

## Smart motor driver with embedded Hall sensor

### FEATURES

- Motor driver with integrated Hall sensor
- Lock-shutdown protection & auto-restart function
- Precise magnetic switching thresholds
- “Soft-switch” phase-switching technique to reduce vibration and acoustic noise
- Thermal shutdown protection
- Available in SIP-4L packages
- For 12V systems



### GENERAL DESCRIPTION

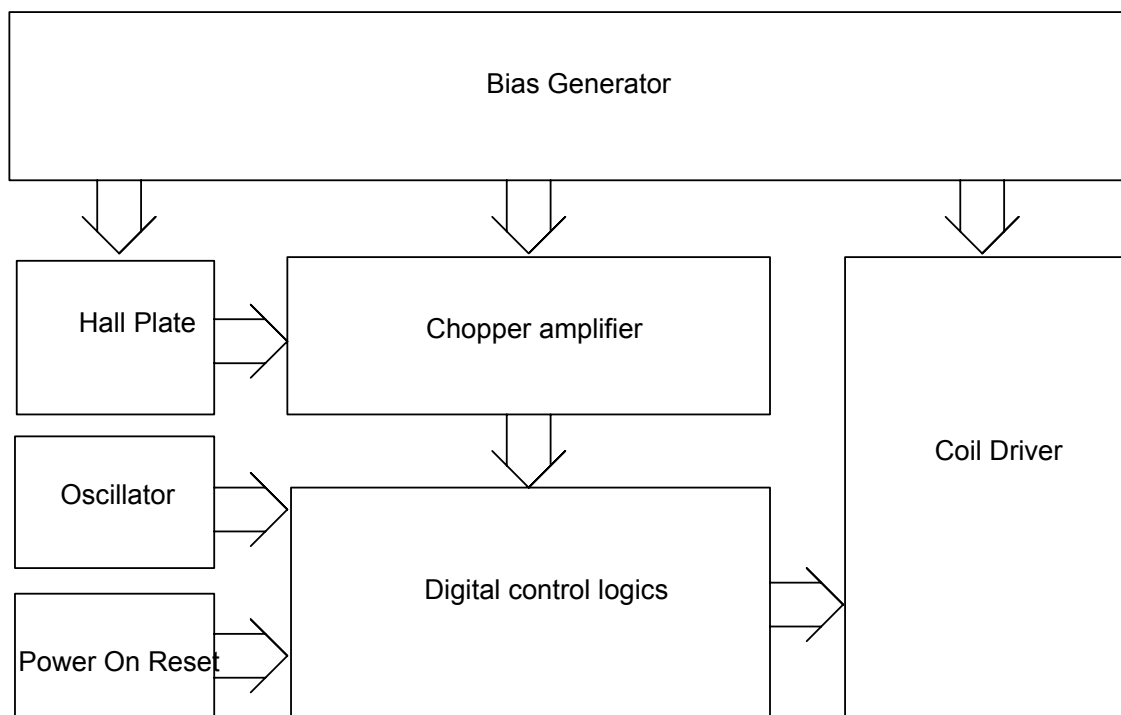
FD1157H is a two coil motor driver with embedded Hall sensor. It integrates the motor driver with the Hall sensor, which simplifies the PCB(printed circuit board) design and make the fabrication of small-size motors possible. Lock-shutdown and auto-restart function keeps the motor from being over-heated and restarts the motor after being locked.

“Soft-switch” phase-switching technique is used to reduce the vibration and acoustic noise.

Thermal-shutdown protection ensures the motor driver to operate under specified temperature ranges.

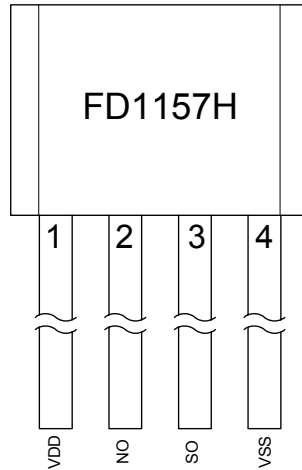
All the protection mechanisms mentioned above combine to provide a complete protecting scenario for the motor system, keep the motor system from possible damages and guarantee correct operations.

### BLOCK DIAGRAM



**Figure.1**

## PIN CONNECTION



**Figure.2**

## PIN DESCRIPTIONS

Name	I/O	FD1157H	Description
VSS	G	4	Ground
SO	O	3	Driver output
NO	O	2	Driver output
VDD	P	1	Positive power supply

Legend: I=input, O=output, I/O=input/output, P=power supply, G=ground

## FUNCTIONAL DESCRIPTIONS

Refer to the block diagram (Figure.1), FD1157H is composed of the following building blocks:

- Bias generator

The bias generator provides precise, temperature- and process-insensitive bias references for the analog circuit blocks. These references guarantee proper operation of the IC under all conditions specified in this specification.

- Oscillator

The built-in oscillator provides the clock signal for the digital control logics

- Power-on Reset

Used to detect the power-up ramp and reset the digital circuits to achieve correct operation as soon as the power is ready.

- Chopper Amplifier

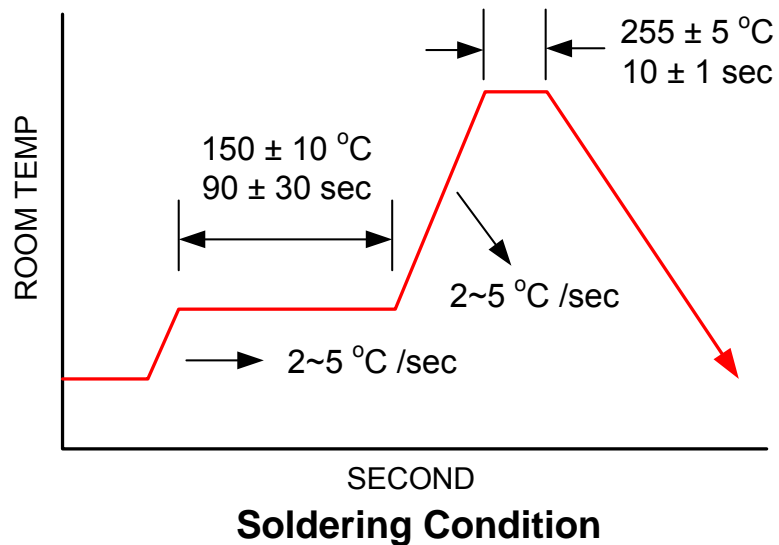
To achieve a higher magnetic sensitivity the chopper amplifier structure is adopted in this design. Use of this structure dynamically removes both the offset and flicker noise at the same time.

- Digital control logics

- Hall sensor part – generates controlling signals for the Hall sensor.
- Coil driver part – generates controlling signals for the Coil driver.

**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Conditions	Values		Unit
			min.	max.	
Operating Temperature	T <sub>OP</sub>	-	-20	105	°C
Storage Temperature	T <sub>ST</sub>	-	-40	150	°C
DC Supply Voltage	V <sub>dd</sub>	-		16	V
Supply Current	I <sub>dd</sub>	-		6	mA
Continuous Current	I <sub>O(Cont.)</sub>			600	mA
Hold Current	I <sub>O(Hold)</sub>			900	mA
Peak Current	I <sub>O(Peak)</sub>	<100us		1000	mA
Junction temperature	T <sub>J</sub>			150	°C
Power Dissipation	P <sub>D</sub>	SIP-4L		600	mW
Thermal Resistance	θ <sub>JA</sub>	SIP-4L		209	°C/W
Lead Temperature		10sec		260	°C





## OPERATING CONDITIONS

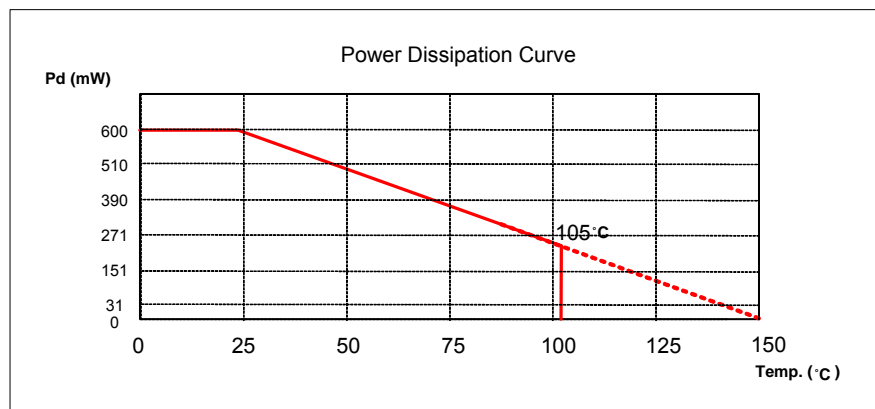
Parameter	Conditions	Values			Unit
		min.	typ.	max.	
Supply Voltage	-	2.5		14.0	V
Ambient Temperature	-	-20		105	°C

## ELECTRICAL CHARACTERISTICS @ VDD=12.0V

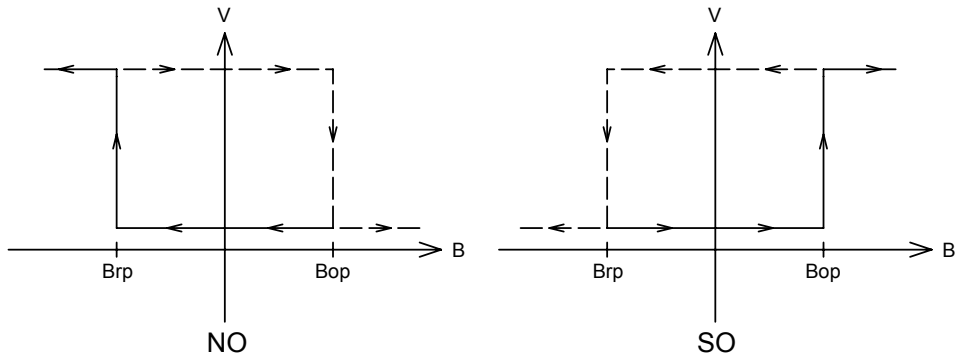
Parameter	Conditions	Values			Unit
		min.	typ.	max.	
Average Supply Current(no load)			5		mA
On resistance			1		Ohm
Thermal Shutdown Threshold			165		°C

## MAGNETIC CHARACTERISTICS

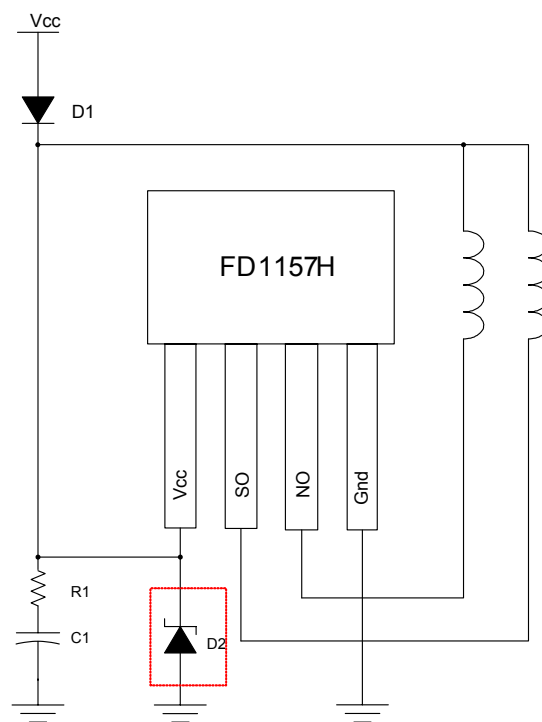
Parameter	Conditions	Values			Unit
		min.	typ.	max.	
Operate Points ( B <sub>OP</sub> )			20		G
Release Points ( B <sub>RP</sub> )			-20		G
Hysteresis			40		G



### HYSTERESIS CHARACTERISTICS



### Application Circuit Reference

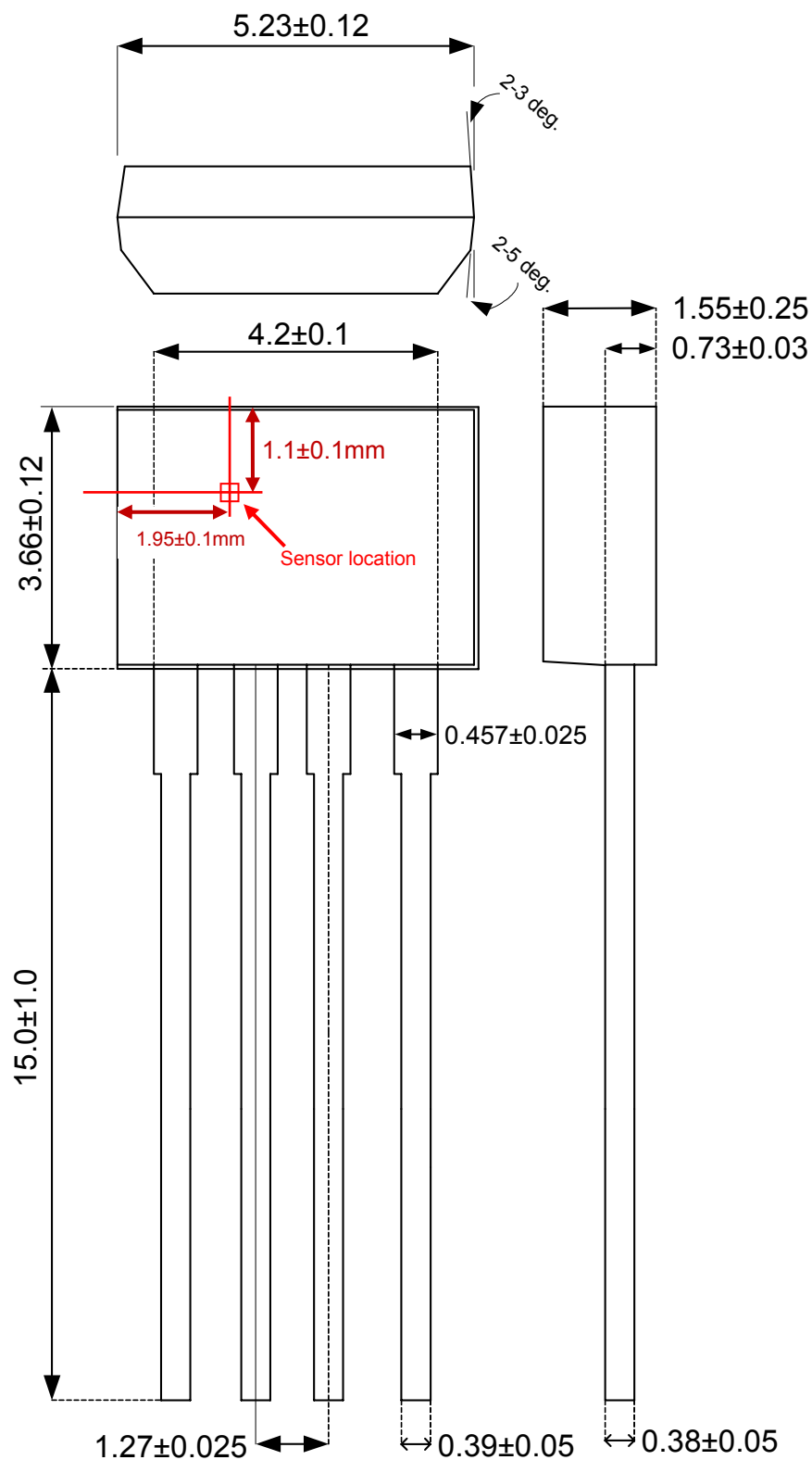


**Figure.3**

**Note: C1=1uF, R1=5~10 ohm,D2(option) breakdown voltage 16V**

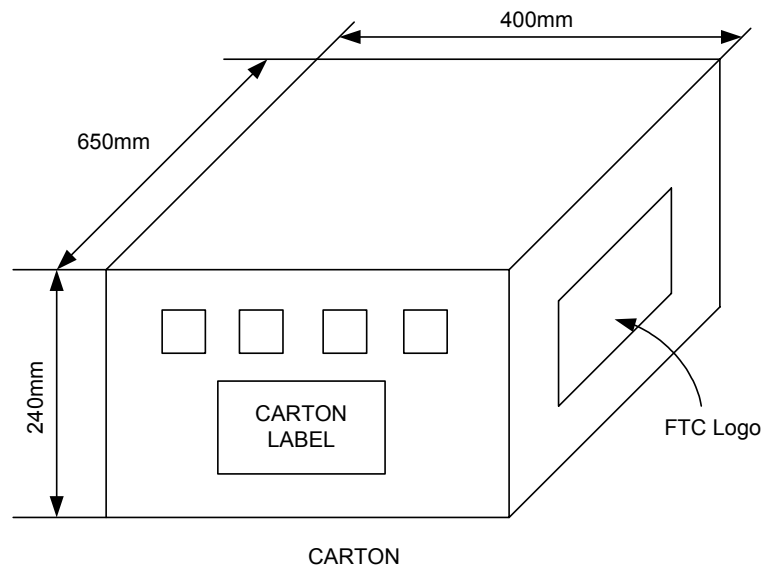
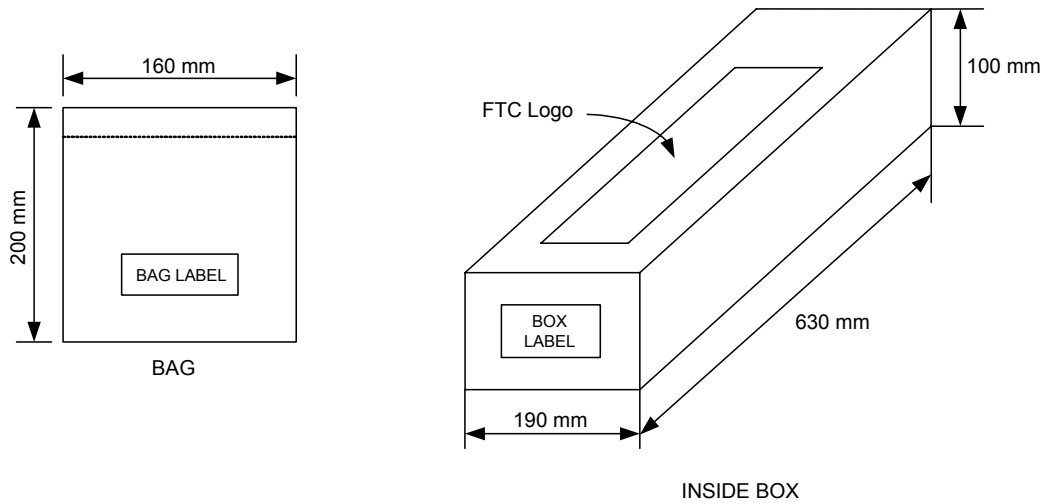


PACKAGE DIMENSION Unit:mm  
SIP-4L(Lead Free)





## PACKING SPECIFICATION BAG & BOX DIMANSION



## PACKING QUANTITY SPECIFICATIONS

1000 EA / 1 BAG

25 BAGS / 1 INSIDE BOX

4 INSIDE BOXES / 1 CARTON

**ORDER INFORMATION**

Part Number	Operating Temperature	Package	Description	Marking
FD1157H-LF	-20 °C to +105 °C	SIP-4L	±25G (B)	-