AH287

HIGH VOLTAGE HALL-EFFECT SMART FAN MOTOR CONTROLLER

Features

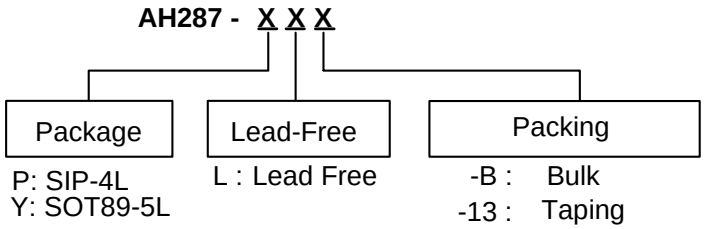
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~28V
- Output current: $I_{O(AVE)}$ = 400mA
- Lead Free Finish/RoHS Compliant for Lead Free products (Note 1)
- Lead Free Packages: SIP-4L and SOT89-5L

General Description

AH287 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-drain drivers for motor's coil driving, automatic lock shutdown and restart function relatively.

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

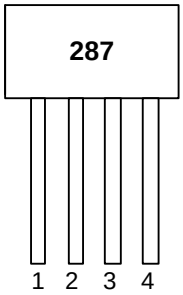


Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

Device	Package Code	Packaging (Note 2)	Tube/Bulk		7" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH287-P	P	SIP-4L	1000	-B	NA	NA
AH287-Y	Y	SOT89-5L	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



Front View

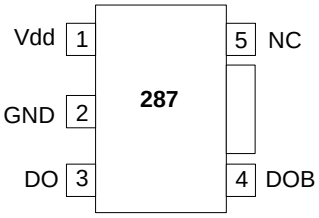
1 : Vdd

2 : DO

3 : DOB

4 : GND

SIP-4L

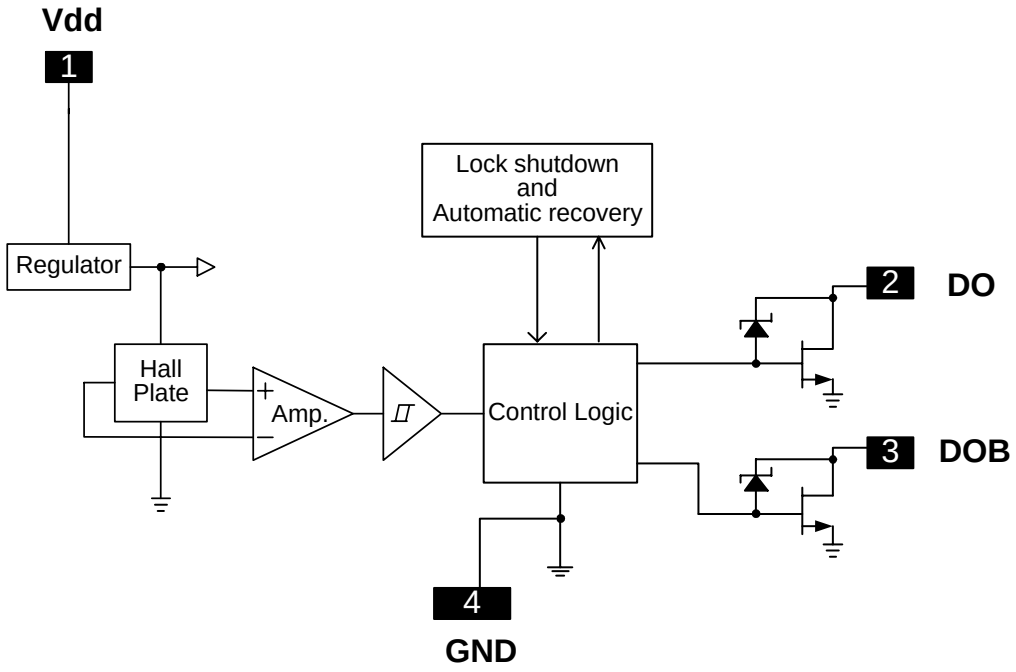


SOT89-5L

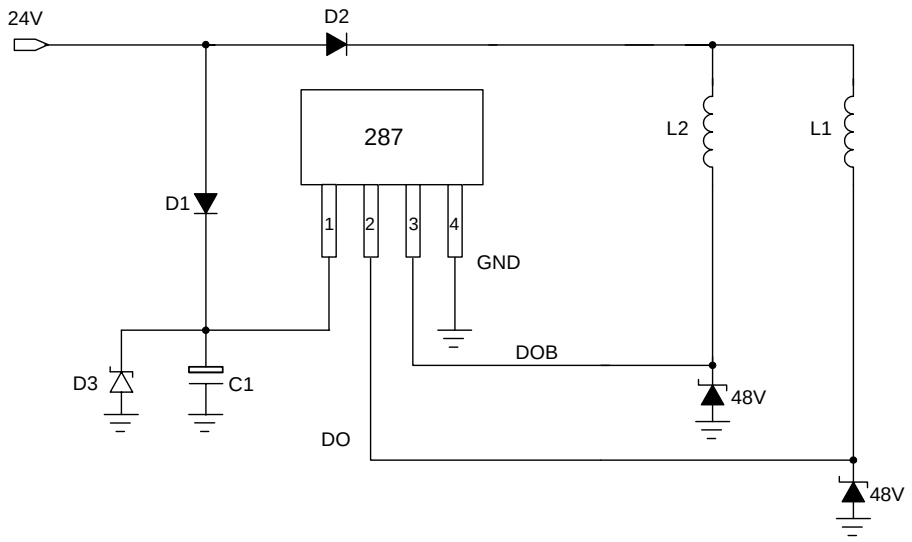
Pin Descriptions

Name	Description
Vdd	Input power
DO	Output pin
DOB	Output pin
GND	Ground
NC	Not connected

Block Diagram (SIP-4L)



Typical Application Circuit (SIP-4L)

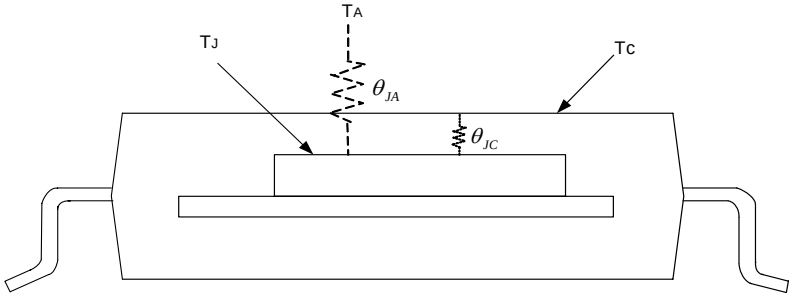


24V brush-less DC fan

Note: 3. The optional Capacitor C1 and Diode D3 are for power stabilization. C1 is recommended to be E-Cap., luF/25V; D3 is recommended to be Zener Diode, V_Z=27V. Which C1and D3 value need to be fine tuned to optimize design for different coils and power suppliers.

Absolute Maximum Ratings (T_A = 25°C)

Characteristics	Symbol		Rating	Unit
Supply Voltage	Vdd		30	V
Output Current	$I_{O(AVE)}$	SIP-4L/SOT89-5L	400	mA
	$I_{O(PEAK)}$		700	
Power Dissipation	P_D	SIP-4L	550	mW
		SOT89-5L	800	
Operating Temperature	Topr		-40 ~ 100	°C
Storage Temperature	Tstg		-55 ~ 150	°C
Maximum Junction Temp.	T_j		150	°C
Thermal Resistance	θ_{JA}	SIP-4L	227	°C/W
		SOT89-5L	156	°C/W



Note: 4. 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}.

Electrical Characteristics (T$_A$ = 25 °C, Vdd =24V, unless otherwise specified)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	Vdd	Operating	3.8	-	28*	V
Supply current	Icc	Operating	-	2.0	4.0	mA
Output Leakage Current	Ioff	V_{OUT}=24V	-	< 0.1	10	µA
Locked Protection On	Tlrp-on		0.4	0.46	0.6	Sec
Locked Protection Off	Tlrp-off		2.4	2.76	3.6	Sec
Output saturation voltage	$V_{OUT(sat)}$	I_O=200mA	-	450	700	mV
		I_O=300mA	-	680	800	
Output On resistance	Rds(on)	I_O=200mA	-	2.25	3.5	ohm
Output Zener-breakdown Voltage	Vz		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.

Truth Table

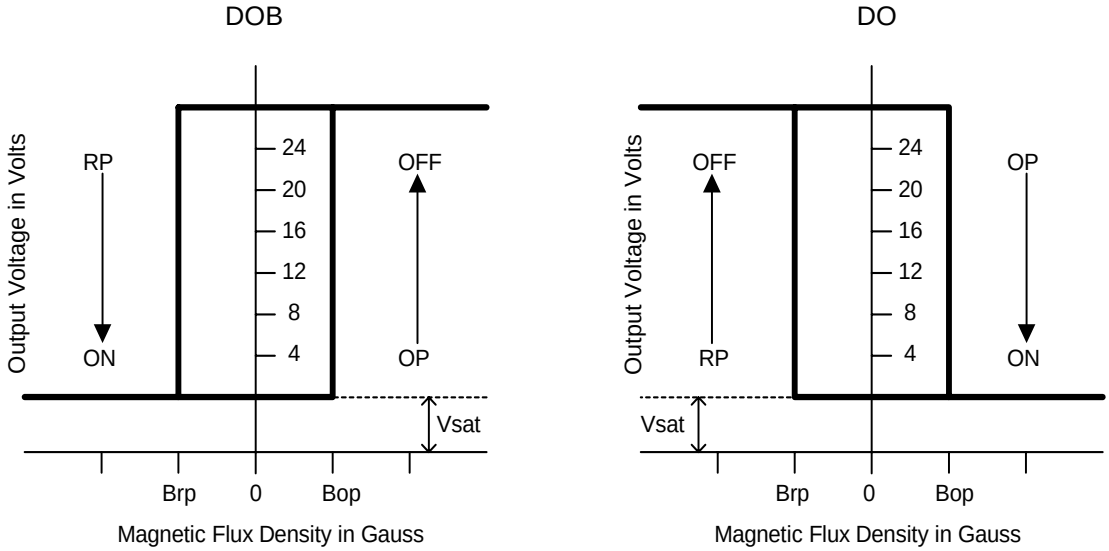
IN-	IN+	CT	OUT1	OUT2	Mode
H	L	L	H	L	Rotating
L	H	L	L	H	Rotating
-	-	H	off	off	Lockup protection activated

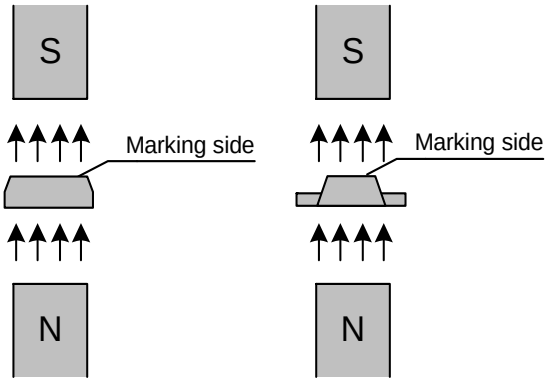
Magnetic Characteristics (TA = 25 °C, Vdd = 24V, unless otherwise specified)

(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

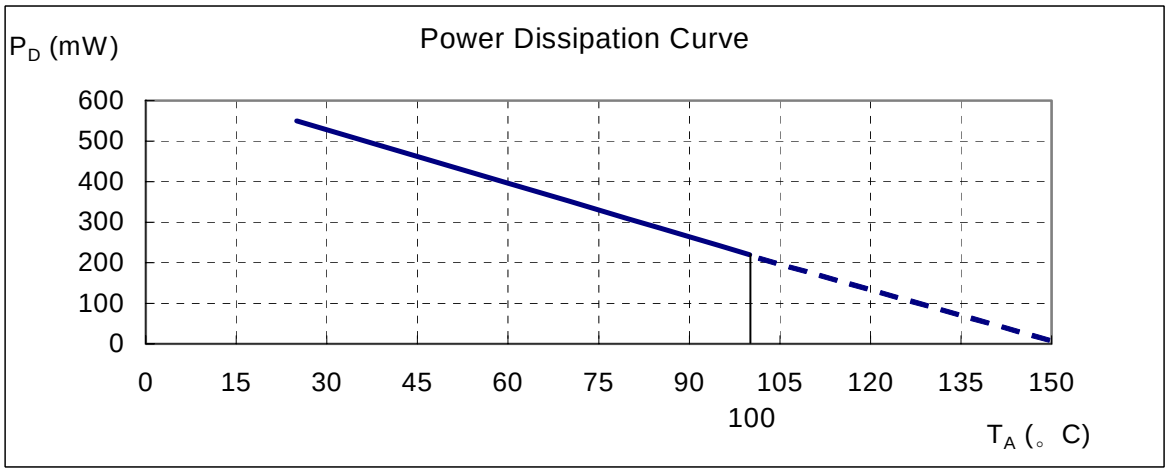
Operating Characteristics





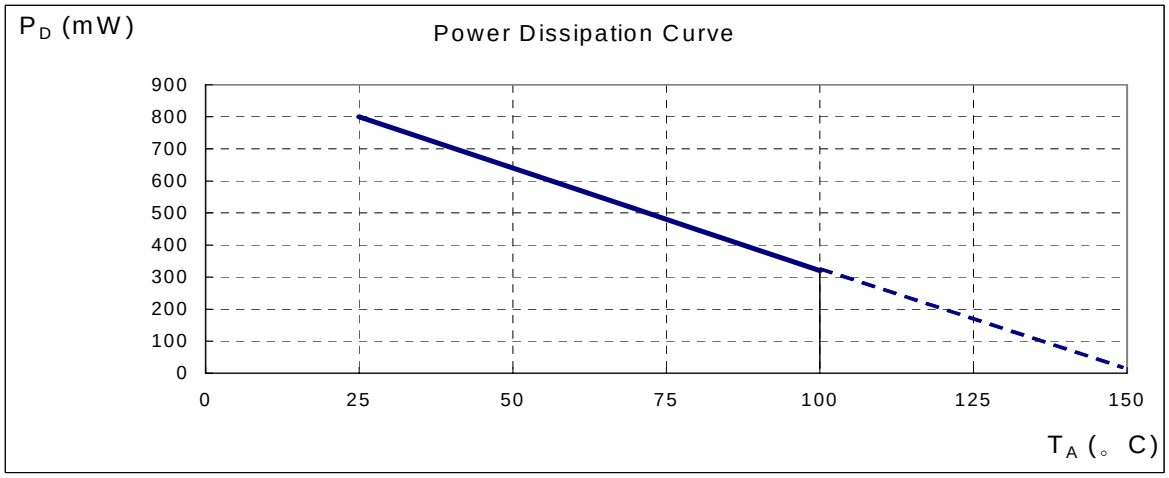
Performance Characteristics (SIP-4L)

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



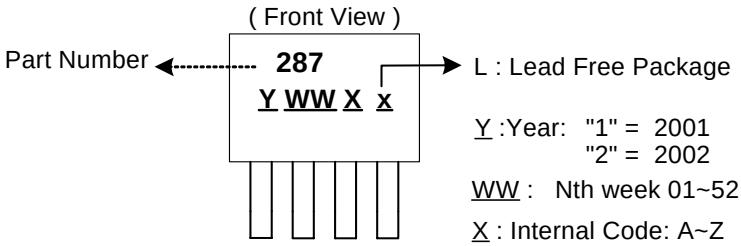
Performance Characteristics (SOT89-5L)

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

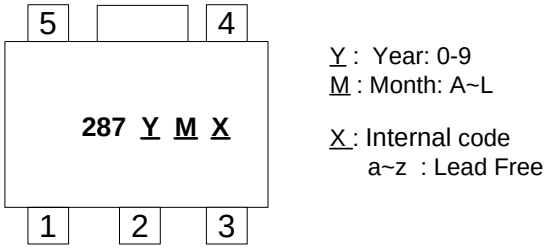


Marking Information

(1) SIP-4L



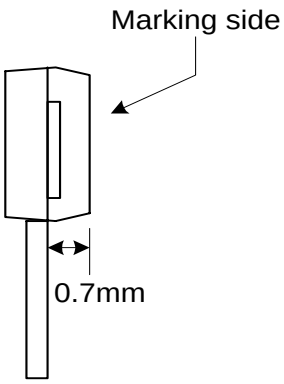
(2) SOT89-5L



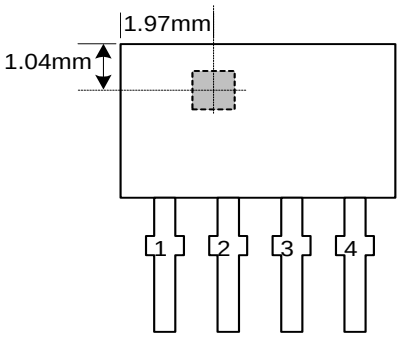
Package Information (unit: mm)

(1) SIP-4L

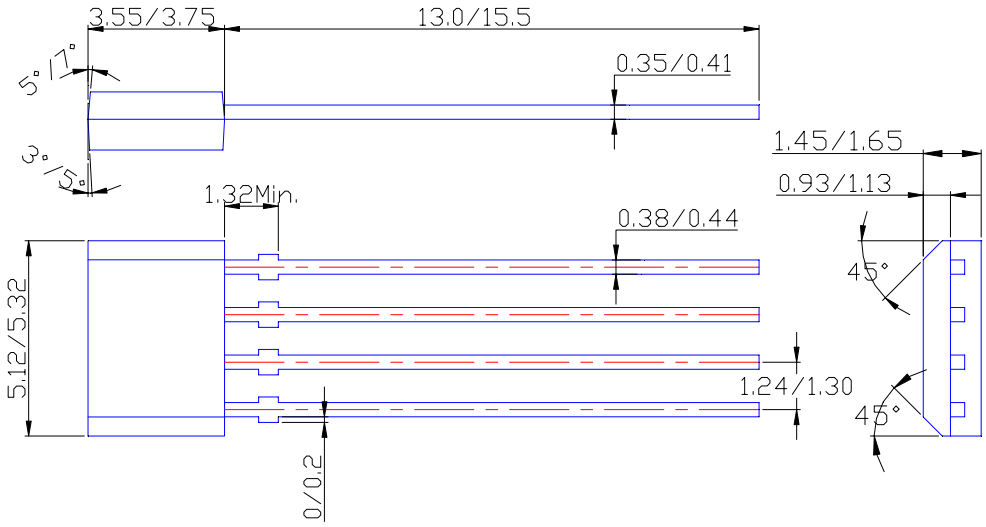
Active Area Depth



Package Sensor Location

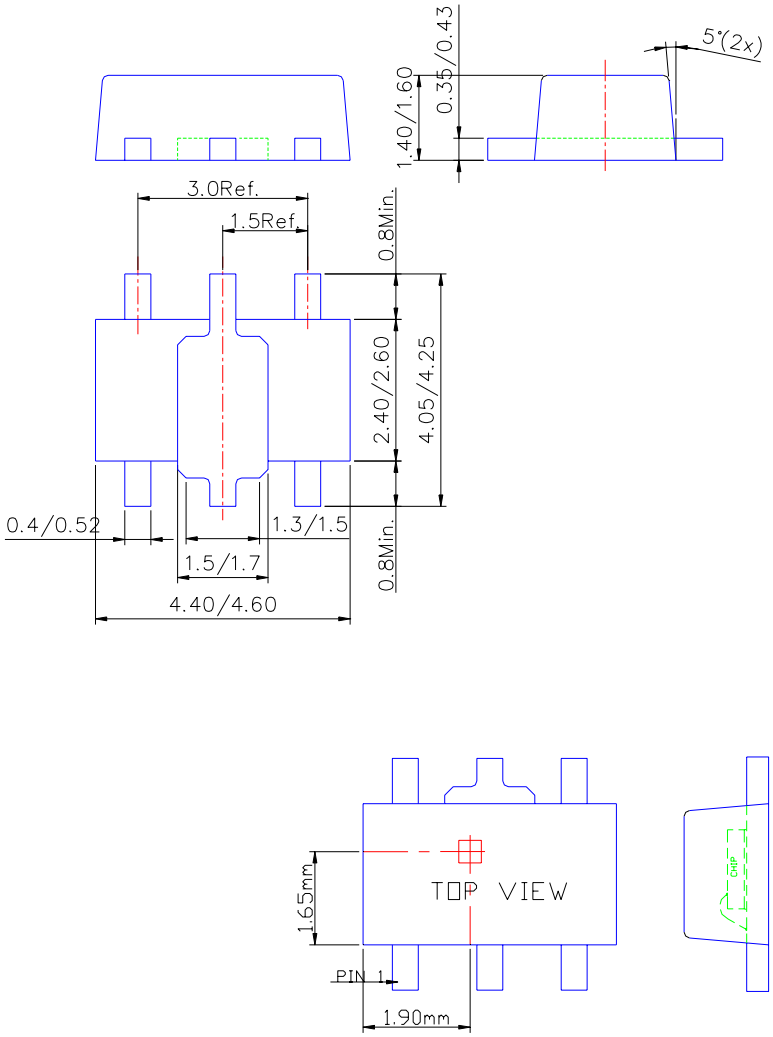


Package Dimension



Package Information (Continued)

(2) SOT89-5L



Sensor Location

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