AH293

LOW VOLTAGE HALL-EFFECT SMART FAN MOTOR CONTROLLER

Features

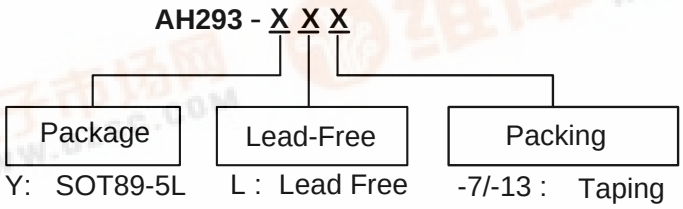
- On Chip Hall Sensor
- Rotor-Locked Shutdown
- Automatically Restart
- Rotor-State Detection (RD) Output
- Built-in Zener Protection for Output Driver
- Operating Voltage: 1.8V~5.75 V
- Output Current: $I_{O(AVE)}$ = 400 mA
- Lead Free Finish/RoHS Compliant for Lead Free products (Note 1)
- Packages: SOT89-5L

General Description

AH293 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-collector transistors for Motor's coil driving, automatic lock current shutdown, and recovery protections. Also, rotor-state detection (RD) output is for speed 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

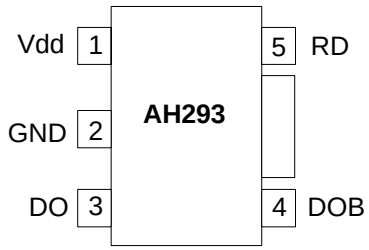


Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

Device	Package Code	Packaging (Note 2)	7" Tape and Reel	
			Quantity	Part Number Suffix
AH293-Y	Y	SOT89-5L	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

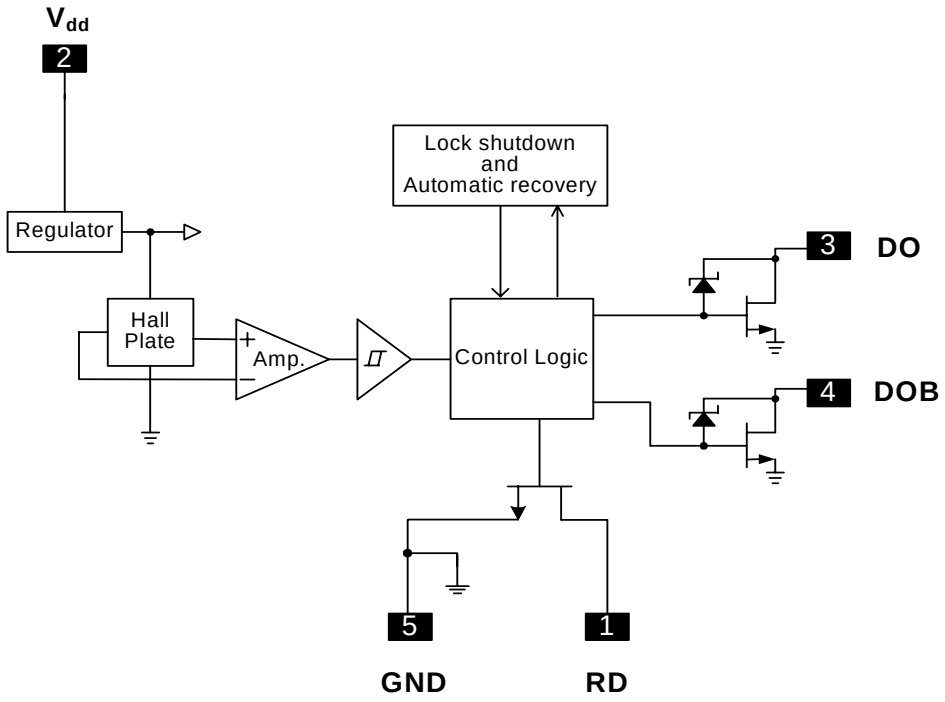


SOT89-5L

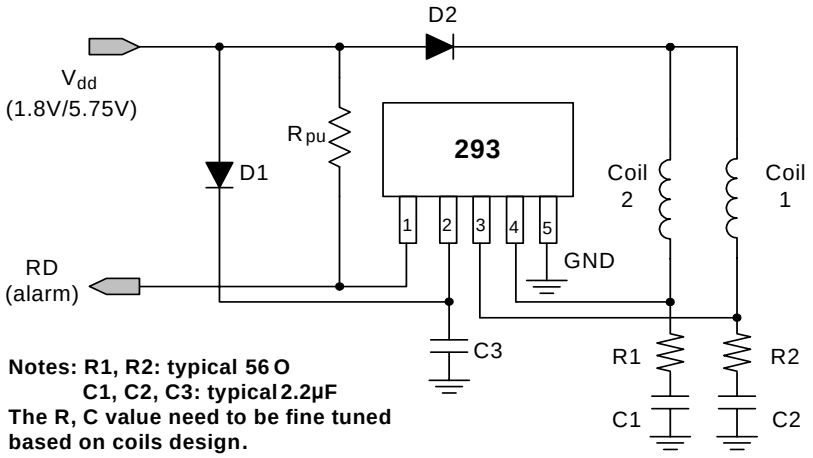
Pin Descriptions

Symbol	Description
RD	Rotor-State Detection
V_{dd}	Input Power
DO	Output Pin
DOB	Output Pin
GND	Ground

Block Diagram



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 DC Brush-Less Fan with RD Output Function

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 Dissipaton	P_D	800	mW
Operating Temperature	T_{op}	-20 ~ 100	°C
Storage Temperature	T_{st}	-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
Locked Protection On	T_{lrp-on}		-	0.4	-	Sec
Locked 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
RD Output Vds	V_{ol}	I_O = 10mA	-	0.5	-	V
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	RD	Mode
H	L	L	H	L	L	Rotating
L	H	L	L	H	L	Rotating
-	-	H	off	off	off	Lockup protection activated

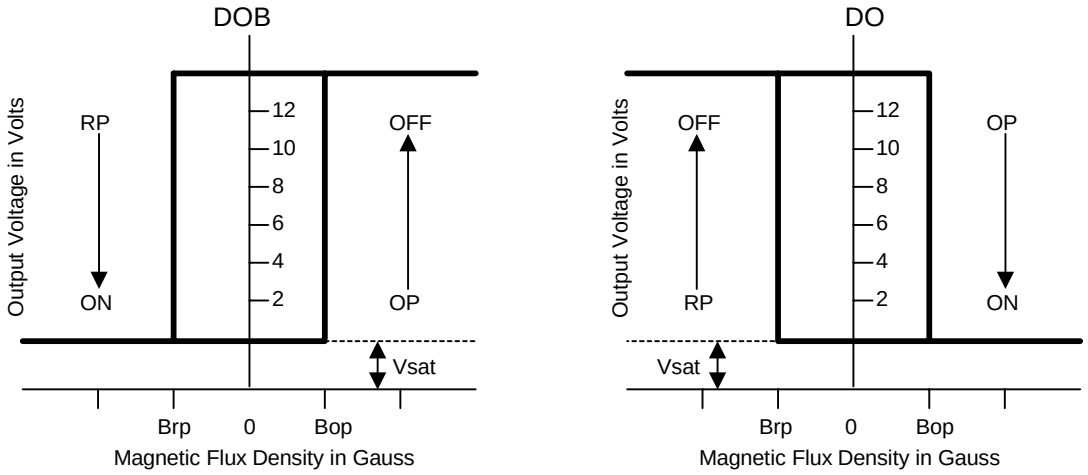
Latch-type RD output is low during rotation and high during stop

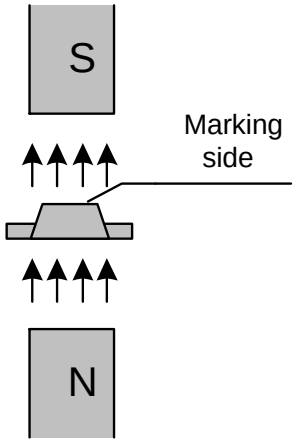
Magnetic Characteristics (T_A = 25 °C, V_{dd} = 5V, unless otherwise specified)

(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



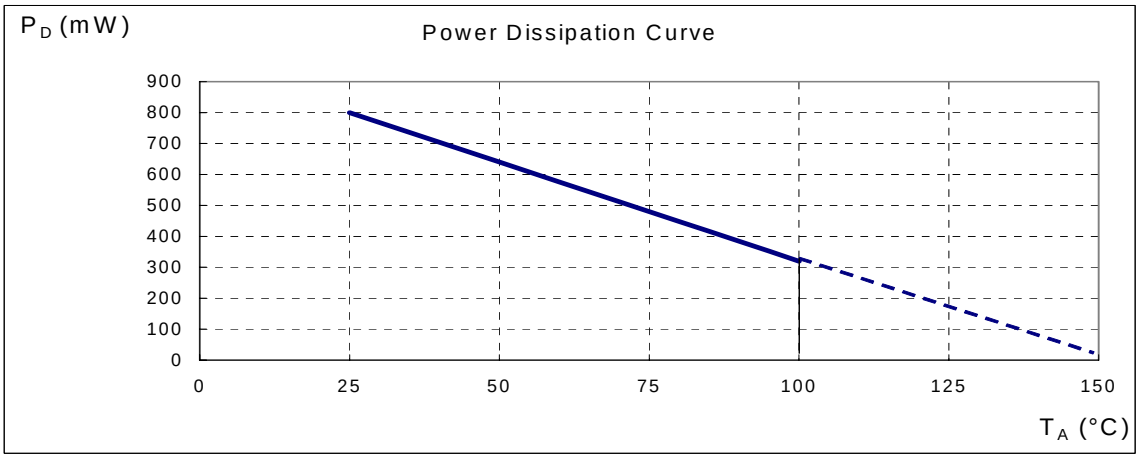


(SOT89-5)

Performance Characteristics

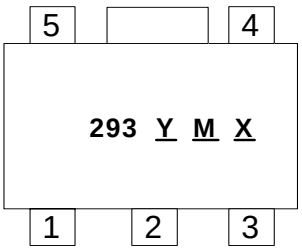
(1) SOT89-5L

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

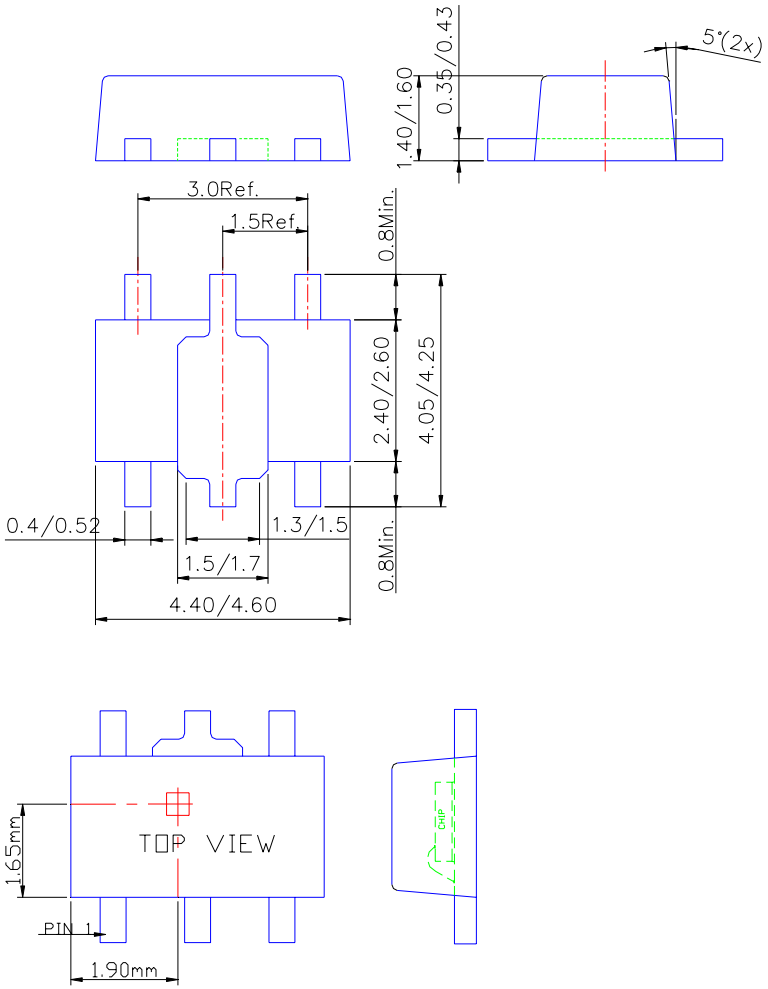


Y : Year: 0-9
M : Month: A~L

X: Internal code
a~z : Lead Free

Package Information (unit:mm)

(1) SOT89-5L



Sensor Location