MH232 is an Open-Drain (OD) Dual Output Micropower Switch Hall IC incorporating a polarity determination circuit that enables separate operation (output) of both the South and North poles.This Hall IC product can be in tablets, smart phones, and other applications in order to detect open and close of the cover. Designed for the most compact and battery-sensitive systems.

This Hall IC product can be in digital video cameras and other applications involving display panels in order to detect the front/back location or determine the rotational direction of the panel.

By incorporating an internal oscillator, the device samples the magnetic field and updates the output at a rate of 20Hz for the lowest current consumption.
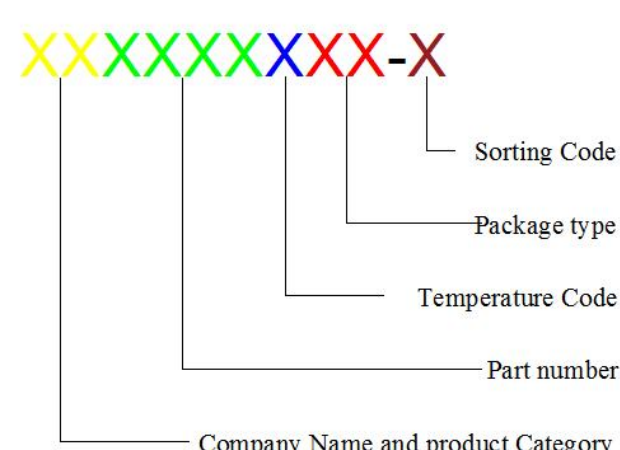
Features and Benefits
- VDD Voltage Range: 1.7V to 3.5V
- Operate Point: ±2.8mT(Typ)
- Hysteresis: 1.0mT(Typ)
- Period: 50ms(Typ)
- Supply Current(AVG): 1.1μA(Typ)
- Output Type: Open Drain
- Operating Temperature Range: -30°C to +85°C

Applications
- Tablets
- Smart Phones
- Notebook Computers
- Digital Video Cameras
- Digital Still Cameras
- Battery-critical position sensing
- Contact less diagnostics or activation
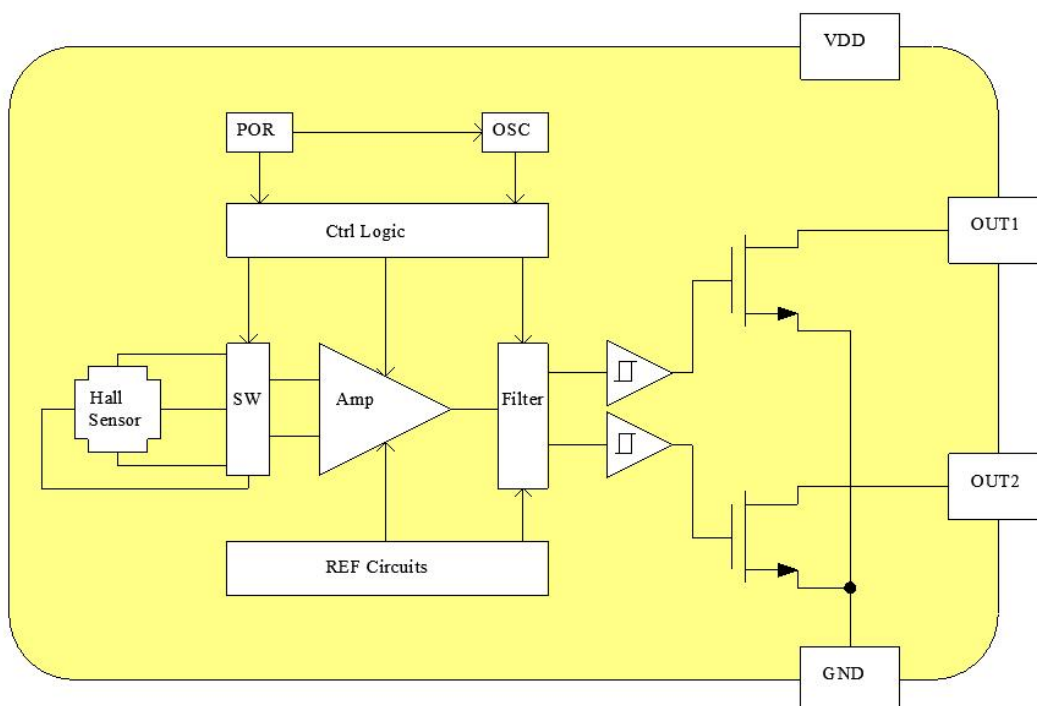
Ordering Information

XXXXXXXXX-X

- Sorting Code
- Package type
- Temperature Code
- Part number
- Company Name and product Category

Company Name and Product Category

  MH:MST Hall Effect/MP:MST Power MOSFET

Part number

  181,182,183,184,185,248,249,276,477,381,381F,381R,382…..

  If part # is just 3 digits, the forth digit will be omitted.

Temperature range

  E: 85 ℃, I: 105 ℃, K: 125 ℃, L: 150 ℃

Package type

  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)

Sorting

  α , β ,Blank…..

Part No.	Temperature Suffix	Package Type
MH232ESS	E(-30°C to + 85°C)	SS (DFN1x1-4L)

Functional Diagram

Absolute Maximum Ratings *At (Ta=25℃)*

Characteristics	Values	Unit
Supply voltage, (*Vcc*)	5	V
Output current, (*Iout*)	1	mA
Operating Temperature Range, (*Ta*)	-30 to +85	°C
Storage temperature range, (*Ts*)	-40 to +125	°C

Caution: Operating the IC over the absolute maximum ratings may damage the IC. The damage can either be a short circuit between pins or an open circuit between pins and the internal circuitry. Therefore, it is important to consider circuit protection measures, such as adding a fuse, in case the IC is operated over the absolute maximum ratings.
Note: Do not apply reverse voltage to V_{cc} and V_{OUT} Pin, It may be caused for Miss function or damaged device.

Electrical Specifications

DC Operating Parameters： T_A=+25℃, V_{CC}=1.8V

Parameters	Test Conditions	Min	Typ	Max	Units
Operating Voltage (*Vcc*)	-	1.7	1.8	3.5	V
Bus Operating Voltage (*V$_{DDIO}$*)	-	1.15	1.2	1.25	V
Operating Current (*Icc*)	100nF	-	1.2	-	uA
Output Low Voltage(*V$_{OL}$*)	V_{DDIO}=1.2V , R1/R2=1KΩ	-	-	0.2	V
Period (*T$_P$*)	-	-	50	-	mS
Electro-Static Discharge	HBM	-	-	2	kV

Magnetic Specifications

DC Operating Parameters：T_A=25℃, V_{CC}=1.8V

Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Operate Point	BopS	Output:OUT1	2.2	2.8	4.0	mT
	BopN	Output:OUT2	-4.0	-2.8	-2.2	mT
Release Point	BrpS	Output:OUT1	1.2	1.8	3.0	mT
	BrpN	Output:OUT2	-3.0	-1.8	-1.2	mT
Hysteresis	BhysS	-	-	1.0	-	mT
	BhysN	-	-	1.0	-	mT

Note: 1mT=10Gauss.Positive ("+") polarity flux is defined as the magnetic flux from south pole which is direct toward to the branded face of the sensor.

## *Typical Application Circuit*
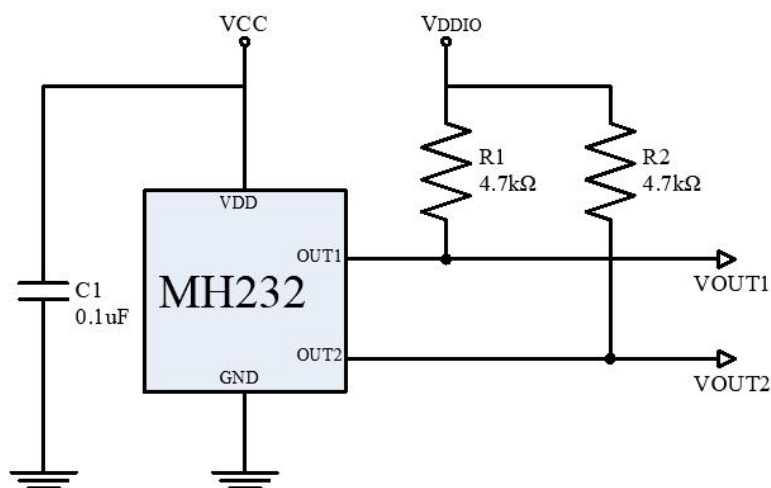
Function Description

1.Description of Operations

Micropower operation: The dual output omnipolar detection Hall IC uses intermittent sensing save energy. At startup the Hall elements, amplifier, comparator, and other detection circuits power on and magnetic detection begins. During standby, the detection circuits power off, thereby reducing current consumption. The detection results are held while standby is active, and then output.


Period: T_p
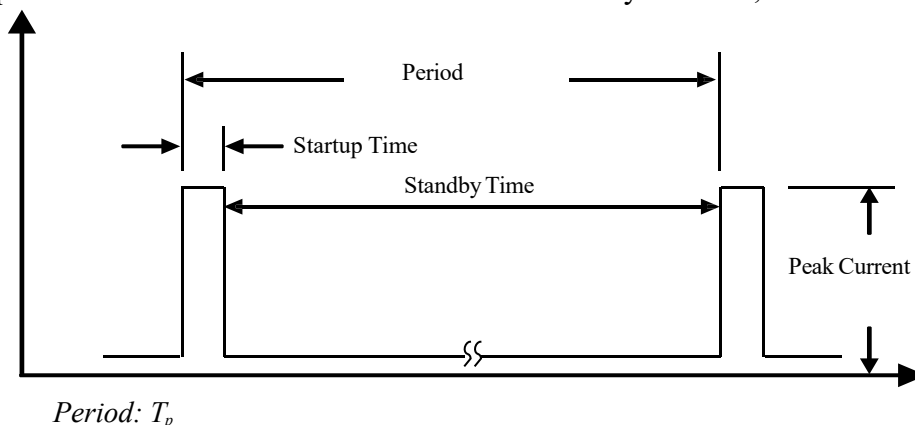
2.Magnetic Field Detection Mechanism

The Hall IC cannot detect magnetic fields that run horizontal to the package top layer.

Be certain to configure the Hall IC so that the magnetic field is perpendicular to the top layer.

The OUT1 pin detects and outputs for the S-pole only. Since the OUT1 pin output is unipolar, the output does not respond to the N-pole.

The OUT2 pin detects and outputs for the N-pole only. Since the OUT2 pin output is unipolar, the output does not respond to the S-pole.
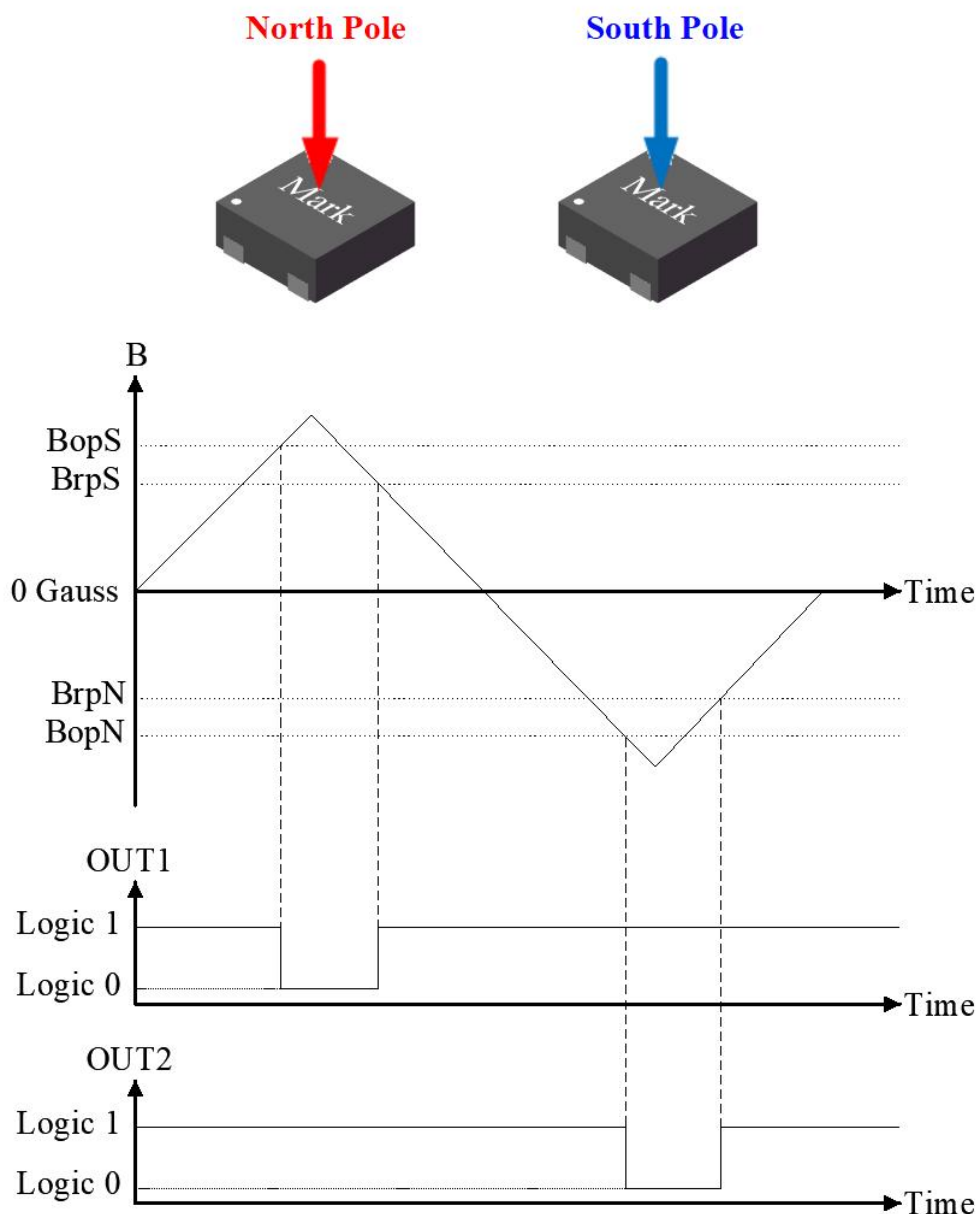

The dual output omnipolar detection Hall IC detects magnetic fields running perpendicular to the top surface of the package. There is an inverse relationship between magnetic flux density and the distance separating the magnet and the Hall IC: when distance increases magnetic density falls. When it drops below the operate point (Bop), output goes Logic 1(HIGH). When the magnet gets closer to the IC and magnetic density rises to the operate point, the output switches Logic 0(LOW). In LOW output mode, the distance from the magnet to the IC increases again until the magnetic density falls to a point just below Bop, and output returns HIGH. The point where magnetic flux density restores a HIGH output is known as the release point, Brp. This detection and adjustment mechanism is designed to prevent noise, oscillation, and other erratic system operation.

Sensor Location, package dimension and marking

SS Package (DFN1x1-4L)

(Top View)
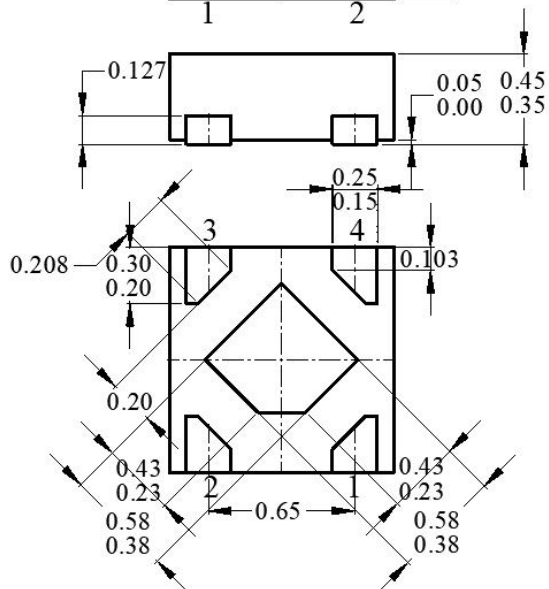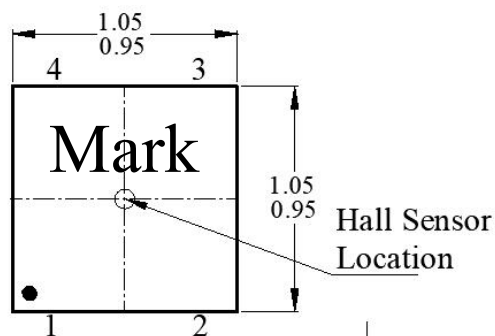
(Bottom View)

NOTES:

Controlling dimension: mm

1. Leads must be free of flash and plating voids

2. Lead thickness after solder plating will be 0.254mm maximum

3. Mark: Refer to DC table

4. PINOUT:

Pin No.	Pin Name	Function
1	VCC	Power Supply
2	GND	Ground
3	OUT1	Output1
4	OUT2	Output2

4. （For reference only）Land pattern