

**Features**

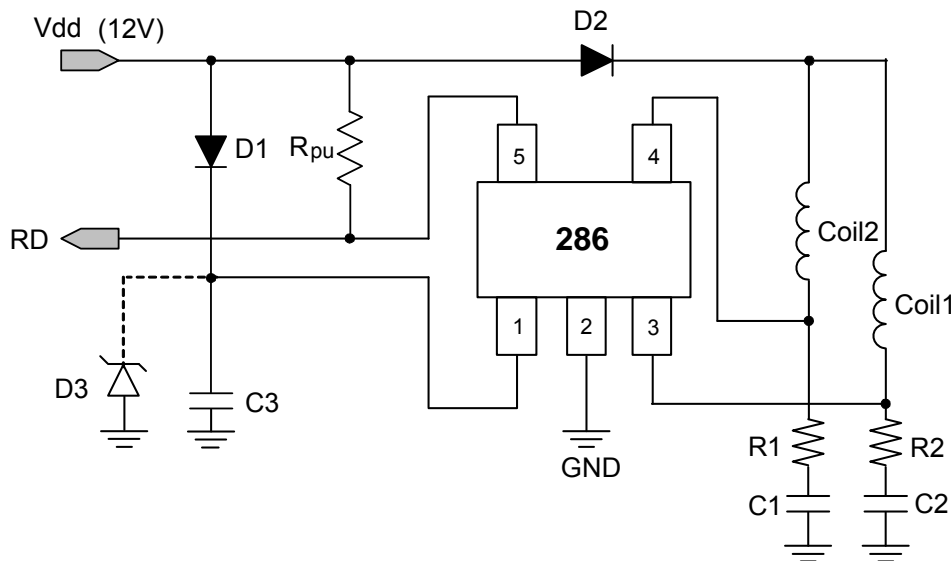
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Rotor-state detection (RD) output
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~20 V
- Output current:  $I_{O(AVE)} = 500\text{mA}$  for SOT89-5L
- Lead Free Package: SOT89-5L
- Lead Free Finish/RoHS Compliant (Note 1)

**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.

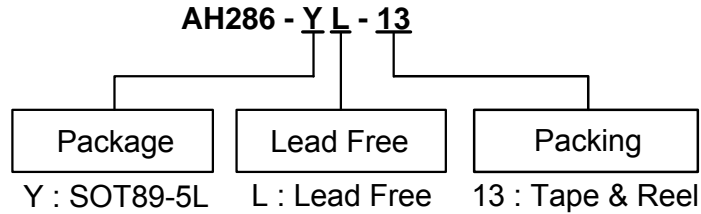
**Typical Application Circuit**




Note: R1, R2: typical 56 Ohm.  
 C1, C2, C3: typical 2.2 $\mu$ F, E-Cap. is recommended.  
 The R, C value need to be fine tuned based on coils design.  
 D3 is a Zener diode, not to exceed the absolute maximum rating voltage.

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

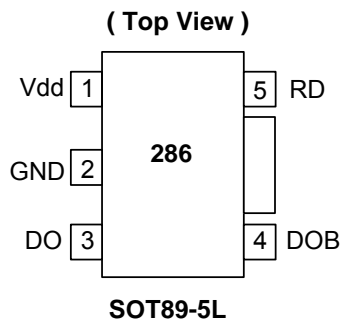
### Ordering Information



Device	Package Code	Packaging (Note 2)	13" Tape and Reel	
			Quantity	Part Number Suffix
 AH286-YL-13	Y	SOT89-5L	2500/Tape & Reel	-13

- Notes:
1. 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)
  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>.

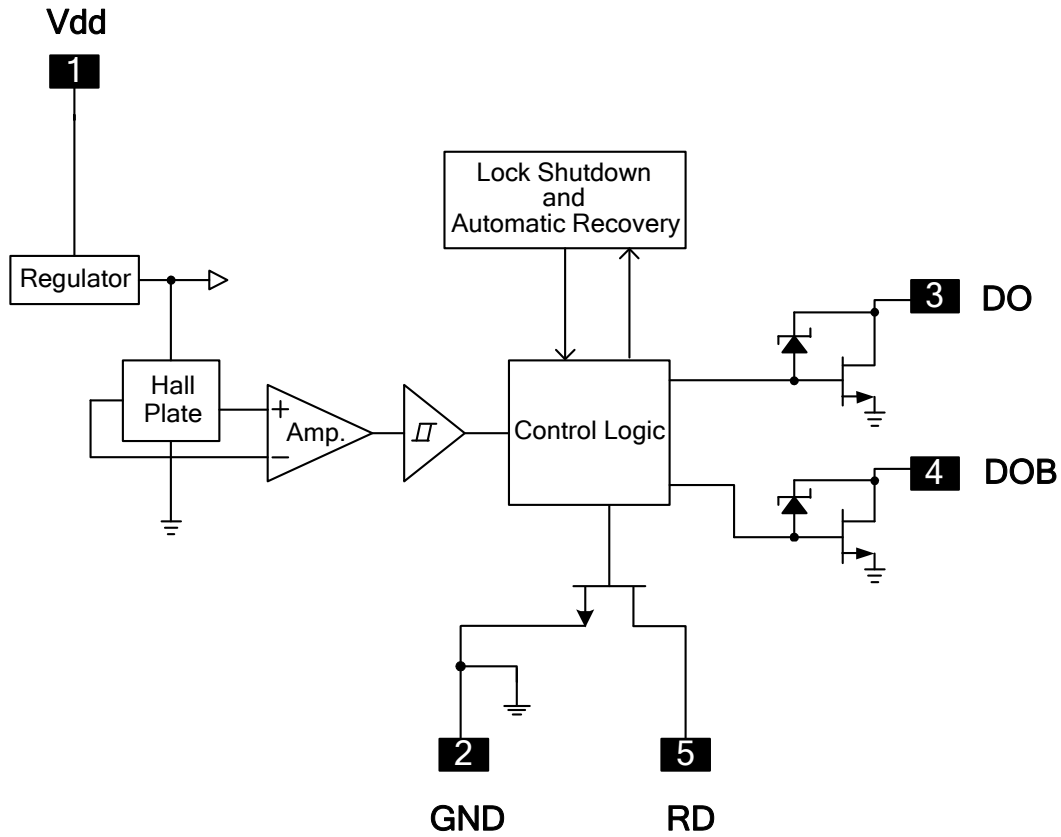
### Pin Assignment



### Pin Descriptions

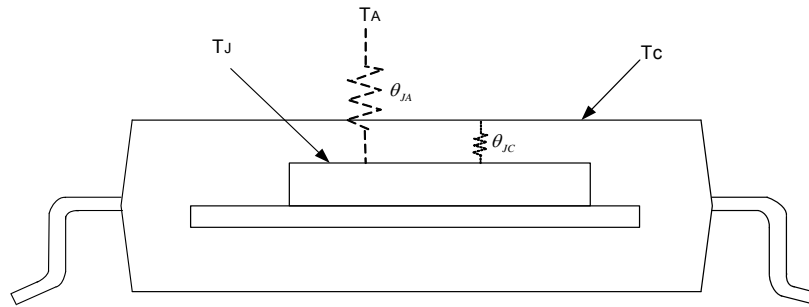
Pin Name	Description
RD	Rotor-state detection
Vdd	Input power
DO	Output pin
DOB	Output pin
GND	Ground

**Block Diagram**



### Absolute Maximum Ratings (T<sub>A</sub> = 25°C)

Symbol	Characteristics	Rating	Unit
V <sub>dd</sub>	Supply Voltage	24	V
I <sub>o</sub>	Output Current	I <sub>o</sub> (AVE)	500 mA
		I <sub>o</sub> (PEAK)	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
θ <sub>JA</sub>	Thermal Resistance Junction-to-Case (Note 3)	156	°C/W



Notes: 3. θ<sub>JA</sub> should be confirmed with what heat sink thermal resistance. If no heat sink contacting, θ<sub>JA</sub> is almost the same as θ<sub>JC</sub>.

### Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Max	Unit
V <sub>dd</sub>	Supply Voltage	Operating	3.8	20	V
T <sub>A</sub>	Operating Ambient Temperature	Operating	-40	100	°C

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

Symbol	Characteristics	Conditions	Min	Typ.	Max	Unit
I <sub>DD</sub>	Supply current	Operating	-	2.0	4.0	mA
I <sub>OFF</sub>	Output Leakage Current	V <sub>OUT</sub> =24V	-	< 0.1	10	μA
T <sub>lrp-on</sub>	Locked Protection On		0.4	0.5	0.6	Sec
T <sub>lrp-off</sub>	Locked Protection Off		2.4	3	3.6	Sec
V <sub>OUT(sat)</sub>	Output saturation voltage	I <sub>O</sub> =300mA	-	375	500	mV
		I <sub>O</sub> =500mA	-	625	900	
R <sub>DS(on)</sub>	Output On resistance	I <sub>O</sub> =300mA	-	1.25	1.67	ohm
V <sub>OL</sub>	RD output V <sub>DS</sub>	I <sub>O</sub> =10mA	-	0.5	-	V
V <sub>Z</sub>	Output Zener-breakdown Voltage		35	42	60	V

**Truth Table**

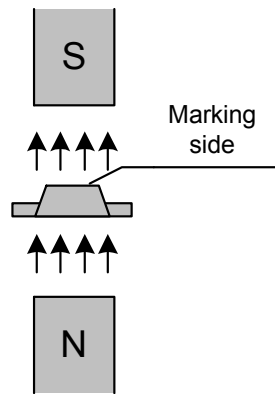
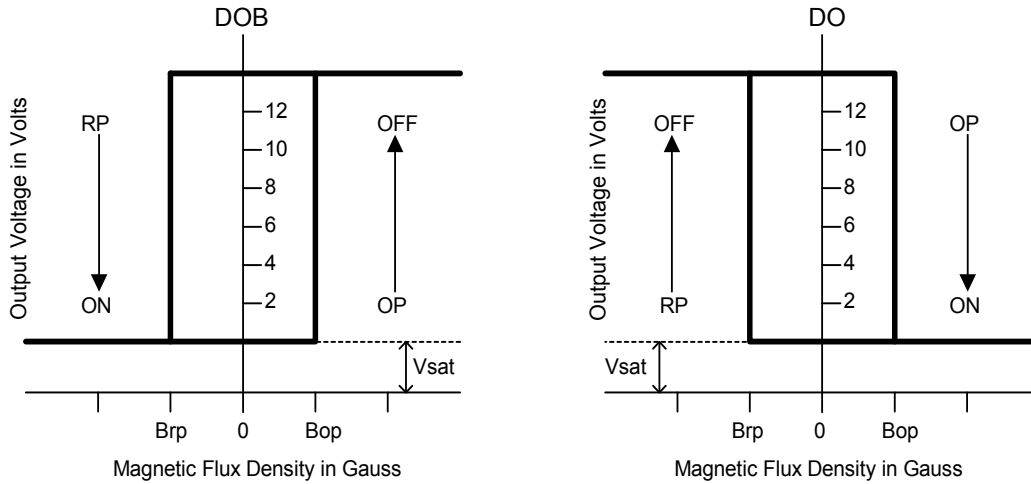
IN-	IN+	CT	OUT1	OUT2	RD	Mode
H	L	L	H	L	L	Rotating
L	H	L	L	H	L	Rotating
-	-	H	off	off	H	Lockup protection activated

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

(1mT=10 Gauss)

Symbol	Characteristics	Min	Typ.	Max	Unit
B <sub>OP</sub>	Operate Point	10	30	60	Gauss
B <sub>RP</sub>	Release Point	-60	-30	-10	Gauss
B <sub>HY</sub>	Hysteresis	--	60	--	Gauss

**Operating Characteristics**

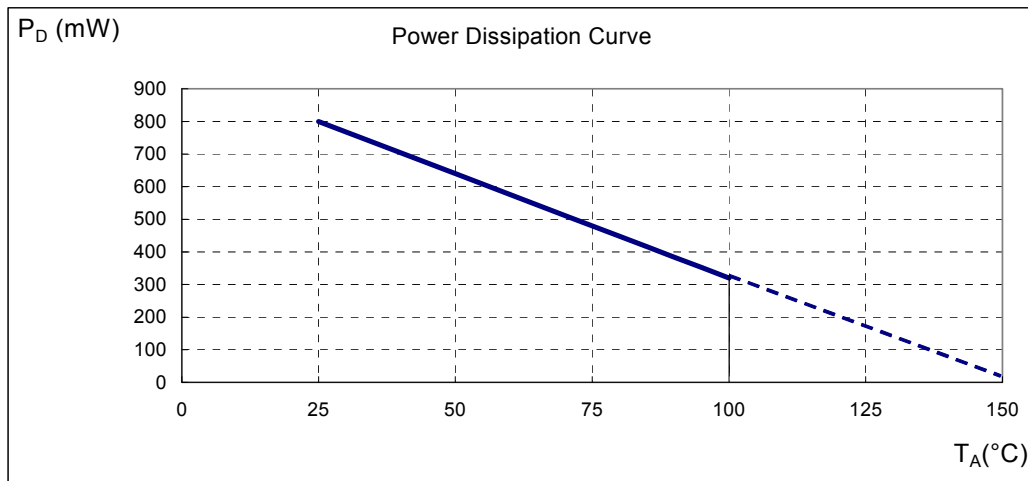


**( SOT89-5L )**

**Performance Characteristics**

(1) SOT89-5L

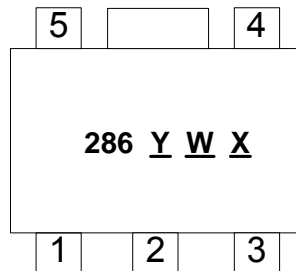
$T_A$ (°C)	25	50	60	70	75	80	85	90	95	100
$P_D$ (mW)	800	640	576	512	480	448	416	384	352	320
$T_A$ (°C)	105	110	115	120	125	130	135	140	145	150
$P_D$ (mW)	288	256	224	192	160	128	96	64	32	0



**Marking Information**

(1) SOT89-5L

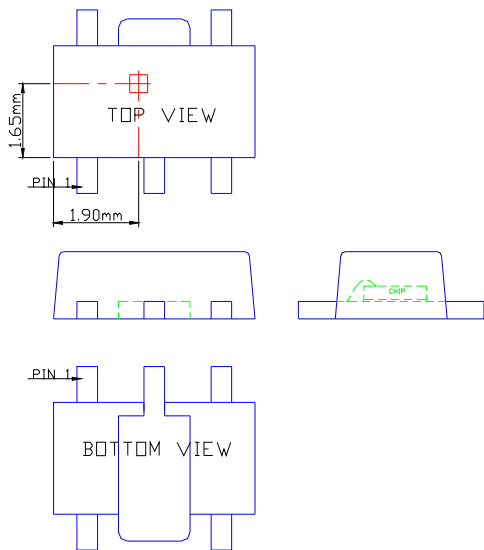
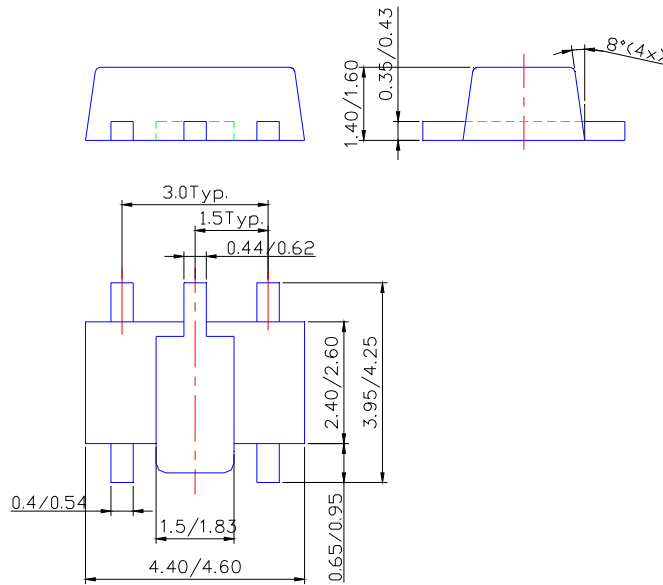
( Top View )



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 : Lead Free

**Package Information (All Dimensions in mm)**

**(1) SOT89-5L**



**Sensor Location**



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