HIGH VOLTAGE HALL-EFFECT SMART FAN MOTOR CONTROLLER

Features

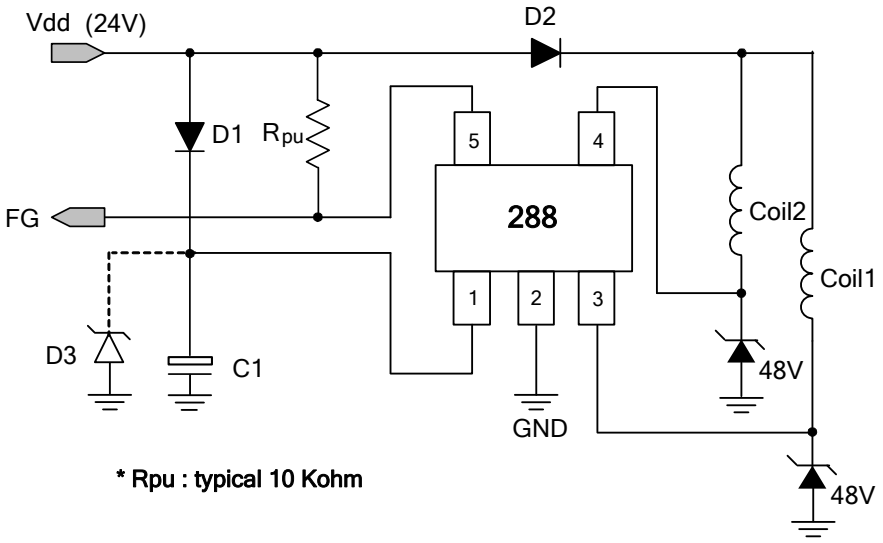
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Frequency generator (FG) output
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~28V
- Output current: $I_{O(AVE)}$ = 400mA
- Lead Free Package: SOT89-5L (Note 1)
- SOT89-5L: Available in “Green” Molding Compound (No Br, Sb)
- Lead Free Finish/RoHS Compliant (Note 2)

General Description

AH288 is a monolithic fan motor controller with Hall sensor’s capability. It contains two complementary open-drain transistors as motor coil drivers, automatic lock current shutdown, and recovery protections. Additional, frequency generator (FG) output is for speed detection 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.

Typical Application Circuit



Note: The optional Capacitor C1 and Diode D3 are for power stabilization. C1 is recommended to be E-Cap., IuF/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.

24V DC Brush-less Fan with FG output function

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Ordering Information

AH288 - Y L - 13

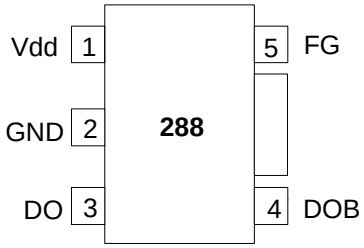
Package	Lead Free	Packing
Y : SOT89-5L	L : Lead Free (Note 1) G : Green	13 : Tape & Reel

Device	Package Code	Packaging (Note 3)	13" Tape and Reel	
			Quantity	Part Number Suffix
AH288-YL-13	Y	SOT89-5L	2500/Tape & Reel	-13
AH288-YG-13	Y	SOT89-5L	2500/Tape & Reel	-13

Notes:
1. AH288-YL-13 will be replaced by AH288-YG-13
2. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
3. 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.
4. Reverse taping as shown on Diodes Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website http://www.diodes.com/datasheets/ap02007.pdf.

Pin Assignments

(Top View)



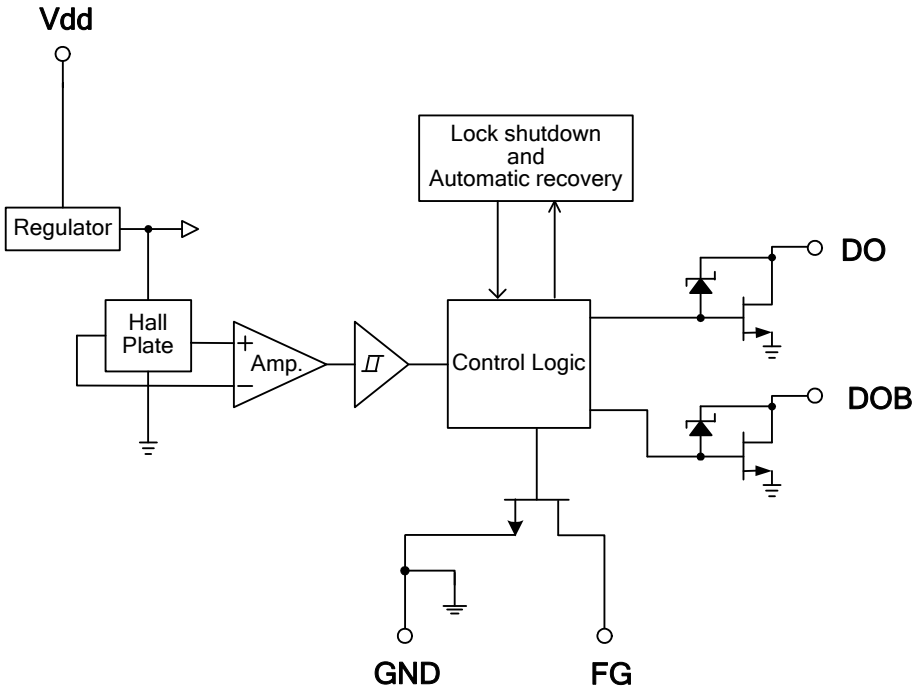
SOT89-5L

Pin Descriptions

Pin Name	Pin No.	Description
Vdd	1	Input power
GND	2	Ground
DO	3	Output pin
DOB	4	Output pin
FG	5	Frequency generation

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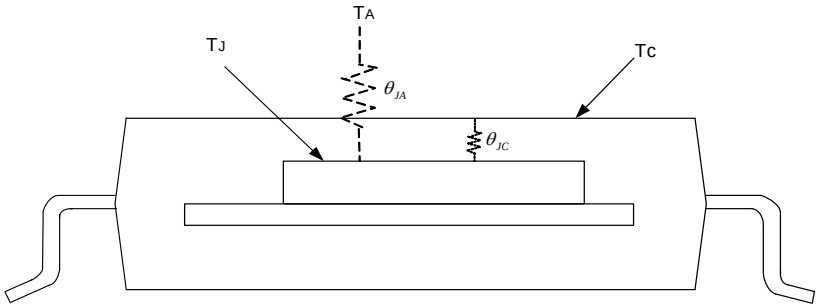
Block Diagram



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Absolute Maximum Ratings (TA = 25°C)

Symbol	Parameter		Rating	Unit
Vdd	Supply Voltage		30	V
I_O	Output Current	$I_{O(AVE)}$	400	mA
		$I_{O(PEAK)}$	700	mA
P_D	Power Dissipation		800	mW
T_{ST}	Storage Temperature		-55 ~ 150	°C
T_J	Maximum Junction Temperature		150	°C
θ_{JA}	Thermal Resistance Junction-to-Case (Note 5)		156	°C/W



Notes: 5. 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}.

Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Max	Unit
Vdd	Supply Voltage (Note 6)	Operating	3.8	28	V
T_A	Operating Ambient Temperature	Operating	-40	100	°C

Notes: 6. Please watch out the current limit issue when the operation voltage is over 26.4V, because of the different efficiency in the coil.

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

Symbol	Parameter	Conditions	Min	Typ.	Max	Unit
I_{CC}	Supply Current	Operating	-	2	4	mA
I_{OFF}	Output Leakage Current	V_{OUT} = 24V	-	< 0.1	10	μA
T_{LRP-ON}	Locked Protection On		0.4	0.46	0.6	Sec
$T_{LRP-OFF}$	Locked Protection Off		2.4	2.76	3.6	Sec
$V_{OUT(SAT)}$	Output Saturation Voltage	I_O = 200mA	-	450	700	mV
		I_O = 300mA	-	680	800	
$R_{DS(ON)}$	Output On Resistance	I_O = 200mA	-	2.25	3.5	ohm
V_{OL}	FG Output Vds	I_O = 10mA	-	0.3	0.5	V
V_Z	Output Zener-breakdown Voltage		42	55	65	V

Truth Table

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

Magnetic Characteristics (TA = 25 °C, Vdd = 24V, unless otherwise specified, Note 7)

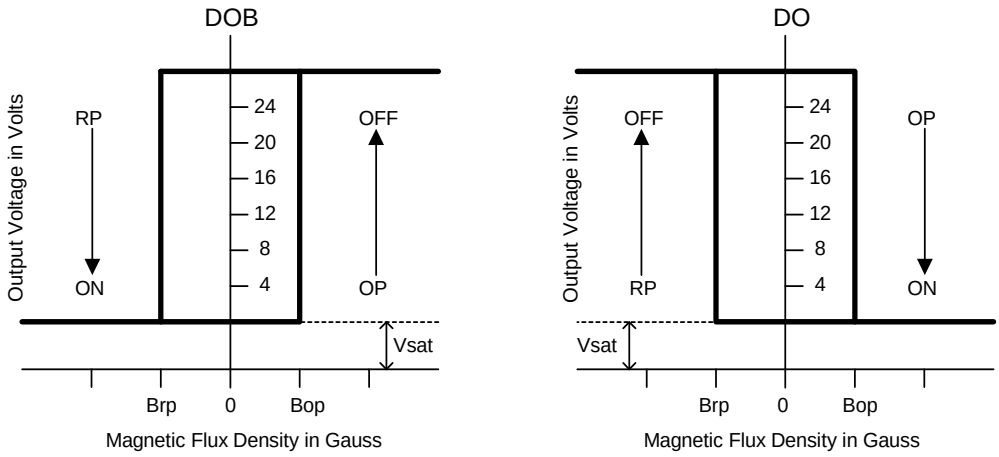
(1mT=10 Gauss)

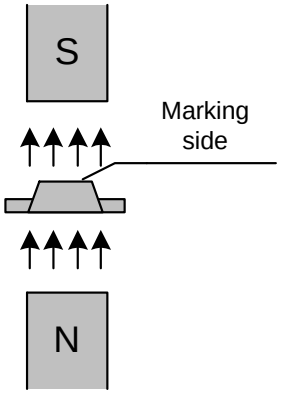
Symbol	Characteristics	Min	Typ.	Max	Unit
Bop	Operate Point	10	30	60	Gauss
Brp	Release Point	-60	-30	-10	Gauss
Bhy	Hysteresis	-	60	-	Gauss

Notes: 7. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.

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Operating Characteristics



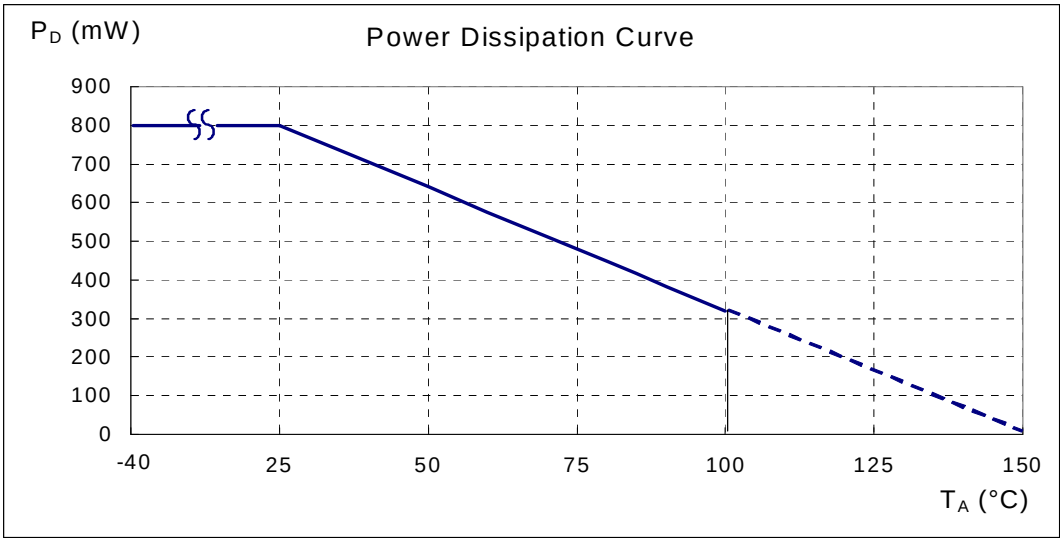


(SOT89-5L)

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Performance Characteristics (SOT89-5L)

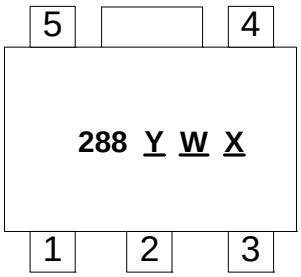
T_A (°C)	25	50	60	70	75	80	85	90	95	100
P_D (mW)	800	640	576	512	480	448	416	384	352	320
T_A (°C)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**
P_D (mW)	288	256	224	192	160	128	96	64	32	0



Marking Information

(1) SOT89-5L

(Top View)

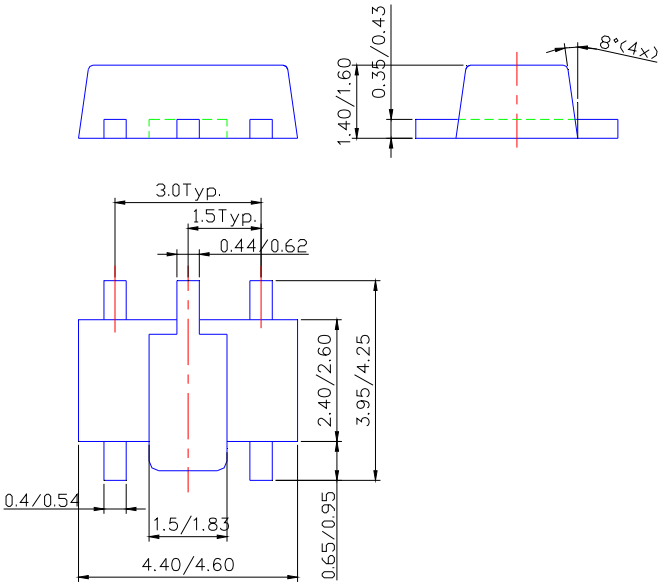


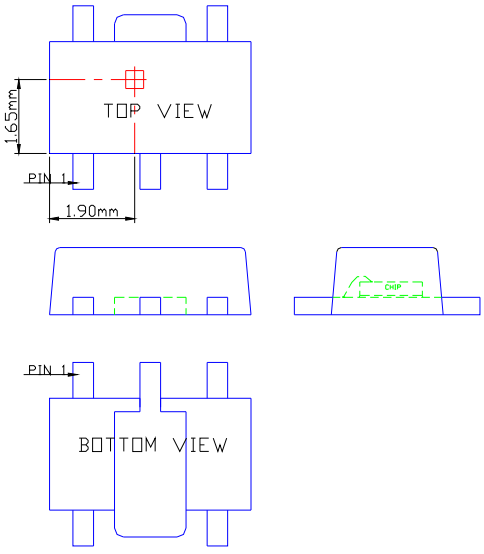
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week;
z represents 52 and 53 week
X : Internal code
a~z : Lead Free
A~Z : Green

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Package Information (All Dimensions in mm)

(1) Package type: SOT89-5L





Sensor Location

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