



MH235H Specifications

Ultra-low power, Inverted Omni-polar Hall Switch

MH235H Hall-effect sensor is a temperature stable, stress-resistant, Low Tolerance of Sensitivity Ultra-power switch. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. This method reduces the offset voltage normally caused by device over molding, temperature dependencies, and thermal stress.

MH235H is special made for low operation voltage, 2.7V, to active the chip which includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, CMOS output driver. Advanced CMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low input-offset errors, and small component geometries. This device requires the presence of omni-polar magnetic fields for operation.

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

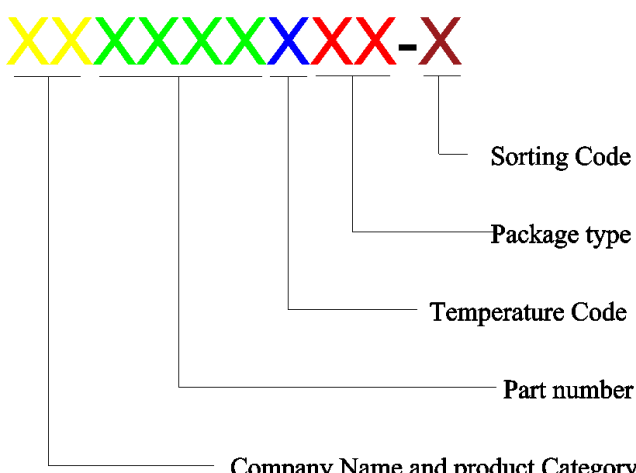
Features and Benefits

- Output-on & Inverted Output-on without Magnet present in one chip
- Low and high Hz presented in one chip
- Strong RF noise protection
- 2.7 to 5.5V for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 2.7V
- High Sensitivity for reed switch replacement applications
- Multi Small Size option
- Low sensitivity drift in crossing of Temp. range
- Ultra-Low power consumption at 1.6uA (Avg)
- High ESD Protection, HBM $>\pm 4$ KV(min)
- Totem-pole output
- RoHS compliant 2011/65/EU and Halogen Free.

Applications

- Solid state switch
- Handheld Wireless Handset Awake Switch
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications
- Floating Meter
- Security
- 3C
- Smart Meter
- TWS

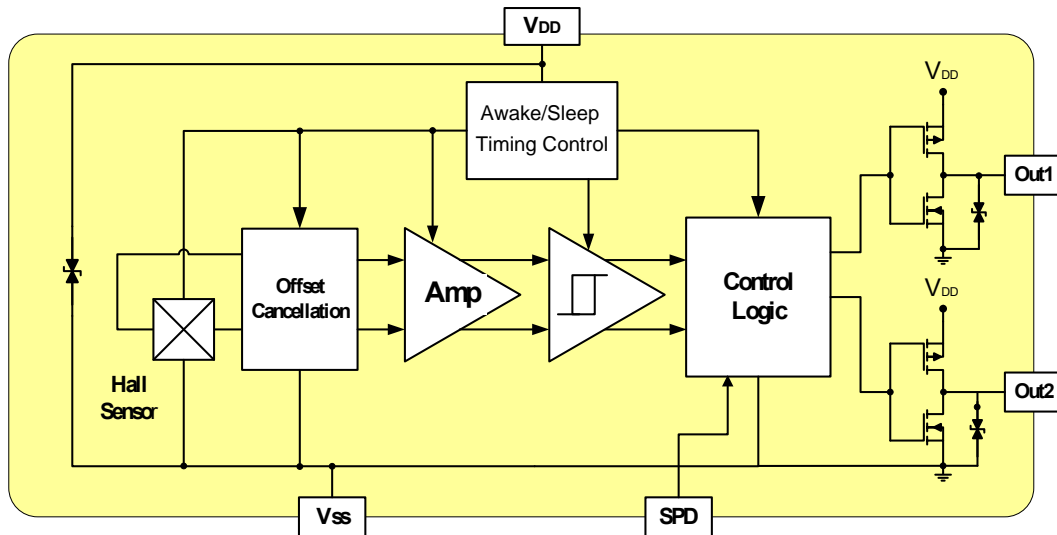
Ordering Information

	<p>Company Name and Product Category MH:MST Hall Effect/MP:MST Power IC</p> <p>Part number 181,D182,183,184,185,248,477,D381,D381F,381R,D382..... If part # is just 3 digits, the fourth digit will be omitted.</p> <p>Temperature range E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C</p> <p>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), SS:TSOT-26,SD:DFN-6</p> <p>Sorting α,β,Blank.....</p>
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Part No.	Temperature Suffix	Package Type
MH235HEST	E (-40°C to + 85°C)	ST(TSOT-23)
MH235HEUA	E (-40°C to + 85°C)	UA(TO-92S)

Custom sensitivity selection is available by MST sorting technology

Functional Diagram



Note: Static sensitive device; please observe ESD precautions. Reverse V_{DD} protection is not included. For reverse voltage protection, a 100 Ω resistor in series with V_{DD} is recommended.

MH 235, HBM >±4KV which is verified by third party lab.



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

Characteristics		Values	Unit
Supply voltage, (V_{DD})		6	V
Output Voltage, (V_{out})		6	V
Magnetic flux density		Unlimited	Gauss
Output current, (I_{out})		5	mA
Operating temperature range, (T_a)		-40 to +85	$^{\circ}\text{C}$
Storage temperature range, (T_s)		-65 to +150	$^{\circ}\text{C}$
Maximum Junction Temp, (T_j)		150	$^{\circ}\text{C}$
Thermal Resistance	(θ_{JA}) UA/ST/SS/SD	206/543/300/160	$^{\circ}\text{C}/\text{A}$
	(θ_{JC}) UA/ST/SS/SD	148/410/52/35	$^{\circ}\text{C}/\text{A}$
Package Power Dissipation, (P_D) UA/ST/SS/SD		606/400/416/780	mW

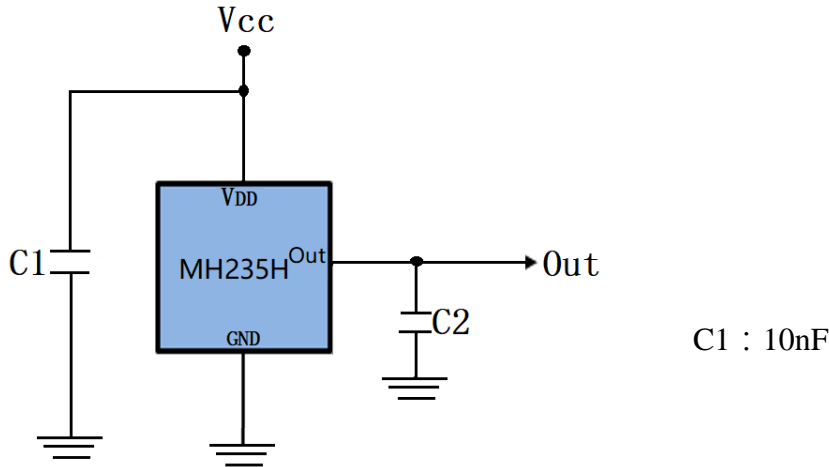
Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

Electrical Specifications

DC Operating Parameters: $T_a=25^{\circ}\text{C}$, $V_{DD}=3.0\text{V}$

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{DD})	Operating	2.7		5.5	Volts
Supply Current, (I_{DD})	Awake State		2.0		mA
	Sleep State		1.0		μA
	Average		1.6		μA
Output High Voltage, (V_{OH})	$I_{OUT}=1.0\text{mA}$ (Source)	$V_{DD}-0.2$			V
Output Low Voltage, (V_{OL})	$I_{OUT}=1.0\text{mA}$ (Sink)			0.2	V
Awake mode time, (T_{aw})	Operating		20	40	μS
Sleep mode time, (T_{sl})	Operating		80	150	mS
Duty Cycle, (D,C)			0.025		%
Power-On Time, (T_{PO})			16	32	nS
Output Switch Time, (T_{SW})	Operating		80	160	mS
Output Switch Frequency, (F_{SW})	Operating	15			Hz
Electro-Static Discharge	HBM	4			KV
Operate Point, $B_{OPS}(B_{OPN})$	$B > B_{OPX} $	20(-55)		55(-20)	Gauss
Release Point, $B_{RPS}(B_{RPN})$	$B < B_{RPX} $	10(-45)		45(-10)	Gauss
Hysteresis, (BHYS)	$ B_{OPX} - B_{RPX} $		10		Gauss

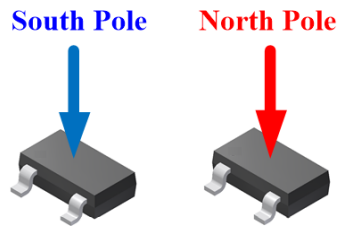
Typical Application circuit



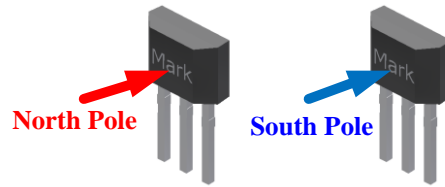
MH235H ST/ UA Output Behavior versus Magnetic Polar

DC Operating Parameters: $T_a = -40$ to 85°C , $V_{dd} = 2.7\text{V}$ to 5.5V

Parameter	Test condition	OUT
South pole	$B > B_{op-S}$	High
Null or weak magnetic field	$B = 0$ or $B < B_{RPX} $	Low
North pole	$B > B_{op-N} $	High

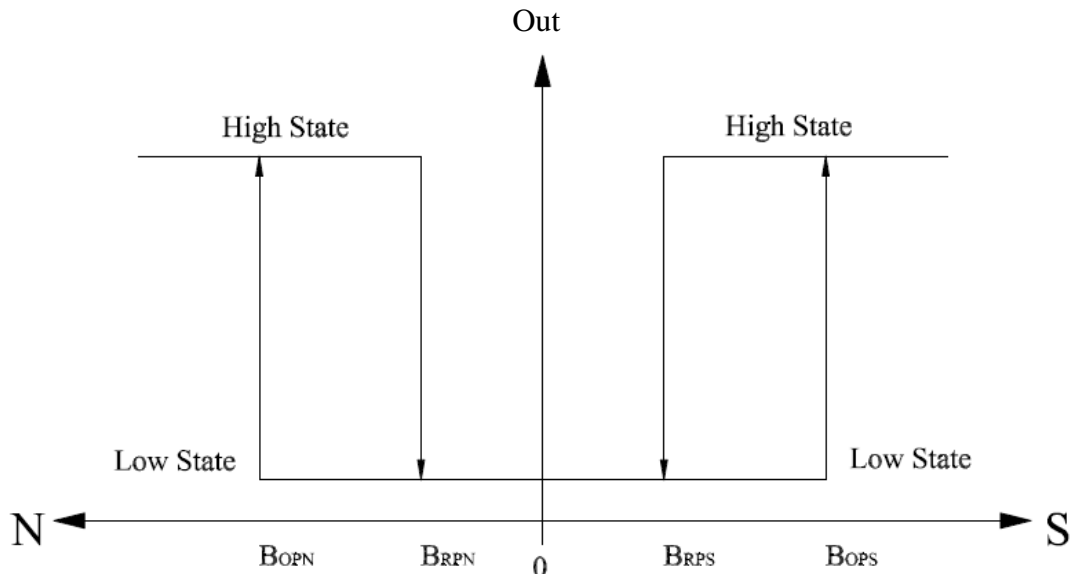


ST Package



UA Package

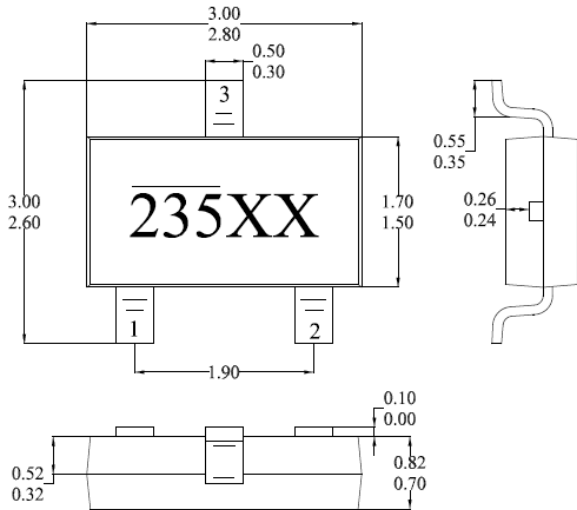
Output Behavior



Sensor Location, package dimension and marking

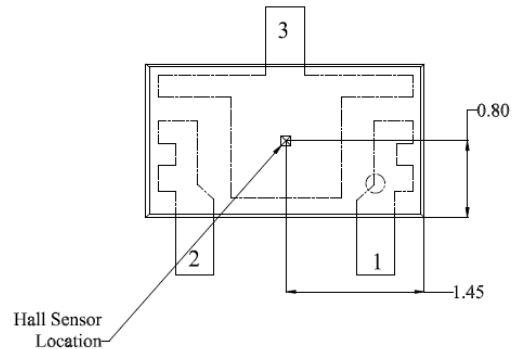
ST Package (TSOT-23)

(Top View)

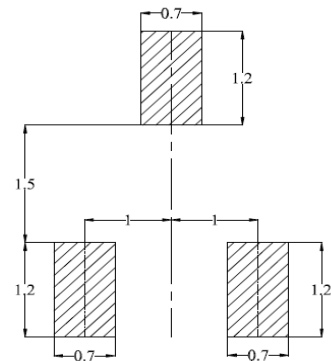


Hall Plate Chip Location

(Bottom view)



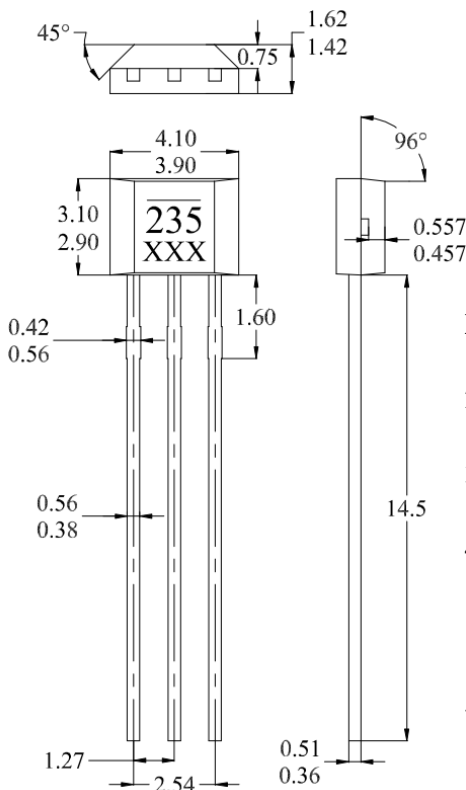
(For reference only) Land Pattern



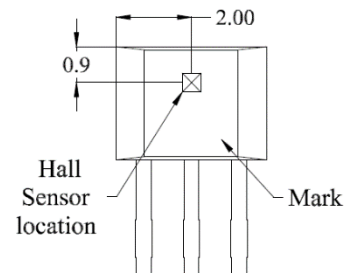
NOTES:

- PINOUT (See Top View at left):
Pin 1 VDD ; Pin 2 Output; Pin 3 GND
- Controlling dimension: mm;
- Lead thickness after solder plating will be 0.254mm maximum
- XX: Date Code, Refer to DC table

UA Package(TO-92)



Hall Chip location



NOTES:

- Controlling dimension: mm
- Leads must be free of flash and plating voids
- Do not bend leads within 1 mm of lead to package interface.
- PINOUT:
Pin 1 VDD
Pin 2 GND
Pin 3 Output
- XXX; 1st X=Year; 2nd and 3rd XX=Week

Output Pin Assignment

(Top view)

