AH291

LOW VOLTAGE HALL-EFFECT SMART FAN MOTOR CONTROLLER

Features

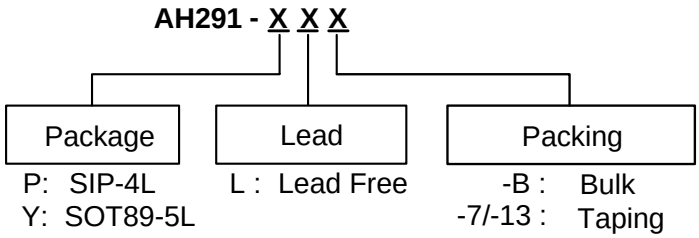
- On Chip Hall Sensor
- Rotor-Locked Shutdown
- Automatically Restart
- Built-in Zener Protection for Output Driver
- Operating Voltage: 1.8V~5.75 V
- Output Current: $I_{O(AVE)}$ = 400 mA
- Lead Free Packages: SIP-4L and SOT89-5L

General Description

AH291 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-collector 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
AH291-P	P	SIP-4L	1000	-B	NA	NA
AH291-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.

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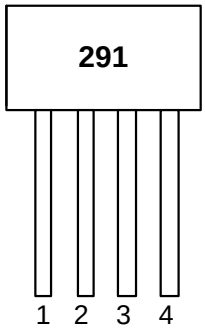
Pin Assignment



Front View

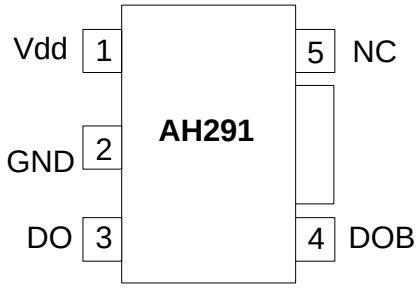
1 : V_{dd}

2 : DO

3 : DOB

4 : GND

SIP-4L



SOT89-5L

Pin Descriptions

Name	Description
V_{dd}	Input Power
DO	Output Pin
DOB	Output Pin
GND	Ground
NC	Not Connected

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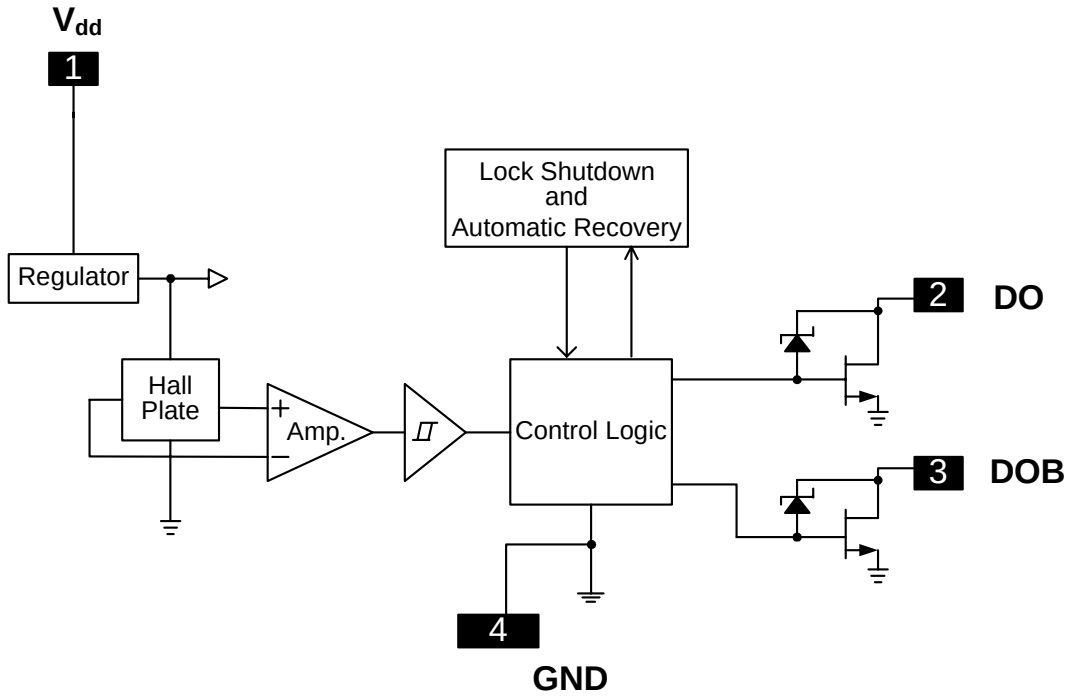
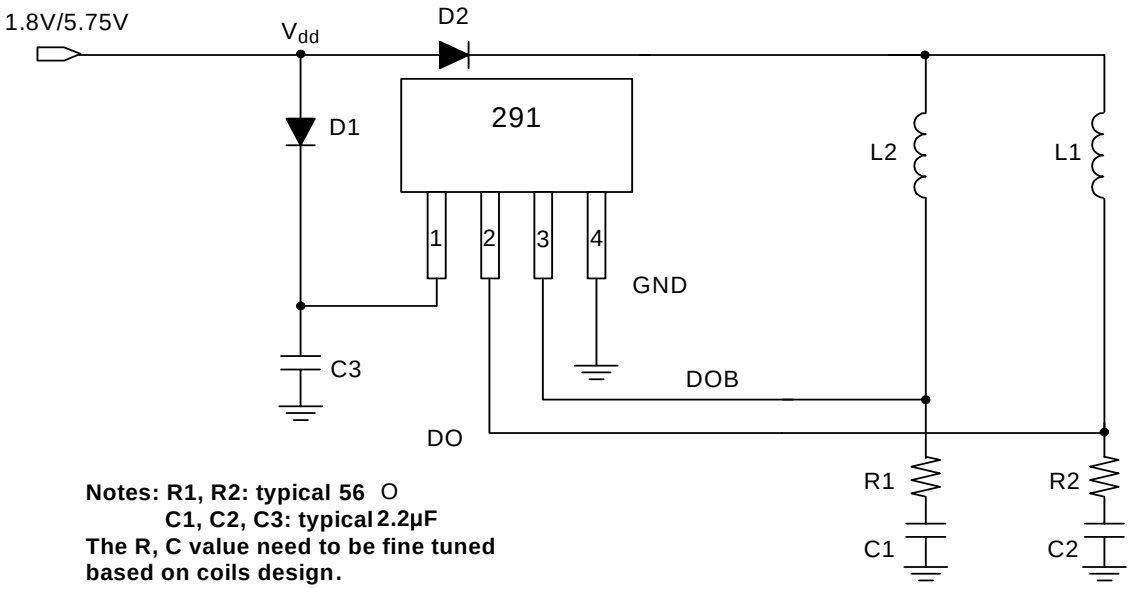
Block Diagram (SIP-4L)



Typical Application Circuit



Notes: R1, R2: typical 56 Ω
C1, C2, C3: typical 2.2μF
The R, C value need to be fine tuned based on coils design.

1.8V/5.75V Brush-Less DC Fan

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Absolute Maximum Ratings (T_A = 25°C)

Characteristics	Symbol		Rating	Unit
Operating Supply Voltage	V_{dd}		8	V
Output Current	$I_{O(AVE)}$		400	mA
	$I_{O(PEAK)}$		700	
Power Dissipation	P_D	SIP-4L	550	mW
		SOT89-5L	800	
Operating Temperature	T_{opr}		-20 ~ 100	°C
Storage Temperature	T_{stg}		-55 ~ 150	°C
Maximum Junction Temperature	Tj		150	°C

Electrical Characteristics (T_A = 25 °C, V_{dd} = 5V, unless otherwise specified)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{dd}	Operating	1.8*	-	5.75	V
Supply Current	I_{dd}	Operating	-	2.6	4.0	mA
Lock Protection On	T_{lrp-on}		-	0.4	-	Sec
Lock Protection Off	$T_{lrp-off}$		2.4	3	3.6	Sec
Output Saturation Voltage	$V_{OUT(SAT)}$	I_O = 180mA	-	300	-	mV
		I_O = 350mA	-	600	-	
Output On Resistance	$R_{ds(on)}$		-	1.75	-	ohm
Output Zener-Breakdown Voltage	V_z		-	15	-	V

*Note: The output of IC will be switched after the supply voltage is over 1.8V, but the magnetic characteristics won't be normal until the supply is over 2.0V.

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

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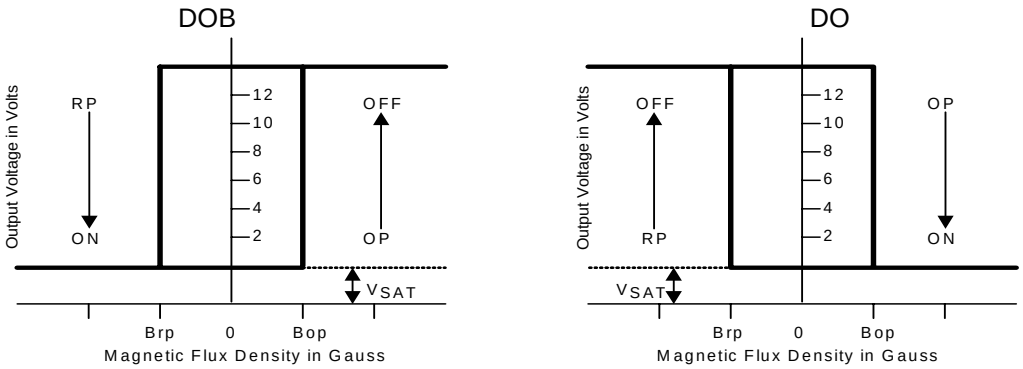
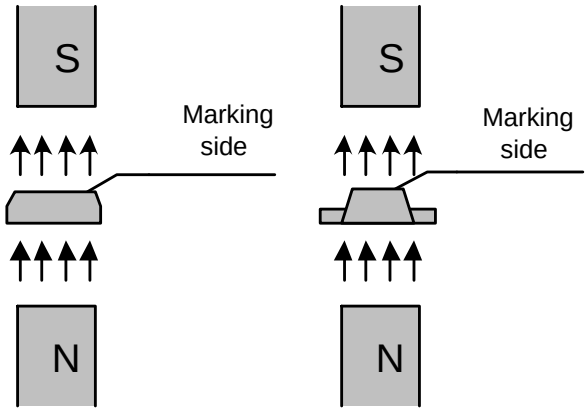
Magnetic Characteristics (T_A = 25 °C, V_{dd} = 5V, unless otherwise specified)

(1mT = 10 Gauss)

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

Operating Characteristics





(SIP4) (SOT89-5)

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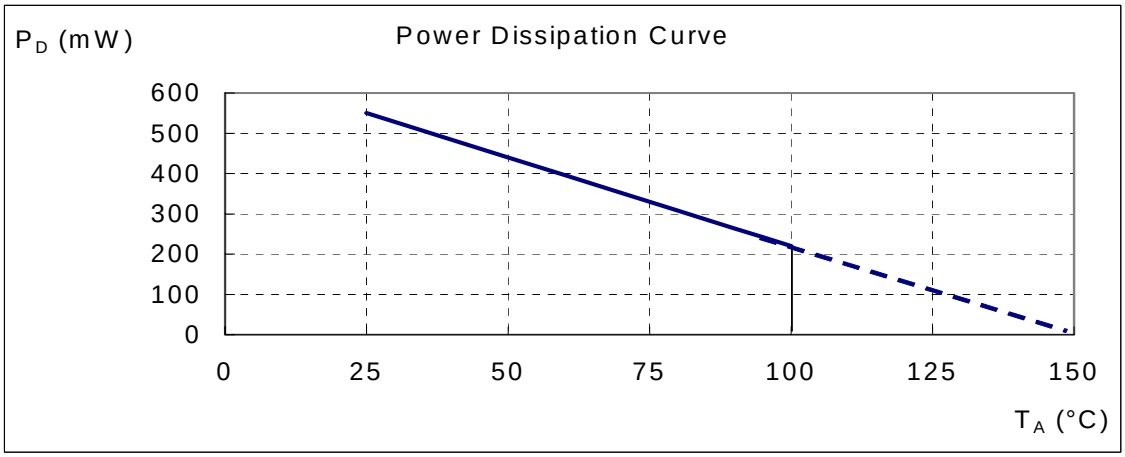
Performance Characteristics

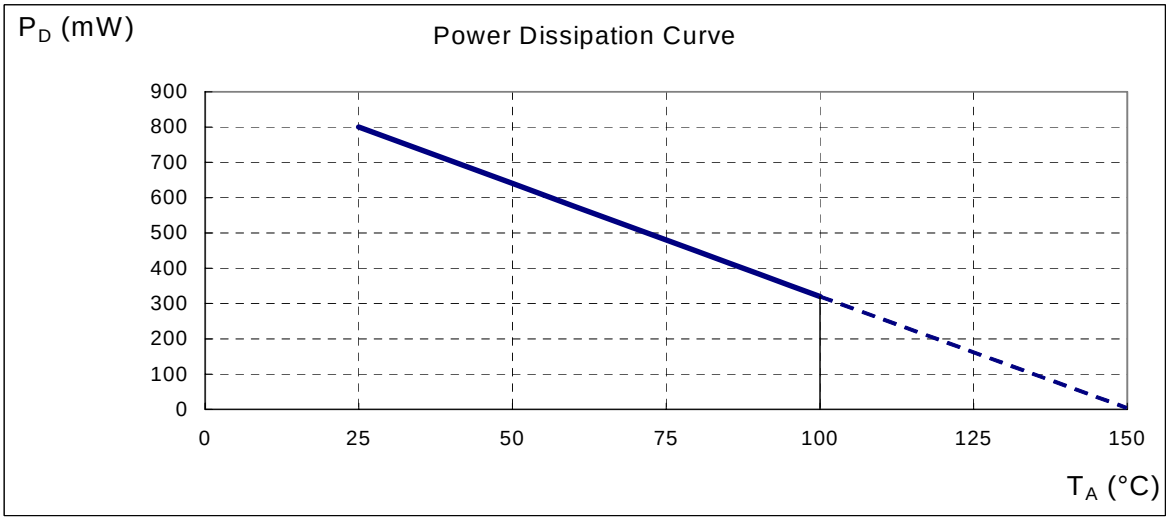
(1) SIP-4L

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



(2) 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



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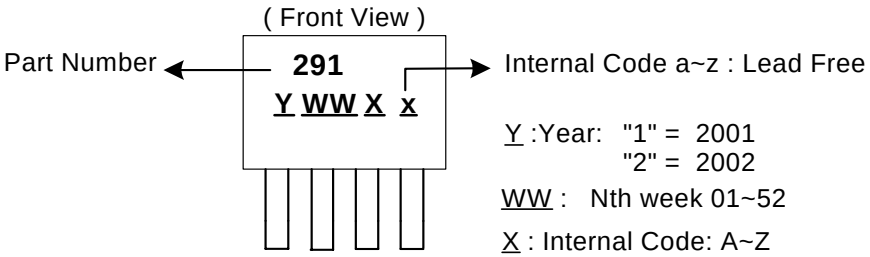
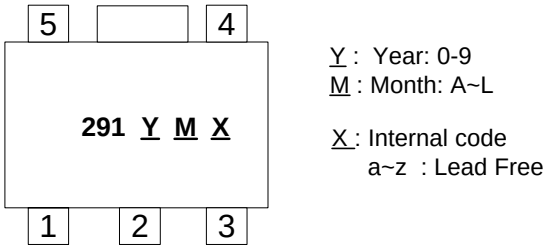
Marking Information

(1) SIP-4L



(2) SOT89-5L



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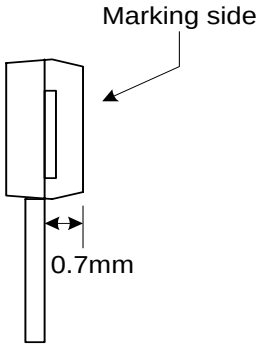
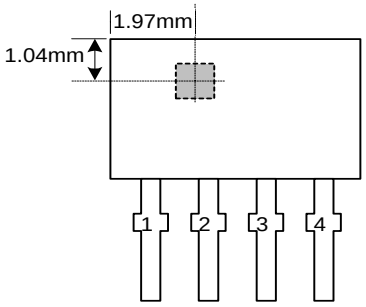
Package Information (unit: mm)

(1) SIP-4L

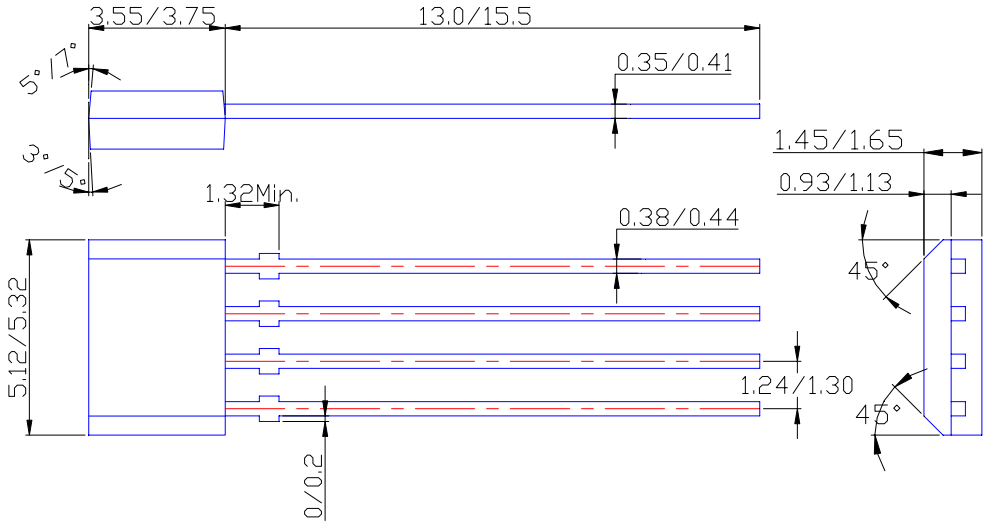
Active Area Depth



Package Sensor Location



Package Dimension



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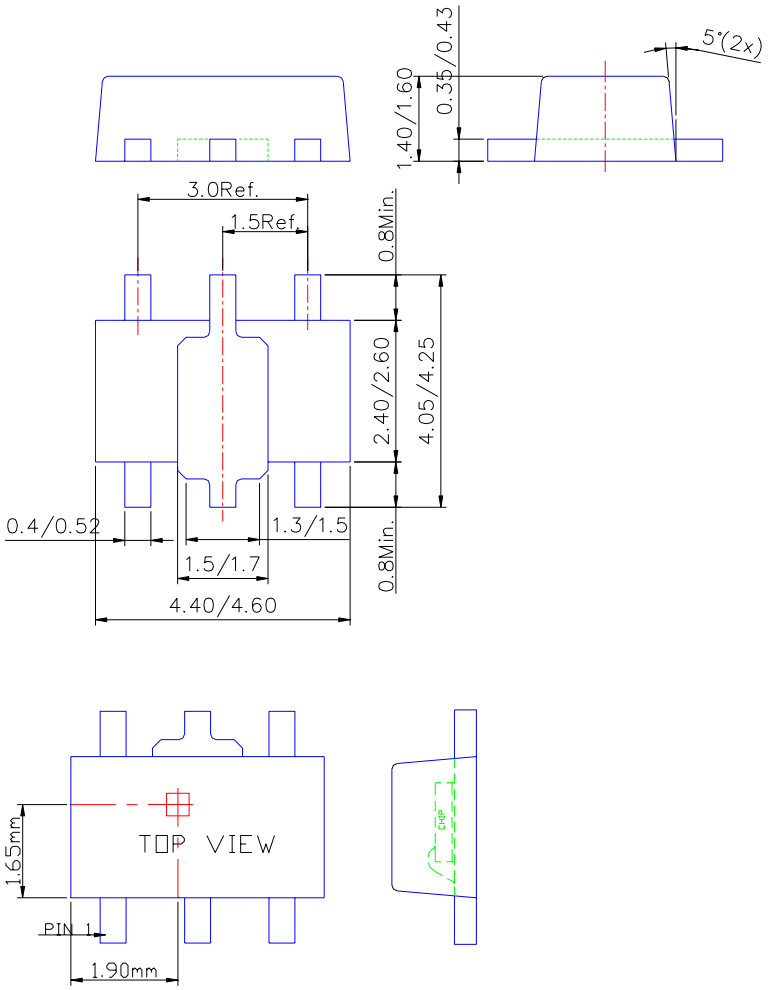
Package Information (Continued)

(2) SOT89-5L



Sensor Location

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