HALL-EFFECT SMART FAN MOTOR CONTROLLER

Features

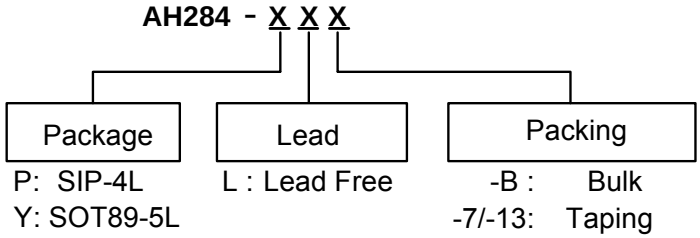
- On Chip Hall Sensor
- Rotor-Locked Shutdown
- Automatically Restart
- Built-in Zener Protection for Output Driver
- Operating Voltage: 3.8V~20 V
- Output Current: $I_{O(AVE)}$ = 500mA for SIP-4/SOT89-5
- Lead Free Finish/RoHS Compliant for Lead Free products (Note 1)
- Lead Free Packages: SIP-4L and SOT89-5L

General Description

AH284 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

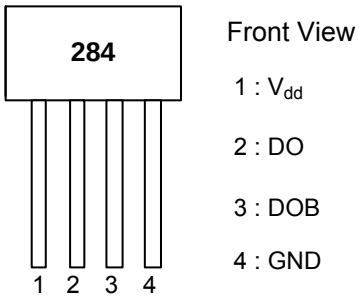


Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

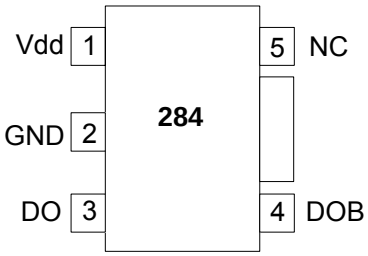
Device	Package Code	Packaging (Note 2)	Tube/Bulk		7" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH284-P	P	SIP-4L	1000	-B	NA	NA
AH284-Y	Y	SOT89-5	NA	NA	2500/Tape & Reel	-13

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.

Pin Assignment



SIP-4L

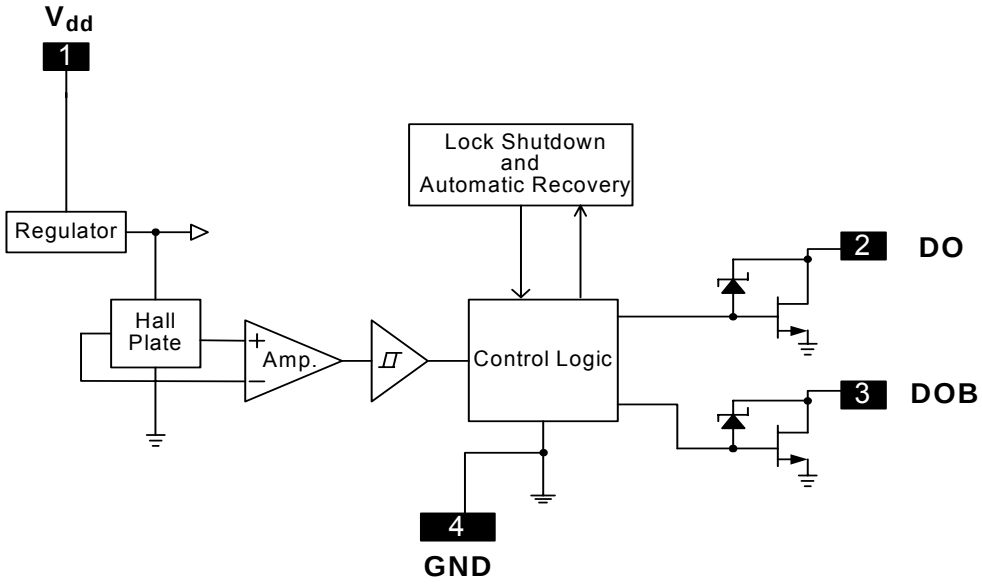


SOT89-5L

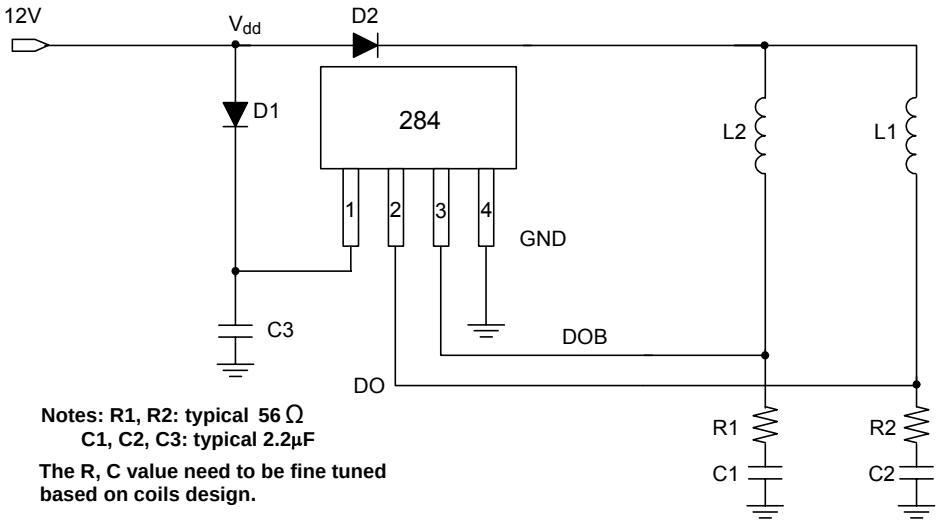
Pin Descriptions

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

Block Diagram



Typical Application Circuit (SIP-4L)



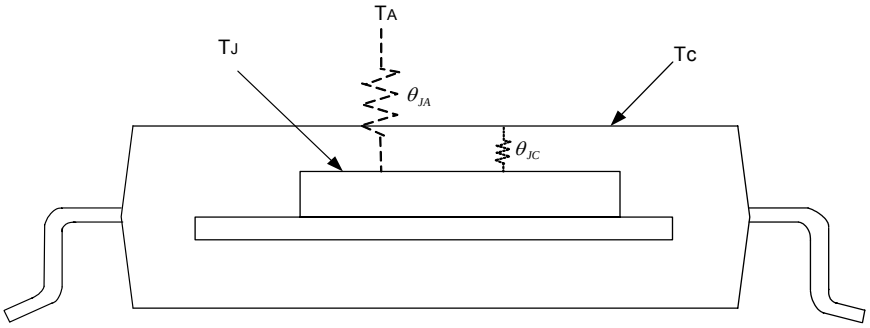
Notes: R1, R2: typical 56 Ω
C1, C2, C3: typical 2.2μF

The R, C value need to be fine tuned based on coils design.

12V Brush-Less DC Fan

Absolute Maximum Ratings (T_A = 25°C)

Characteristics	Symbol		Rating	Unit
Supply Voltage	V_{dd}		24	V
Output Current	$I_{O\ (AVE)}$	SIP4/SOT89-5	500	mA
	$I_{O\ (PEAK)}$		700	
Power Dissipation	P_D	SIP4	550	mW
		SOT89-5	800	
Operating Temperature	T_{opr}		-40 ~ 100	°C
Storage Temperature	T_{stg}		-55 ~ 150	°C
Maximum Junction Temp.	Tj		150	°C
Thermal Resistance	θ_{JA}	SIP4	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}.

Electrical Characteristics (T_A = 25 °C, V_{dd} =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
Output Zener-Breakdown Voltage	Vz		35	42	60	V

Truth Table

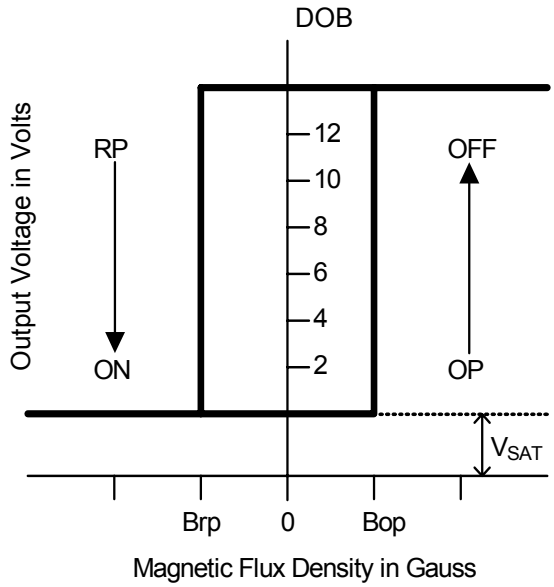
IN-	IN+	CT	OUT1	OUT2	Mode
H	L	L	H	L	Rotating
L	H	L	L	H	Rotating
-	-	H	off	off	Lockup protection activated

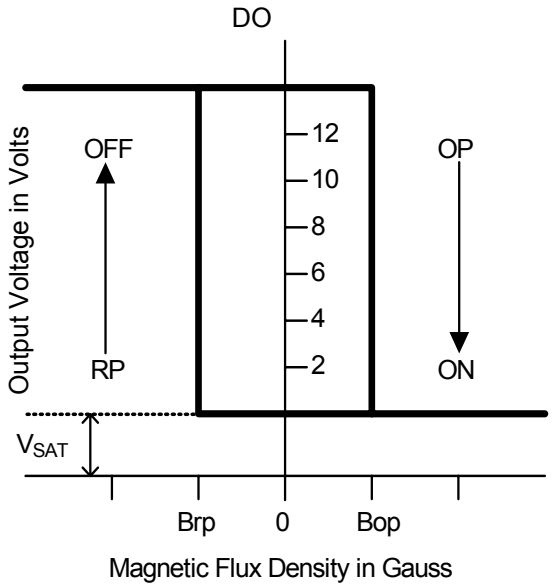
Magnetic Characteristics (T_A = 25 °C, V_{dd} = 12V, unless otherwise specified)

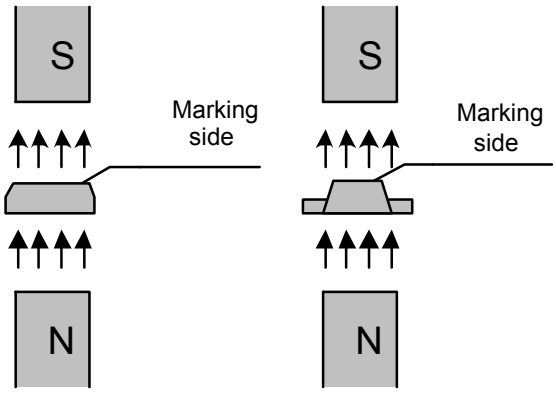
(1mT = 10 Gauss)

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

Operating Characteristics



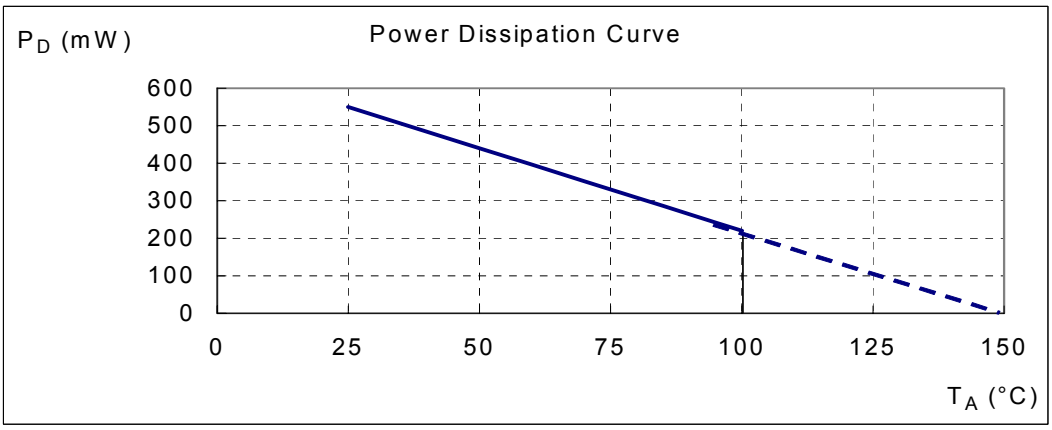




(SIP4) (SOT89-5)

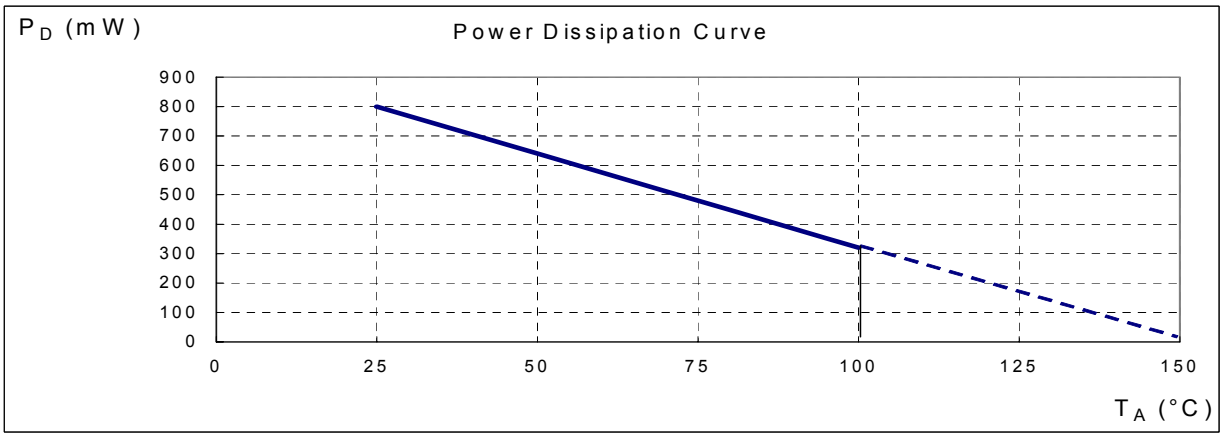
Performance Characteristics (SIP-4L)

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



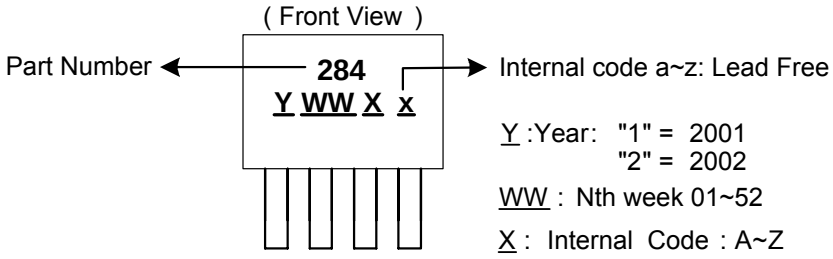
Performance Characteristics (SOT89-5L)

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

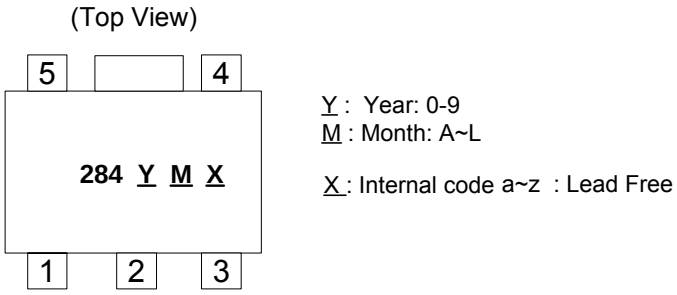


Marking Information

(1) SIP-4L



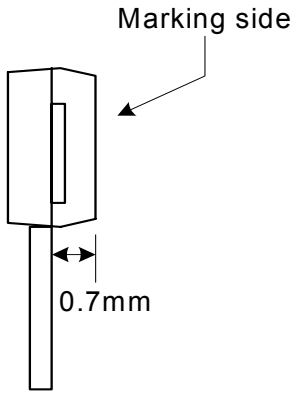
(2) SOT89-5L



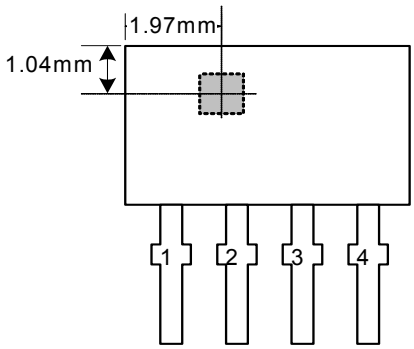
Package Information (unit: mm)

(1) SIP-4L

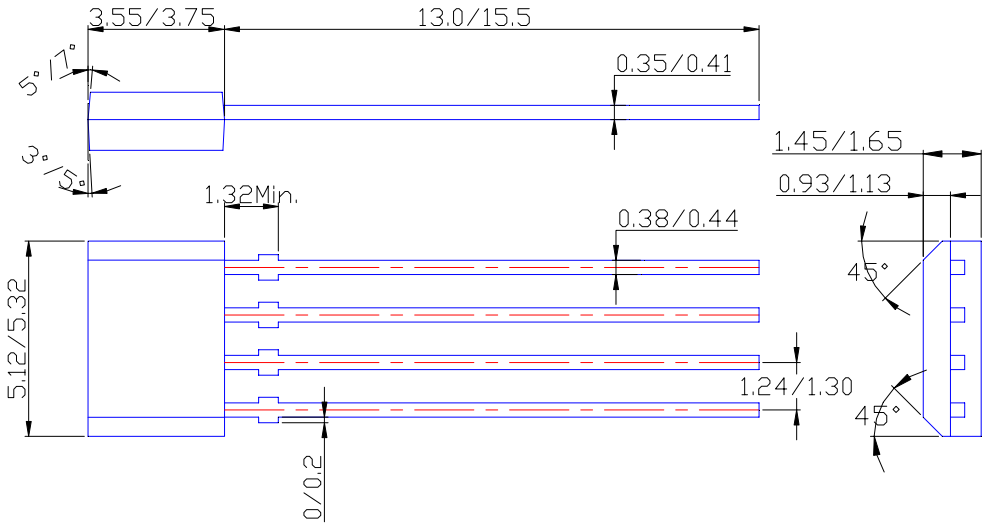
Active Area Depth



Package Sensor Location

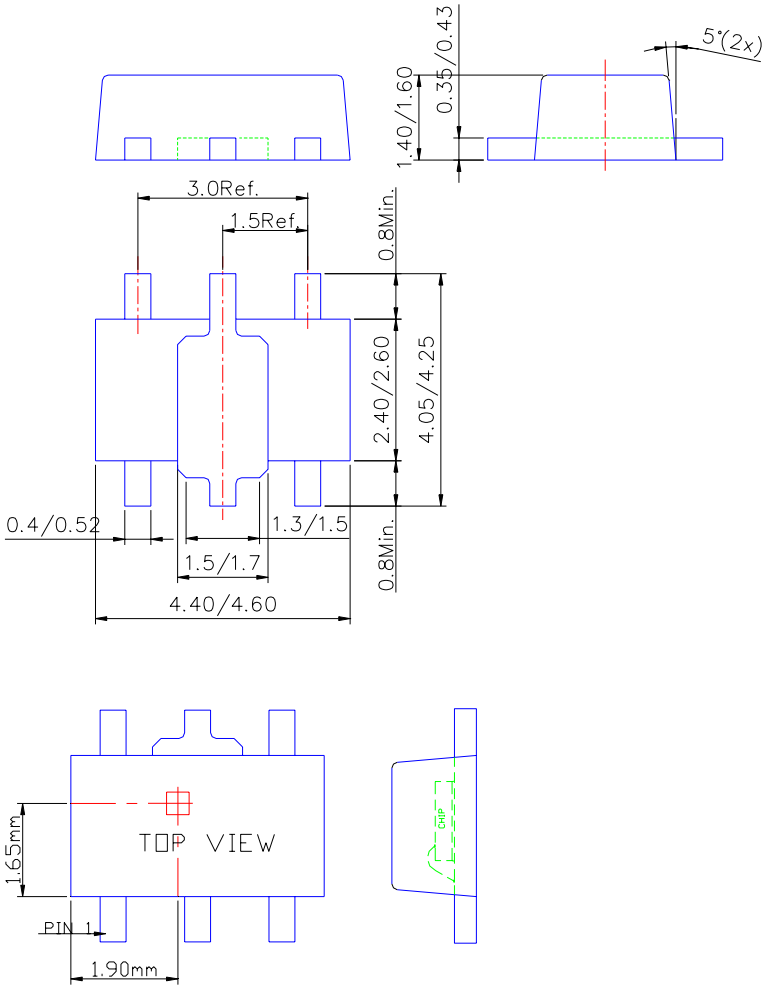


Package Dimension



Package Information (Continued)

(2) SOT89-5L



Sensor Location