# AH281

Hall-Effect Smart Fan Motor Controller

## ■ Features

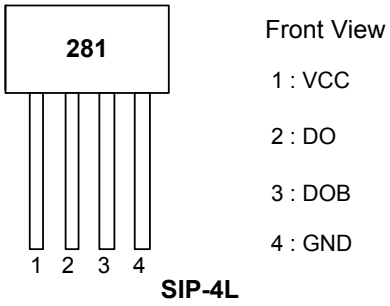
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Built-in Zener protection for output driver
- Operating voltage: 10V~20 V, driver start up: 8V (minimum)
- Output current: $I_{O(AVE)}$ = 300 mA
- Package: SIP-4L, SOT89-5L

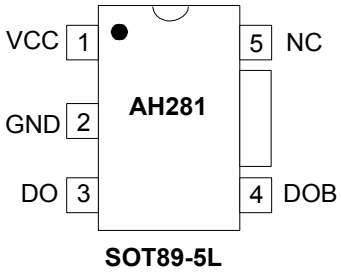
## ■ General Description

AH281 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-collector drivers for motor's coil driving, automatic lock shutdown and restart function relatively.

To avoid coil burning, rotor-lock shutdown detection circuit shut down the output driver if the rotor is blocked and then the automatic recovery circuit will try to restart the motor. This function repeats while rotor is blocked. Until the blocking is removed, the motor recovers running normally.

## ■ Pin Assignment

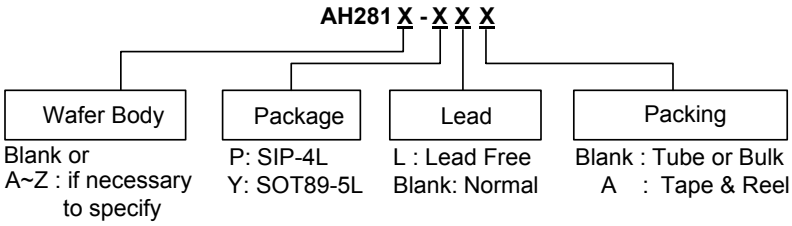



## ■ Pin Descriptions

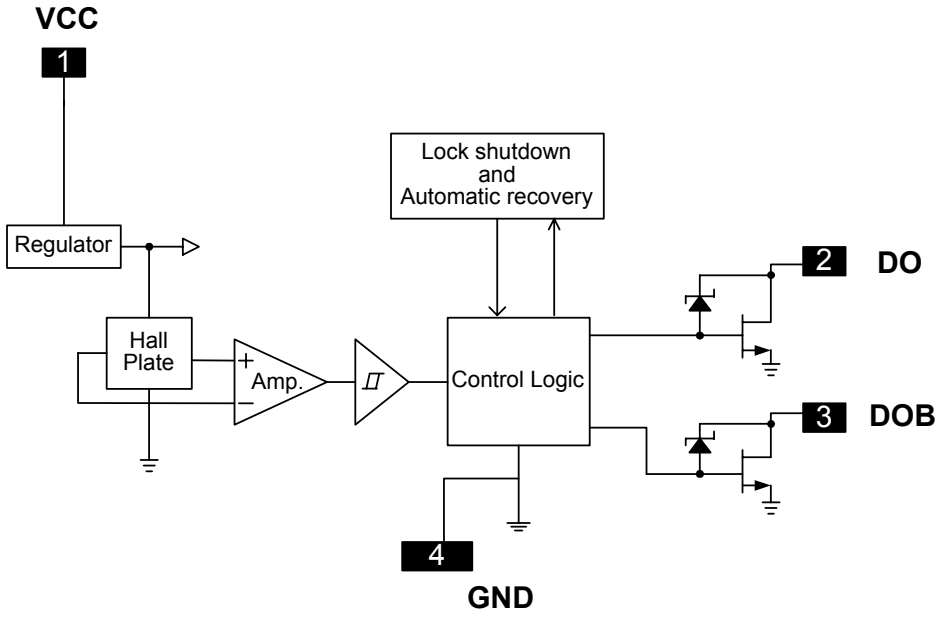
| Name | Description |
|---|---|
| VCC | Input power |
| DO | Output pin |
| DOB | Output pin |
| GND | Ground |
| NC | Not connected |

## ■ Ordering Information

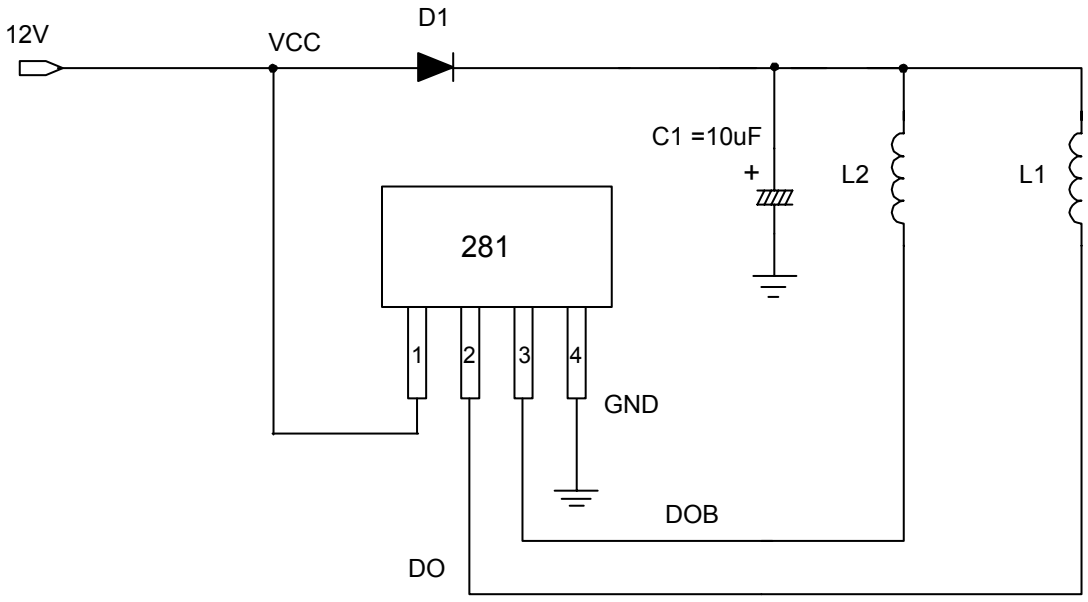



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## ■ Block Diagram (SIP4)




## ■ Application Circuit




12V brush-less DC fan

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

| Characteristics | Symbol | | Rating | Unit |
|---|---|---|---|---|
| Output Zener-breakdown Voltage | Vz | | 38 | V |
| Operating Supply Voltage | $V_{CC}$ | | 28 | V |
| Output Current | $I_{O(AVE)}$ | | 300 | mA |
| | $I_{O(PEAK)}$ | | 400 | |
| Power Dissipation | $P_D$ | SIP4 | 550 | mW |
| | | SOT89-5 | 800 | |
| Operating Temperature | Topr | | -20 ~ 100 | °C |
| Storage Temperature | Tstg | | -55 ~ 150 | °C |
| Maximum Junction Temp. | Tj | | 150 | °C |

## ■ Electrical Characteristics (Ta = 25 °C, $V_{CC}$ =12V, unless otherwise specified)

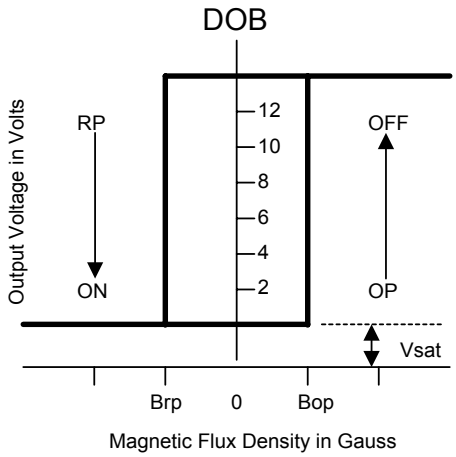
| Characteristics | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage | Vcc | Operating | 10 | | 20 | V |
| Supply current | $I_{cc}$ | Operating | - | 2.0 | 4.0 | mA |
| Locked Protection On | Tlrp-on | | | 0.4 | | Sec |
| Locked Protection Off | Tlrp-off | | | 2.4 | | Sec |
| Output saturation voltage | $V_{OUT(sat)}$ | $I_O$=150mA | - | 375 | | mV |
| | | $I_O$=250mA | - | 625 | | |
| Output On resistance | Rds(on) | | | 2.6 | | ohm |

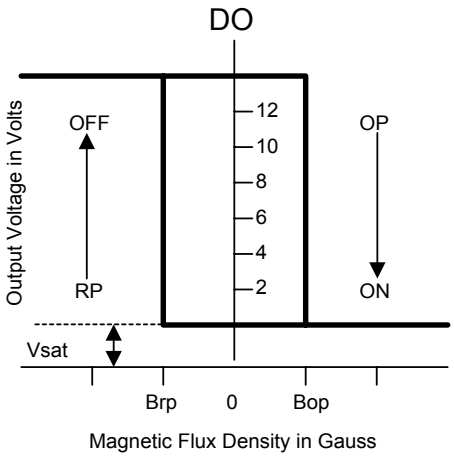
## ■ Magnetic Characteristics (Ta = 25 °C, $V_{CC}$ = 12V, unless otherwise specified)

(1mT=10 Gauss)

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

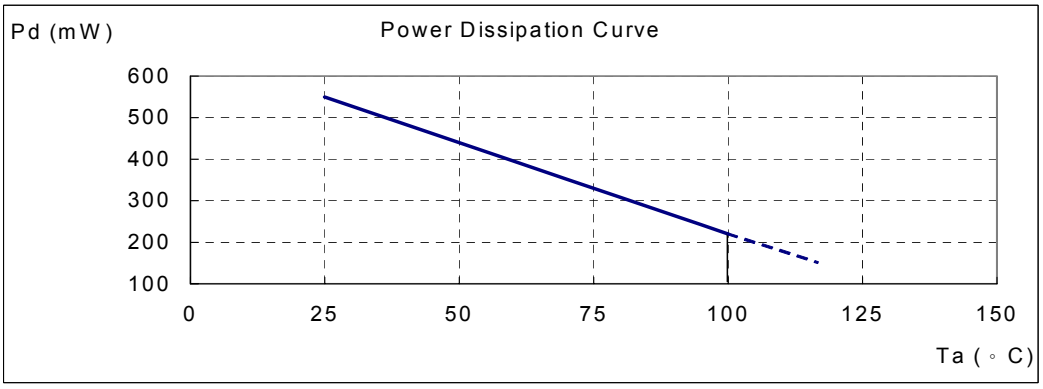
## ■ Operating Characteristics



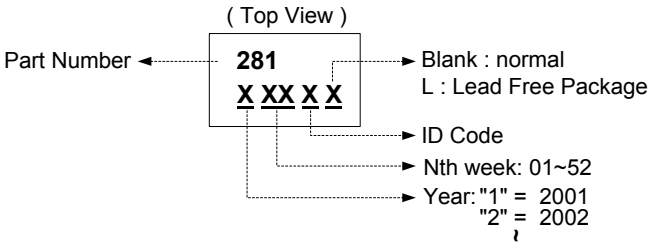

## ■ Performance Characteristics (SIP4)

| Ta (°C) | 25 | 50 | 60 | 70 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pd (mW) | 550 | 440 | 396 | 352 | 308 | 286 | 264 | 242 | 220 | 198 | 176 | 154 | 132 |

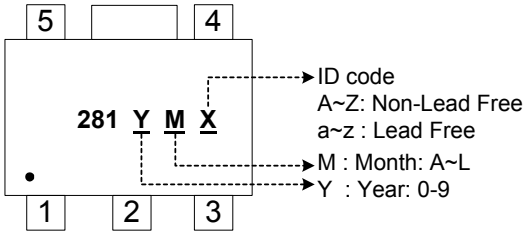


## ■ Marking Information

**(1)SIP-4L**



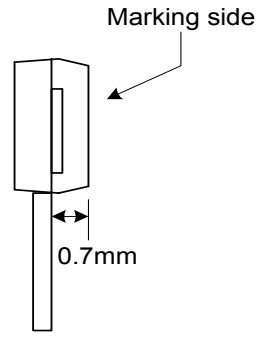

**(2)SOT89-5L**



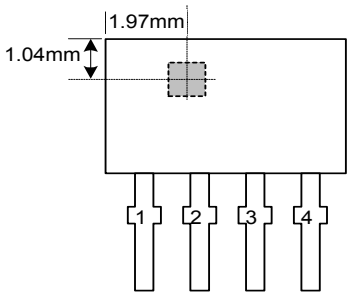
## ■ Package Information

**(1)SIP-4L**

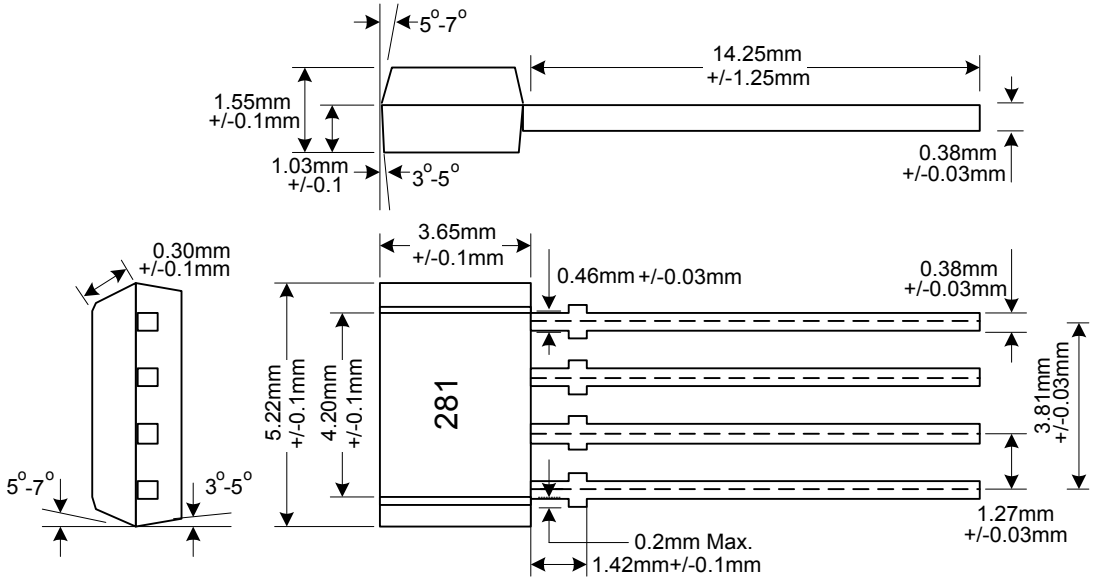
Active Area Depth



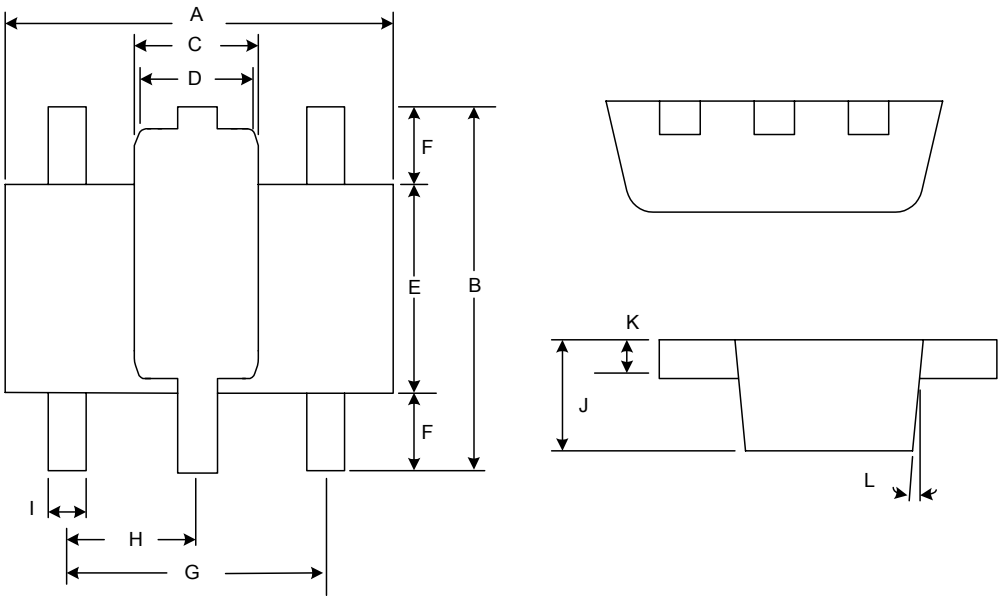

Package Sensor Location



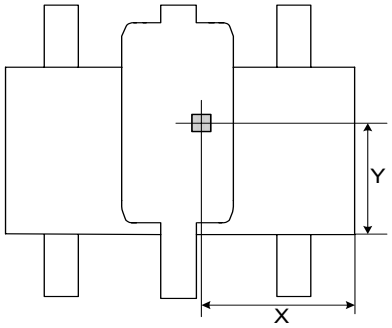

Package Dimension



**(2)SOT89-5L**




**Package Sensor Location**




| Symbol | Dimensions In Millimeters | | | Dimensions In Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Nom. | Max. | Min. | Nom. | Max. |
| A | 4.40 | 4.50 | 4.60 | 0.173 | 0.177 | 0.181 |
| B | 4.05 | 4.15 | 4.25 | 0.159 | 0.163 | 0.167 |
| C | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| D | 1.30 | 1.40 | 1.50 | 0.051 | 0.055 | 0.059 |
| E | 2.40 | 2.50 | 2.60 | 0.094 | 0.098 | 0.102 |
| F | 0.80 | - | - | 0.031 | - | - |
| G | 3.00 Ref. | | | 0.118 Ref. | | |
| H | 1.50 Ref. | | | 0.059 Ref. | | |
| I | 0.40 | 0.46 | 0.52 | 0.016 | 0.018 | 0.020 |
| J | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| K | 0.35 | 0.39 | 0.43 | 0.014 | 0.015 | 0.017 |
| L | $5^{o}$ Typ. | | | $5^{o}$ Typ. | | |
| X | - | 1.90 | - | - | 0.075 | - |
| Y | - | 1.65 | - | - | 0.065 | - |