

# SIP-5L and SOT23-5L Not Recommended for New Design



**AH289**

High Voltage Hall-Effect Smart Fan Motor Controller

## ■ Features

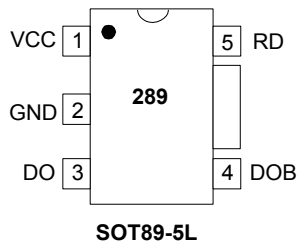
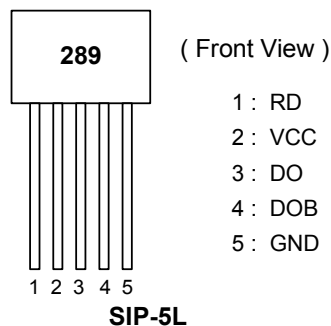
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Rotor-state detection (RD) output
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~28V
- Output current:  $I_{O(AVE)} = 400\text{mA}$
- Package: SIP-5L, SOT89-5L

## ■ General Description

AH289 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-drain transistors for motor's coil driving, automatic lock current shutdown, and recovery protections. In addition, rotor-state detection (RD) output is for Rotor-state detection.

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 the rotor is blocked. Until the blocking is removed, the motor recovers running normally.

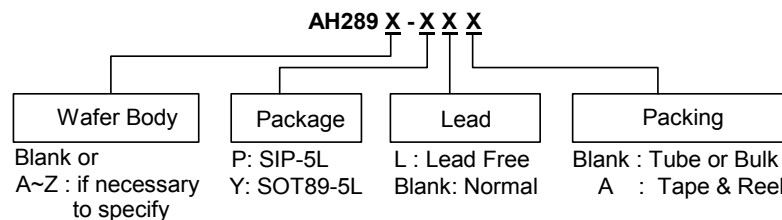
## ■ Pin Configuration



## ■ Pin Descriptions

Symbol	Description
RD	Rotor-state detection
VCC	Input power
DO	Output pin
DOB	Output pin
GND	Ground

## ■ Ordering Information



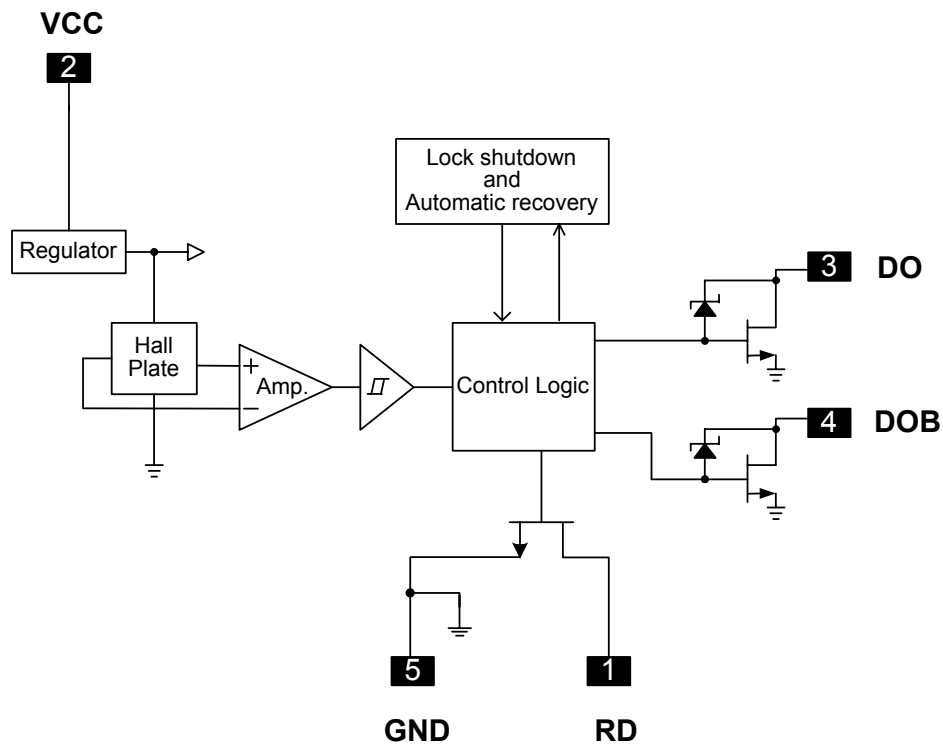
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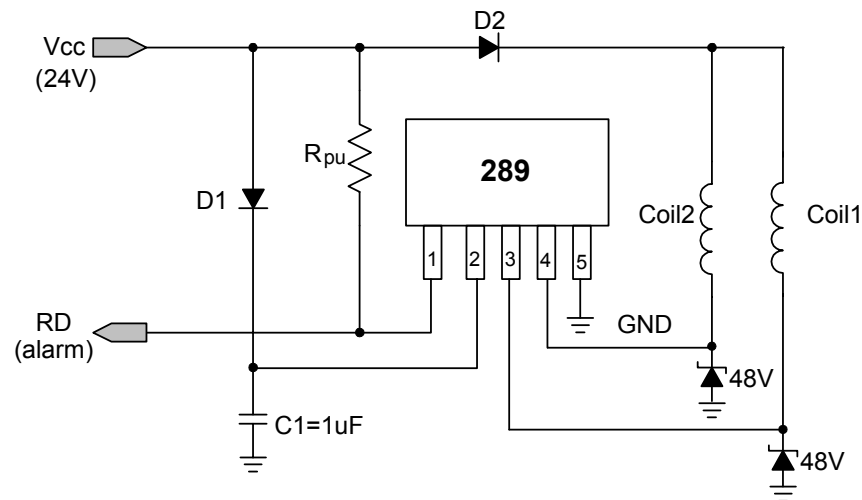
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## ■ Block Diagram (SIP5)



## ■ Typical Application Circuit (SIP5)



24V DC Brush-less Fan with RD output function

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■ **Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Supply Voltage	$V_{CC}$	30	V
Output Current	$I_{O(AVE)}$	SIP5/SOT89-5 400	mA
	$I_{O(PEAK)}$	700	
Power Dissipation	$P_D$	SIP5 550	mW
		SOT89-5 800	
Operating Temperature	$T_{opr}$	-40 ~ 100	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~ 150	$^\circ\text{C}$
Maximum Junction Temp.	$T_j$	150	$^\circ\text{C}$
Thermal Resistance	$\theta_{jc}$	SIP5 227	$^\circ\text{C/W}$
		SOT89-5 156	$^\circ\text{C/W}$

■ **Electrical Characteristics** ( $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 24\text{V}$ , unless otherwise notice)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	$V_{CC}$	Operating	3.8	-	28*	V
Supply current	$I_{CC}$	Operating	-	2.0	4.0	mA
Output Leakage Current	$I_{off}$	$V_{OUT}=24\text{V}$	-	< 0.1	10	$\mu\text{A}$
Locked Protection On	$T_{lpr-on}$		0.4	0.46	0.6	Sec
Locked Protection Off	$T_{lpr-off}$		2.4	2.76	3.6	Sec
Output saturation voltage	$V_{OUT(sat)}$	$I_O=200\text{mA}$	-	450	700	mV
		$I_O=300\text{mA}$	-	680	800	
Output On resistance	$R_{ds(on)}$	$I_O=200\text{mA}$	-	2.25	3.5	ohm
RD output $V_{ds}$	$V_{ol}$	$I_O=10\text{mA}$	-	0.3	0.5	V
Output Zener-breakdown Voltage	$V_z$		42	55	65	V

\*Note: Please watch out the current limit issue when the operation voltage is over 26.4V, because of the different efficiency in the coil.

■ **Magnetic Characteristics** ( $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 24\text{V}$ , unless otherwise specified)

(1mT=10 Gauss)

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

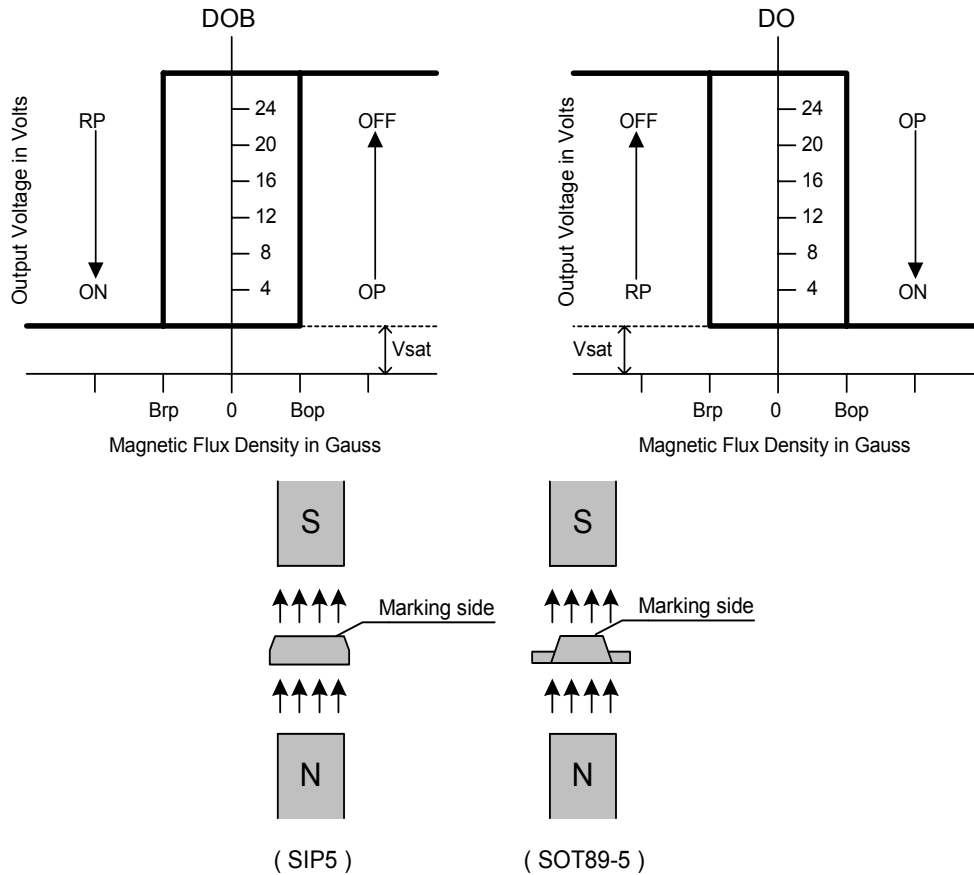
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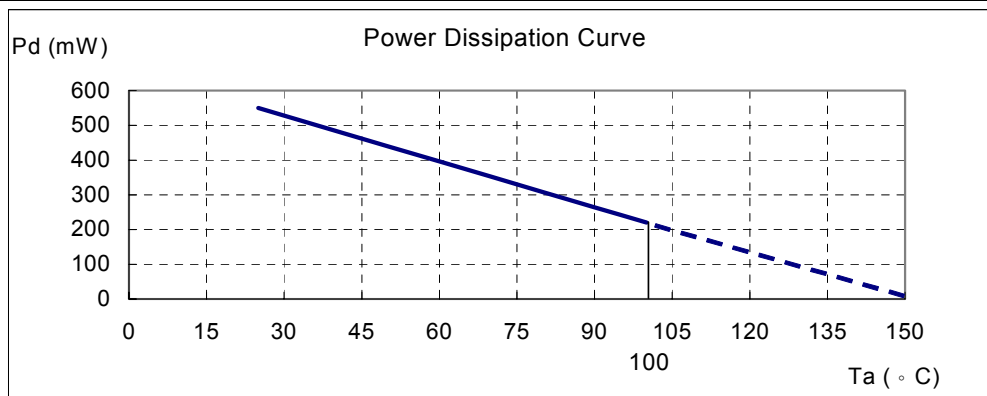
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## Operating Characteristics



## Performance Characteristics (SIP5)

<b>Ta (°C)</b>	<b>25</b>	<b>50</b>	<b>60</b>	<b>70</b>	<b>80</b>	<b>85</b>	<b>90</b>	<b>95</b>	<b>100</b>
Pd (mW)	550	440	396	352	308	286	264	242	220
<b>Ta (°C)</b>	<b>105</b>	<b>110</b>	<b>115</b>	<b>120</b>	<b>125</b>	<b>130</b>	<b>135</b>	<b>140</b>	<b>150</b>
Pd (mW)	198	176	154	132	110	88	66	44	0



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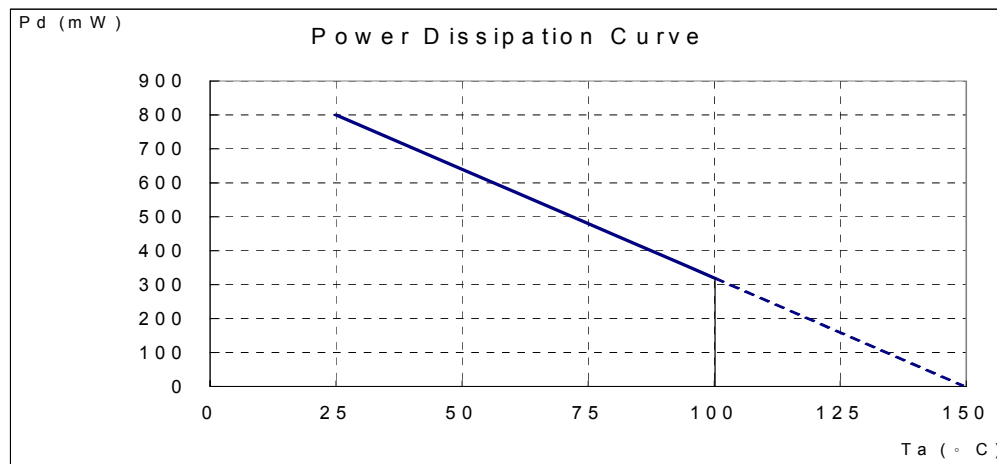


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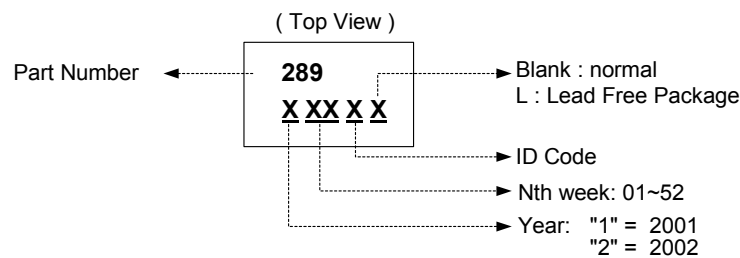
## ■ Performance Characteristics (SOT89-5)

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

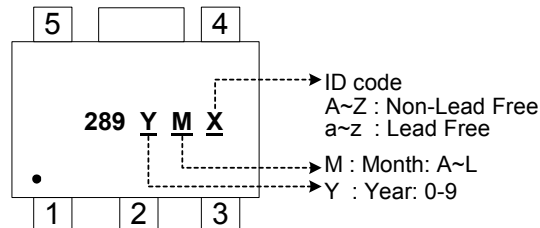


## ■ Marking Information

### (1)SIP-5L



### (2)SOT89-5L



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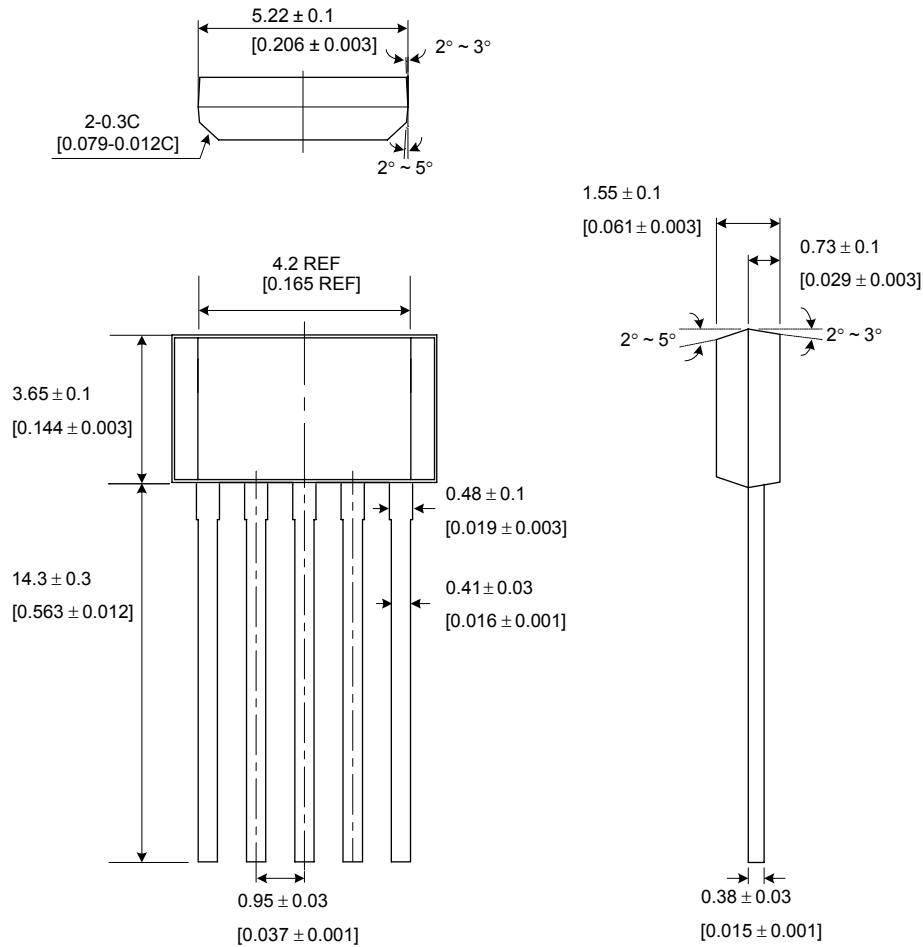


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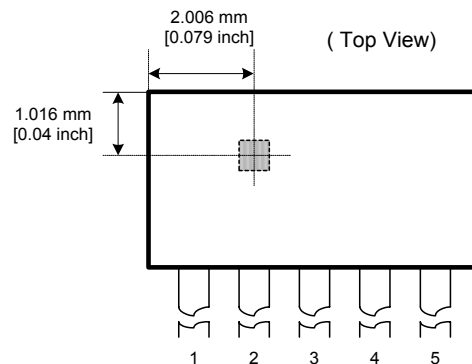
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## ■ Package Information

(1) Package type: SIP-5L (unit: mm / [inch])



## ■ Location of Sensing Point



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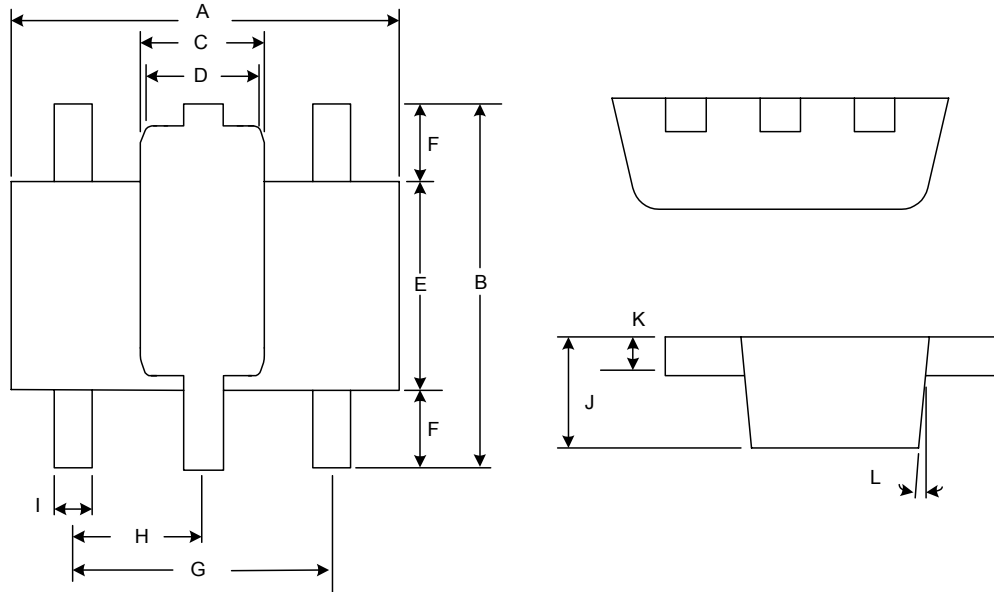


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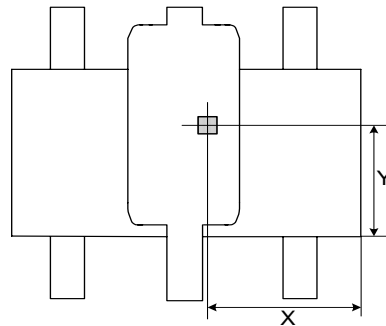
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(2) Package type: SOT89-5L



**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° Typ.			5° Typ.		
X	-	1.90	-	-	0.075	-
Y	-	1.65	-	-	0.065	-