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Application Note

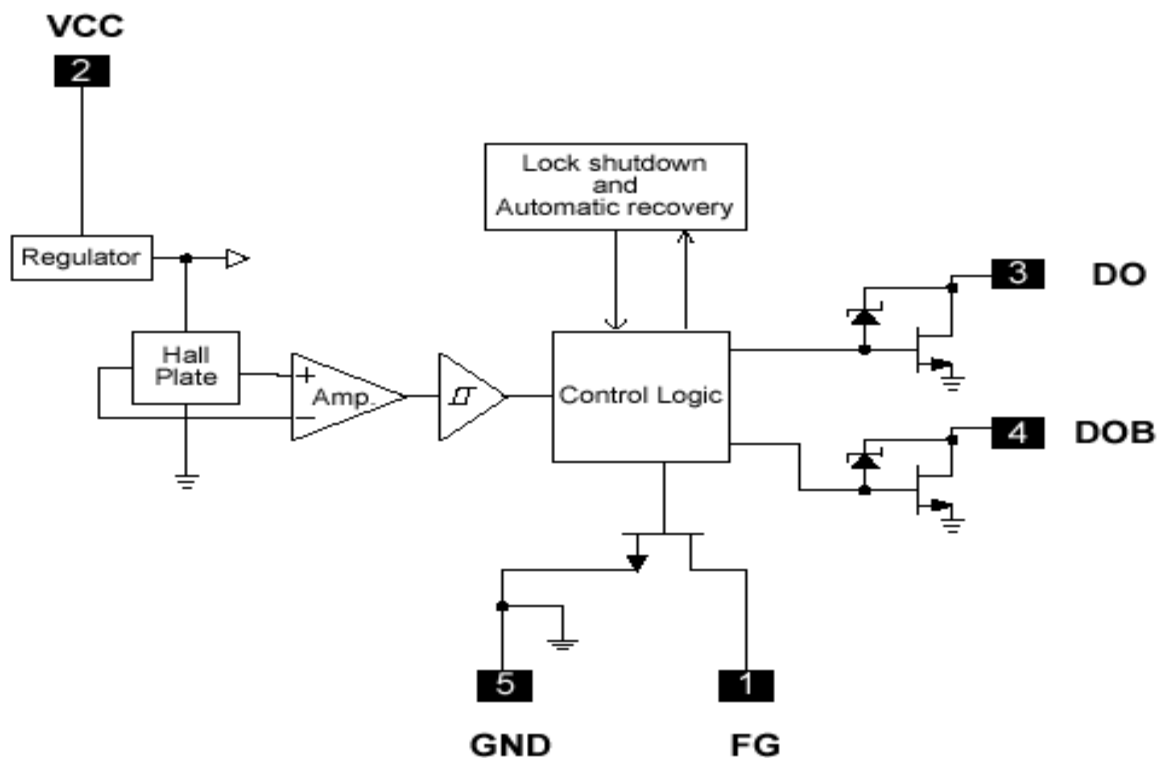
AH285 Demo Board Hall-Effect Smart Fan Motor Controller

1.0 Features

- On Chip Hall Sensor
- Rotor-Locked Shutdown
- Automatically Restart
- Frequency Generator (FG) Output
- Built-in Zener Protection for Output Driver
- Internal Diode only Protect for IC Power Reverse Connecting
- Operating Voltage: 3.5V~20 V
- Output Current: $I_o (AVE) = 500 \text{ mA}$
- Package: SIP-5L

2.0 General Description

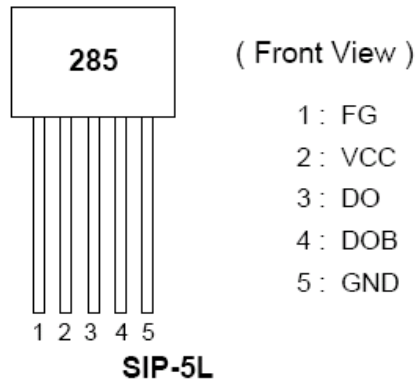
AH285 is a monolithic fan motor controller with Hall sensor's capability. The capabilities contain two complementary open-collector transistors for motor's coil driving, automatic lock current shutdown, and recovery protections. Besides, the Frequency Generator (FG) output is for speed detection relatively. To avoid coil burning, the rotor-lock shutdown detection circuit shuts down the output driver if the rotor is blocked and then the automatic recovery circuit will try to restart the motor. These protected actions are repeated and periodic during the blocked period. Until the blocking is removed, the motor recovers running normally.

3.0 Block Diagram

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4.0 Pin Configuration



Symbol	Description
FG	Frequency Generation
V _{CC}	Input Power
DO	Output Pin
DOB	Output Pin
GND	Ground

5.0 Absolute Maximum Ratings (T_A = 25°C)

Characteristics	Symbol	Rating	Unit
Supply Voltage	V _{CC}	24	V
Output Current	I _O (AVE)	SIP5/SOT89-5	500
		SOT23-5	400
	I _O (PEAK)	700	
Power Dissipation	P _D	SIP5	550
		SOT23-5	230
		SOT89-5	800
Operating Temperature	T _{OPR}	-40 ~ 100	°C
Storage Temperature	T _{STG}	-55 ~ 150	°C
Maximum Junction Temperature	T _J	150	°C

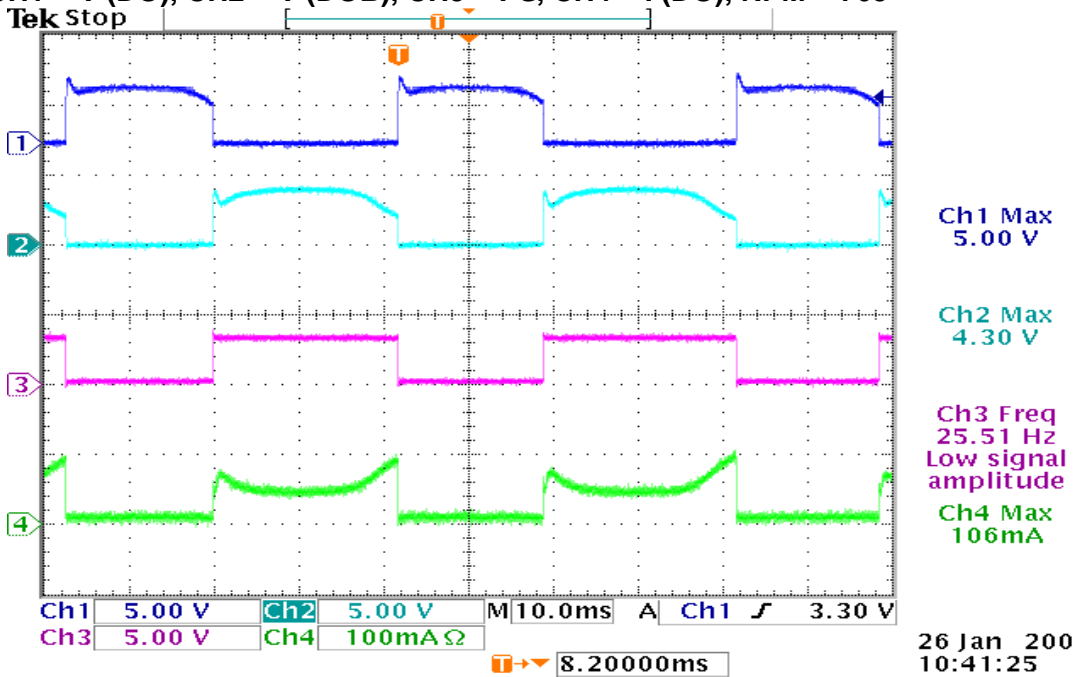
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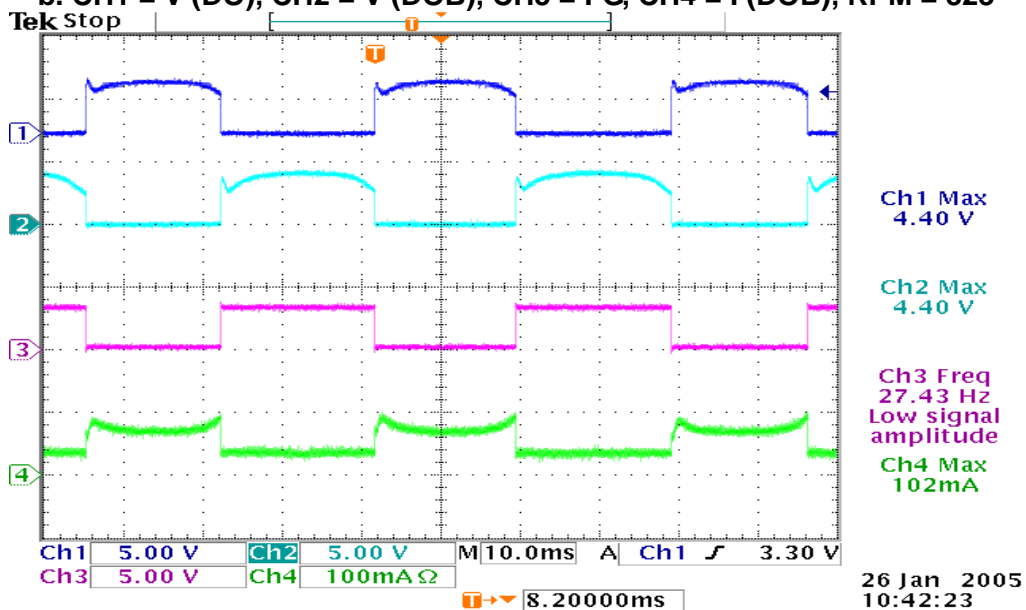
6.0 Typical Performance Characteristics (refer to the diagram in “Application Information” (P.11))

6.0.1 Min Start-up: $V_{CC} = 3.5V$, $I_{CC} = 0.04A$

a. CH1 = V (DO), CH2 = V (DOB), CH3 = FG, CH4 = I (DO), RPM = 765



b. CH1 = V (DO), CH2 = V (DOB), CH3 = FG, CH4 = I (DOB), RPM = 823

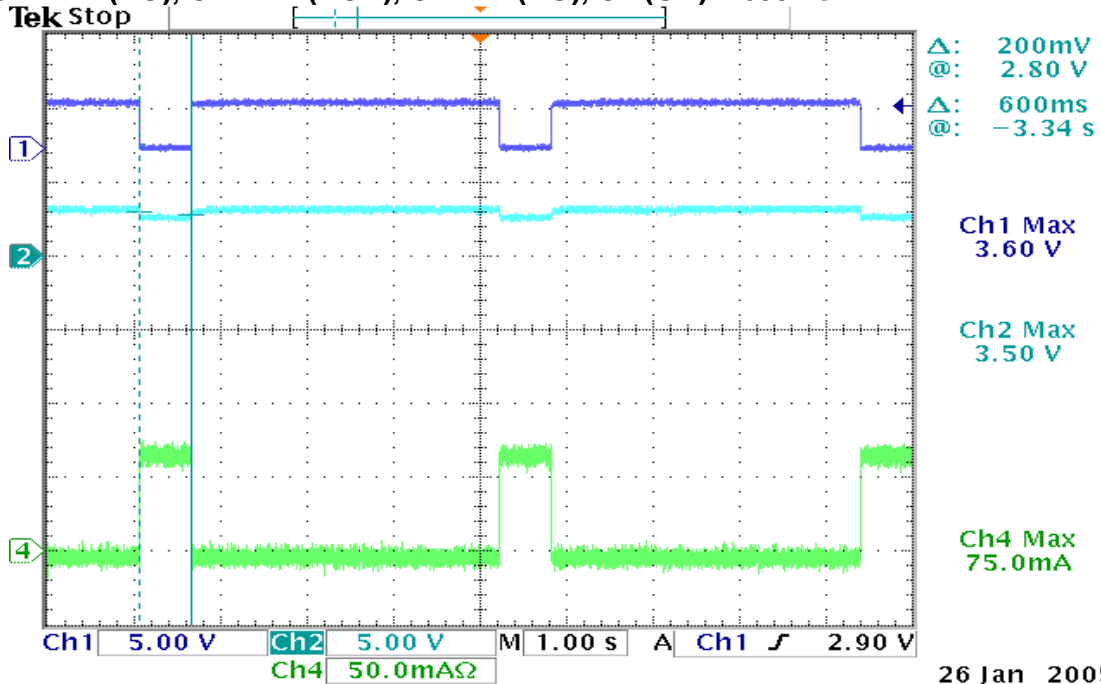


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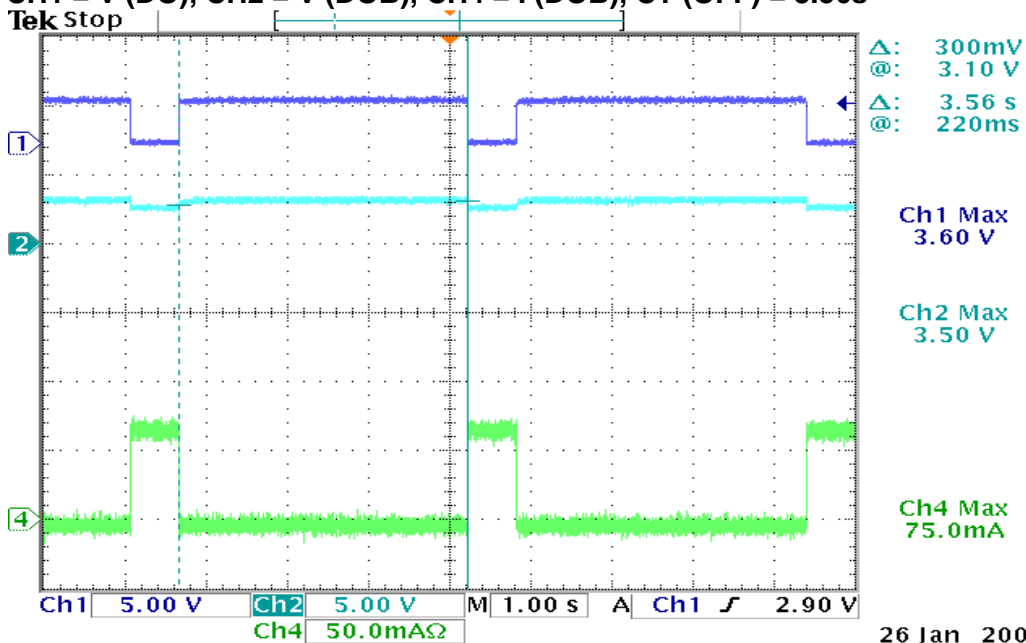
6.0.2 Min Start-up for DC Fan Locked : $V_{CC} = 3.5V$, CT (ON)/(OFF) = 1:5.933

a. CH1 = V (DO), CH2 = V (DOB), CH4 = I (DO), CT (ON) = 600ms



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b. CH1 = V (DO), CH2 = V (DOB), CH4 = I (DOB), CT (OFF) = 3.56s



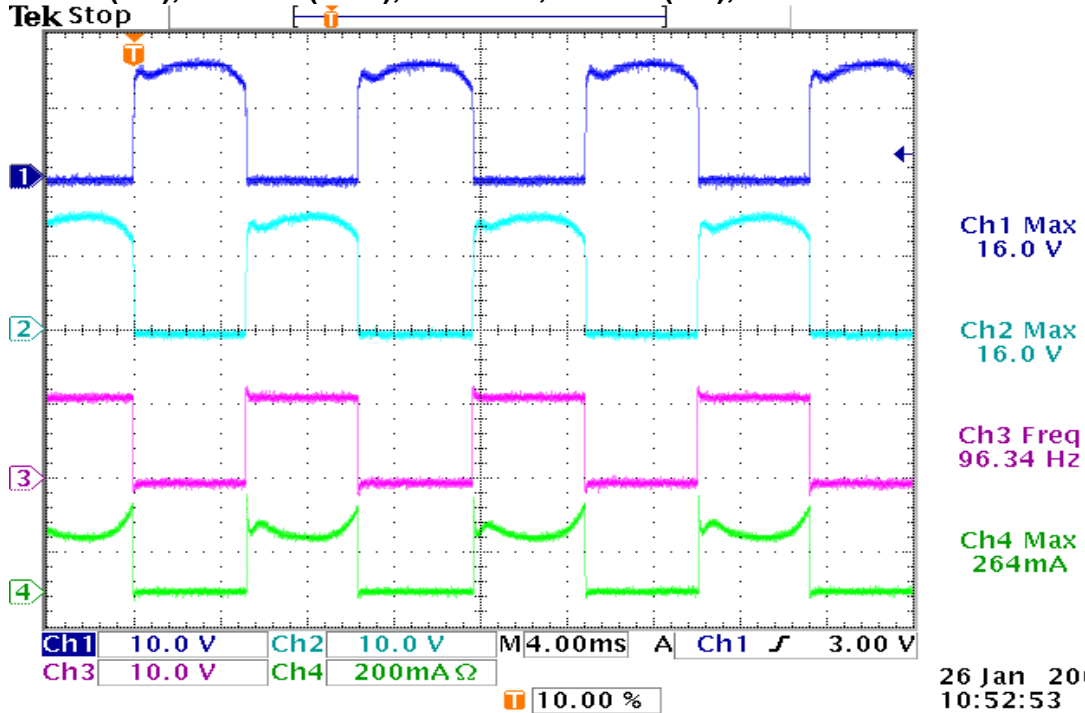
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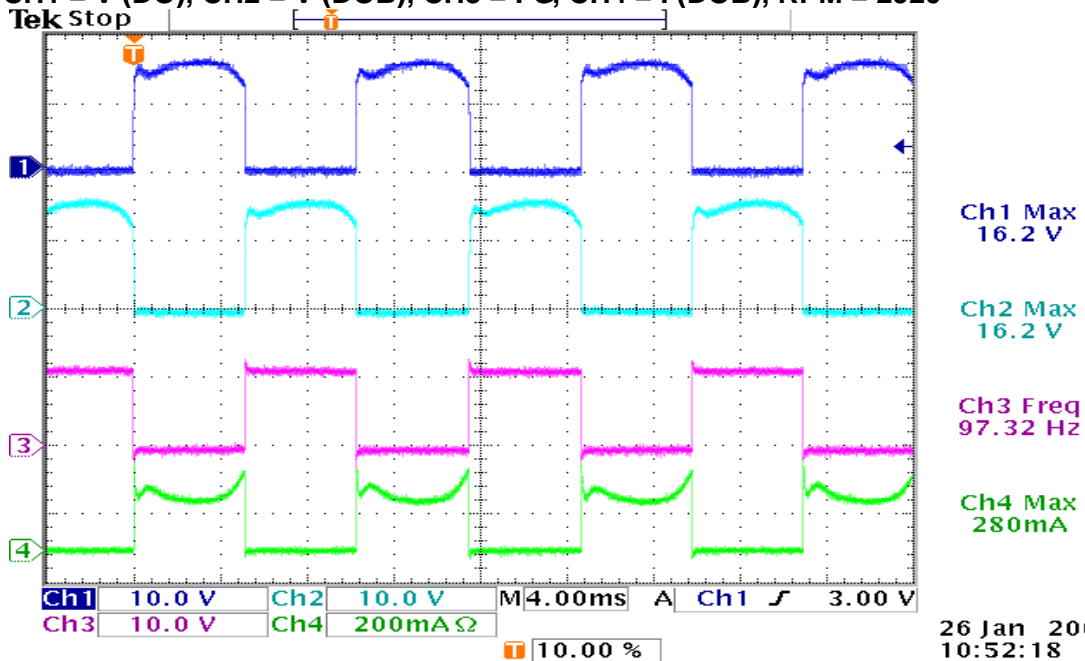
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6.0.3 Operation: $V_{CC} = 12V$, $I_{CC} = 0.17A$

a. CH1 = V (DO), CH2 = V (DOB), CH3 = FG, CH4 = I (DO), RPM = 2890



b. CH1 = V (DO), CH2 = V (DOB), CH3 = FG, CH4 = I (DOB), RPM = 2920

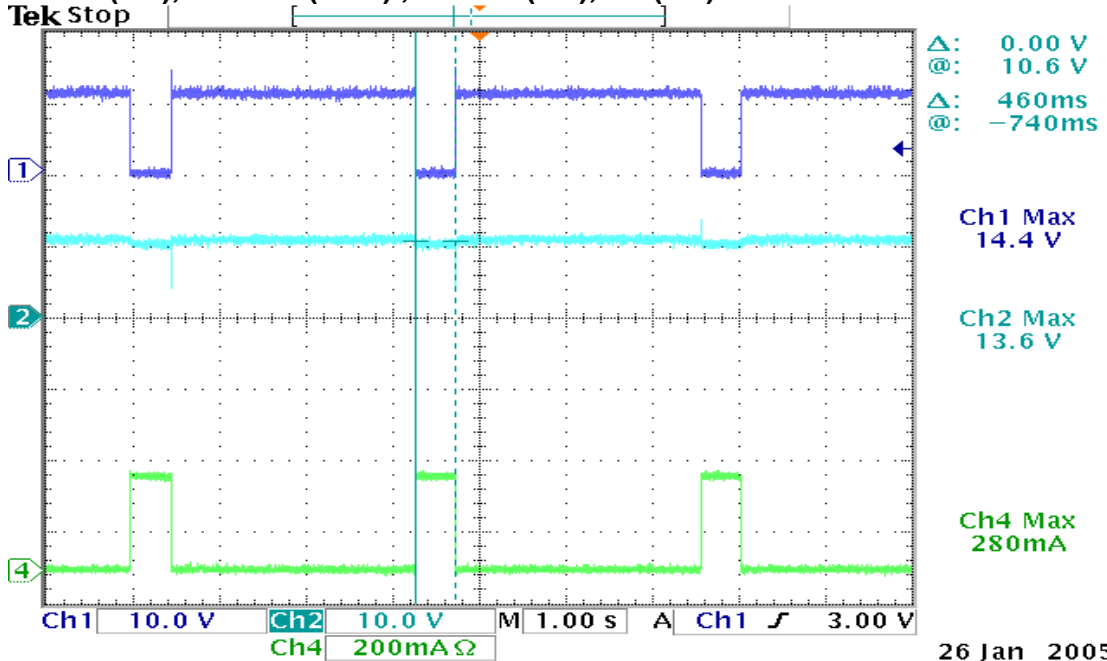


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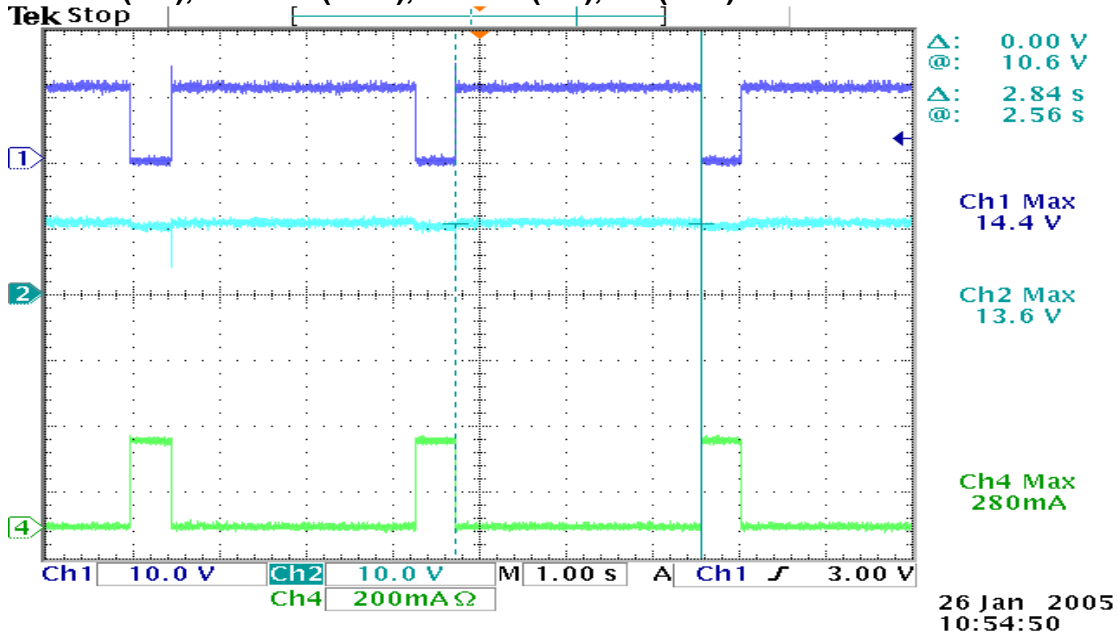
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6.0.4 Operation for DC Fan Locked: $V_{CC} = 12V$, CT (ON)/(OFF) = 1:6.17

a. CH1 = V (DO), CH2 = V (DOB) , CH4 = I (DO), CT (ON) = 460ms



b. CH1 = V (DO), CH2 = V (DOB), CH4 = I (DO), CT (OFF) = 2.84s

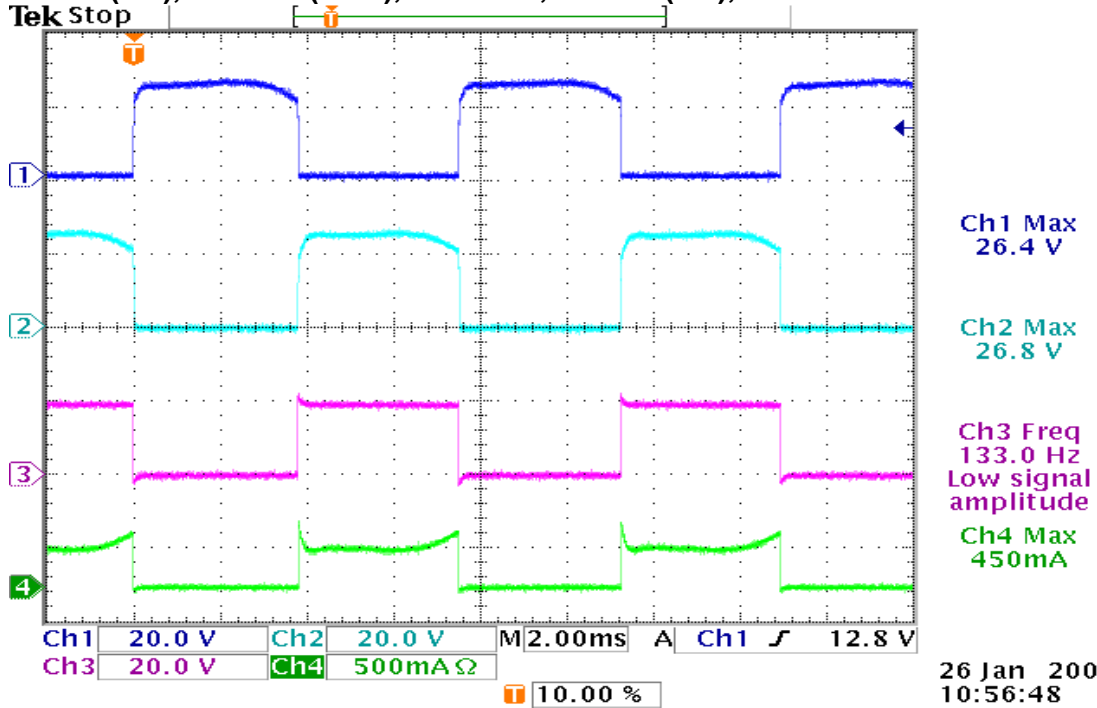


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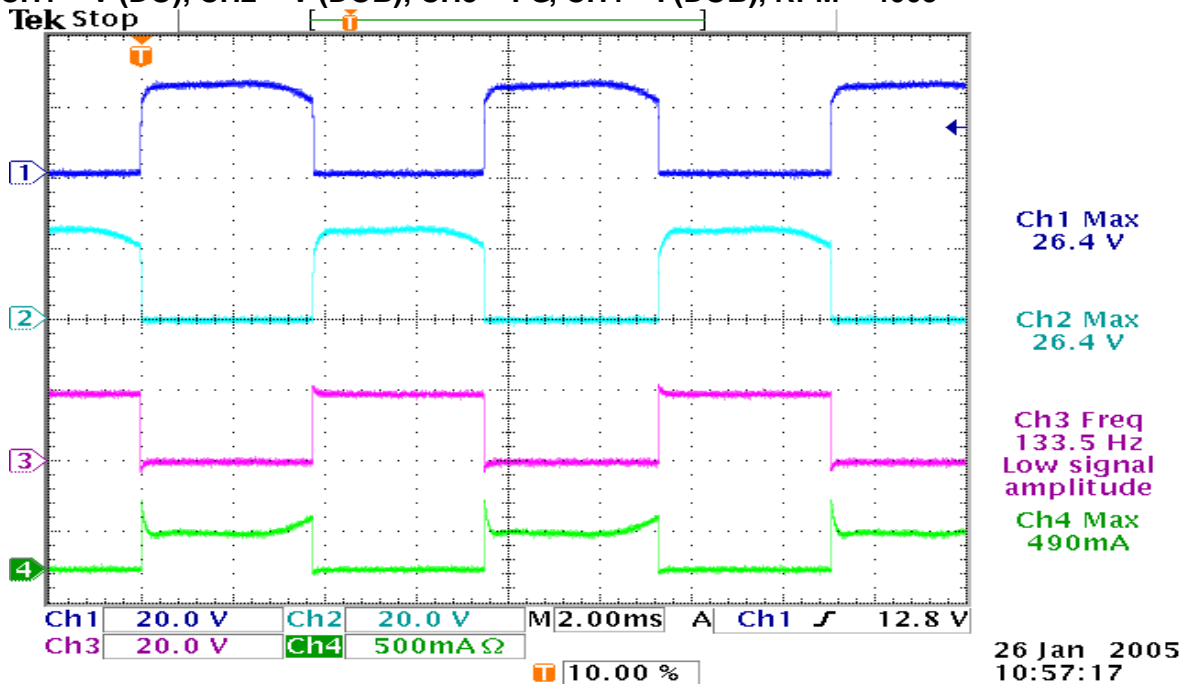
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6.0.5 Max Working: $V_{CC} = 20V$, $I_{CC} = 0.28A$

a. CH1 = V (DO), CH2 = V (DOB), CH3 = FG, CH4 = I (DO), RPM = 3990



b. CH1 = V (DO), CH2 = V (DOB), CH3 = FG, CH4 = I (DOB), RPM = 4005

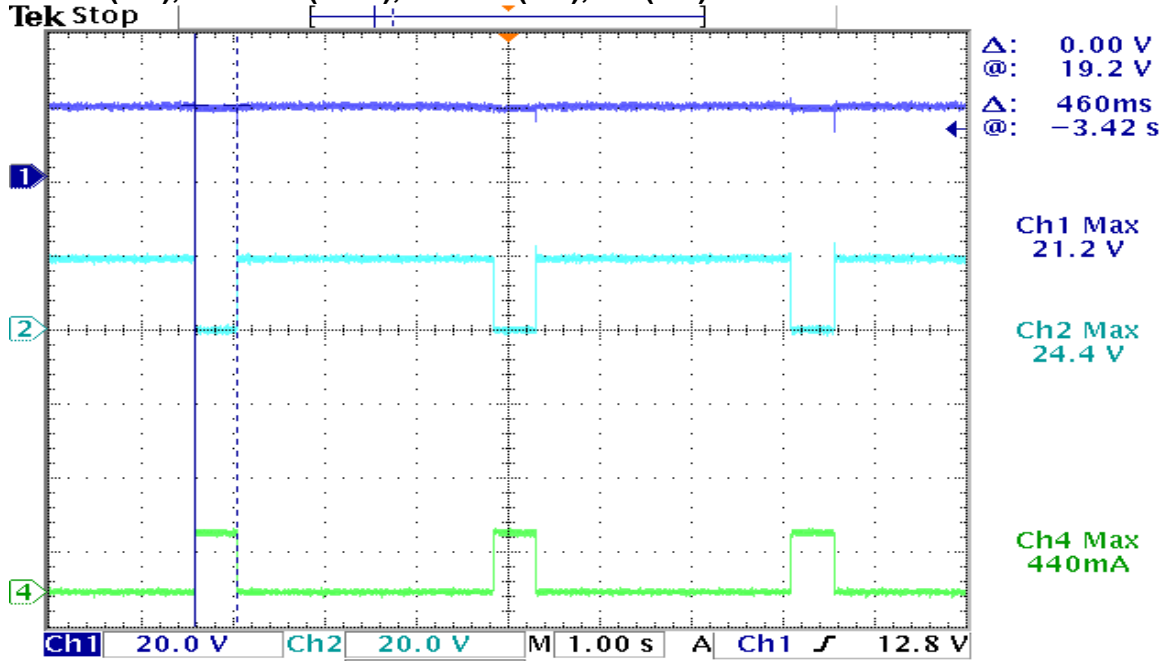


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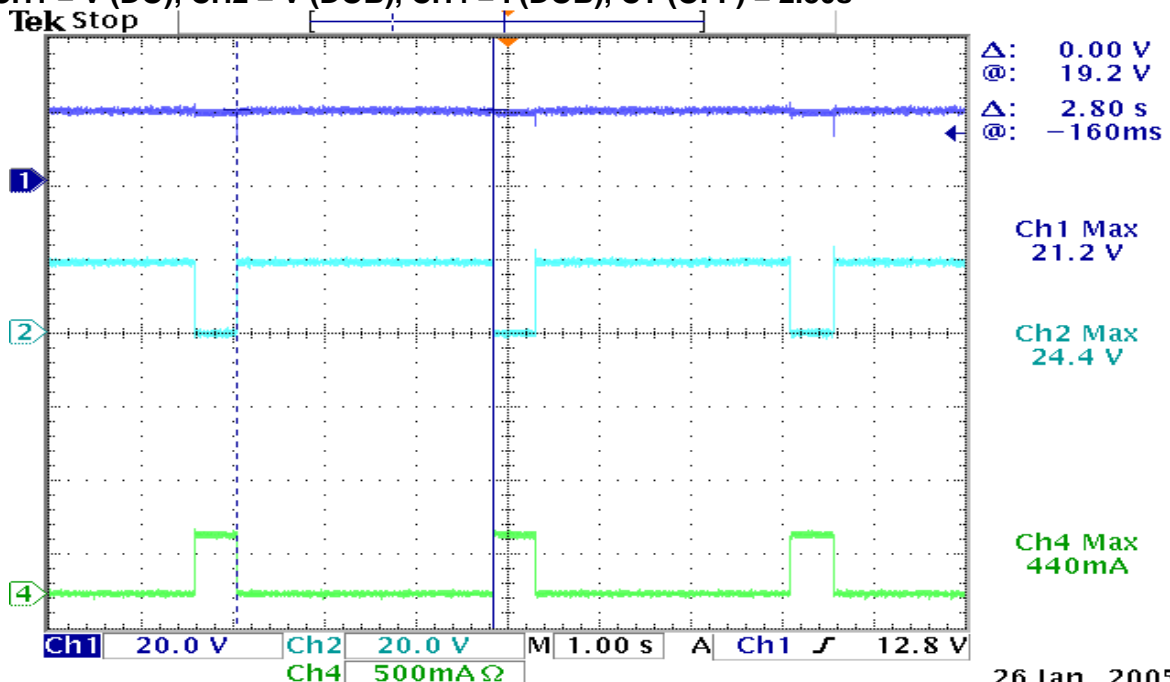
6.0.6 Max. Working for DC Fan Lock: $V_{CC} = 20V$, CT (ON)/(OFF) = 1:6.08

a. CH1 = V (DO), CH2 = V (DOB), CH4 = I (DO), CT (ON) = 460ms



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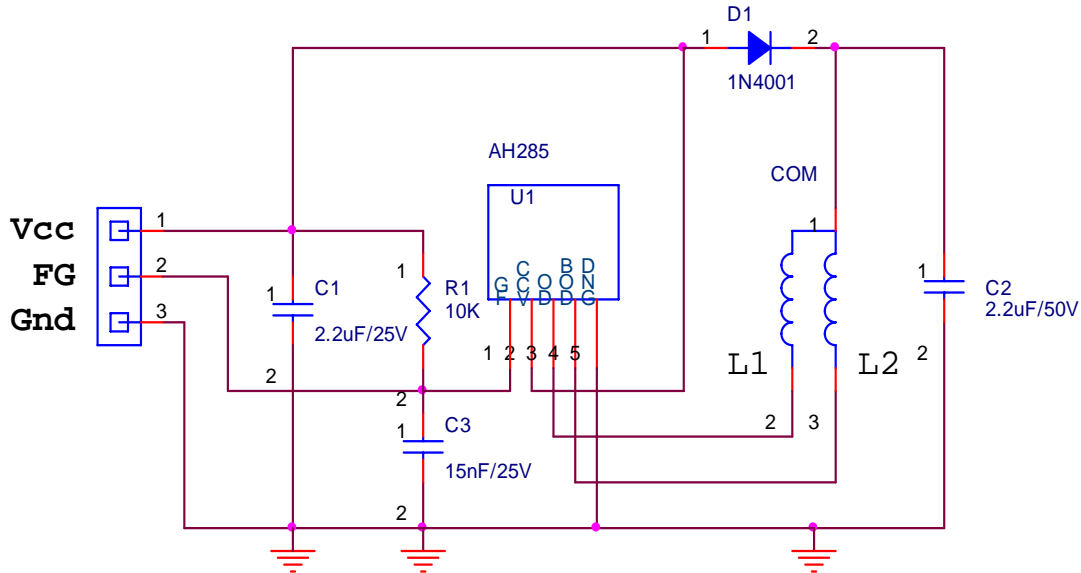
b. CH1 = V (DO), CH2 = V (DOB), CH4 = I (DOB), CT (OFF) = 2.80s



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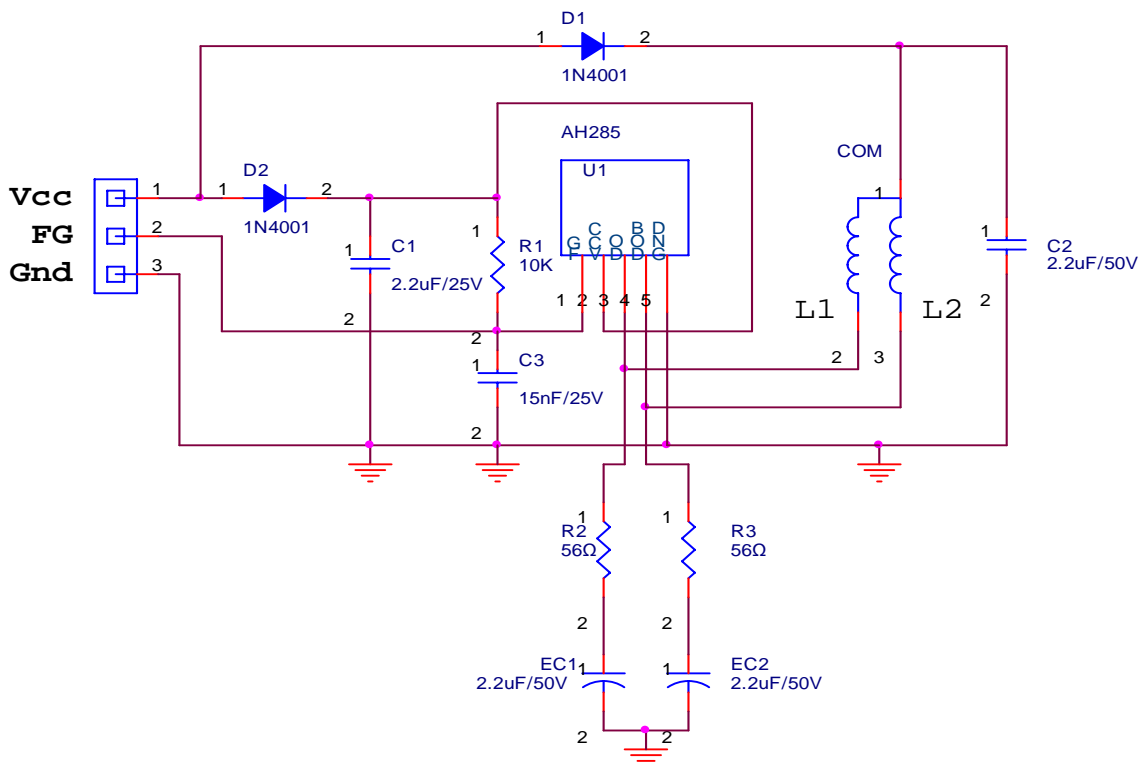
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7.0 Application Information:



*FG pull high resistor: R1

8.0 Demo Board schematic:



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Parts List (Board of Materials):

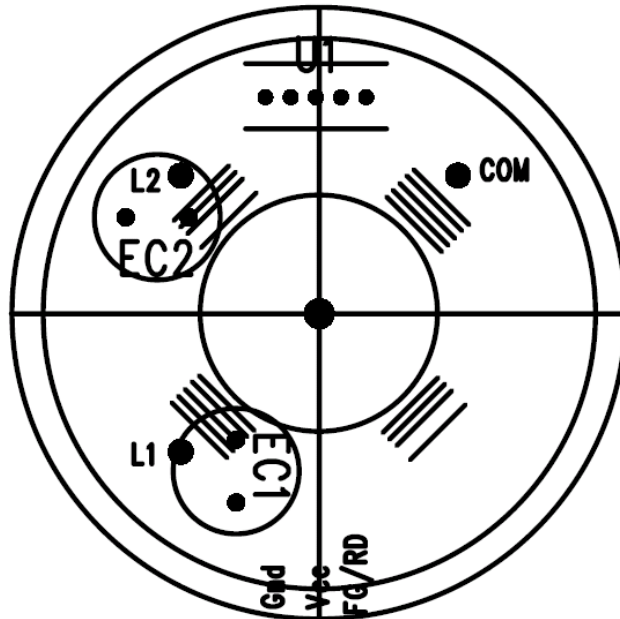
L_3 PIN	L1 mH/Z (Ω)	L2 mH/Z (Ω)	LT = L1 + L2
100HZ	16.44mH/74.05 Ω	16.42mH /73.76 Ω	65.62mH/152.78 Ω

Item	Part Number	Description	Value	Quantity
C1	Std	SMD/0805	2.2uF/25v	1
C2	Std	SMD/0805	2.2uF/50v	1
C3	Std	SMD/0805	15nF/25v	Option
EC1	Std	Option	Option	Option
EC2	Std	Option	Option	Option
R1	Std	SMD/0805	10k Ω	1
R2	Std	SMD/0805	Option	Option
R3	Std	SMD/0805	Option	Option
D1	Std	SMD/Diode	50V, 1A	1
D2	Std	SMD/Diode	50V, 0.5A	1
L_3PIN	BOARD-TECH	DIP/L1, L2, com	50V, 2A	1
U1, U2	AH285	Hall Ic/SIP-5	3.5~20V	1

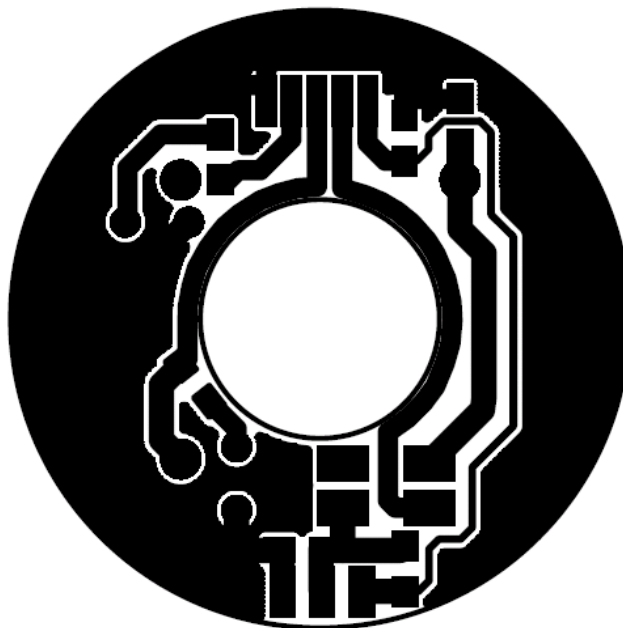
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Typical PC Board Layout, Adjustable Output:

(1) Component Placement Guide



(2) Component Side PC Board Layout



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