

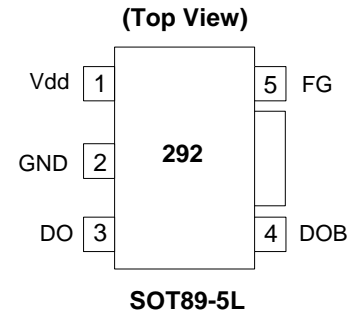
### Description

AH292 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-collector transistors for motor's coil driving, automatic lock current shutdown, and recovery protections. In addition a Frequency generator (FG) output is also available for speed detection.

Rotor-lock shutdown detection circuit turns off the output driver when the rotor is blocked to avoid coil overheat. Then, the automatic recovery circuit will restart the motor. These protected actions are repeated and periodic during the blocked period. Until the blocking is removed, the motor recovers and runs normally.

The AH292 is available in SOT89-5L package.

### Pin Assignments



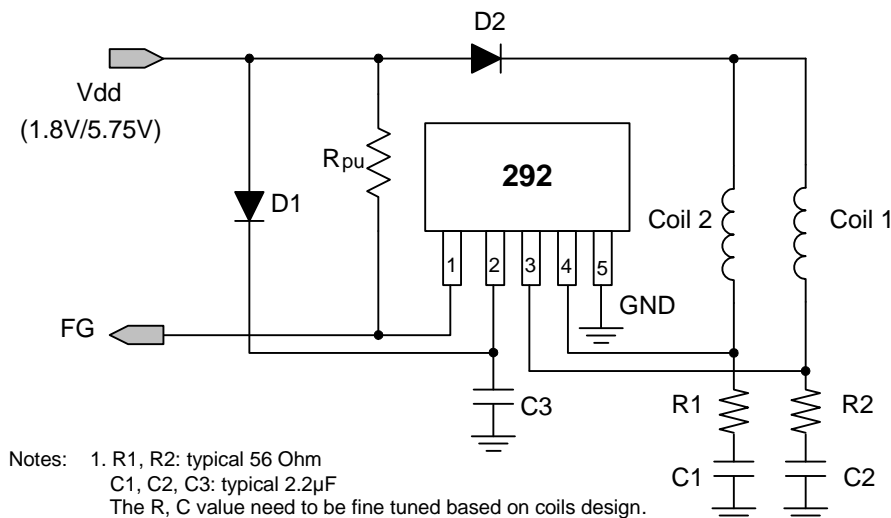
### Features

- On Chip Hall Sensor
- Rotor-Locked Shutdown
- Automatically Restart
- Frequency Generator (FG) Output
- Built-in Zener Protection for Output Driver
- Operating Voltage: 1.8V to 5.75V
- Output Current:  $I_{O(AVE)} = 400\text{mA}$
- Packaged in SOT89-5L
- Green Molding Compound

### Applications

- Two-coil BLDC cooling fans
- Low to medium voltage, low power BLDC motors

### Typical Application Circuit (Note 1)

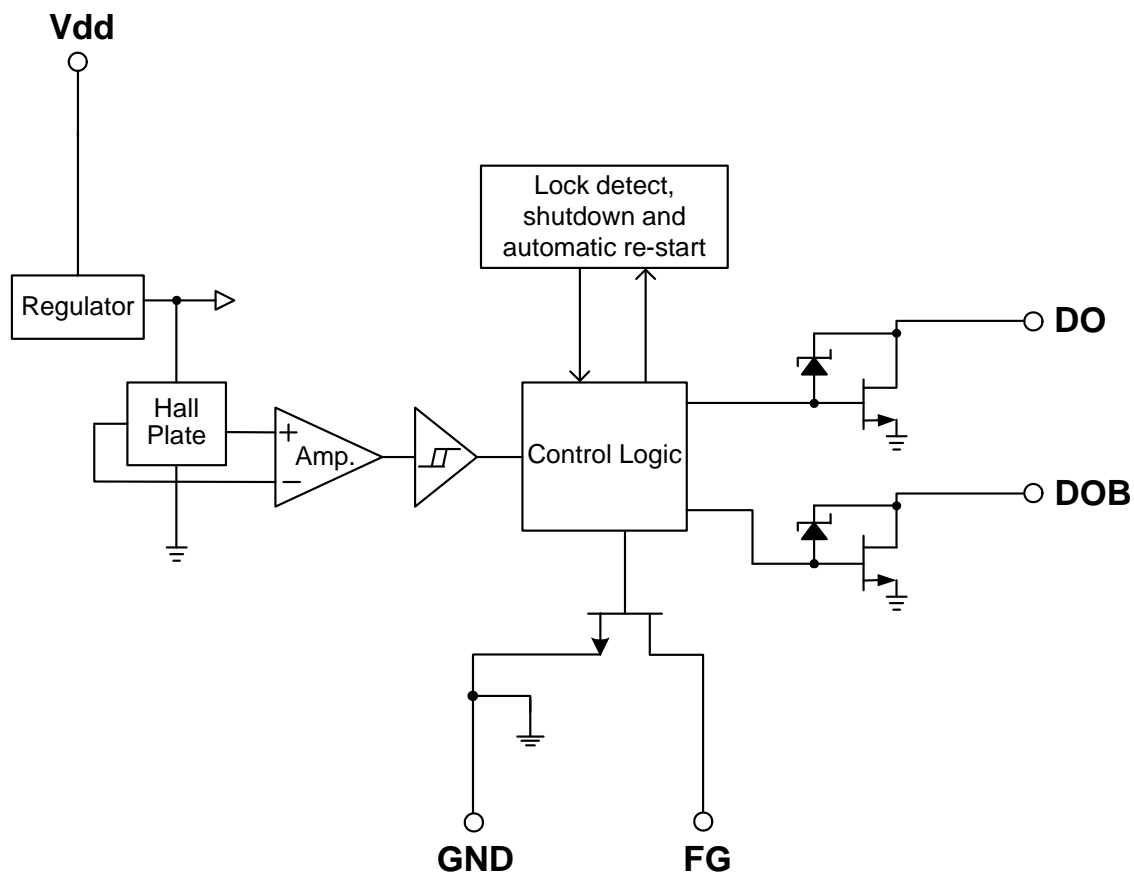


**1.8V/5.75V DC Brush-less Fan with FG output function**

## Pin Descriptions

| Pin Name | Description          |
|----------|----------------------|
| FG       | Frequency Generation |
| Vdd      | Input Power          |
| DO       | Output Pin           |
| DOB      | Output Pin           |
| GND      | Ground               |

## Functional Block Diagram



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

| Symbol               | Characteristics              | Rating    | Unit |
|----------------------|------------------------------|-----------|------|
| V <sub>DD</sub>      | Operating Supply Voltage     | 8         | V    |
| I <sub>O(AVE)</sub>  | Output Current               | 400       | mA   |
| I <sub>O(PEAK)</sub> | Output Current               | 700       | mA   |
| P <sub>D</sub>       | Power Dissipation            | 800       | mW   |
| T <sub>ST</sub>      | Storage Temperature          | -55 ~ 150 | °C   |
| T <sub>J</sub>       | Maximum Junction Temperature | 150       | °C   |

### Recommended Operating Conditions

| Symbol          | Characteristic                | Conditions | Min | Max  | Unit |
|-----------------|-------------------------------|------------|-----|------|------|
| V <sub>DD</sub> | Supply Voltage (Note 2)       | Operating  | 1.8 | 5.75 | V    |
| T <sub>A</sub>  | Operating Ambient Temperature | Operating  | -20 | 100  | °C   |

Notes: 2. The output of IC will be switched after the supply voltage is over 1.8V, but the magnetic characteristics won't be normal until the supply is over 2.0V.

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ , V<sub>DD</sub> = 5V, unless otherwise specified)

| Symbol                | Characteristics                | Conditions             | Min | Typ. | Max | Unit |
|-----------------------|--------------------------------|------------------------|-----|------|-----|------|
| I <sub>DD</sub>       | Supply current                 | Operating              | -   | 2.6  | 4.0 | mA   |
| T <sub>RLP-ON</sub>   | Rotor Lock Protection On Time  |                        | -   | 0.4  | -   | Sec  |
| T <sub>RLP-OFF</sub>  | Rotor Lock Protection Off Time |                        | 2.4 | 3    | 3.6 | Sec  |
| V <sub>OUT(SAT)</sub> | Output Saturation Voltage      | I <sub>O</sub> = 180mA | -   | 300  | -   | mV   |
|                       |                                | I <sub>O</sub> = 350mA | -   | 600  | -   | mV   |
| R <sub>DS(ON)</sub>   | Output On Resistance           |                        | -   | 1.75 | -   | ohm  |
| V <sub>OL</sub>       | FG Output V <sub>ds</sub>      | I <sub>O</sub> = 10mA  | -   | 0.5  | -   | V    |
| V <sub>Z</sub>        | Output Zener-Breakdown Voltage |                        | -   | 15   | -   | V    |

### Truth Table

| IN- | IN+ | CT | OUT1 | OUT2 | FG | Mode                        |
|-----|-----|----|------|------|----|-----------------------------|
| H   | L   | L  | H    | L    | H  | Rotating                    |
| L   | H   | L  | L    | H    | L  | Rotating                    |
| -   | -   | H  | off  | off  | -  | Lockup protection activated |

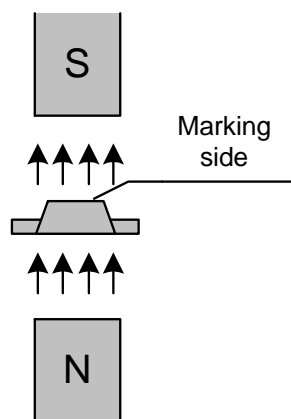
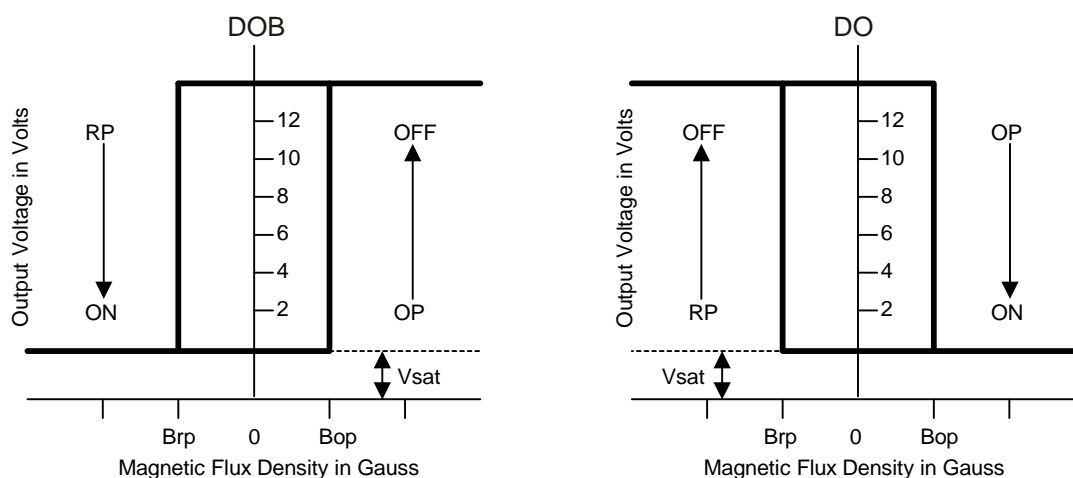
**Magnetic Characteristics** ( $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 5\text{V}$ , unless otherwise specified, Note 3)

(1mT = 10 Gauss)

| Symbol | Characteristics | Min | Typ. | Max | Unit  |
|--------|-----------------|-----|------|-----|-------|
| Bop    | Operation Point | 10  | 30   | 60  | Gauss |
| Brp    | Release Point   | -60 | -30  | -10 | Gauss |
| Bhy    | Hysteresis      | -   | 60   | -   | Gauss |

Notes: 3. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

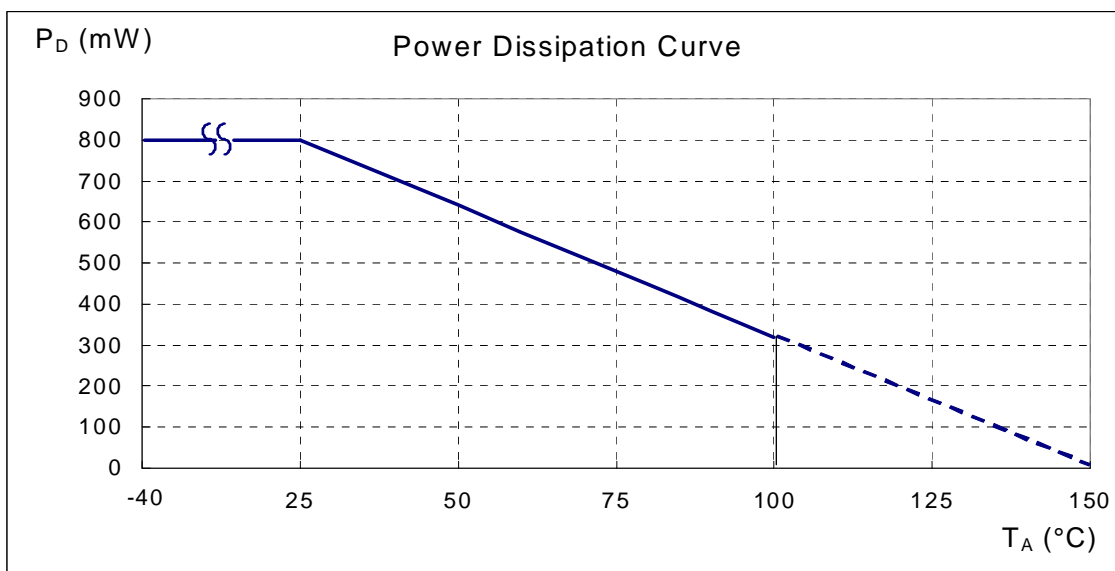
**Operating Characteristics**



( SOT89-5L )

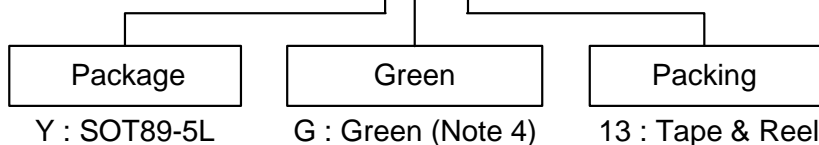
**Performance Characteristics**

| $T_A$ (°C) | 25  | 50  | 60  | 70  | 75  | 80  | 85  | 90  | 95  | 100 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| $P_D$ (mW) | 800 | 640 | 576 | 512 | 480 | 448 | 416 | 384 | 352 | 320 |
| $T_A$ (°C) | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
| $P_D$ (mW) | 288 | 256 | 224 | 192 | 160 | 128 | 96  | 64  | 32  | 0   |



### Ordering Information

**AH 292 - Y G - 13**



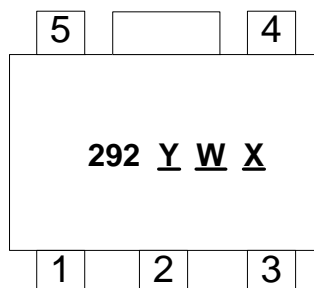
| Device      | Package Code | Packaging (Note 5, 6) | Bulk     |                    | 13" Tape and Reel |                    |
|-------------|--------------|-----------------------|----------|--------------------|-------------------|--------------------|
|             |              |                       | Quantity | Part Number Suffix | Quantity          | Part Number Suffix |
| AH292-YG-13 | Y            | SOT89-5L              | NA       | NA                 | 2500/Tape & Reel  | -13                |



Notes: 4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).  
 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.  
 6. Reverse taping as shown on Diodes Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website <http://www.diodes.com/datasheets/ap02007.pdf>.

### Marking Information

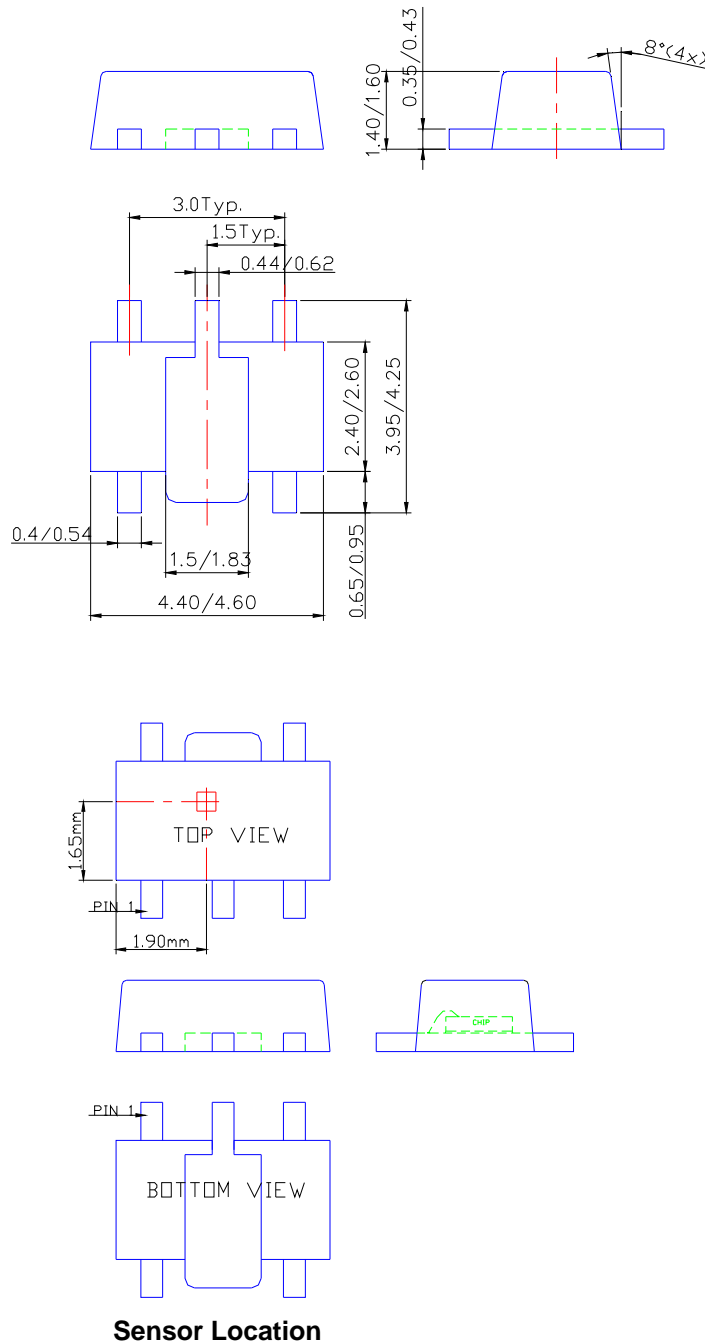
**(Top View)**



**SOT89-5L**

Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week;  
 z represents 52 and 53 week  
X : Internal code  
 A~Z : Green

### Package Outline Dimensions (All Dimensions in mm)



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