

## General Description

The AM9799 is a single-phase DC brushless motor driver IC featuring BiCMOS process. It is suitable for fan motor drivers for low voltage equipment such as the note personal computers. The AM9799 includes lock shutdown, automatic restart, frequency generator (FG), have been incorporated into one chip. When the motor is under lock condition, lock shutdown function turns off the output current. When the lock condition is removed, the IC automatically restarts and allows DC fan to run. In addition, the FG function is to output rotation speed signal. It features MOS-FET driver circuit for better saturation characteristics. Slew rate of amplifiers and feedback resistors are optimized to achieve low-noise motor operation.

The AM9799 is available in MSOP-8 package.

## Features

- Lock Detection and Rotational Speed Sensing Mechanisms are Built-in
- Rotor-locked Protection and Automatic Restart When the Motor Lock is Undone
- Hall Bias Built-in and Hall Inputs Have a Hysteresis
- Built-in Thermal Shutdown Circuit
- Built-in Over Current Protection
- Built-in Short Protection
- Operating Voltage:  $V_{CC}=2V$  to  $6V$
- BiCMOS Technology
- Compact Package: MSOP-8

## Applications

- CPU Cooler Fan in Notebook Personal Computers

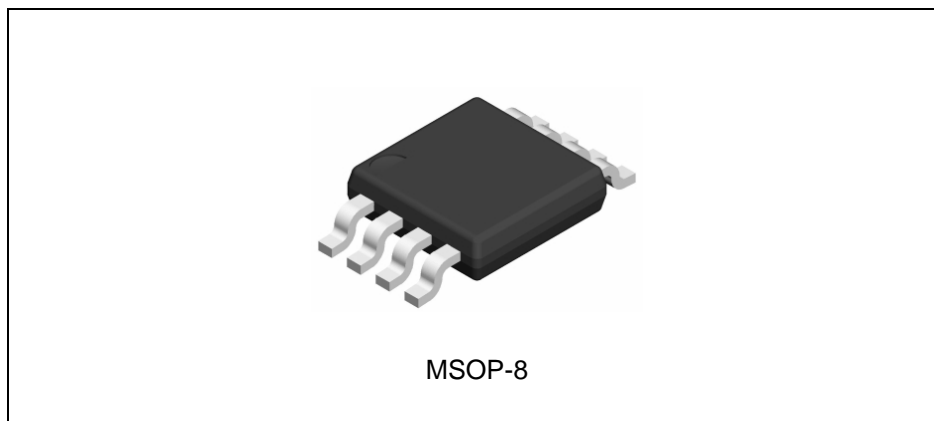


Figure 1. Package Type of AM9799

## Pin Configuration

MM Package  
(MSOP-8)

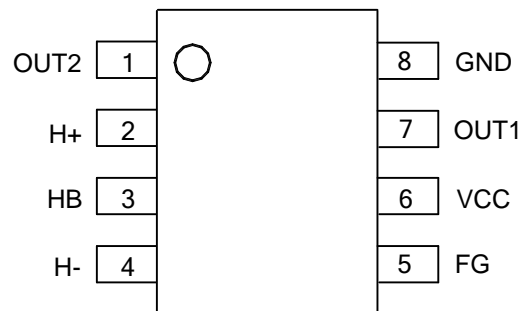


Figure 2. Pin Configuration of AM9799 (Top View)

## Pin Description

Pin Number	Pin Name	Function
1	OUT2	Driver out2
2	H+	Hall input(+)
3	HB	Hall bias
4	H-	Hall input(-)
5	FG	Frequency generator
6	VCC	Power supply
7	OUT1	Driver out1
8	GND	Ground

**Single Phase Full-wave Low Voltage Fan Motor Driver**

**AM9799**

**Functional Block Diagram**

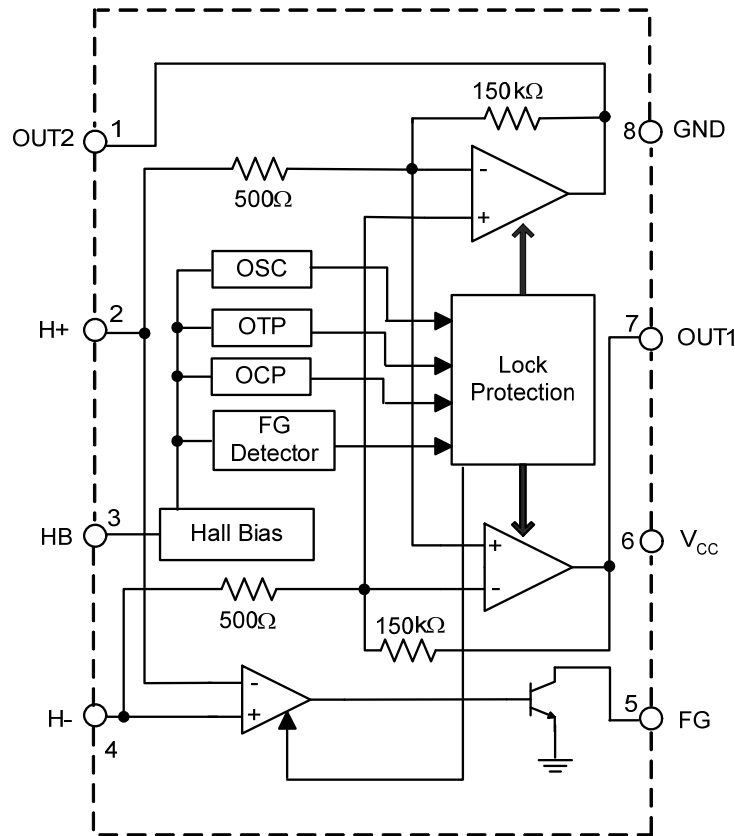
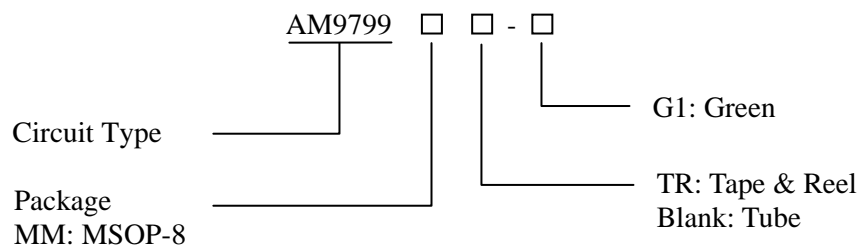


Figure 3. Functional Block Diagram of AM9799

**Ordering Information**



Package	Temperature Range	Part Number	Marking ID	Packing Type
MSOP-8	-40 to 105°C	AM9799MM-G1	6799MM-G1	Tube
		AM9799MMTR-G1	6799MM-G1	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and green.

**Single Phase Full-wave Low Voltage Fan Motor Driver****AM9799****Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ , Note 1)**

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	7	V
Output Current	$I_O(\text{max})$	1	A
FG Output Current	$I_{FG}$	5	mA
FG Output Voltage	$V_{FG}$	7	V
Lead Temperature (Soldering 10s)		260	$^{\circ}\text{C}$
Power Dissipation	$P_D$	585	mW
Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Thermal Resistance (Die to Ambient)	$\theta_{JA}$	214	$^{\circ}\text{C}/\text{W}$
Storage Temperature Range	$T_{STG}$	-55 to 150	$^{\circ}\text{C}$
ESD (Human Body Model) (Note 2)	ESD	2000	V

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Note 2: Electronic semiconductor products are sensitive to Electro Static Discharge (ESD). Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

**Recommended Operating Conditions ( $T_A=25^{\circ}\text{C}$ )**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	$V_{CC}$	2	6	V
Hall Input Voltage Range	$V_H$	0.4	$V_{CC} - 1.1$	V
Operating Temperature	$T_{OP}$	-40	105	$^{\circ}\text{C}$

**Single Phase Full-wave Low Voltage Fan Motor Driver****AM9799****Electrical Characteristics** $V_{CC}=5V$ ,  $T_A=25^{\circ}C$ , unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Current	$I_{CC}$			4	6	mA
Input Offset Voltage	$V_{HOFS}$				$\pm 4$	mV
Output Saturation Voltage	$V_O$	$I_O=250mA$ upper and lower total		0.3	0.45	V
Input-output Gain	$G_{IN}$		45	48	50	dB
FG Low Voltage	$V_{FGL}$	$I_{FG}=3mA$			0.3	V
Input Hysteresis Voltage	$V_{HYS}$		$\pm 6$	$\pm 10$	$\pm 15$	mV
Lock Detection ON time	$T_{ON}$		0.35	0.5	0.7	sec
Lock Detection OFF time	$T_{OFF}$		3.5	5	7	sec
Hall Bias Voltage	$V_{HB}$	$I_{HB}=5mA$	1.15	1.3	1.45	V

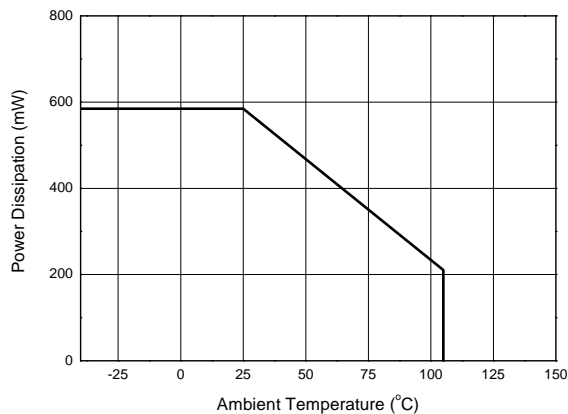
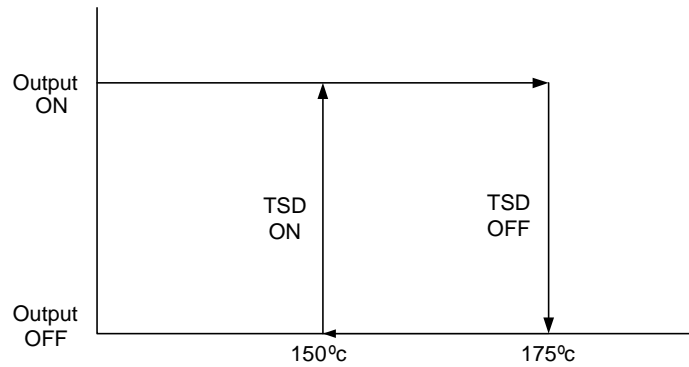
**Typical Performance Characteristics**

Figure 4. Power Dissipation vs. Ambient Temperature

### Thermal Shut Down (TSD)

This IC is built-in TSD. TSD has the temperature hysteresis.



TSD ON (Typ. 175°C) All output transistor OFF.  
 TSD OFF (Typ. 150°C) Reset ordinary motion.  
 (It has the temperature hysteresis of 25°C <TYP>)

Figure 5. Thermal Shut Down

### Lock Detection, Automatic Restart Circuit

This IC detects the rotation of the motor by hall signal, and adjusts lock detection ON time (Ton) and lock detection OFF time (Toff) by the internal counter. These time (Ton, Toff) are showed below.

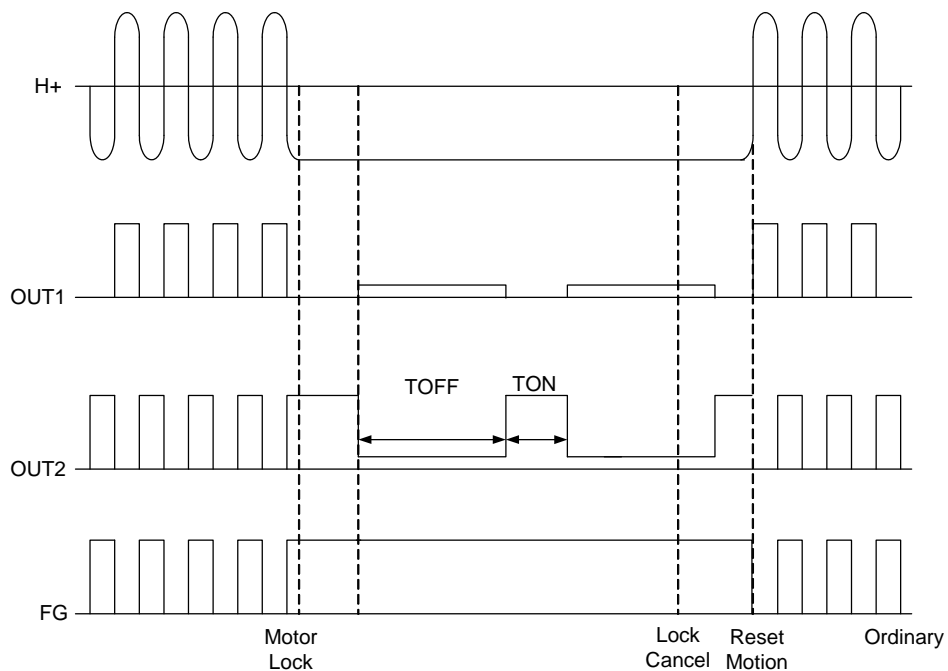


Figure 6. The Function of Rotor-locked Protection and Auto Restart Diagram of AM9799

Typical Application

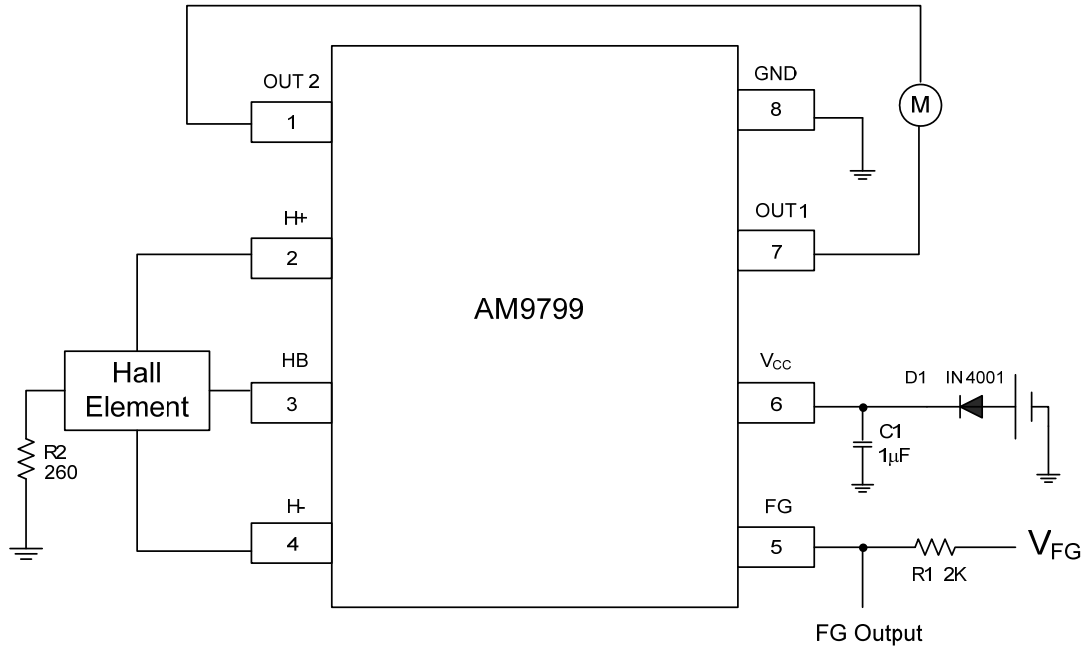
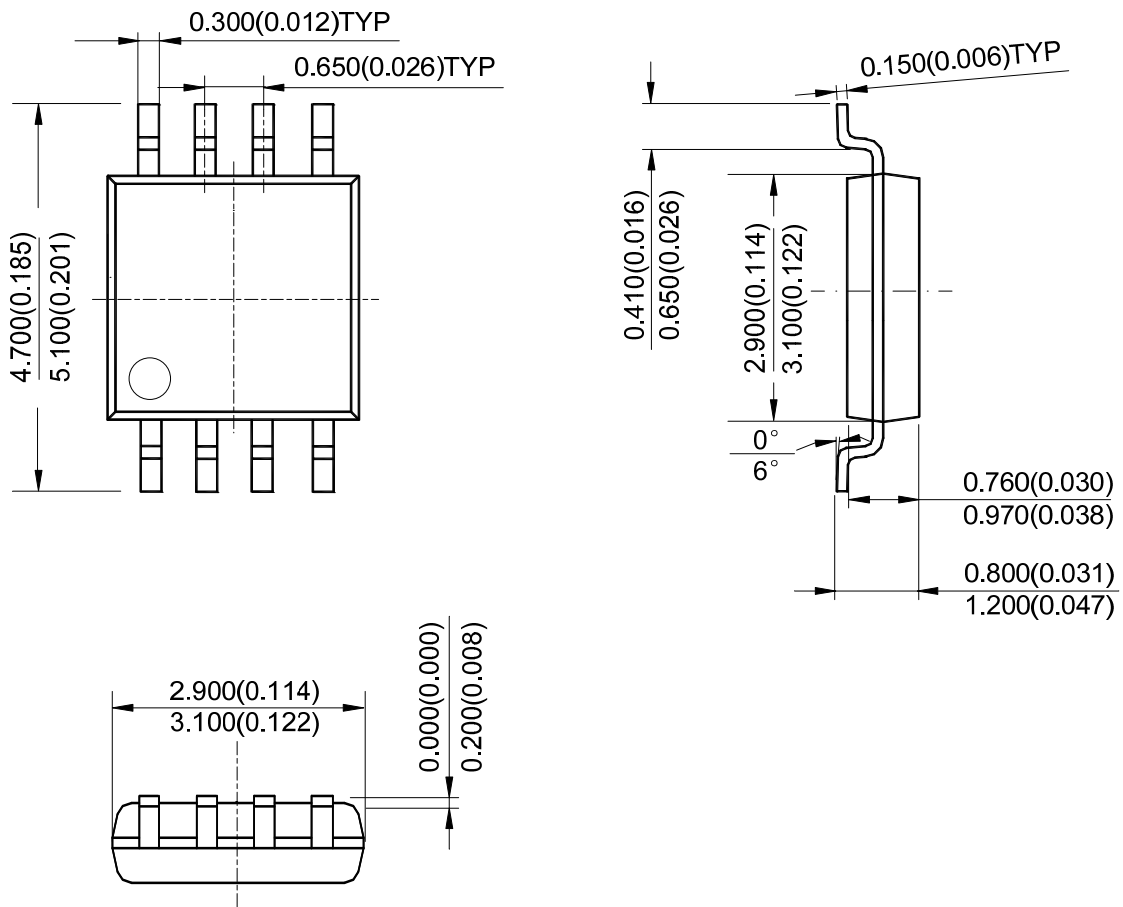


Figure 7. Typical Application of AM9799

Mechanical Dimensions

MSOP-8

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.





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