# HOLTEK

HT6338
Local Fan Controller

Features

- Operating voltage: 3V~5.5V
- Operating current: 40μA (Typ.) at V_{DD}=5V
- 3 levels adjustable fan speed
- Time setting (Max.: 8 hours)
- Three kinds of wind control mode (Normal, Rhythm, and Sleep)
- Right/left swing control
- Up/down swing control (HT6338A)
- LED indication
- 32768Hz crystal system clock
- Keytone output
- 16-pin DIP/SOP package for HT6338B
- 18-pin DIP or 20-pin SOP package for HT6338A

General Description

The HT6338 is a CMOS LSI designed for use in local fan control. It offers rhythm and sleep operation modes in addition to normal wind speed conventional control. All of the three operations (rhythm, sleep, and normal) provide different speed controls (level 1~level 3).

The HT6338 also supports time setting and fan head swing. All of the operations are indicated by a LED display.
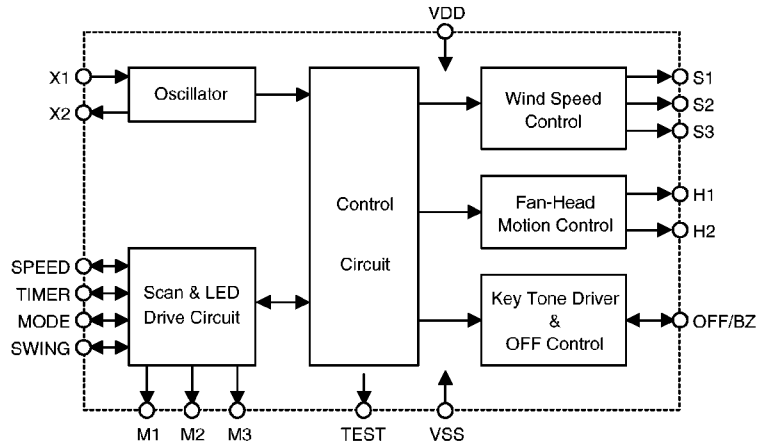
Pin Assignment

HT6338A – 18 DIP

HT6338A – 20 SOP

HT6338B – 16 DIP/SOP
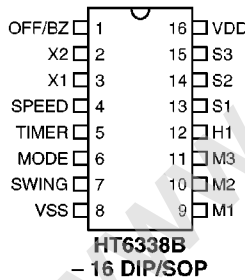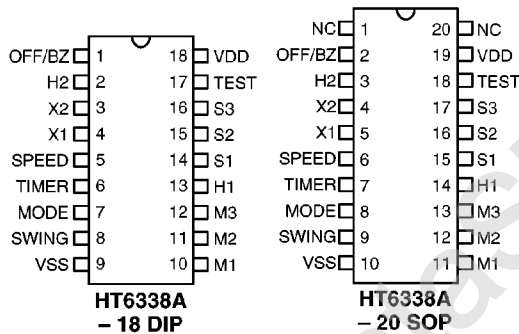
Pad Assignment
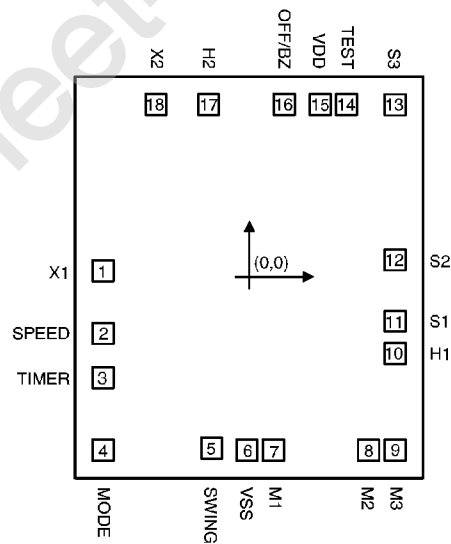
Chip size: 98×113 (mil)^2

* The IC substrate should be connected to VDD in the PCB layout artwork.

Block Diagram

Pad Coordinates
Unit: mil

Pad No.	X	Y	Pad No.	X	Y
1	−42.03	1.70	10	42.03	−22.10
2	−42.03	−16.32	11	42.03	−12.75
3	−42.03	−29.07	12	42.03	4.89
4	−42.03	−49.94	13	42.03	49.47
5	−10.84	−49.30	14	28.01	49.64
6	−0.68	−49.94	15	20.53	49.64
7	6.97	−49.94	16	10.12	49.64
8	34.38	−49.94	17	−11.60	49.64
9	42.03	−49.94	18	−26.82	49.60

Pin Description

For HT6338A

Pin No.	Pin Name	I/O	Internal Connection	Description
1	OFF/BZ	I/O	CMOS Pull-High	OFF/BZ turns the system off and generates a keytone signal. When this pin is operating, connect it low to force the system into an off state. While working, this pin generates a sound signal to affirm the key pressed

Pin No.	Pin Name	I/O	Internal Connection	Description
2	H2	O	NMOS Open Drain	Fan head swing drive signal H2 generates a low TRIAC trigger signal to make the fan head swing up and down. This function is used for the HT6338A only
3	X2	O	CMOS	Oscillator output
4	X1	I	CMOS	Oscillator input
5	SPEED	I/O	CMOS IN Pull-High PMOS OUT	Wind speed adjustment input and scanning signal output, three speeds available: speed 1~speed 3 The scanning signal is for LED display
6	TIMER	I/O	CMOS IN Pull-High PMOS OUT	Timer setting input and scanning signal output, four timer ranges: 1 hour, 2 hours, 4 hours, and 8 hours The scanning signal is for LED display
7	MODE	I/O	CMOS IN Pull-High PMOS Out	Fan working mode selection input and scanning signal output, three modes selectable: normal, rhythm and sleep (see the functional description for details). The scanning signal is for LED display
8	SWING	I/O	CMOS IN Pull-High PMOS OUT	Fan swing control input and scanning signal output, four modes selectable: up/down, left/right, both works or both stops The scanning signal is for LED display
9	VSS	I	—	Power supply (negative)
10~12	M1~M3	O	NMOS Open Drain	Scanning signal output M1~M3, SPEED, TIMER, MODE, and SWING make up of a matrix structure to turn on the LEDs that correspond to the operating mode
13	H1	O	NMOS Open Drain	Fan head swing drive signal H1 generates a low TRIAC trigger signal to make the fan head swing left and right
14~16	S1~S3	O	NMOS Open Drain	Wind speed drive signal S1~S3 generate low voltage TRIAC trigger signals to control the wind speed. S1 denotes the low speed, S2 the medium speed, and S3 the high speed
17	TEST	O	NMOS Open Drain	For IC test only
18	VDD	I	—	Power supply (positive)

Approximate internal connection circuits
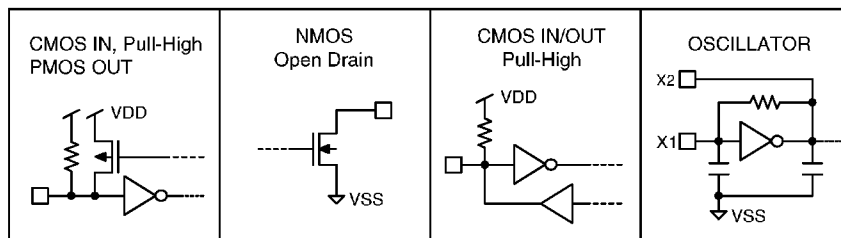
Absolute Maximum Ratings*

Supply Voltage .... –0.3V to 5.5V
Input Voltage.................... V_{SS}–0.3 to V_{DD}+0.3V

Storage Temperature................. –55°C to 125°C
Operating Temperature................. –0°C to 70°C

*Note: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extened periods may affect device reliability.

Electrical Characteristics

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V_{DD}	Supply Voltage	—	—	3.0	—	5.5	V
I_{DD}	Operating Current	5V	F_{OSC}=32768 No load	—	40	200	μA
I_{OL1}	OFF/BZ Output Sink Current	5V	V_{OL}=0.5V	0.3	0.5	—	mA
I_{OL2}	Output Pin Sink Current (for H1, H2, S1~S3)	5V	V_{OL}=0.5V	7.2	12	—	mA
I_{OH1}	Select Pin Source Current (for SPEED, TIMER, MODE, SWING)	5V	VOH=0.5V	–2.5	–4.2	—	mA
I_{OL3}	Scanning Pin Sink Current (for M1~M3)	5V	V_{OL}=0.5V	6.6	11	—	mA
F_{OSC}	System Frequency	5V	—	—	32768	—	Hz

Functional Description

Speed

The fan controller provides three different speeds. When power is turned on and the speed key is pressed, the system operates in the normal mode, and S2 outputs a 4-second low signal (speed 2 is active) to switch the motor on. After 4 seconds, the fan changes from speed 2 to speed 1, but the LED of speed 1 remains on. At this time, if the speed key is pressed again, the speed will increase one level. The level of speed is indicated by a LED. The OFF/BZ pin will generate a "beep" tone signal when the speed key is pressed.

Refer to the operation flow for operation of the speed settings.

Timer

The timer can be set to: 1 hour, 2 hours, 4 hours, or 8 hours. After power is turned on, the time is set to zero (always on). Pressing the timer key once changes the setting step by step.

The set time of timer is indicated by a LED. The OFF/BZ pin will generate a "beep" tone signal when the timer key is pressed.

Refer to the operation flow for operation of the timer settings.

Mode

The Mode key selects the operation mode (normal, rhythm, or sleep mode). Pressing the speed key when power is turned on causes the system to go to the normal mode.
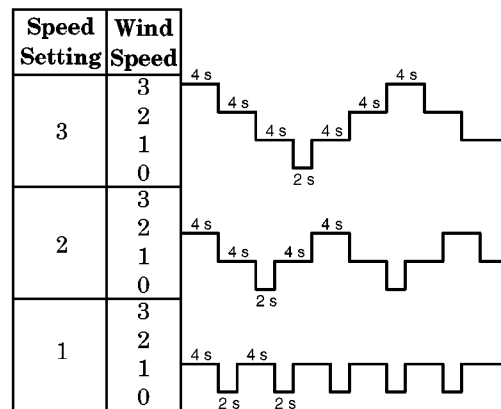
Refer to the operation flow for operation of the mode settings.

The relation between the wind speed and time is as shown:

- Normal mode (that wind speed=0 denotes the fan motor is in the stop state)

Speed Setting	Wind Speed	
3	3 2 1 0	
2	3 2 1 0	
1	3 2 1 0	

- Rhythm mode

Speed Setting	Wind Speed	
3	3 2 1 0	
2	3 2 1 0	
1	3 2 1 0	

- Sleep mode

Speed Setting	State (see the rhythm mode)
3	Speed 3 rhythm wind 1 hour Speed 2 rhythm wind 1 hour Speed 1 rhythm wind to time-out
2	Speed 2 rhythm wind 1 hour Speed 1 rhythm wind to time-out
1	Speed 1 rhythm wind to time-out

In the sleep mode, the time has to be set before operation. If the timer should fail to be set, the system turns out to be the maximal sleep time (8 hours) by default.

Fan head swing mode

The fan head has two control outputs. One is for controlling the head up/down swing, and the other for controlling the head left/right swing. The H2 pin can be assigned to control the up/down swing and the H1 pin to control the left/right swing.

Refer to operation flow for operation of the head swing.

System off and keytone

The OFF/BZ pin contains two functions. When the IC is operating and the OFF/BZ key is pressed, the system is turned off and all the states are cleared (the preceding states will not be saved). The OFF/BZ pin also generates a tone signal when any key is pressed. The key-tone signal is as shown.

18th Sep '97
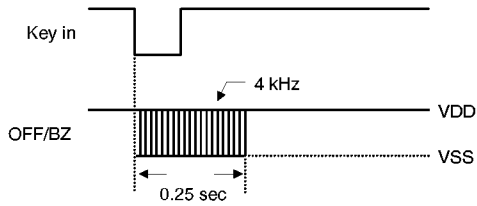
Operation flow

The operation flowchart of the system is as shown:
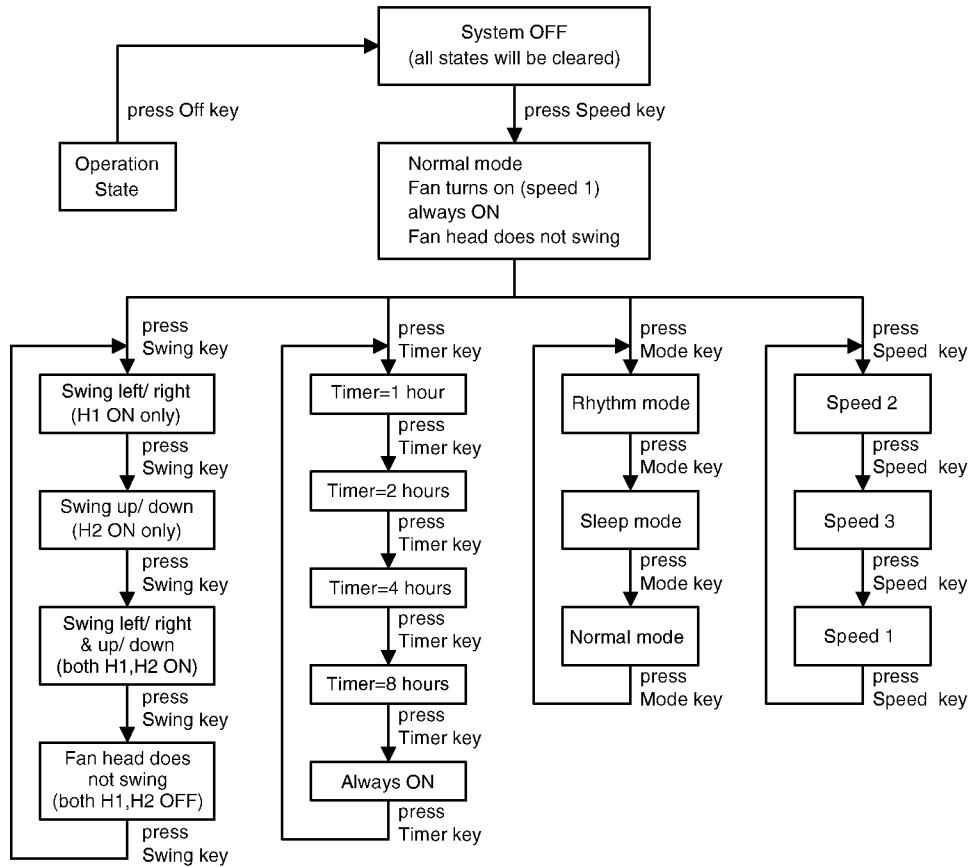
Note: Speed 1 denotes the low wind speed, speed 2 the middle wind speed, and speed 3 the high wind speed.
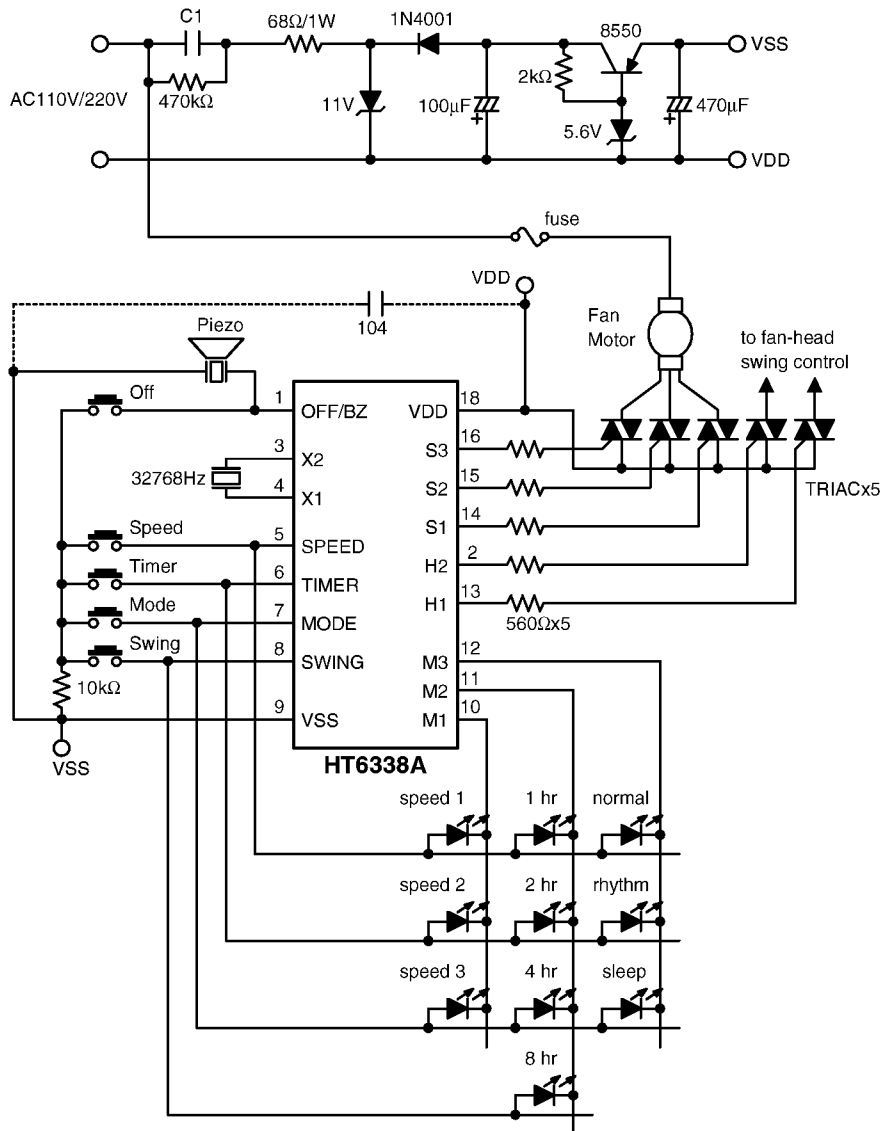
When the system is in the OFF state, the timer or mode key can be pressed to set the operating time or operation mode, but the fan motor will not revolve.

The setting of fan head swing can be made after the Speed key is pressed.

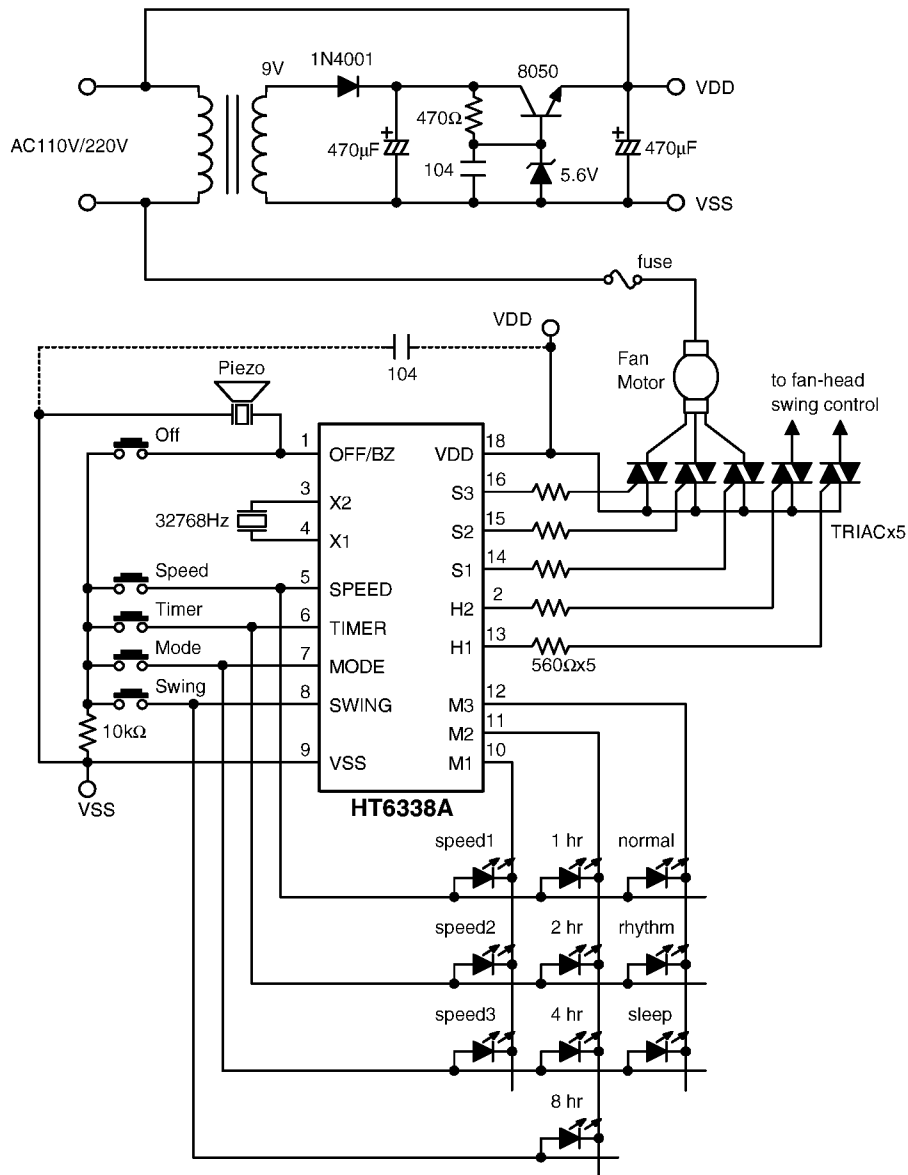The HT6338B can control only the left/right swing of the fan head.

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Application Circuits

With capacitor power supply (for the HT6338A)

Note: C1=2μF/300V when the AC power supply is 110V.
      C1=1μF/600V when the AC power supply is 220V.
      Typical infrared receiver modules: PIC-12043T/PIC-12043S (KODENSHI CORP.)
                                         or LTM9052 (LITEON CORP.)
      The thermistor is 50kΩ at 25°C and has a negative temperature coefficient.

With transformer power supply (for the HT6338A)

Note: Typical infrared receiver modules: PIC-12043T/PIC-12043S (KODENSHI CORP.)
or LTM9052 (LITEON CORP.)
The thermistor is 50kΩ at 25°C and has a negative temperature coefficient.