MH238 Hall-effect sensor is a temperature stable, stress-resistant, Low Tolerance of Sensitivity nano-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.

MH238 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, open-drain output. 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.

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

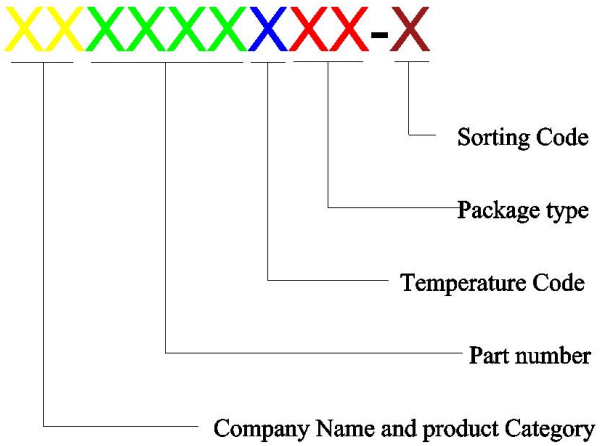
Features and Benefits

- CMOS Hall IC Technology
- Strong RF noise protection
- 1.65 to 5.5V for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 1.65V, Nano power consumption
- High Sensitivity for reed switch replacement applications
- Multi Small Size option
- Low sensitivity drift in crossing of Temp. range
- Ultra Low power consumption at 900nA (Avg)
- High ESD Protection, HBM >±8KV(min)
- RoHS compliant 2011/65/EU and Halogen Free.

Applications

- Solid state switch
- Handheld Wireless Handset Awake Switch (Flip Cell/PHS Phone/Note Book/Flip Video Set)
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications
- Water Meter
- Floating Meter
- PDVD
- NB

Ordering Information



Company Name and Product Category

MH:MST Hall Effect/MP:MST Power IC

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),

SS:TSOT-26,SD:DFN-6;

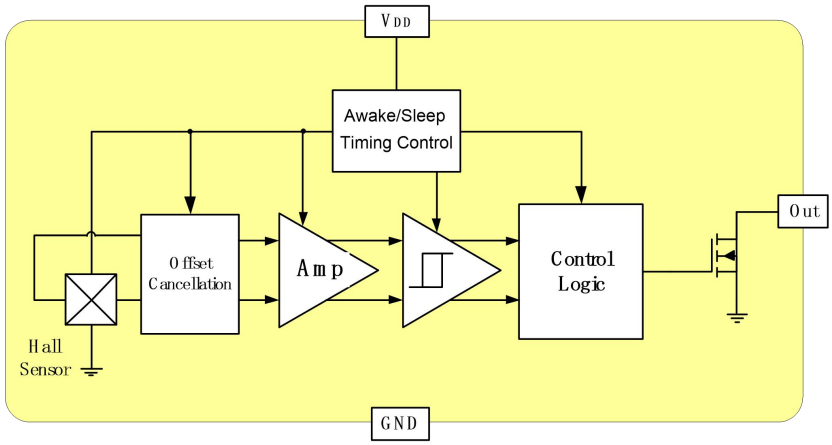
Sorting

α,β,Blank…..

Part No.	Temperature Suffix	Package Type
MH238EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH238ESO	E (-40°C to + 85°C)	SO (SOT-23)
MH238ESM	E (-40°C to + 85°C)	SM (DFN1.6*1.6-6L)

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.*
MH238, HBM >±8KV 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
Reverse Voltage,(V_{DD}) (V_{OUT})	-0.3	V
Magnetic flux density	Unlimited	Gauss
Output current,(I_{OUT})	10	mA
Operating temperature range, (Ta)	-40 to +85	℃
Storage temperature range, (Ts)	-65 to +150	℃
Maximum Junction Temp,(Tj)	150	℃

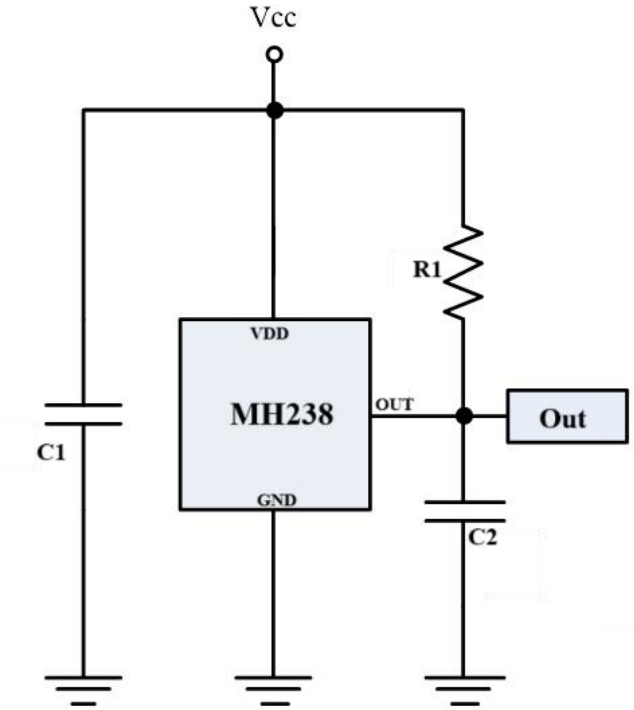
Note: *Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.*

Electrical Specifications

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

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage,(V_{DD})	Operating	1.65		5.5	V
Supply Current,(I_{DD})	Average		900		nA
Output Leakage Current,($Ioff$)	Output off			0.1	uA
Output High Voltage,(V_{OH})	I_{OUT}=0.5mA(Source)	V_{DD}-0.2			V
Output Low Voltage,(V_{OL})	I_{OUT}=0.5mA(Sink)			0.2	V
Awake mode time,(Taw)	Operating		25	80	uS
Sleep mode time,(T_{SL})	Operating		35	80	mS
Sampling period			35		mS
Electro-Static Discharge	HBM	8			KV

Typical Application circuit



C1：10nF
C2：100pF
R1：10KΩ

MH238EUA/SM Magnetic Specifications

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

Parameter	*Symbol*	*Test Conditions*	*Min.*	*Typ.*	*Max.*	*Units*
Operating Point	B_{OPS}	S pole to branded side, B > BOP, Vout On	20		40	Gauss
	B_{OPN}	N pole to branded side, B > BOP, Vout On	-40		-20	
Release Point	B_{RPS}	S pole to branded side, B < BRP, Vout Off	10		30	Gauss
	B_{RPN}	N pole to branded side, B < BRP, Vout Off	-30		-10	Gauss
Hysteresis	B_{HYS}	|BOPx - BRPx|		10		Gauss

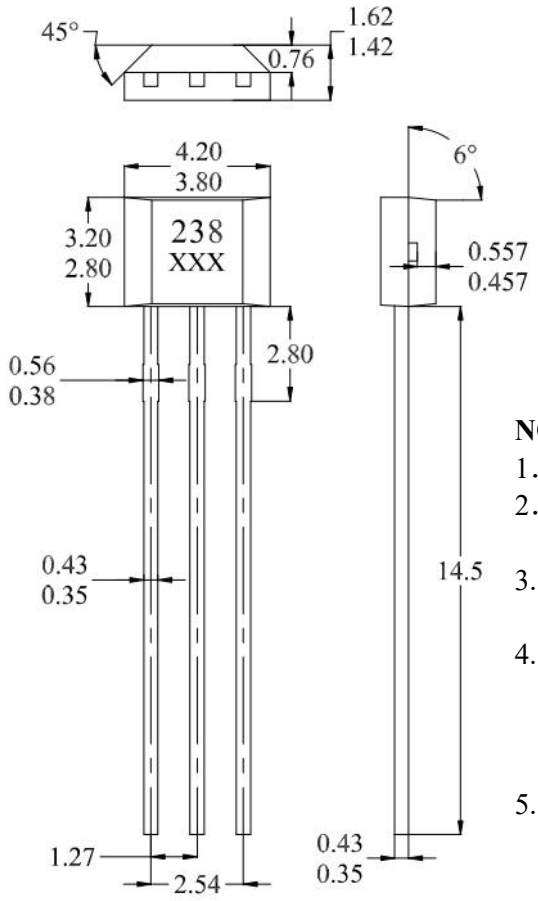
MH238ESO Magnetic Specifications

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

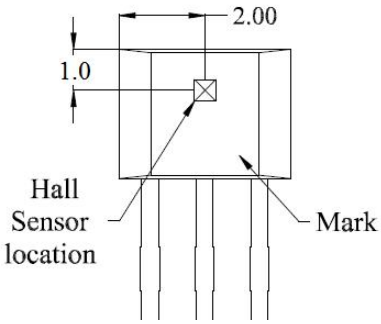
Parameter	*Symbol*	*Test Conditions*	*Min.*	*Typ.*	*Max.*	*Units*
Operating Point	B_{OPS}	N pole to branded side, B > BOP, Vout On	20		40	Gauss
	B_{OPN}	S pole to branded side, B > BOP, Vout On	-40		-20	Gauss
Release Point	B_{RPS}	N pole to branded side, B < BRP, Vout Off	10		30	Gauss
	B_{RPN}	S pole to branded side, B < BRP,Vout Off	-30		-10	Gauss
Hysteresis	B_{HYS}	|BOPx - BRPx|		10		Gauss

Sensor Location, package dimension and marking

UA Package (TO-92S)



Hall Chip location

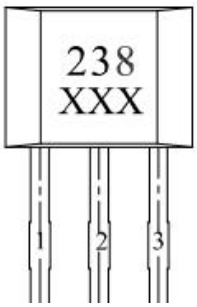


NOTES:

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 VDD
   Pin 2 GND
   Pin 3 Output
5. XXX；1st X=Year；
   2nd and 3rd XX=Week

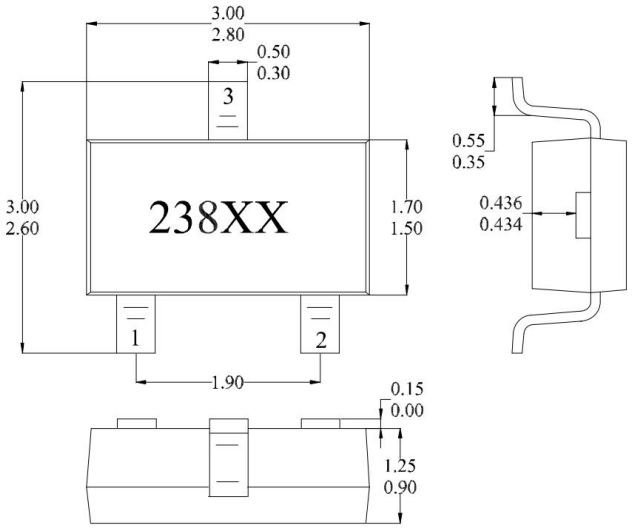
Output Pin Assignment

(Top view)

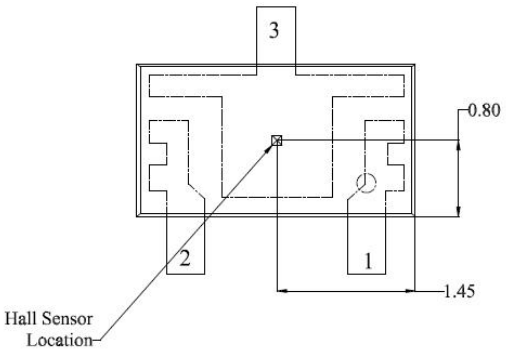


SO Package (SOT-23)

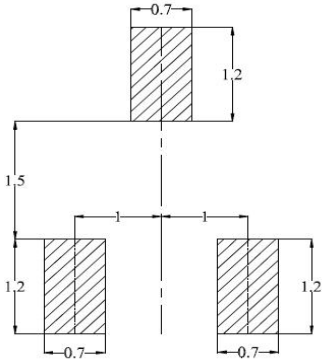
(Top View)



Hall Plate Chip Location



(For reference only)Land Pattern



NOTES:

1 PINOUT (See Top View at left :)
Pin 1 V_{DD}; Pin 2 Output; Pin 3 GND

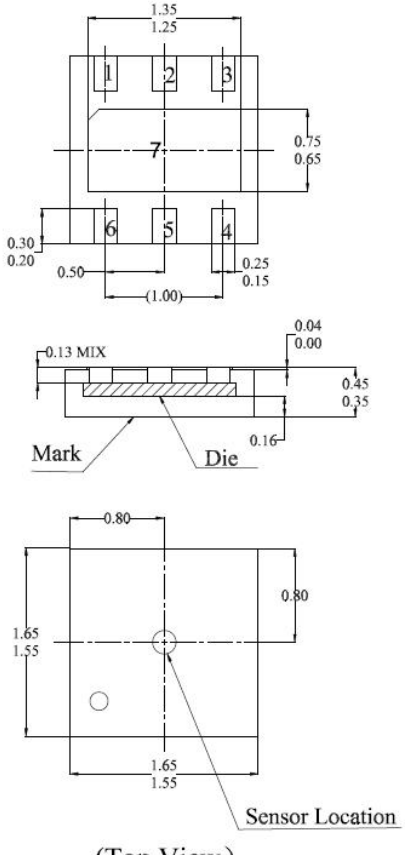
2 Controlling dimension: mm

3 Lead thickness after solder plating will be 0.254mm maximum

4 XX: Date Code, Refer to DC table

SM Package

(Bottom View)



(Top View)

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	N.C	N.C
3	V_{OUT}	Output
4	N.C	N.C
5	V_{SS}	Ground
6	N.C	N.C
7	N.C	N.C

1. （For reference only）Land pattern