

Features

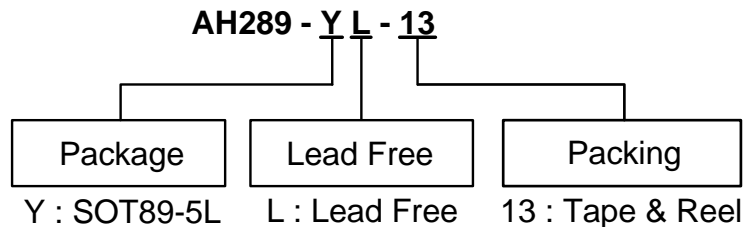
- On Chip Hall Sensor
- Rotor-Locked Shutdown
- Automatically Restart
- Rotor-State Detection (RD) Output
- Built-in Zener Protection for Output Driver
- Operating Voltage: 3.8V~28V
- Output Current: $I_{O(AVE)} = 400\text{mA}$
- Lead Free Package: SOT89-5L
- Lead Free Finish/RoHS Compliant (Note 1)

General Description

AH289 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-drain transistors for motors coil driving, an automatic lock current shutdown, and recovery protection. In addition, the Rotor-State Detection (RD) output is for Rotor-State 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

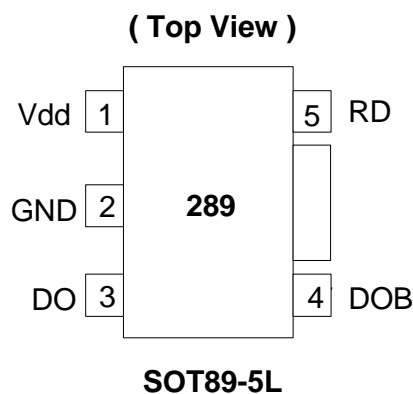


Device	Package Code	Packaging (Note 2)	13" Tape and Reel	
			Quantity	Part Number Suffix
AH289-YL-13	Y	SOT89-5L	2500/Tape & Reel	-13



- Notes:
1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see *EU Directive 2002/95/EC Annex Notes*.
 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>.
 3. Reverse taping as shown on Diodes Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

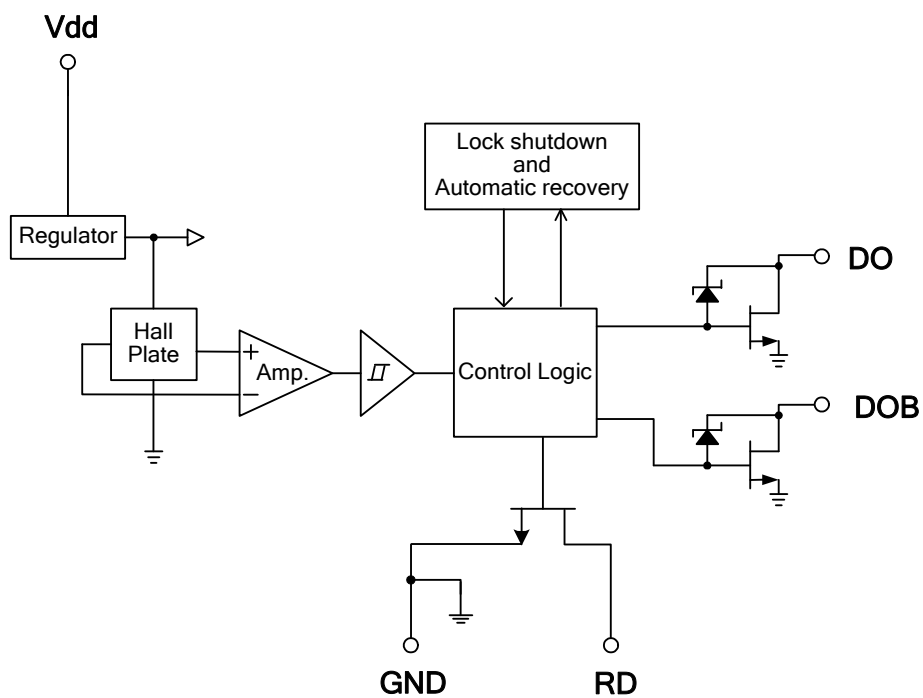
Pin Assignments



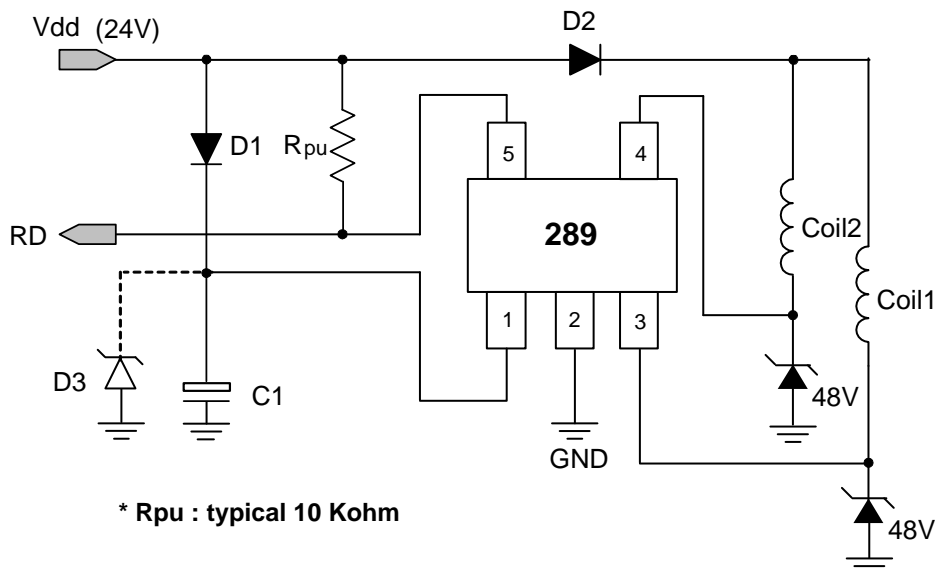
Pin Descriptions

Pin Name	Pin No.	Description
Vdd	1	Input power
GND	2	Ground
DO	3	Output pin
DOB	4	Output pin
RD	5	Rotor-State Detection

Block Diagram



Typical Application Circuit

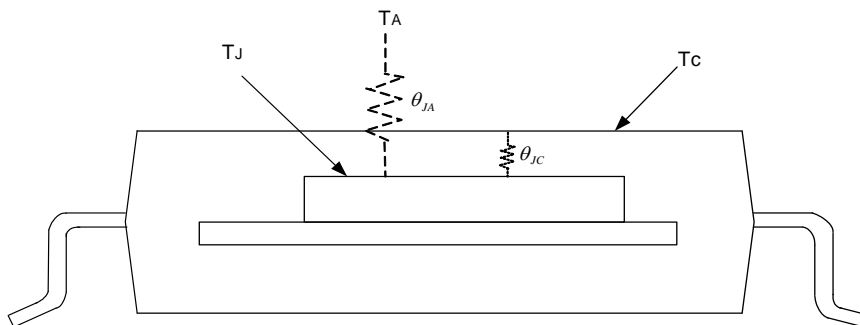


Notes: 4. The optional Capacitor C1 and Diode D3 are for power stabilization. C1 is recommended to be E-Cap., $\mu\text{F}/25\text{V}$; D3 is recommended to be Zener Diode, $V_Z = 27\text{V}$. Which C1 and D3 value need to be fine tuned to optimize design for different coils and power suppliers.

24V DC Brush-Less Fan with RD Output Function

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)

Symbol	Parameter	Rating	Unit
Vdd	Supply Voltage	30	V
$I_{O(AVE)}$	Output Current	400	mA
$I_{O(PEAK)}$		700	
P_D	Power Dissipation	800	mW
T_{OP}	Operating Temperature	-40 ~ 100	$^\circ\text{C}$
T_{ST}	Storage Temperature	-55 ~ 150	$^\circ\text{C}$
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$



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} .

Electrical Characteristics (T_A = 25 °C, V_{dd} = 24V, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ.	Max	Unit
V _{dd}	Supply Voltage	Operating	3.8	-	28*	V
I _{CC}	Supply Current	Operating	-	2.0	4.0	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}	RD Output V _{ds}	I _o = 10mA	-	0.3	0.5	V
V _Z	Output Zener-Breakdown Voltage		42	55	65	V
θ _{JA}	Thermal Resistance Junction-to-Ambient	SOT89-5L		156		°C/W

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

Truth Table

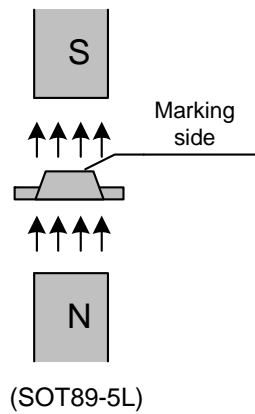
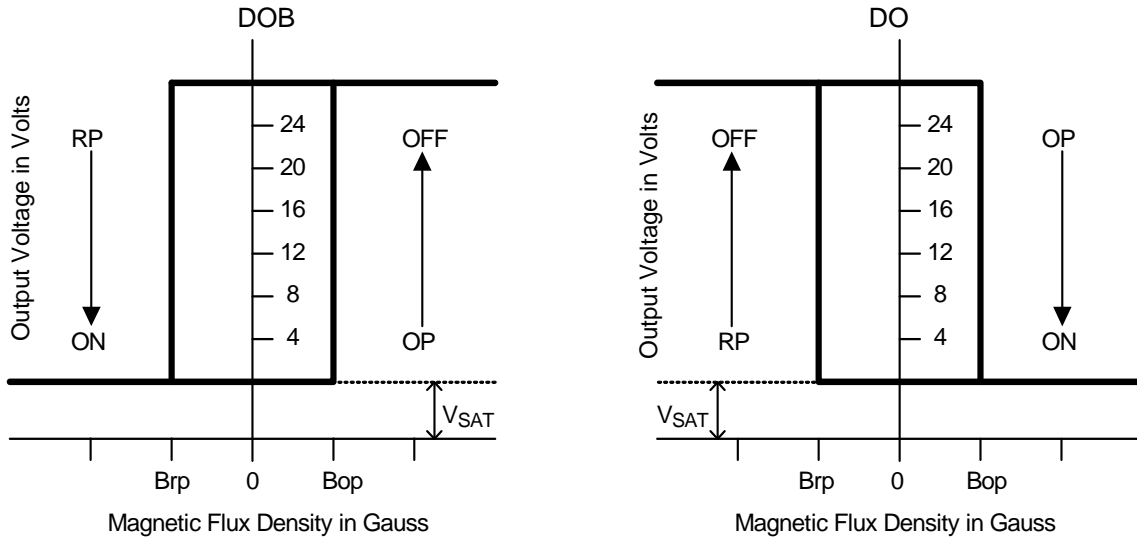
IN-	IN+	CT	OUT1	OUT2	RD	Mode
H	L	L	H	L	L	Rotating
L	H	L	L	H	L	Rotating
-	-	H	off	off	H	Lockup protection activated

Magnetic Characteristics (T_A = 25 °C, V_{dd} = 24V, unless otherwise specified)

(1mT = 10 Gauss)

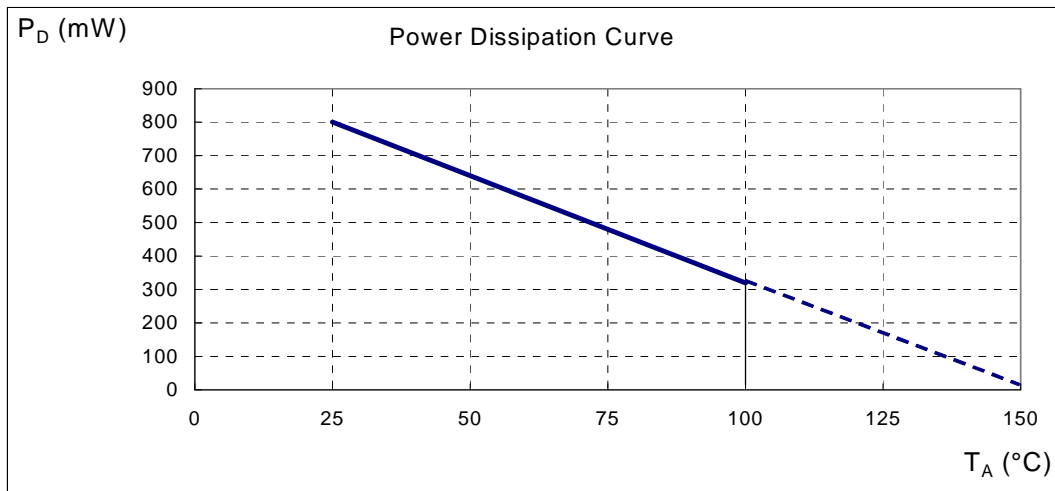
Symbol	Characteristics	Min	Typ.	Max	Unit
B _{op}	Operation Point	10	30	60	Gauss
B _{rp}	Release Point	-60	-30	-10	Gauss
B _{hy}	Hysteresis	--	60	--	Gauss

Operating Characteristics



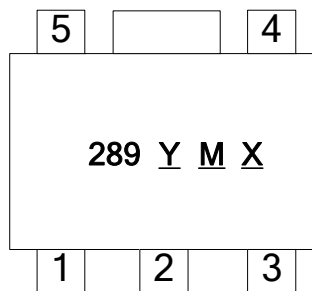
Performance Characteristics (SOT89-5L)

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

(Top View)

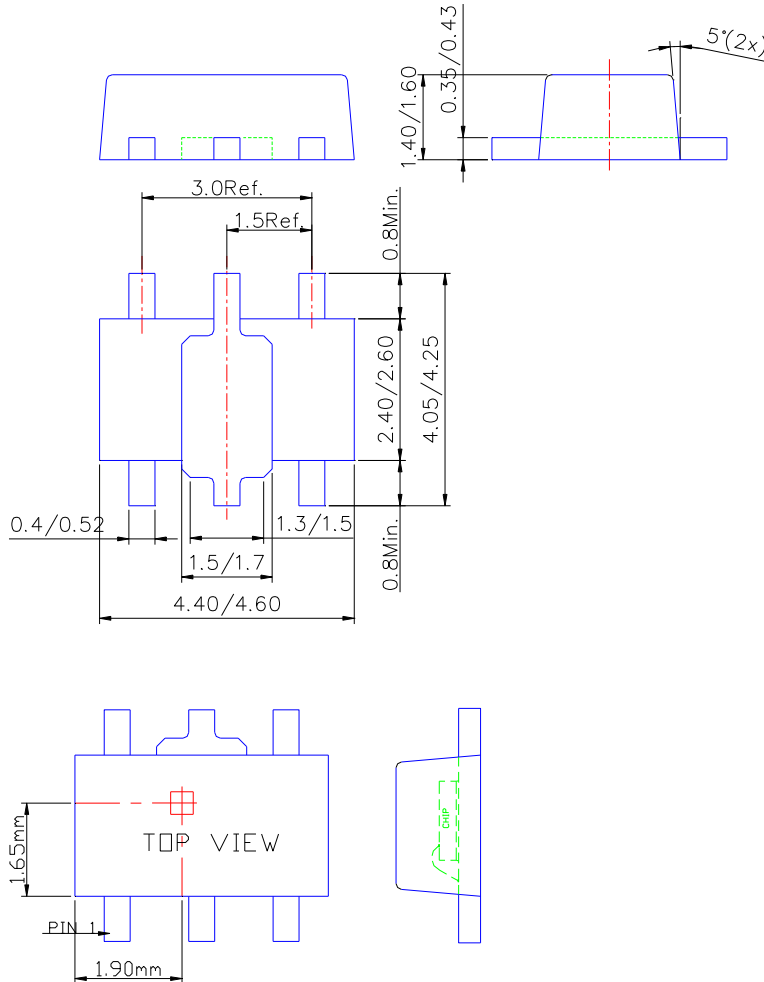


Y : Year: 0-9
M : Month: A~L
X : Internal code a~z: Lead Free

SOT89-5L

Package Information (All Dimensions in mm)

(1) Package type: SOT89-5L



Sensor Location

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