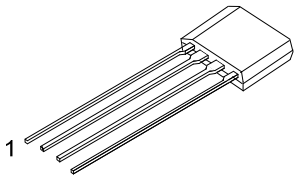
SMART MOTOR DRIVER WITH INTEGRATED HALL SENSOR



SIP-4

■ DESCRIPTION

The **UH457** is a single coil motor driver with integrated Hall sensor. Lock-shutdown and auto-restart function protects the motor from being over-heated and restarts the motor after being locked.

Thermal-shutdown protection (TSD) ensures the internal drivers of IC are operating under a safe operating temperature range.

The **UH457** also uses Soft-switch phase-switching technique to reduce the vibration and acoustic noise.

■ FEATURES

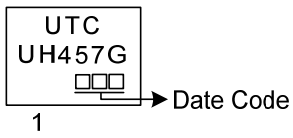
* Soft switching output driver
* Built-in Hall sensor motor driver
* Motor lock protection and automatic restart
* Thermal shutdown protection
* H-Bridge MOS driver
* For 12V or 24V DC motor / FAN systems

■ ORDERING INFORMATION

Ordering Number	Package	Packing
UH457G-G04-K	SIP-4	Bulk

UH457G-G04-K (1)Packing Type (2)Package Type (3)Green Package	 (1) K: Bulk (2) G04: SIP-4 (3) G: Halogen Free and Lead Free

■ MARKING

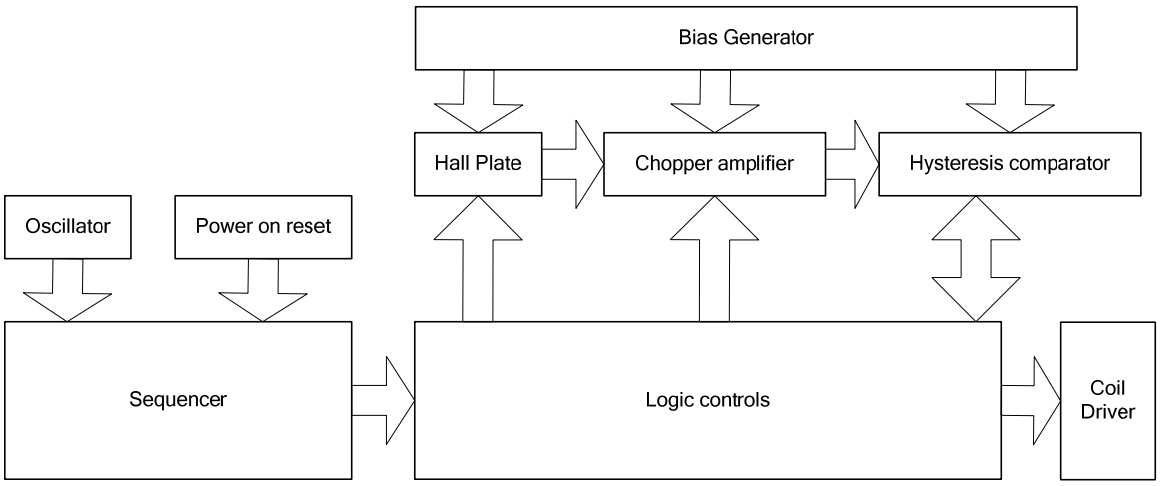


■ PIN DESCRIPTION

PIN NO.	PIN NAME	P/I/O	DESCRIPTION
1	V_{DD}	P	Power supply
2	NO	O	Driver output
3	SO	O	Driver output
4	V_{SS}	G	Ground

Note: I=Input, O=Output, I/O=Input/output, P=Power supply, G=Ground

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage(V_{DD}, FG)	V_{DD}	29	V
Output Voltage (NO, SO)	V_{OUT}	V_{DD} + 0.3	V
Supply Current	I_{DD}	5	mA
Continuous Current	I_{CONT}	300	mA
Hold Current	I_{HOLD}	800	mA
Peak current (< 100 μs)	I_{PEAK}	1000	mA
Magnetic Flux Density	B	Unlimited	Gauss
IR-Reflow Lead Temperature (10sec)		260	°C
Power Dissipation	P_D	1000	mW
Junction Temperature	T_J	170	°C
Operation Junction Temperature	T_{OPR}	-20 ~ +85	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Output Zener protection voltage.

■ RECOMMENDED OPERATING COMDITIONS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{DD}	4.0		28	V
Operation Junction Temperature	T_A	-40		85	°C

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient	θ_{JA}		125		°C/W
Junction to Case	θ_{JC}		100		°C/W

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Average Supply Current	I_{DD}	V_{DD}=24V, no load		2.5		mA
On resistance (R_{PMOS}+R_{NMOS})	R_{ON}	V_{DD}=5V		4.5		Ω
		V_{DD}=24V		3.0		Ω
Thermal Shutdown Threshold	T_{SD}		150			°C
Locked Rotor Period	T_{ON}			1.1		s
	T_{OFF}			7.5		s

■ MAGNETIC CHARACTERISTICS

PARAMETR	SYMBOL	MIN	TYP	MAX	UNIT
Operate Point	B_{OP}	5	25	50	G
Release Point	B_{RP}	-50	-25	-5	G
Hysteresis	B_{HYS}		50		G

■ DRIVER OUTPUT VS. MAGNETIC POLE

PARAMETER	TEST CONDITIONS	NO	SO
North pole	B < B_{RP}	High	Low
South pole	B > B_{OP}	Low	High

■ FUNCTIONAL DESCRIPTIONS

Refer to the block diagram above, **UH457** is composed of the following blocks:

1. Bias generator
The bias generator provides bias references for the analog blocks.

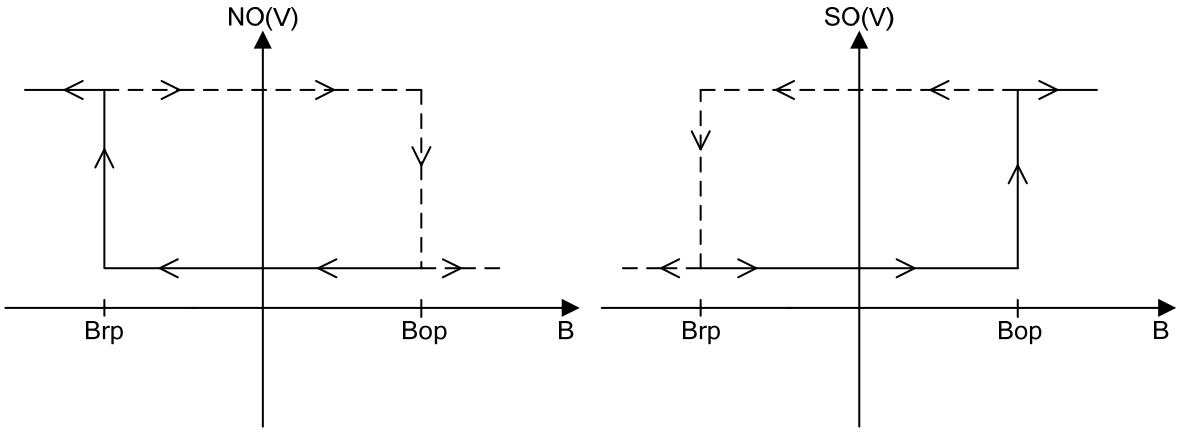
2. Oscillator
The integrated oscillator provides the clock signal for the digital control logics.

3. Power-on Reset
The block of power-on reset is used to detect the power-up ramp and reset the digital circuits.

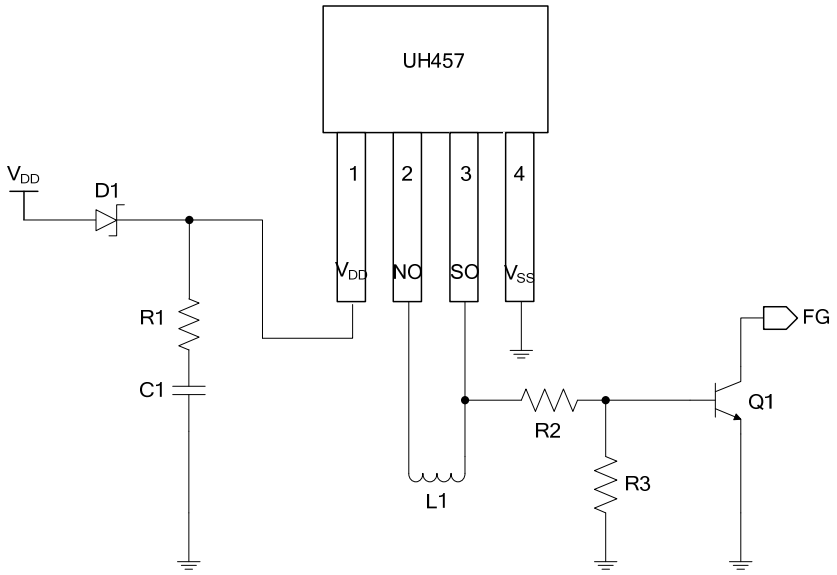
4. Chopper Amplifier
The chopper amplifier structure can achieve a higher magnetic sensitivity and dynamically removes both the offset and flicker noise at the same time.

5. Digital control logics
Generates controlling signals for the Hall sensor and Coil driver and Timer part.

■ HYSTERESIS CHARACTERISTICS



■ TYPICAL APPLICATIONS CIRCUIT



D1: Reversed protection diode
R1: 4.7~10 Ohm
C1: 4.7uF
R2: 20K Ohm
R3: 2K Ohm
Q1: 2N2222

Note: Capacitor C1 is necessary to use for the decoupling between V_{DD} and V_{SS} and should be placed as close to the IC as possible.

■ OUTPUT WAVEFORMS DESCRIPTION