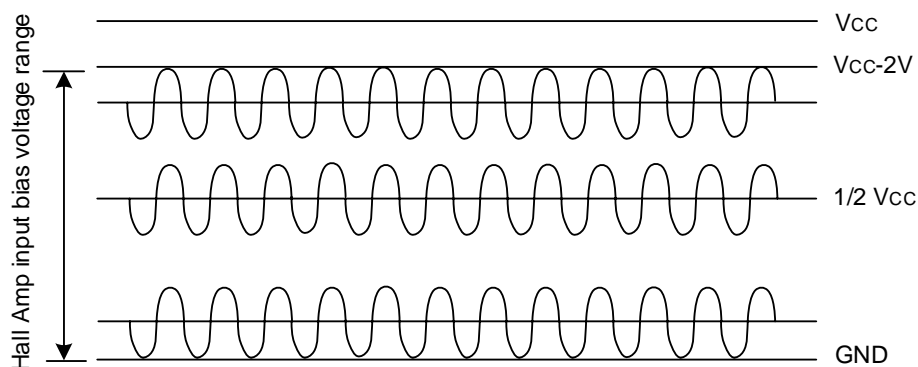


Fig.2 Hall amp input bias voltage range

A. Hall signal amplitude should be key within range $0V \sim V_{CC}-2V$.

B. The output signal of this IC is the amplified by about 500 times of hall input signal coith pattern shown below for different leuel ok signal input.

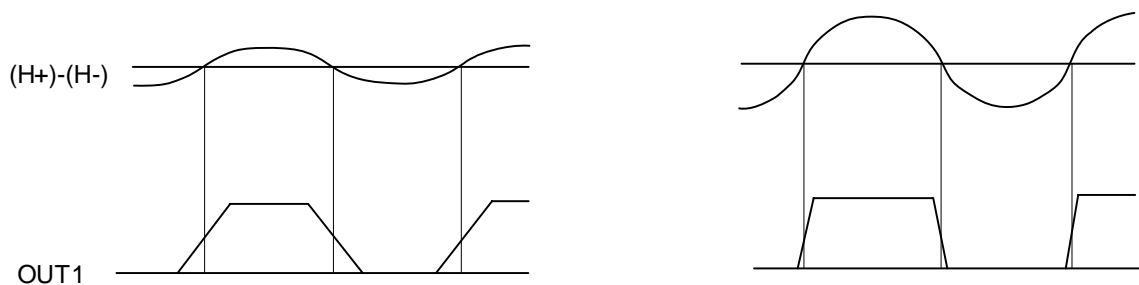


Fig.3 Difference of output signal depending on hall input signal

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