



OCH2993R

Single Phase DC Fan Driver

ORIENT-CHIP

General Description

OCH2993R is a fan motor driver for the single coil brushless DC motor. With its high efficient direct PWM control mode, OCH2993R controls the speed of brushless DC motor with an external hall switch IC. OCH2993R is suitable to drive variable speed motors for personal computer's power supply radiation fans and CPU coolers.

OCH2993R integrates PWM fan speed control, minimum speed mode, soft start, soft switch, fan tachometer, lock protection, auto restart and Hall IC power circuit. PWM mode controls fan speed in low noise and low vibration ways by adjusting PWM signal duty. OCH2993R can set minimum fan speed by presetting MINSP voltage. With soft start function, OCH2993R can effectively reduce the peak current when power on. To reduce fan driver audible noise and power loss, the OCH2993R features a soft on/off phase transition and automatic phase-lock function of the motor winding BEMF and current.

Robust protections in OCH2993R include under-voltage lockout (UVLO), rotor deadlock protection, over current protection (OCP) and thermal shutdown.

The OCH2993R requires a minimal number of external components to save solution cost. The OCH2993R is available in TSSOP16L-EP packages.

Features

- Supporting speed: Max. 40000 Rpm/Min.
- Wide Operating Input Voltage Range: 3.5V~18V
- Integrated Power MOSFETs: Total 220mΩ(High side + Low side)
- PWM Fan Speed Control
- Programmable Minimum Fan Speed
- MINSP Setting Minimum Fan Speed
- Soft On/Off Phase Transition
- 5S Soft Start and Soft Restart Function
- RD Signal Output
- Over Temperature Protection
- External Hall Switch
- Lock-shutdown protection & auto-restart function
- Automatic Phase Lock Detection of Winding BEMF and Current Zero-Crossing
- 15KHz to 60kHz PWM Input Frequency Range
- Fixed 26kHz Output Switching Frequency
- OCP (Over Current Protection)
- Current Limit & Soft Start and Soft Restart
- Thermal Protection and Automatic Recovery
- Built-In Input UVLO
- -40°C ~ + 105°C Temperature Range
- RoHS Compliant
- TSSOP-16L-EP Packages

Applications

- Power、Industrial product、Equipment or Servers
- Single Coil DC Brushless DC Motor

Pin Configuration

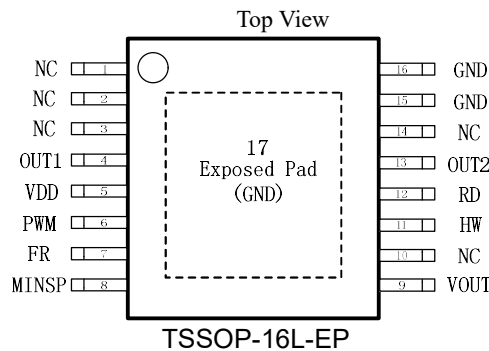


Figure 1, Pin Assignments Of OCH2993R

Pin Name	TSSOP16L-EP	Pin Function
NC	1,2,3,10,14	No Connection
OUT1	4	Output 1
VDD	5	Positive Power Supply
PWM	6	PWM Signal Input
FR	7	Inductive polarity Or Rotation Direction Control Pin,
MINSP	8	Input to set minimum speed or fan off range
VOUT	9	Regulator Output(Power supply for external HALL switch)
HW/SCL	11	Hall switch input(connect the external Hall Switch output)
RD	12	RD Signal Output. This is an open-drain output.
OUT2	13	Output 2
GND	15, 16, Exposed pad	Ground

■ Typical Application Circuit

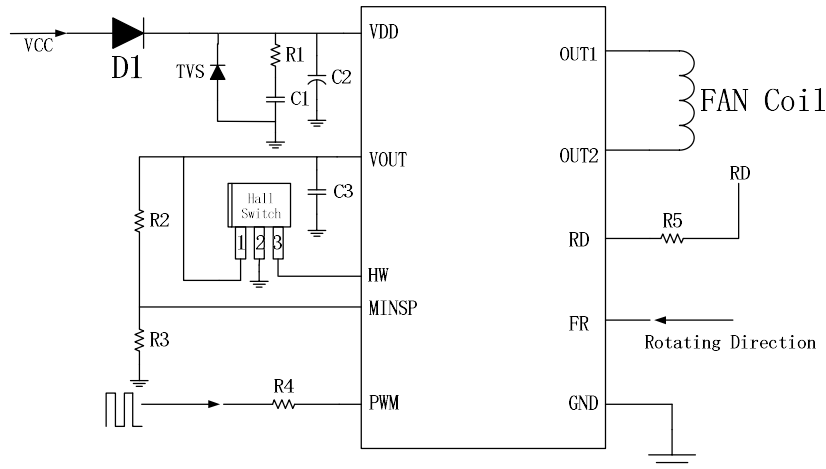


Figure 2, Typical Application Circuit Of OCH2993R (TSSOP16L-EP)

Note1:

- 1) Must use least $C1=10\mu F\sim 22\mu F$ and $R1=1\sim 2\Omega$ (Typ.) for the decoupling between VDD and GND and place the capacitor as close to the IC as Possible.
- 2) A TVS diode is needed in application.
- 3) C2 is Electrolytic Capacitor, the typical value is $10\mu F\sim 47\mu F$.
- 4) C3 is Optional, the typical value is $1\mu F$.
- 5) R2/R3 value decided the minimum output duty setting.
- 6) R4/R5, the typical value R4 is $10k\Omega$, R5 is 100Ω .

■ Block Diagram

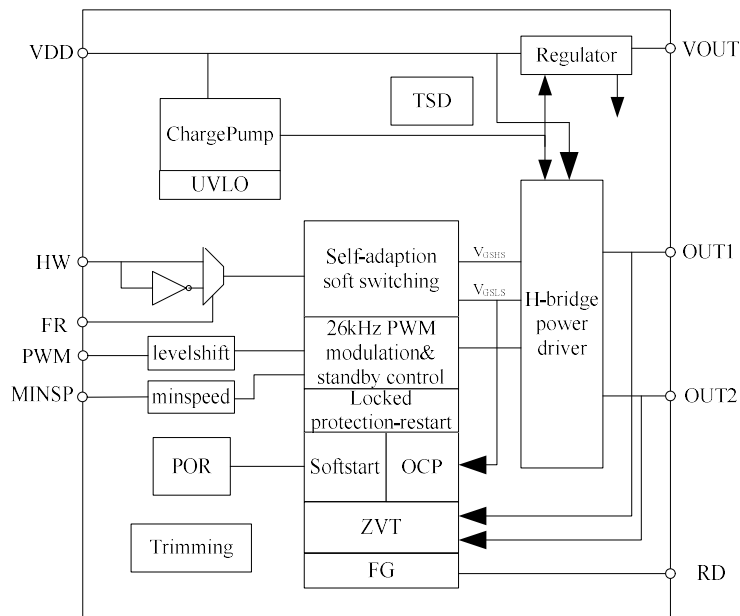


Figure 4, Block Diagram Of OCH2993R