HALL-EFFECT SMART FAN MOTOR CONTROLLER

Features

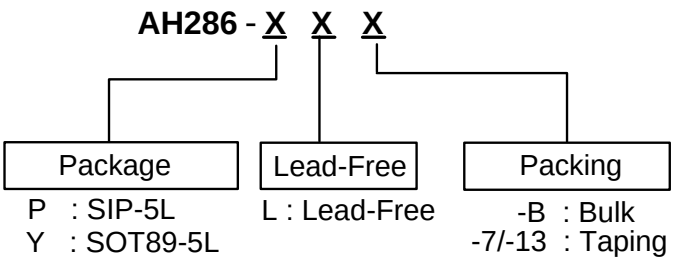
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Rotor-state detection (RD) output
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~20 V
- Output current: $I_{O(AVE)}$ = 500mA for SOT89-5L
- Lead Free Packages: SIP-5L and SOT89-5L

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



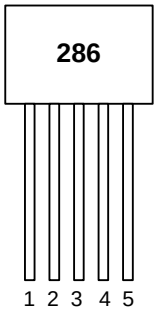
Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

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.

© Diodes Incorporated

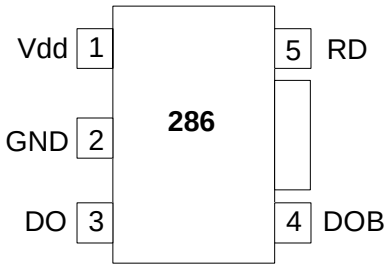
Pin Assignment



(Front View)

1 : RD
2 : Vdd
3 : DO
4 : DOB
5 : GND

SIP-5L



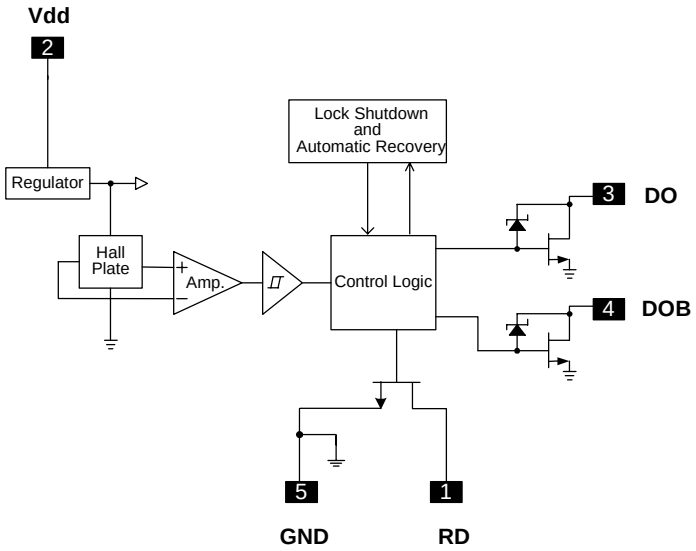
SOT89-5L

Pin Descriptions

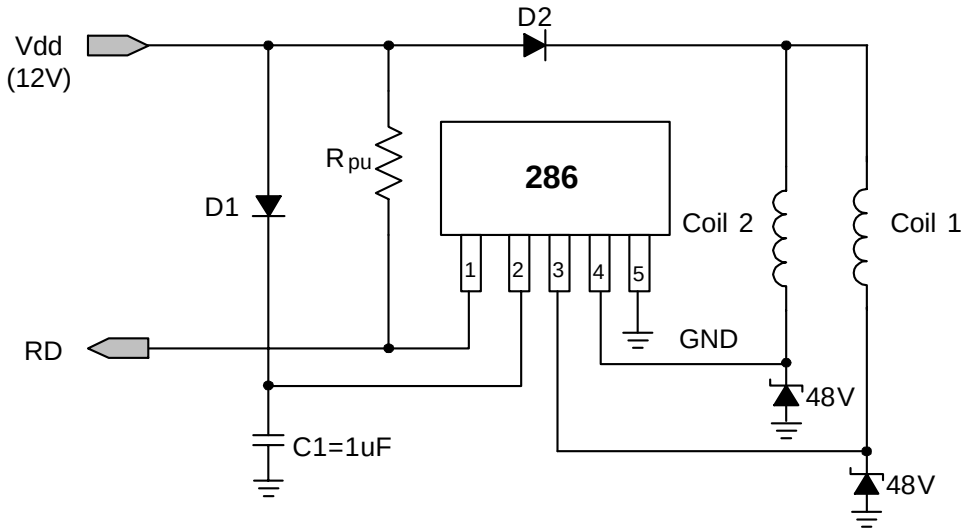
Symbol	Description
RD	Rotor-state detection
Vdd	Input power
DO	Output pin
DOB	Output pin
GND	Ground

© Diodes Incorporated

Block Diagram



Typical Application Circuit (SIP-5L)

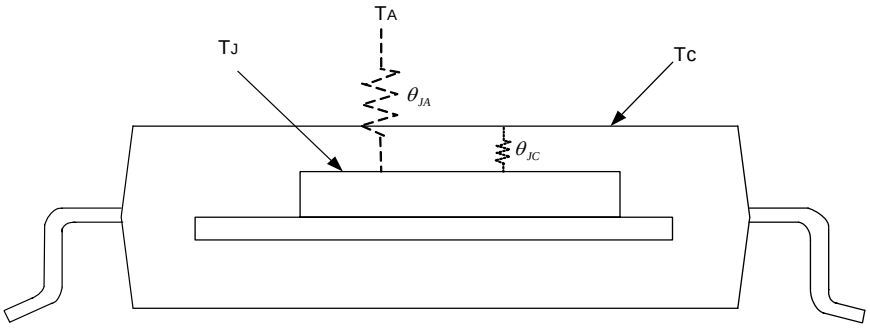


12V DC Brush-Less Fan with RD Output Function

© Diodes Incorporated

Absolute Maximum Ratings (T_A = 25°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	°C
Storage Temperature	T_{stg}		-55 ~ 150	°C
Maximum Junction Temp.	T_j		150	°C
Thermal Resistance	θ_{JA}	SIP5	227	°C/W
		SOT89-5	156	



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

© Diodes Incorporated

Electrical Characteristics (T_A = 25 °C, Vdd =12V, 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}=24V	-	< 0.1	10	μA
Locked Protection On	T_{lrp-on}		0.4	0.5	0.6	Sec
Locked Protection Off	$T_{lrp-off}$		2.4	3	3.6	Sec
Output saturation voltage	$V_{OUT(sat)}$	I_O=300mA	-	375	500	mV
		I_O=500mA	-	625	900	
Output On resistance	$R_{ds(on)}$	I_O=300mA	-	1.25	1.67	ohm
RD output Vds	V_{ol}	I_O=10mA	-	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

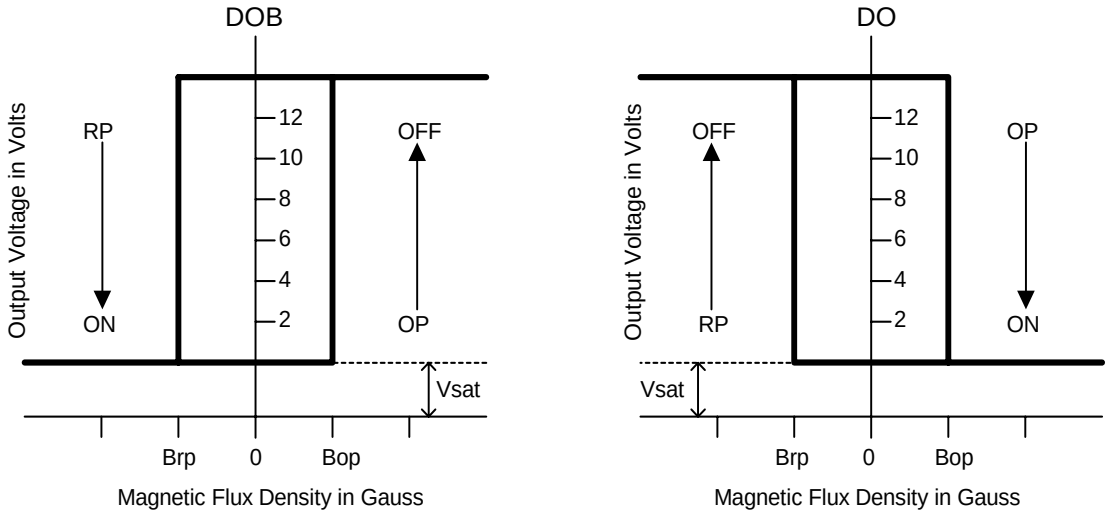
Magnetic Characteristics (T_A = 25 °C, Vdd = 12V, unless otherwise specified)

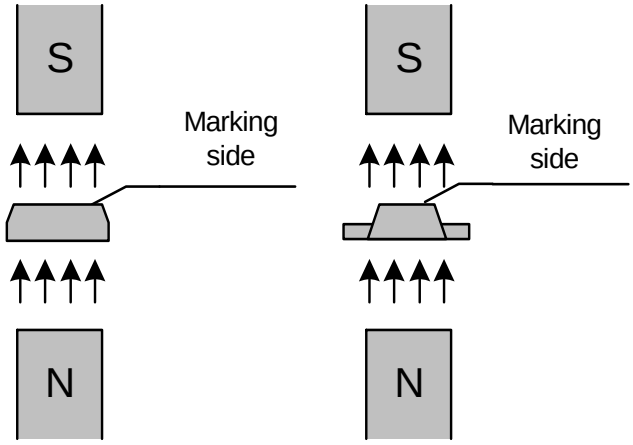
(1mT=10 Gauss)

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

© Diodes Incorporated

Operating Characteristics



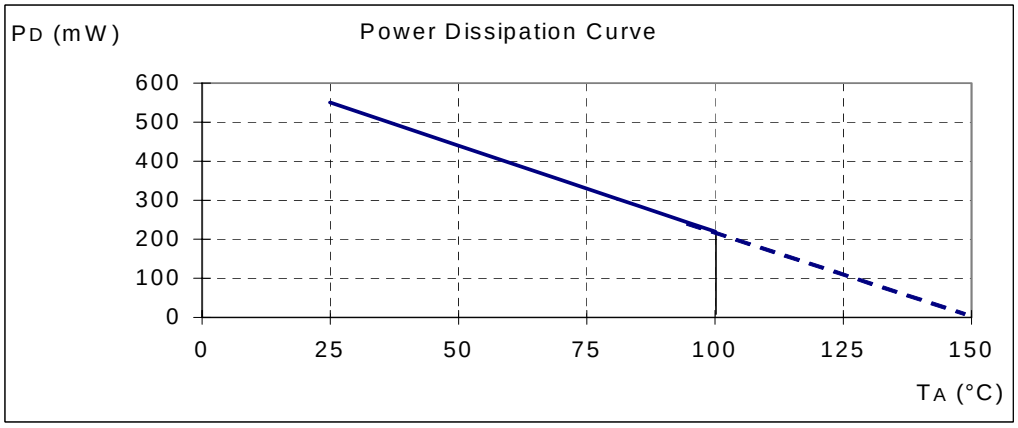


(SIP5) (SOT89-5)

© Diodes Incorporated

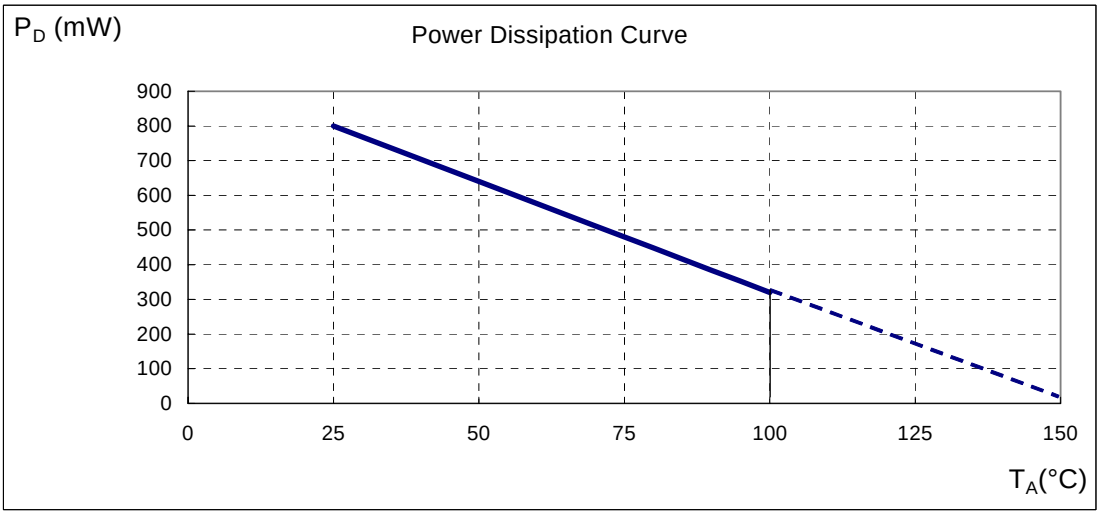
Performance Characteristics (SIP-5L)

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



Performance Characteristics (SOT89-5L)

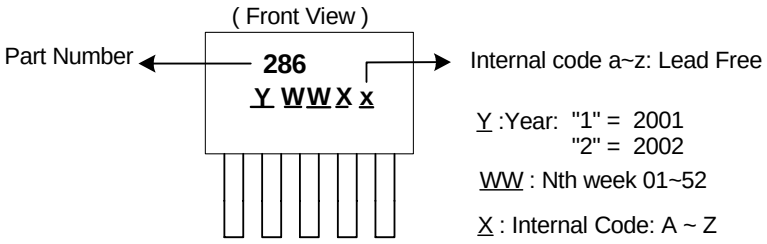
T_A (°C)	25	50	60	70	75	80	85	90	95	100
P_D (mW)	800	640	576	512	480	448	416	384	352	320
T_A (°C)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**
P_D (mW)	288	256	224	192	160	128	96	64	32	0



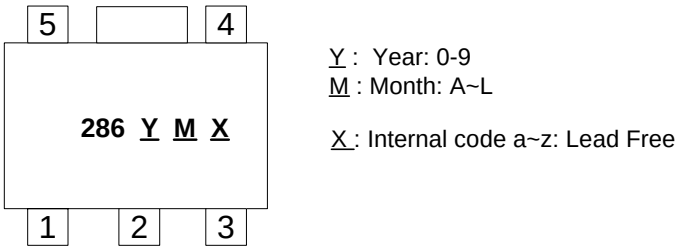
© Diodes Incorporated

Marking Information

(1) SIP-5L



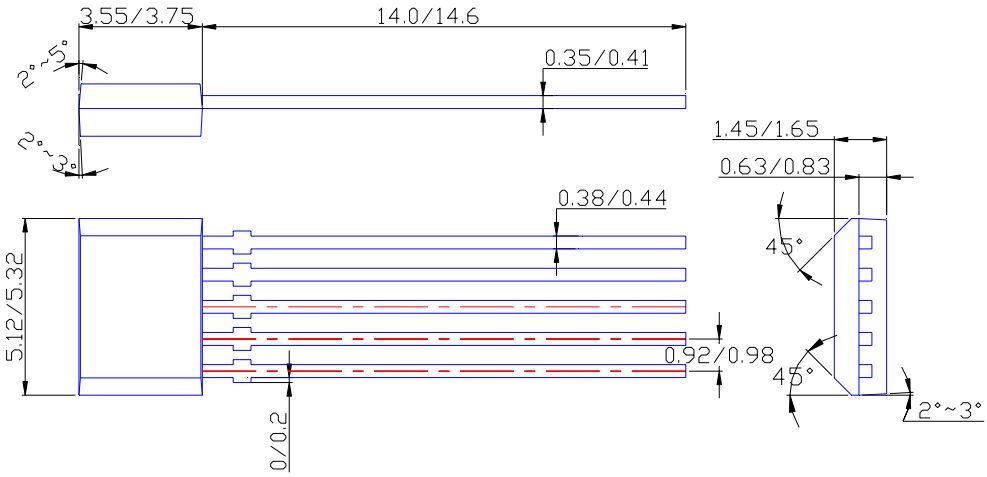
(2) SOT89-5L



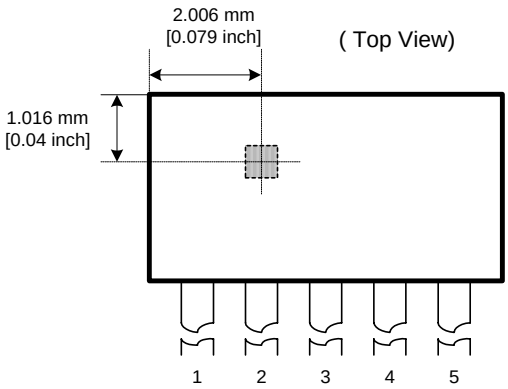
© Diodes Incorporated

Package Information (unit: mm)

(1) Package type: SIP-5L

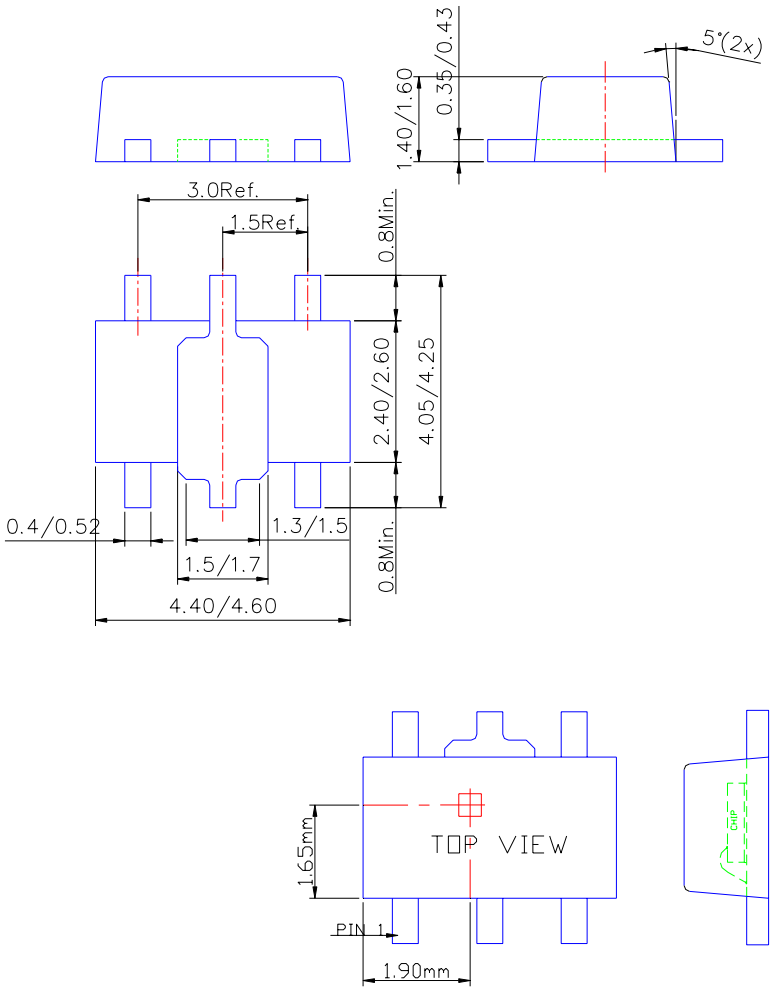


Location of Sensing Point



© Diodes Incorporated

(2) Package type: SOT89-5L



Sensor Location

IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.

© Diodes Incorporated