

MH284 provides a one-chip solution for 3-wire fan with two unipolar coil windings. The chip contains the Hall-effect sensor, dynamic offset correction, power drivers and a pair of complementary open-drain outputs (DO, DOB) . The output drivers pins are fully protected against switching transients.

While the magnetic flux density (B) is larger than operate point (Bop), DO will turn on (low), and meanwhile DOB will turn off (high). Each output is latched until B is lower than release point (Brp), and then DO, DOB transfer each state.

For DC fan application, sometimes need to test power reverse connection condition. Internal diode only protects chip-side but not for coil-side. If necessary, add one external diode to block the reverse current from coil-side

MH284KVK is rated for operation between the ambient temperatures  $-40\text{ }^{\circ}\text{C}$  and  $125\text{ }^{\circ}\text{C}$  for the K temperature range. MH284EVK is rated for operation between the ambient temperatures  $-40\text{ }^{\circ}\text{C}$  and  $85\text{ }^{\circ}\text{C}$  for the E temperature range. The package is available provided magnetically optimized solutions for most applications. Package VK is a four-lead ultra mini SIP for through-hole mounting. the Thermal shut-down function is integrated as well for better protection.

The package type is in a Halogen Free version has been verified by third party Lab.


### ***Features and Benefits***

- One Chip Hall sensor solution
- High sensitivity Hall sensor
- Locked rotor shutdown and auto-restart
- Power-efficient CMOS and power MOSFETS.
- Built-in Zener diodes protect outputs
- 3.5V to 20V operating voltage
- Peak currents up to 1200mA
- Thermal shutdown

### ***Applications***

- Dual-coil Brush-less DC Motor
- Dual-coil Brush-less DC Fan
- Revolution Counting
- Speed Measurement

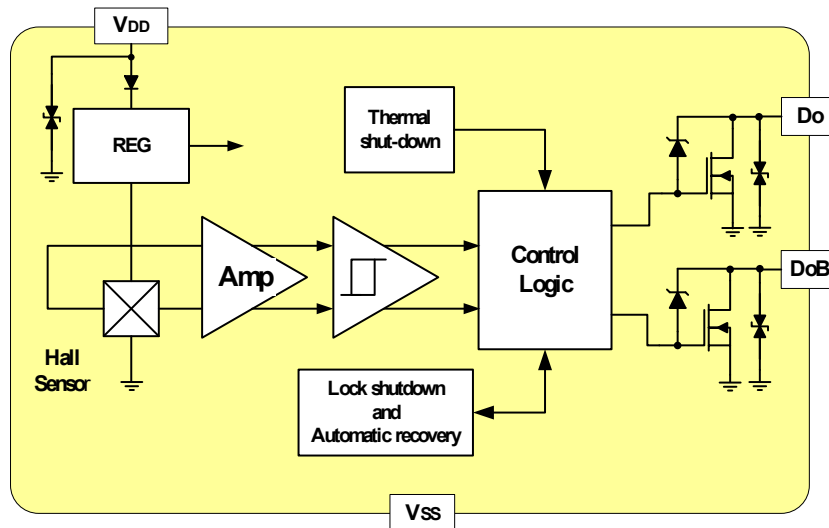
### Ordering Information

	<p><b>Company Name and Product Category</b></p> <p>MH:MST Hall Effect/MP:MST Power IC</p> <p><b>Part number</b></p> <p>181,D182,183,184,185,248,477,D381,D381F,381R,D382.....</p> <p>If part # is just 3 digits, the fourth digit will be omitted.</p> <p><b>Temperature range</b></p> <p>E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C</p> <p><b>Package type</b></p> <p>UA:TO-92S,VK:TO-92S(4pin),VF:TO-92S(5pin),SO:SOT-23, SQ:QFN-3,ST:TSOT-23,SN:SOT-553,SF:SOT-89(5pin), SS:TSOT-26,SD:DFN-6,SG:SOT-89(3pin)</p> <p><b>Sorting</b></p> <p>α,β,Blank.....</p>
<p>Sorting Code</p> <p>Package type</p> <p>Temperature Code</p> <p>Part number</p> <p>Company Name and Product Category</p>	

Part No.	Temperature Suffix	Package Type
MH284KVK	K(-40°C to + 125°C)	VK (4-pin TO-92S)
MH284EVK	E (-40°C to + 85°C)	VK (4-pin TO-92S)

*K spec is using in industrial and automotive application. Special Hot Testing is utilized.*

### Functional Diagram



### Absolute Maximum Ratings At( $T_a=25^{\circ}\text{C}$ )

Characteristics		Values	Unit
Supply Voltage, ( $V_{DD}$ )		24	V
Do, DoB Voltage, ( $V_Z$ )		36	V
Reverse Voltage, ( $V_{DD}$ )		-32	V
Output "on" current, ( $I_O$ )		600(Average)	mA
		1200(Peak)	mA
Operating Temperature Range, ( $T_A$ )	"E" Class	-40 ~ +85	$^{\circ}\text{C}$
	"K" Class	-40 ~ +125	$^{\circ}\text{C}$
Storage temperature Range, ( $T_S$ )		-55 ~ +150	$^{\circ}\text{C}$
Maximum Junction Temp, ( $T_J$ )		150	$^{\circ}\text{C}$
Thermal Resistance	$(\theta_{JA})\text{VK}$	227	$^{\circ}\text{C}/\text{w}$
	$(\theta_{JC})\text{VK}$	49	$^{\circ}\text{C}/\text{w}$
Package Power Dissipation, ( $P_D$ )		550	mW

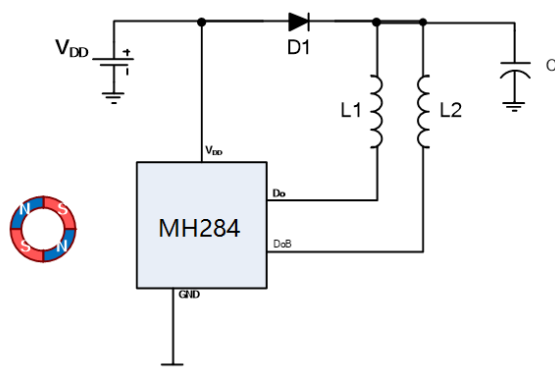
**Note:** Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

### Electrical Specifications

DC Operating Parameters :  $T_a=25^{\circ}\text{C}$ ,  $V_{DD}=12\text{V}$

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, ( $V_{DD}$ )	Operating	3.5		20.0	V
Supply Current, ( $I_{DD}$ )	Operating		3.5	5.0	mA
Output Leakage Current, ( $I_{off}$ )	$V_{OUT}=24\text{V}$		<0.1	10	$\mu\text{A}$
Output On resistance, ( $R_{DSON}$ )	$I_{OUT}=300\text{mA}$		0.8	1.4	$\Omega$
Output Saturation Voltage, ( $V_{DSON}$ )	$I_{OUT}=300\text{mA}$		240		mV
Output Rise Time, ( $T_R$ )	$R_L=820\Omega$ , $C_L=20\text{pF}$		7	20	$\mu\text{S}$
Output Fall Time, ( $T_F$ )	$R_L=820\Omega$ ; $C_L=20\text{pF}$		6	20	$\mu\text{S}$
Locked Protection on, ( $T_{ON}$ )		0.25	0.40	0.55	S
Locked Protection off, ( $T_{OFF}$ )			2.4		S
Output Switching delay	"dead time" when both drivers are off		20		$\mu\text{S}$
Thermal shut-down Temp		150	155		$^{\circ}\text{C}$
Thermal release temperature			125		$^{\circ}\text{C}$
Thermal shut-down Hysteresis			30		$^{\circ}\text{C}$
Electro-Static Discharge	HBM	4			KV
Operate Point, ( $B_{OP}$ )		5	30	50	Gauss
Release Point, ( $B_{RP}$ )		-50	-30	-5	Gauss
Hysteresis, ( $B_{HYS}$ )	$ B_{OP} - B_{RP} $		60		Gauss

### Typical Application circuit



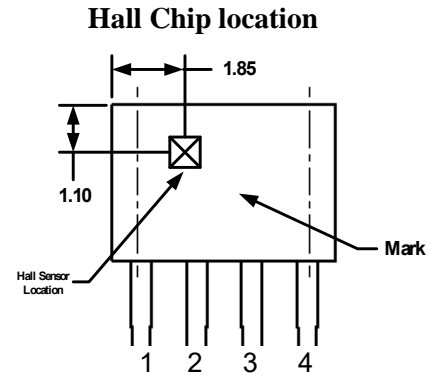
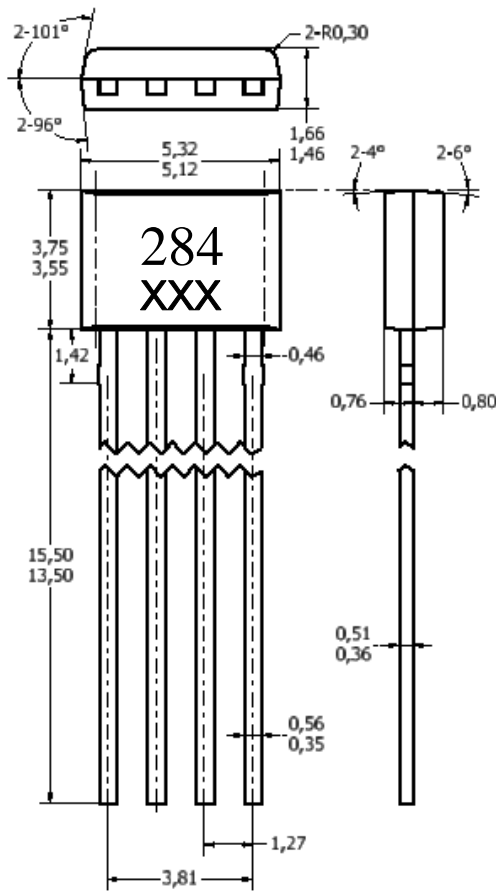
D1 : IN4001

C1 : 2.2 $\mu\text{F}$ /25V

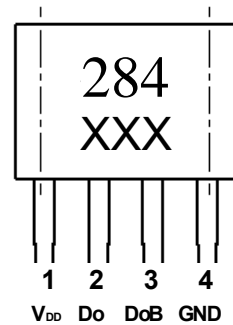
**Sensor Location, package dimension and marking**

**MH 284 Package**

**VK Package (To-92 4 pins)**



**Output Pin Assignment**



**NOTES:**

- 1).Controlling dimension: mm
- 2).Leads must be free of flash and plating voids
- 3).Do not bend leads within 1 mm of lead to package interface.
- 4).PINOUT:

Pin 1	V <sub>DD</sub>
Pin 2	Do
Pin 3	DoB
Pin 4	GND