

**Features**

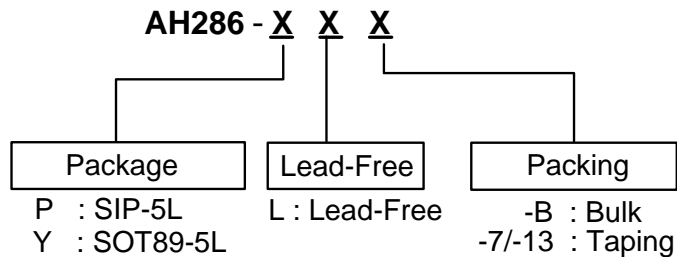
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Rotor-state detection (RD) output
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~20 V
- Output current:  $I_{O(AVE)} = 500\text{mA}$  for SOT89-5L
- Lead Free Packages: SIP-5L and SOT89-5L

**General Description**

AH286 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.

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.

**Ordering Information**

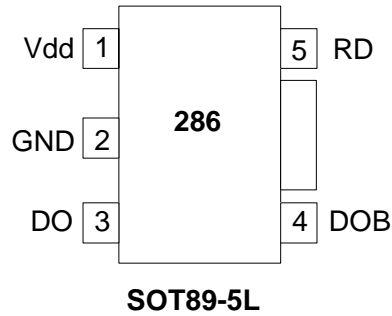
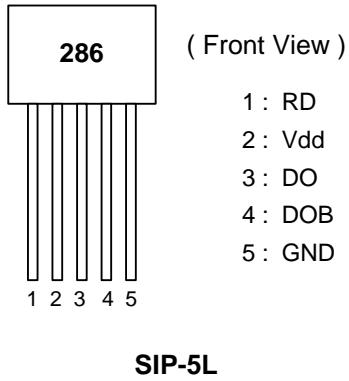


Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

Device	Package Code	Packaging	Tube/Bulk		7" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH286-P	P	SIP-5	1000	-B	NA	NA
AH286-Y	Y	SOT89-5	NA	NA	2500/Tape & Reel	-13

Note: 2. 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>.

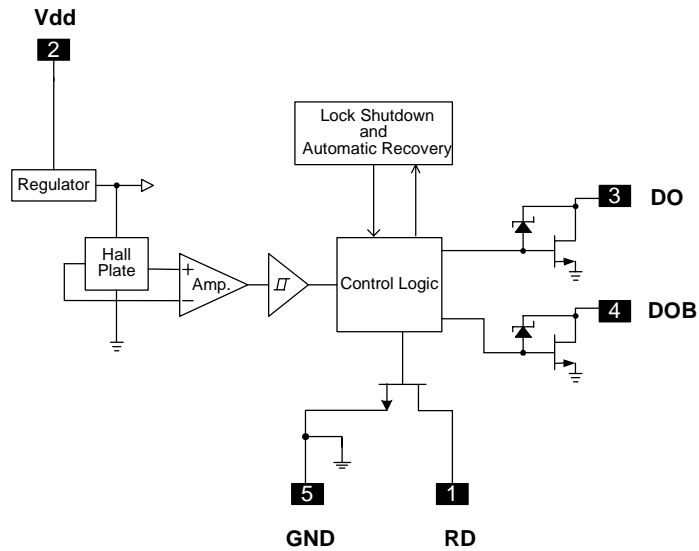
**Pin Assignment**



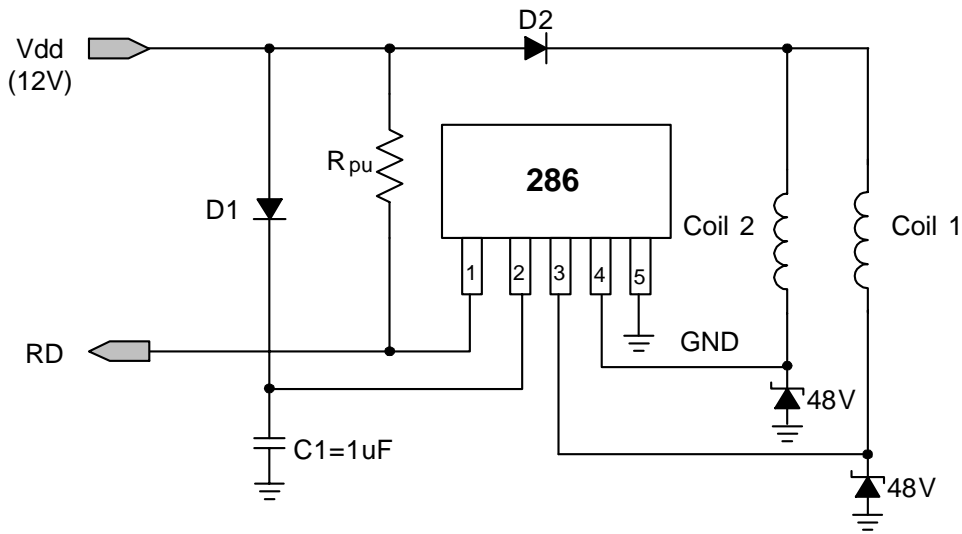
**Pin Descriptions**

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

**Block Diagram**



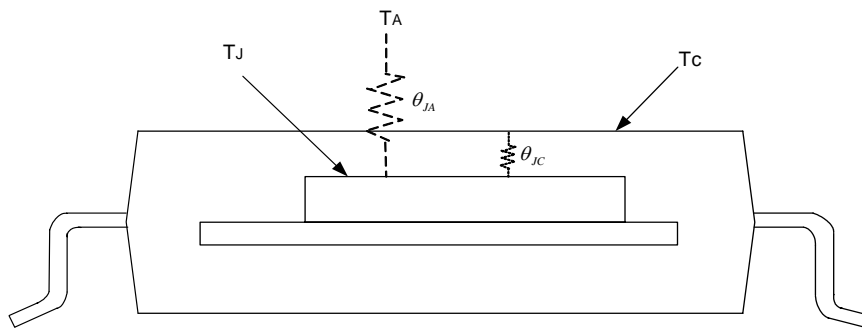
**Typical Application Circuit (SIP-5L)**



**12V DC Brush-Less Fan with RD Output Function**

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

Characteristics	Symbol	Rating	Unit	
Supply Voltage	$V_{dd}$	24	V	
Output Current	$I_{O(AVE)}$	SIP5/SOT89-5 500	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	$\theta_{JA}$	SIP5	227	$^\circ\text{C/W}$
		SOT89-5	156	



Note:  $\theta_{JA}$  should be confirmed with what heat sink thermal resistance. If no heat sink contacting,  $\theta_{JA}$  is almost the same as  $\theta_{JC}$ .

**Electrical Characteristics** ( $T_A = 25\text{ }^\circ\text{C}$ ,  $V_{DD} = 12\text{V}$ , unless otherwise specified)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	$V_{DD}$	Operating	3.8	-	20	V
Supply current	$I_{DD}$	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	$T_{IRP-on}$		0.4	0.5	0.6	Sec
Locked Protection Off	$T_{IRP-off}$		2.4	3	3.6	Sec
Output saturation voltage	$V_{OUT(sat)}$	$I_O = 300\text{mA}$	-	375	500	mV
		$I_O = 500\text{mA}$	-	625	900	
Output On resistance	$R_{DS(on)}$	$I_O = 300\text{mA}$	-	1.25	1.67	ohm
RD output Vds	$V_{OL}$	$I_O = 10\text{mA}$	-	0.5	-	V
Output Zener-breakdown Voltage	$V_Z$		35	42	60	V

**Truth Table**

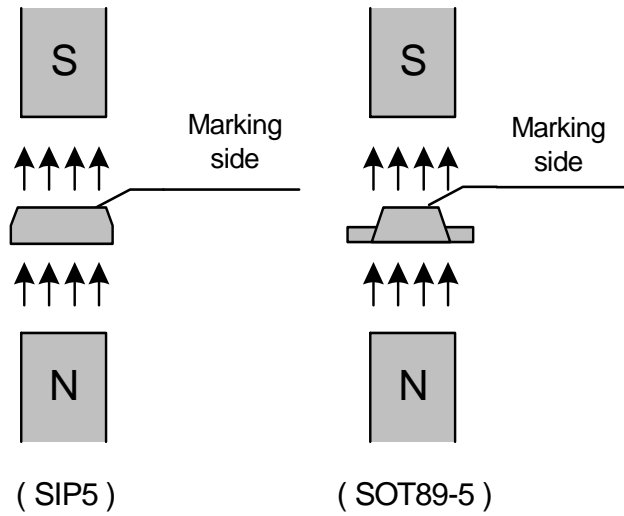
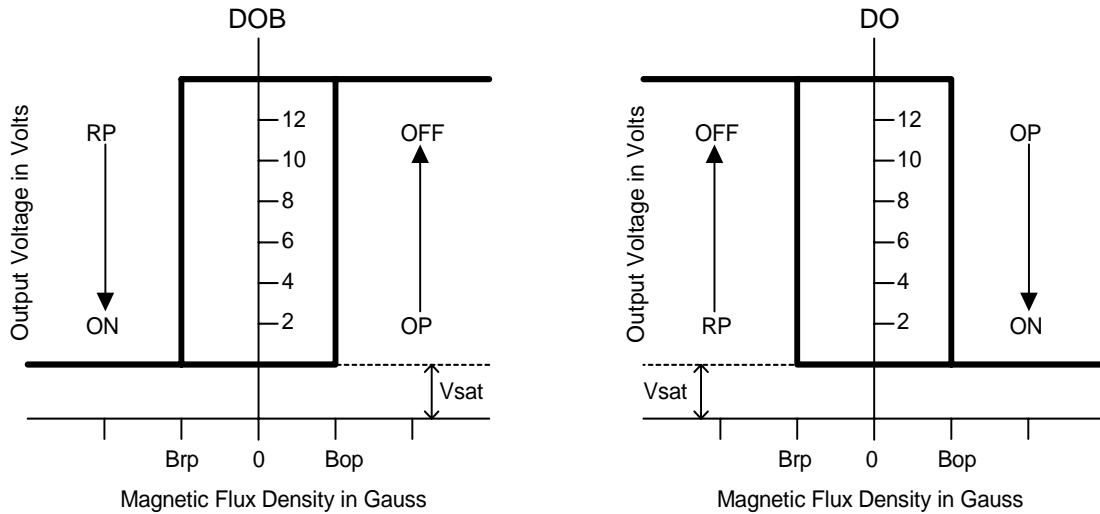
IN-	IN+	CT	OUT1	OUT2	RD	Mode
H	L	L	H	L	L	Rotating
L	H	L	L	H	L	Rotating
-	-	H	off	off	H	Lockup protection activated

**Magnetic Characteristics** ( $T_A = 25\text{ }^\circ\text{C}$ ,  $V_{DD} = 12\text{V}$ , unless otherwise specified)

(1mT=10 Gauss)

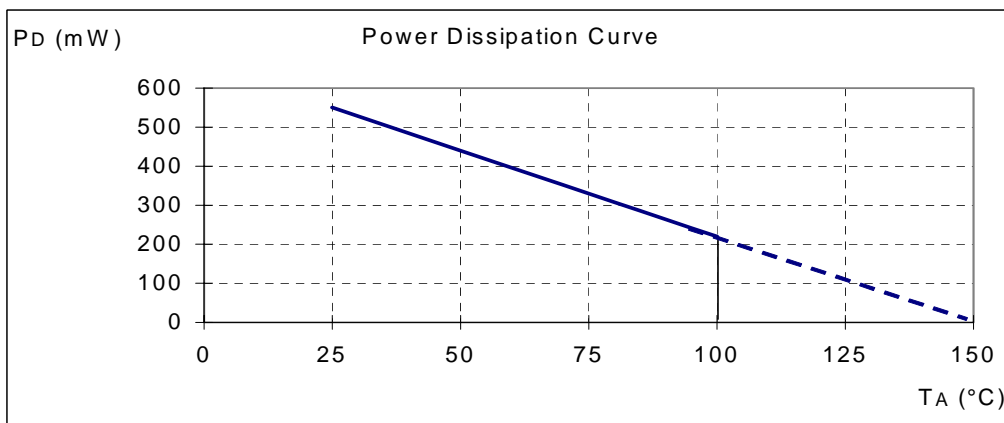
Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operate Point	Bop	10	30	60	Gauss
Release Point	Brp	-60	-30	-10	Gauss
Hysteresis	Bhy	--	60	--	Gauss

**Operating Characteristics**



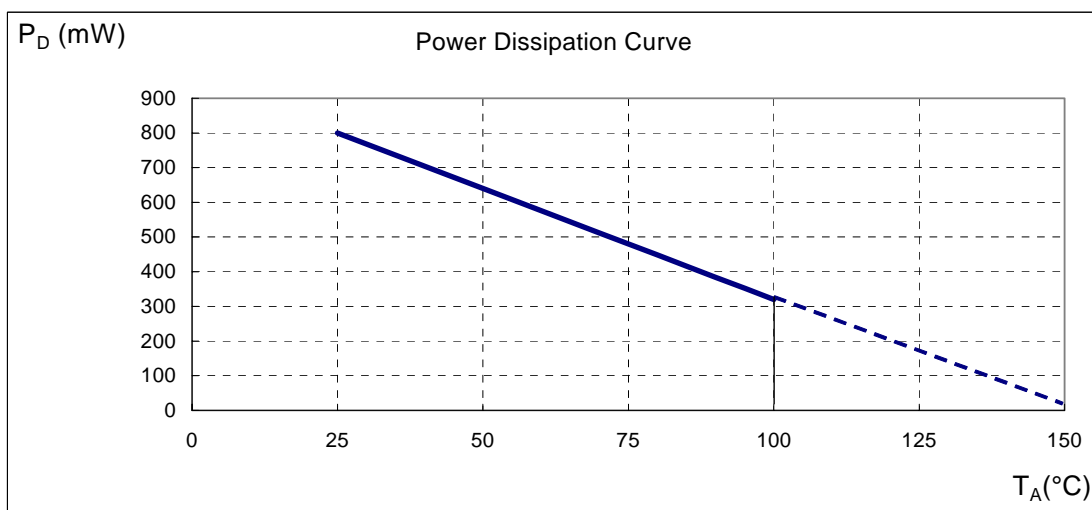
**Performance Characteristics (SIP-5L)**

<b>T<sub>A</sub> (°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>
P <sub>D</sub> (mW)	550	440	396	352	308	286	264	242	220
<b>T<sub>A</sub> (°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>
P <sub>D</sub> (mW)	198	176	154	132	110	88	66	44	0



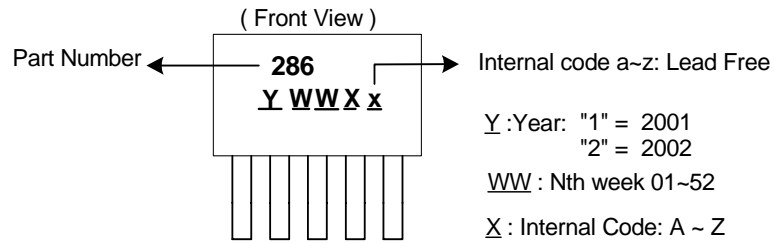
**Performance Characteristics (SOT89-5L)**

<b>T<sub>A</sub> (°C)</b>	<b>25</b>	<b>50</b>	<b>60</b>	<b>70</b>	<b>75</b>	<b>80</b>	<b>85</b>	<b>90</b>	<b>95</b>	<b>100</b>
P <sub>D</sub> (mW)	800	640	576	512	480	448	416	384	352	320
<b>T<sub>A</sub> (°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>145</b>	<b>150</b>
P <sub>D</sub> (mW)	288	256	224	192	160	128	96	64	32	0

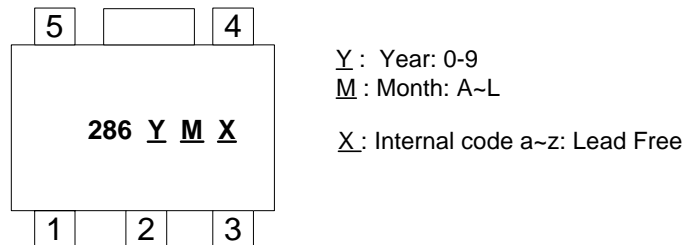


**Marking Information**

**(1) SIP-5L**



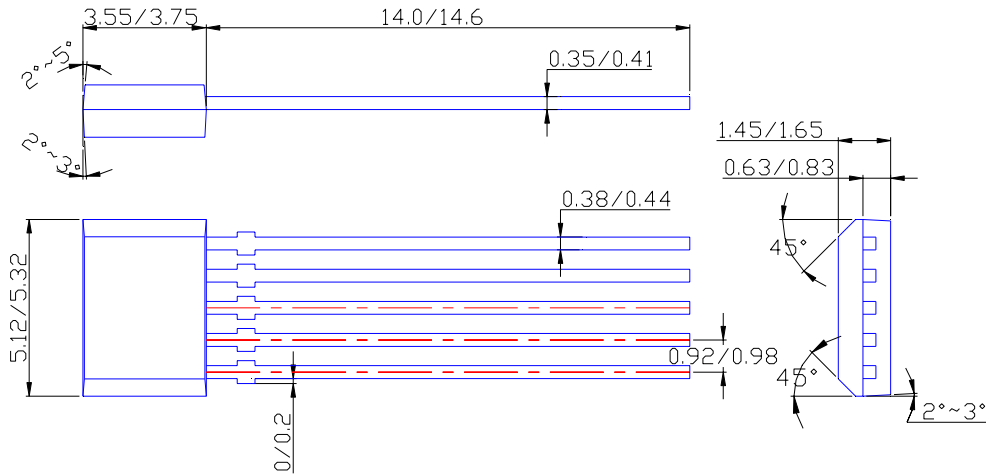
**(2) SOT89-5L**



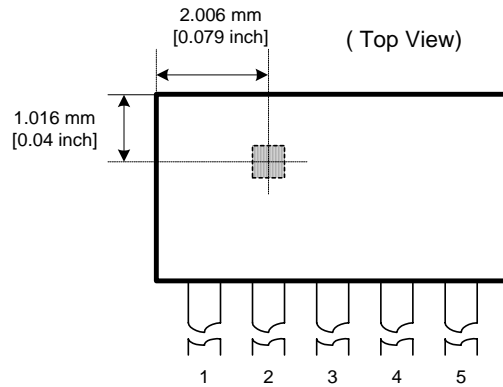


**Package Information** ( unit: mm )

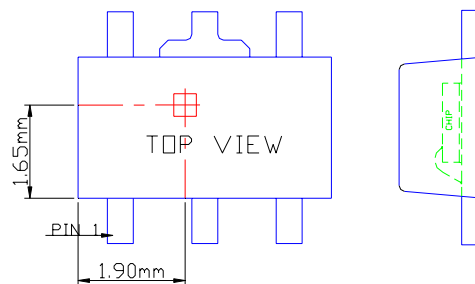
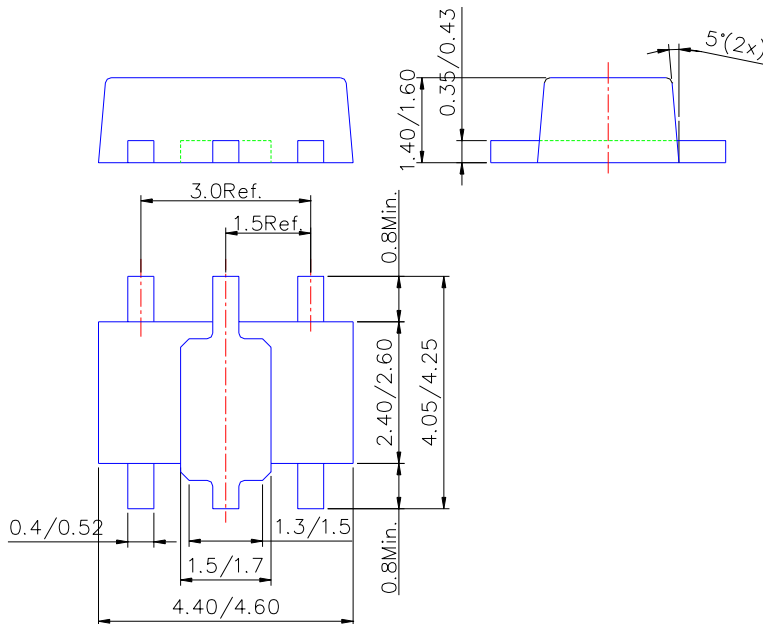
(1) Package type: SIP-5L



**Location of Sensing Point**



**(2) Package type: SOT89-5L**



**Sensor Location**

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