



## UH457

Preliminary

CMOS IC

### SMART MOTOR DRIVER WITH INTEGRATED HALL SENSOR

#### DESCRIPTION

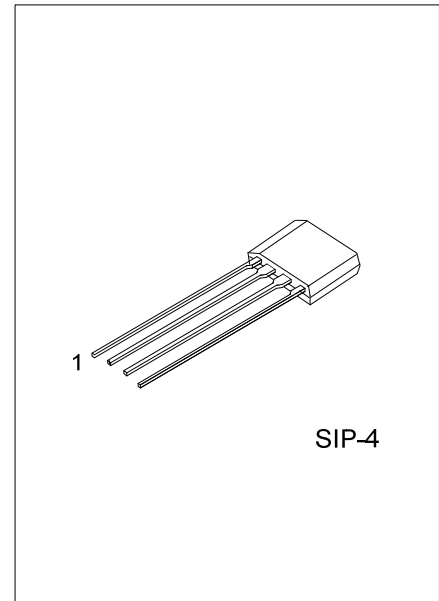
The **UH457** is a single coil motor driver with integrated Hall sensor. Lock-shutdown and auto-restart function protects the motor from being over-heated and restarts the motor after being locked.

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

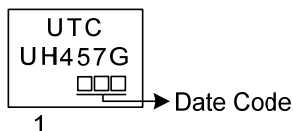


#### ORDERING INFORMATION

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

<p>UH457G-G04-K</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) K: Bulk</p> <p>(2) G04: SIP-4</p> <p>(3) G: Halogen Free and Lead Free</p>
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#### MARKING

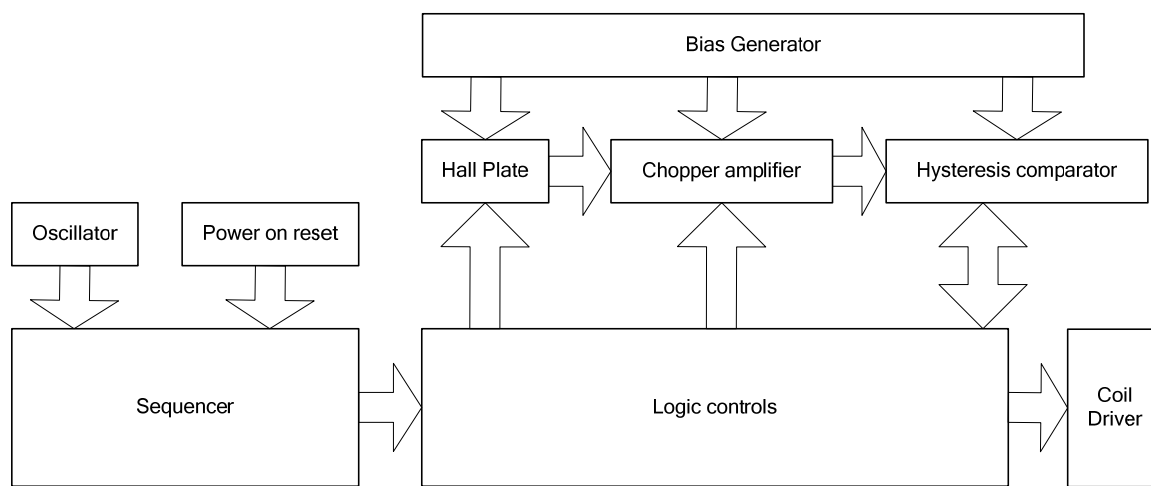


## ■ PIN DESCRIPTION

PIN NO.	PIN NAME	P/I/O	DESCRIPTION
1	V <sub>DD</sub>	P	Power supply
2	NO	O	Driver output
3	SO	O	Driver output
4	V <sub>SS</sub>	G	Ground

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

## ■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , 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 ( $< 100 \mu\text{s}$ )	$I_{PEAK}$	1000	mA
Magnetic Flux Density	B	Unlimited	Gauss
IR-Reflow Lead Temperature (10sec)		260	$^{\circ}\text{C}$
Power Dissipation	$P_D$	1000	mW
Junction Temperature	$T_J$	170	$^{\circ}\text{C}$
Operation Junction Temperature	$T_{OPR}$	$-20 \sim +85$	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	$-55 \sim +150$	$^{\circ}\text{C}$

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 ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{DD}$	4.0		28	V
Operation Junction Temperature	$T_A$	-40		85	$^{\circ}\text{C}$

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient	$\theta_{JA}$		125		$^{\circ}\text{C/W}$
Junction to Case	$\theta_{JC}$		100		$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Average Supply Current	$I_{DD}$	$V_{DD}=24\text{V}$ , no load		2.5		mA
On resistance ( $R_{PMOS}+R_{NMOS}$ )	$R_{ON}$	$V_{DD}=5\text{V}$		4.5		$\Omega$
		$V_{DD}=24\text{V}$		3.0		$\Omega$
Thermal Shutdown Threshold	$T_{SD}$		150			$^{\circ}\text{C}$
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.

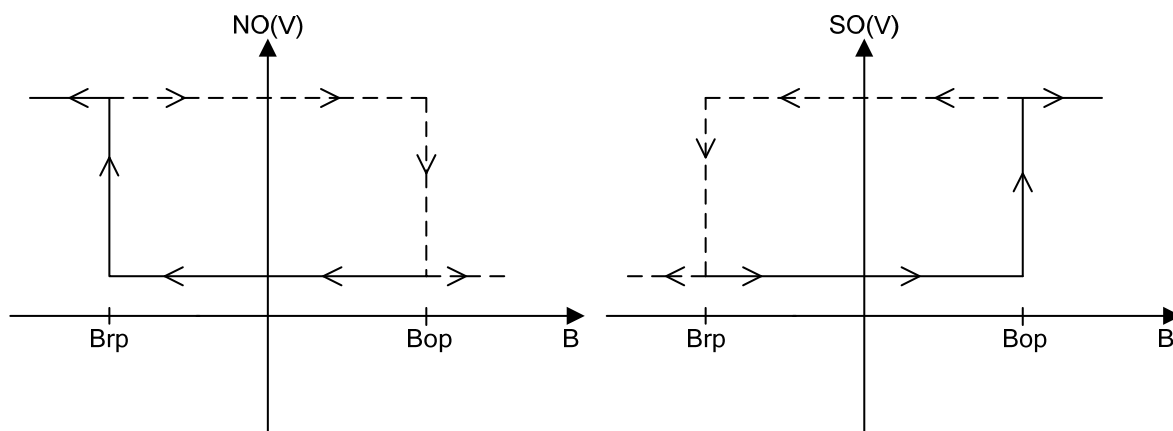
### 4. Chopper Amplifier

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

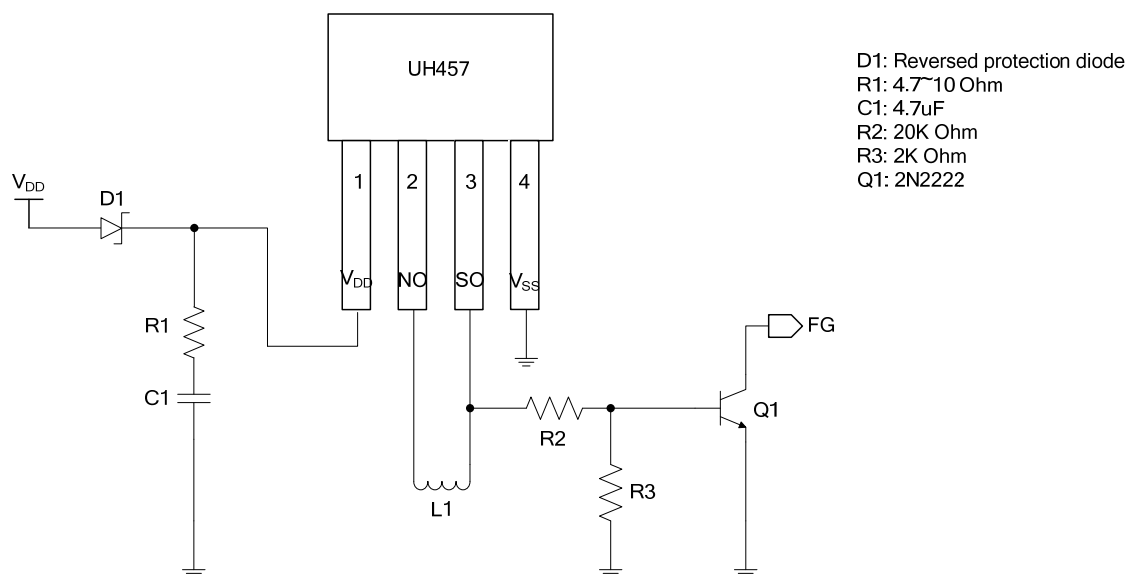
### 5. Digital control logics

Generates controlling signals for the Hall sensor and Coil driver and Timer part.

## ■ HYSTERESIS CHARACTERISTICS

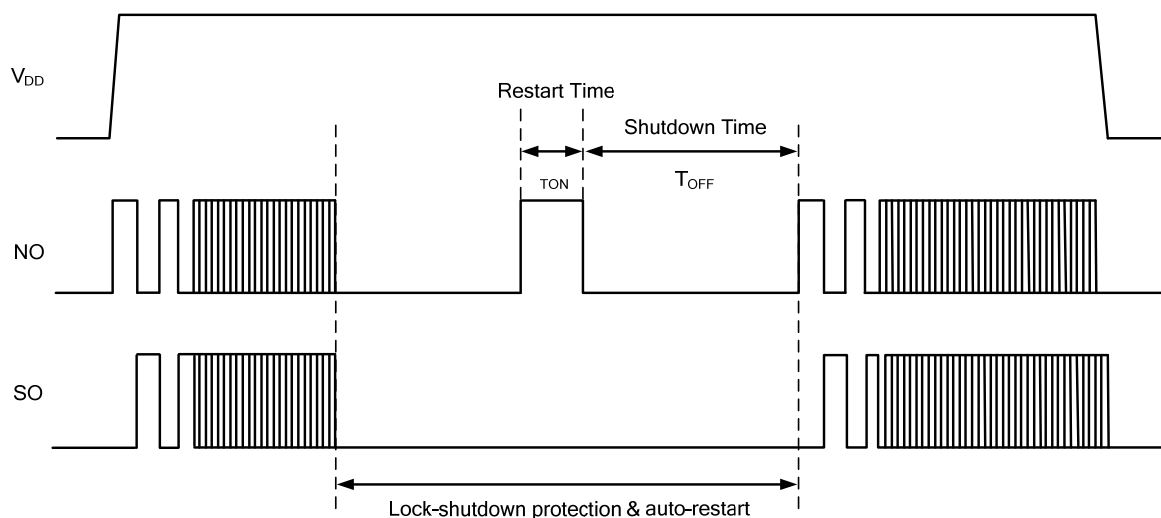


## ■ TYPICAL APPLICATIONS CIRCUIT



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



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