



US90/91

24V Hall IC Fan Driver

Features and Benefits

- Power efficient CMOS and Power MOSFET technology
- Built-in Zener diodes protection for the power outputs
- One chip solution
- SOIC-8 package
- High sensitivity
- Locked Rotor shutdown and auto-restart

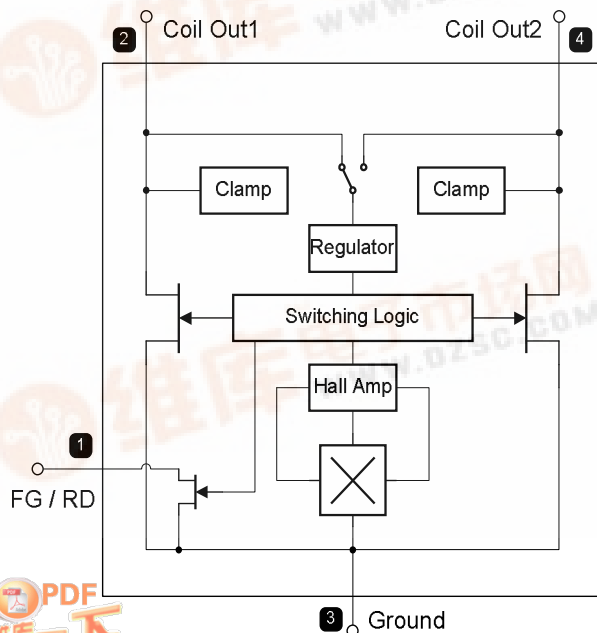
Applications

- Current Range up to 500mA Peak
- For 12V/24V Fans

Ordering Information

Part No.	Temperature Suffix	Package Code
US90	E (-40°C to 85°C)	SO (8-Pin Narrow SOIC)
US91	E (-40°C to 85°C)	SO (8-Pin Narrow SOIC)

Functional Diagram



Description

US90: The Tachometer/Frequency Generator (FG) version produces a logic signal, which is aligned with the Hall plate signal.

US91: The Rotation Detector (RD) / Alarm Signal version has a low output in the normal condition. When a locked rotor condition occurs the RD output changes to a high state.

Absolute Maximum Ratings

Supply Voltage (Over Voltage), V_{DD}	30V
Output Current (Fault), I_{OUT}	500mA
Operating Temperature Range, T_A	-40 to 85°C
Storage Temperature Range, T_S	-55 to 150°C
Junction Temperature, T_J	125°C

Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

US90/91 Electrical Specifications

DC operating parameters: $T_A = 25^\circ\text{C}$, $V_{DD} = 24\text{V}$ unless otherwise specified.

Parameter	Test Conditions		Min	Typ	Max	Units
Fan Supply Voltage	V_{DD}	Operating	5	-	30	V
Supply Current	I_{DD}	Vdd=5 to 30V	-	2.0	4	mA
Output voltage Clamp	V_{OUT}	$B < B_{HYS}$	-	65	-	V
Output Saturation voltage	V_{DSS}	$I_{OUT} = 150\text{mA}$	-	375	-	mV
Output Saturation voltage	V_{DSS}	$I_{OUT} = 250\text{mA}$	-	625	-	mV
Thermal resistance	R_{th}	Operating	-	200	-	°C/Watt
Locked rotor protection on	T_{LRP-ON}		-	0.25	-	Sec
Locked rotor protection off	$T_{LRP-OFF}$		-	1.5	-	Sec
FG/RD output Vds	V_{O-LOW}	$I_{OUT} = 10\text{mA}$	-	-	0.5	V
FG/RD output high clamp	V_{O-HIGH}		28	-	-	V

US90/91 Magnetic Specifications

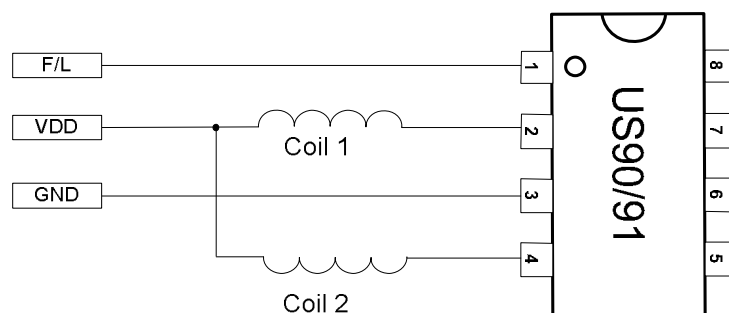
DC operating parameters: $T_A = 25^\circ\text{C}$, $V_{DD} = 24\text{V}$ unless otherwise specified. 1 mT = 10 Gauss.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operate Point	B_{OP}	Operating	-	3.0	6.0	mT
Release Point	B_{RP}	Operating	-6.0	-3.0	-	mT
Hysteresis	B_{HYS}	Operating	-	6.0	-	mT

Applications Notes

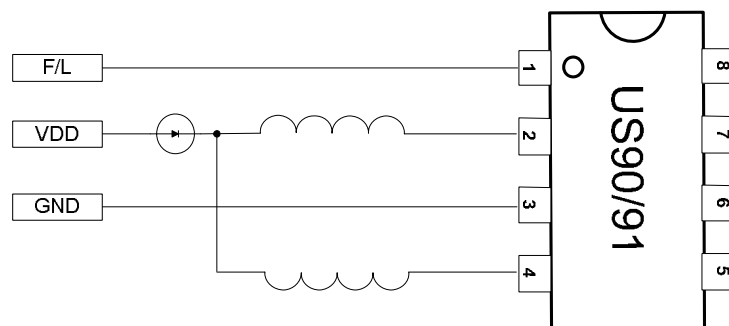
Without reverse bias protection diode

Recommended with higher than 120 ohm



With reverse bias protection diode

Recommended with lower than 60 ohm coil



Applications Comments

EMC protection is built into the power outputs. EMC considerations require that the fan assembly should tolerate ESD, reverse voltage, over voltage and not radiate RF noise, which may interfere with other electronic equipment. These capabilities are built into the chip to meet EMC requirements.

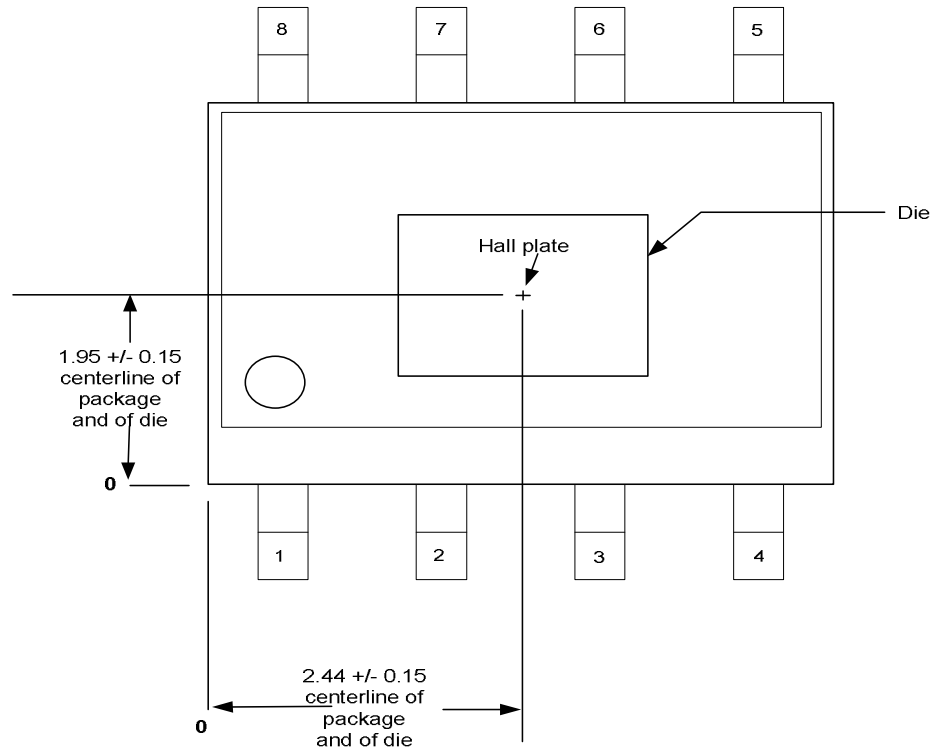
Start and Run Current US90/91 maximum starting current is 500mA. Recommended maximum run current is 250mA.

Power supply voltage. US90/91 are designed for 24V fan. It is recommended that fan operating voltage does not exceed 30V and that the supply + BEMF be no more than 60V.

Temperature US90S/91S function up to a junction temperature of 125°C. Hall IC circuitry and power FET outputs provide low power dissipation, and a cool chip.

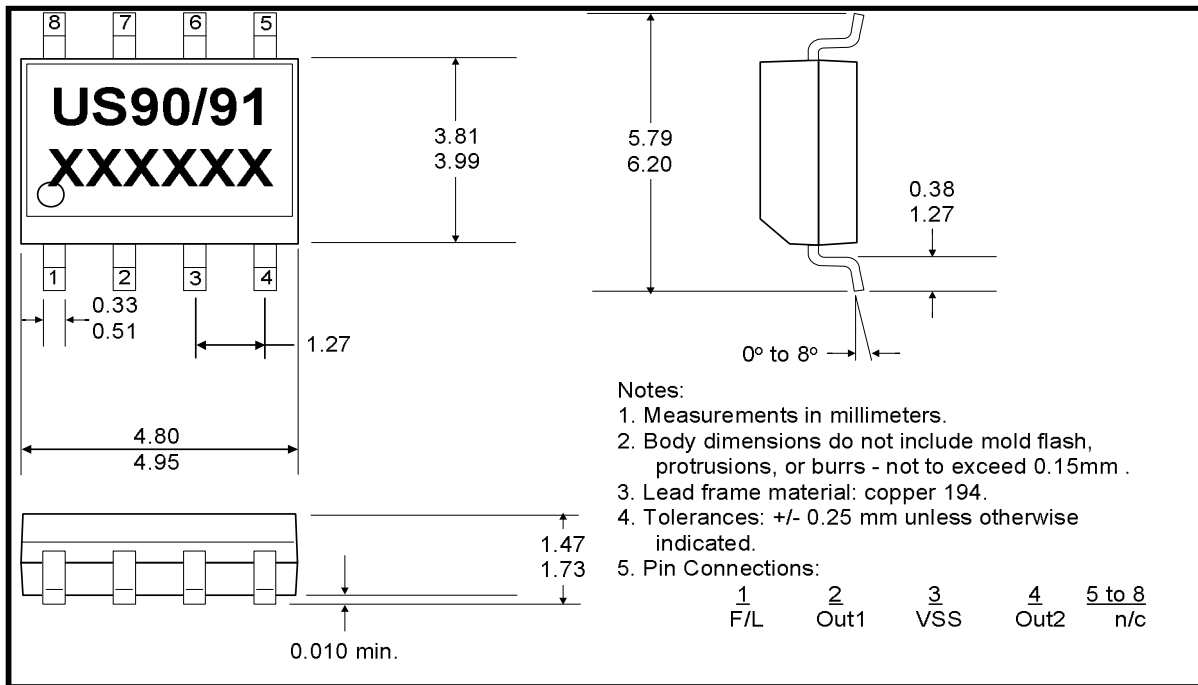
Locked Rotor conditions are detected by the IC when there is no motion for 0.25 seconds and will shut off the motor drive for 1.5 second, then turn on the drive current for 0.25 seconds. This sequence will continue indefinitely until the locked rotor condition is fixed. This feature prevents overheating.

US90/91 Hall Plate Location



Notes:
1. Measurements in millimeters (mm).

Package Dimensions



SO: 8-Pin narrow SOIC

Reel Information is attached ref SOIC08-AC90.OP2 There are 2600 parts/reel

Reliability information

Melexis devices are classified and qualified regarding suitability for infrared, vapor phase and wave soldering with usual (63/37 SnPb-) solder (melting point at 183degC).

The following test methods are applied:

- IPC/JEDEC J-STD-020A (issue April 1999)
Moisture/Reflow Sensitivity Classification For Nonhermetic Solid State Surface Mount Devices CECC00802 (issue 1994)
- Standard Method For The Specification of Surface Mounting Components (SMDs) of Assessed Quality
- MIL 883 Method 2003 / JEDEC-STD-22 Test Method B102
Solderability

For all soldering technologies deviating from above mentioned standard conditions (regarding peak temperature, temperature gradient, temperature profile etc) additional classification and qualification tests have to be agreed upon with Melexis.

The application of Wave Soldering for SMD's is allowed only after consulting Melexis regarding assurance of adhesive strength between device and board.

For more information on manufacturability/solderability see quality page at our website: <http://www.melexis.com/>

ESD Precautions

Electronic semiconductor products are sensitive to Electro Static Discharge (ESD).

Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

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