MH235 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.

MH235 is special made for low operation voltage, 2.7V, to active the chip which is 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.

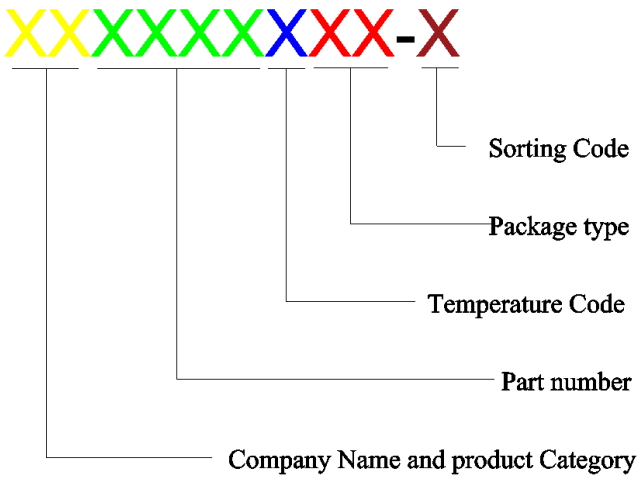
Features and Benefits

- 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>±4KV(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



Company Name and Product Category

MH:MST Hall Effect/MP:MST Power IC

Part number

181,D182,183,184,185,248,477,D381,D381F,381R,D382…..

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),

SS:TSOT-26,SD:DFN-6

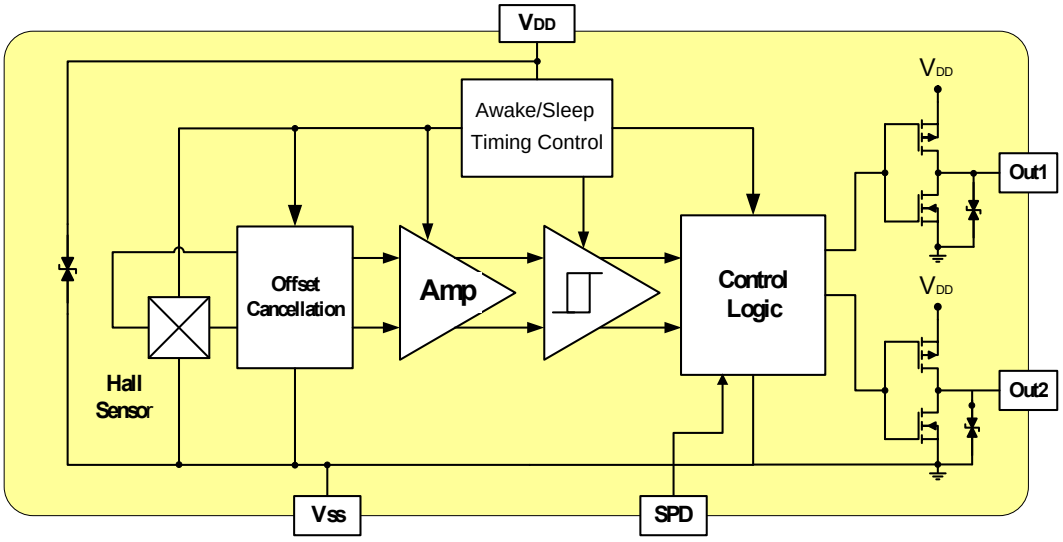
Sorting

α,β,Blank…..

Part No.	Temperature Suffix	Package Type
MH235EST	E (-40°C to + 85°C)	ST(TSOT-23)
MH235EUA	E (-40°C to + 85°C)	UA(TO-92S)
MH235ESD	E (-40°C to +85°C)	SD (DFN2X2-6L)
MH235ESS	E (-40°C to + 85°C)	SS (QFN1x1-4L)

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 100Ω resistor in series with V_{DD} is recommended.*
MH 235, HBM>±4KV which is verified by third party lab.

Absolute Maximum Ratings *At(Ta=25℃)*

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, (Ta)		-40 to +85	℃
Storage temperature range, (Ts)		-65 to +150	℃
Maximum Junction Temp,(Tj)		150	℃
Thermal Resistance	(θ_{JA}) UA/ST/SS/SD	206/543/300/160	℃/A
	(θ_{JC}) UA/ST/SS/SD	148/410/52/35	℃/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

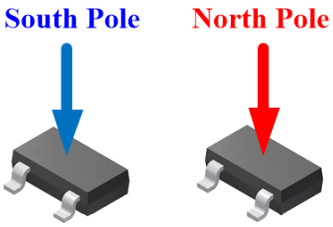
DC Operating Parameters：Ta=25℃, V_{DD}=3.0V

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 (SPD=Hi)		1.6(135)		μA
Output High Voltage, (V_{OH})	I_{OUT}=1.0mA (Source)	V_{DD}-0.2			V
Output Low Voltage, (V_{OL})	I_{OUT}=1.0mA (Sink)			0.2	V
Awake mode time, (Taw)	Operating		20	40	uS
Sleep mode time, (T_{SL})	Operating (SPD=Hi)		80(0.16)	150(0.32)	mS
Duty Cycle, (D,C)	(SPD=Hi)		0.025(12.5)		%
Power-On Time, (T_{PO})			16	32	nS
Output Switch Time, (T_{SW})	Operating (SPD=Hi)		80(0.2)	160(0.4)	mS
Output Switch Frequency, (F_{SW})	Operating (SPD=Hi)	15(6.5k)			Hz
Electro-Static Discharge	HBM	4			KV
Operate Point, BOPS(BOPN)	B>B_{OP}X	20(-55)		55(-20)	Gauss
Release Point, BRPS(BRPN)	B<B_{RP}X	10(-45)		45(-10)	Gauss
Hysteresis, (BHYS)	|BOPX - BRPX|		10		Gauss

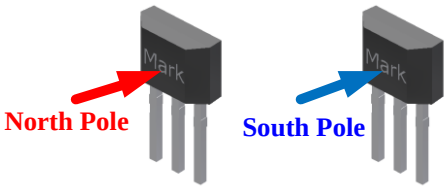
MH235 ST/UA Output Behavior versus Magnetic Polar

DC Operating Parameters：Ta =-40 to 85℃， Vdd =2.7V to 5.5V

Parameter	*Test condition*	*OUT*
South pole	B>Bop-S	Low
Null or weak magnetic field	B=0 or B <| $B_{RP}X$|	High
North pole	B>|Bop-N|	Low

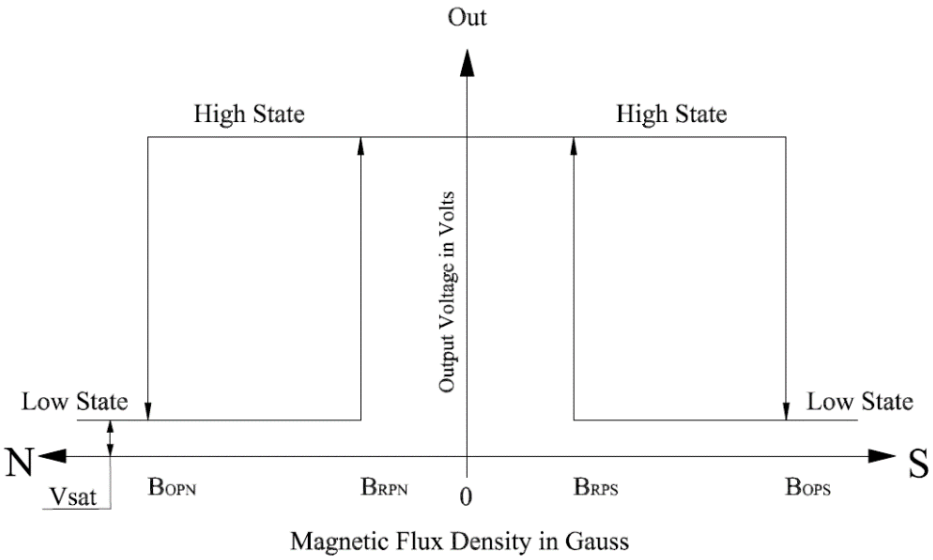


ST Package

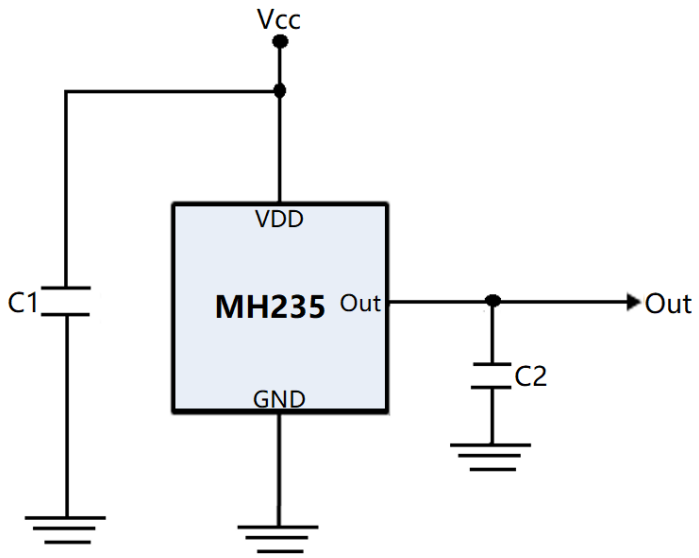


UA Package

Output Behavior



ST and UA package Typical Application Circuit

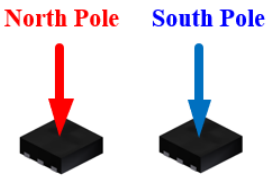


C1：10nF

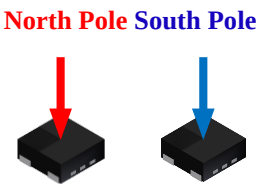
MH235 SS/SD Output Behavior versus Magnetic Polar

DC Operating Parameters：Ta =-40 to 85℃， Vdd =2.7V to 5.5V

Parameter	*Test condition*	*OUT1*	*OUT2*
South pole	B>Bop-S	Low	High
Null or weak magnetic field	B=0 or B <| B_{RP}-X |	High	Low
North pole	B>|Bop-N|	Low	High

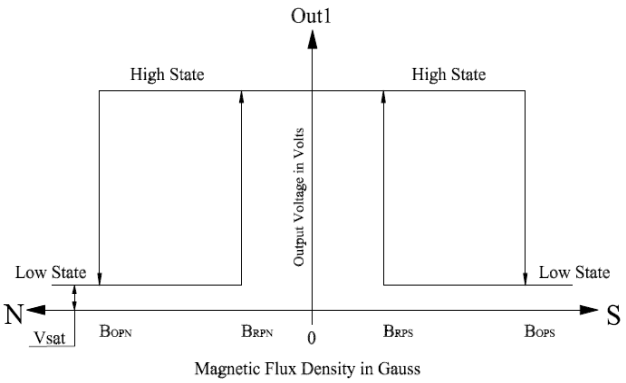


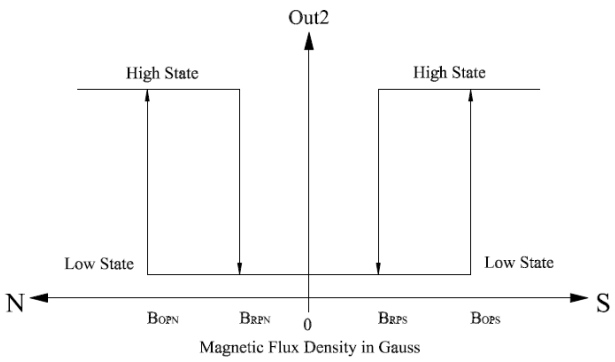
SD Package



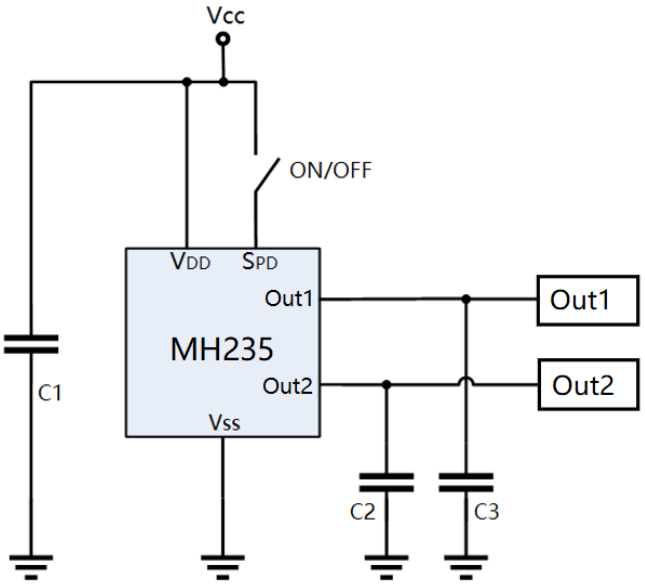
SS Package

Output Behavior





SS and SD Package Typical Application circuit



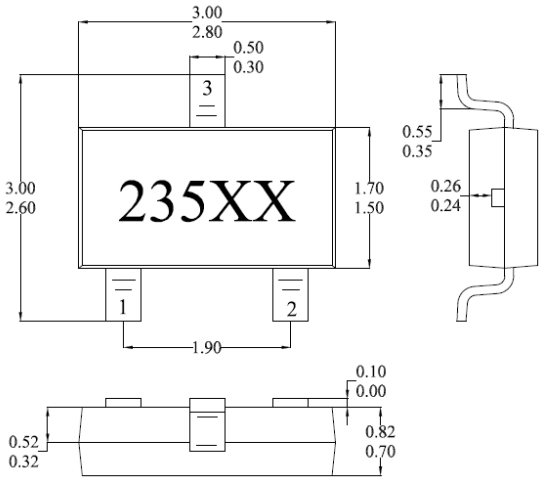
C1：10nF

C2：100pF

Sensor Location, package dimension and marking

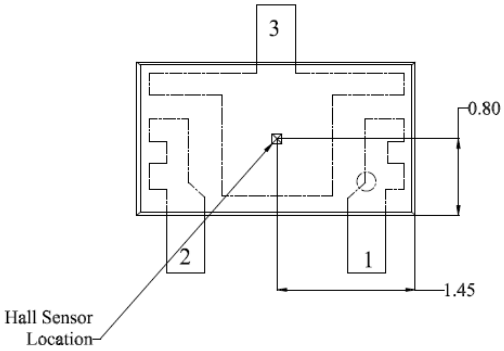
ST Package (TSOT-23)

(Top View)

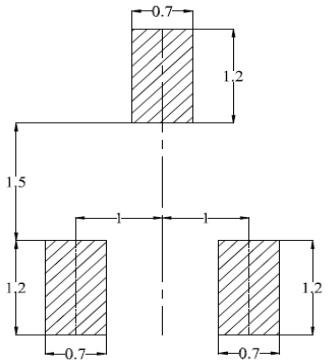


Hall Plate Chip Location

(Bottom view)



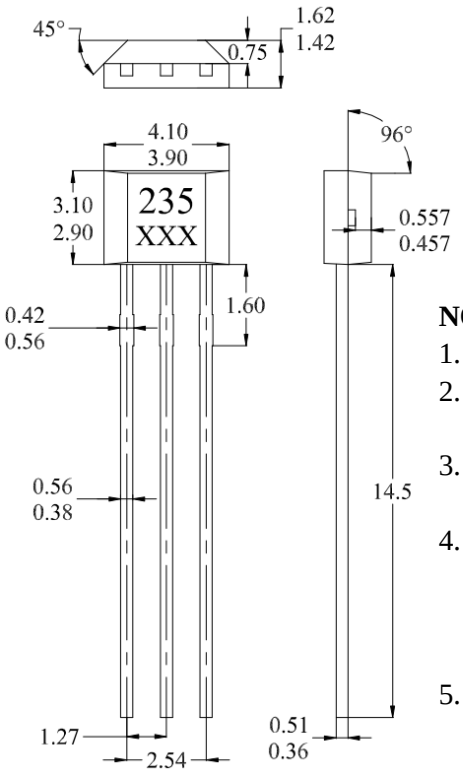
(For reference only) Land Pattern



NOTES:

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

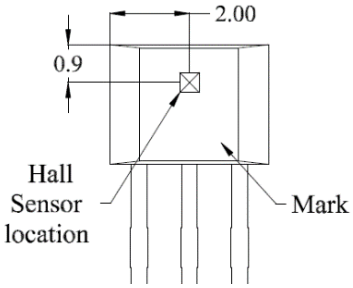
UA Package (TO-92)



NOTES:

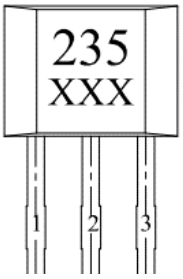
1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Do not bend leads within 1 mm of lead to package interface.
4. PINOUT:
   Pin 1 VCC
   Pin 2 GND
   Pin 3 Output
5. XXX； 1st X=Year； 2nd and 3rd XX=Week

Hall Chip location

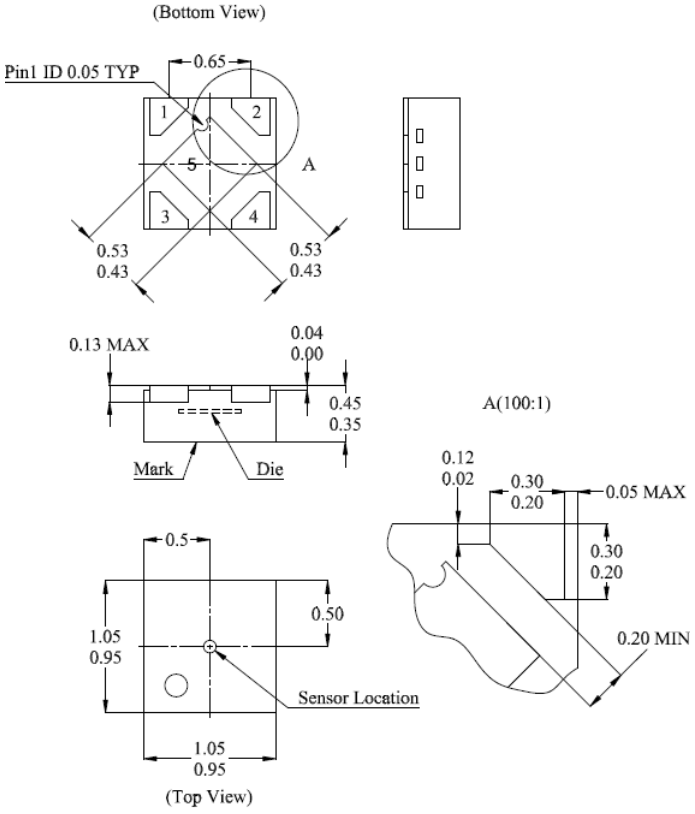


Output Pin Assignment

(Top view)



SS Package (DFN 1.0*1.0-4L)

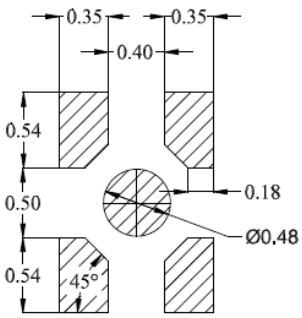


NOTES:

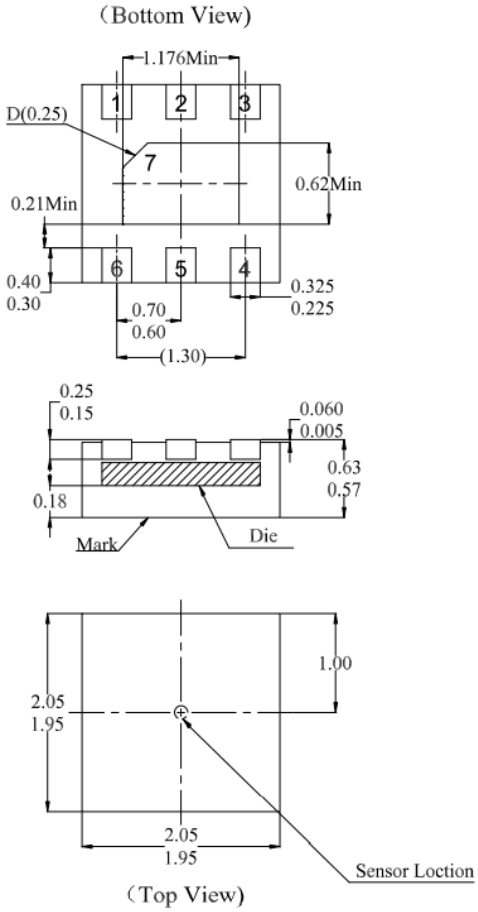
1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Lead thickness after solder plating will be 0.254mm maximum
4. PINOUT:

Pin No.	Pin Name	Function
1	V_{DD}	Power Supply
2	V_{SS}	Ground
3	V_{OUT}	Output1
4	$\overline{V_{OUT}}$	Output2
5	PAD	Ground

4.（For reference only）Land pattern



SD package (DFN2*2-6L)



NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Lead thickness after solder plating will be 0.254mm maximum
4. PINOUT:

Pin No.	Pin Name	Function
1	V_{DD}	Power Supply
2	$\overline{V_{OUT}}$	Output2
3	V_{OUT}	Output1
4	N.C	N.C
5	V_{SS}	Ground
6	SPD	Set pin
7	PAD	Ground

5. （For reference only）Land pattern