



MH254 Specifications **Micro-power CMOS Unipolar Hall Effect Switch**

MH254 Hall-effect sensor is a temperature stable, stress-resistant, Low Tolerance of sensitivity micro-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.

MH254 is special made for low operation voltage, 1.7V, 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 unipolar magnetic fields for operation.

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

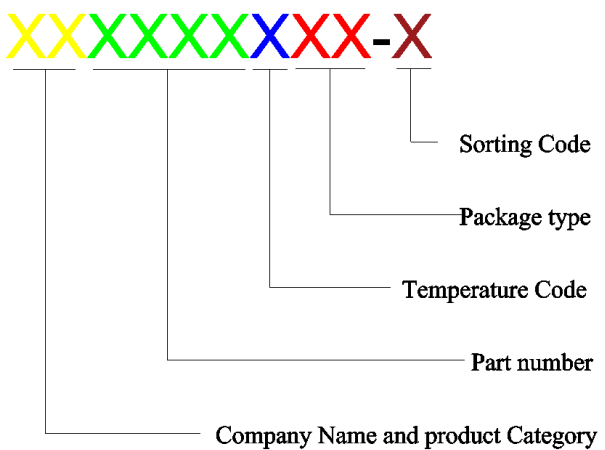
Features and Benefits

- CMOS Hall IC Technology
- Strong RF noise protection
- 1.7 to 5.5V for battery-powered applications
- Operation down to 1.7V, Unipolar Hall Switch Micro power consumption
- High Sensitivity for reed switch replacement applications
- Low sensitivity drift in crossing of Temp. range
- Ultra Low power consumption at 5uA (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 (Flip Cell/PHS Phone/Note Book/Flip Video Set)
- Magnet proximity sensor for reed switch replacement in low duty cycle applications
- Lid close sensor for battery powered devices
- Water Meter
- PDVD
- Floating Meter
- NB

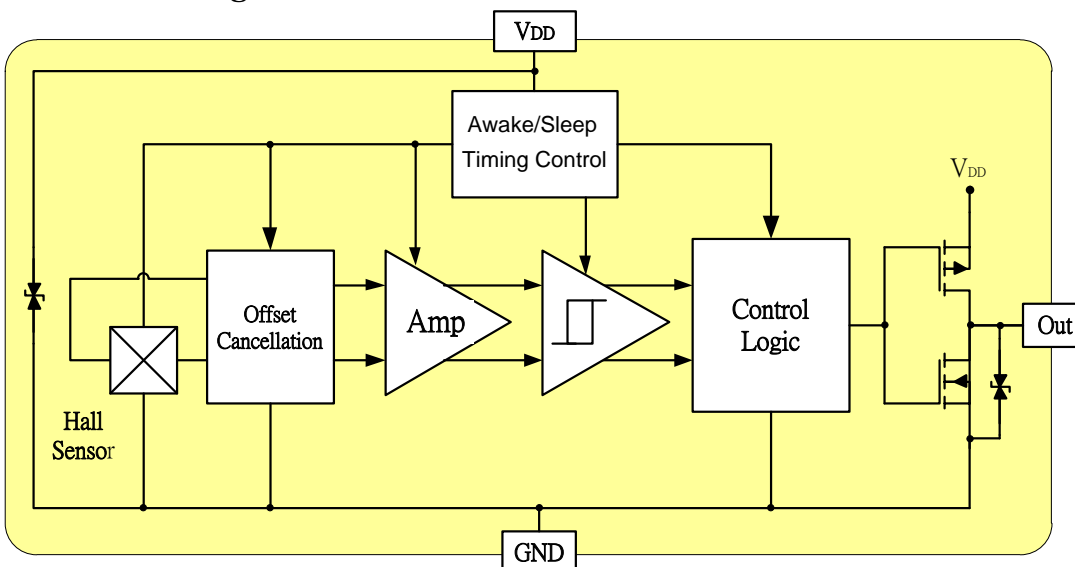
Ordering Information

	<p>Company Name and Product Category MH:MST Hall Effect/MP:MST Power IC</p> <p>Part number 181,182,183,184,185,248,249,276,477,381,381F,381R,382..... 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
MH254EUA	E (-40°C to + 85°C)	UA(TO-92S)
MH254EST	E (-40°C to + 85°C)	ST (TSOT-23)
MH254ESQ	E (-40°C to + 85°C)	SQ (QFN2020-3)
MH254ESS	E (-40°C to + 85°C)	SS (QFN1x1x4L)

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.

MH254, HBM > ±4KV which is verified by third party lab.

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

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})	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}) ST/UA/SQ/SS	310/206/540/540
	(θ_{JC}) ST/UA/SQ/SS	223/148/390/390
Package Power Dissipation, (P_D) ST/UA/SQ/SS	400/606/230/230	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 : $T_a=25\text{ }^\circ\text{C}$, $V_{DD}=1.8\text{V}$

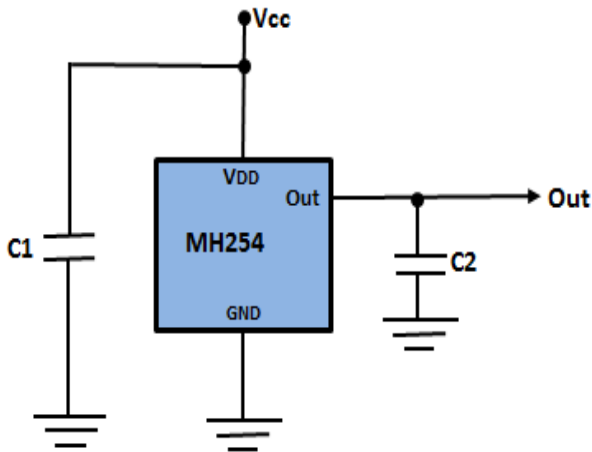
Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{DD})	Operating	1.7		5.5	Volts
Supply Current, (I_{DD})	Awake State		1.5	3	mA
	Sleep State		3.5	7	μA
	Average		5	10	μA
Output Leakage	Output off			1	μA
Output High Voltage, (V_{OH})	$I_{OUT}=0.5\text{mA}$ (Source)	$V_{DD}-0.2$			V
Output Low Voltage, (V_{OL})	$I_{OUT}=0.5\text{mA}$ (Sink)			0.2	V
Awake mode time, (T_{aw})	Operating		40	80	μS
Sleep mode time, (T_{sl})	Operating		40	80	mS
Duty Cycle, (D,C)			0.1		%
Electro-Static Discharge	HBM	4			KV

MH254EST/UA/SQ/SS Magnetic Specifications

DC Operating Parameters : $T_a=25\text{ }^\circ\text{C}$, $V_{DD}=1.8\text{V}$

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OP}	N pole to branded side, $B > B_{OP}$, V_{out} On	-50	-30		Gauss
Release Point	B_{RP}	N pole to branded side, $B < B_{RP}$, V_{out} Off		-20	-10	Gauss
Hysteresis	B_{HY}	$ B_{OPx} - B_{RPx} $		10		Gauss

Typical application circuit

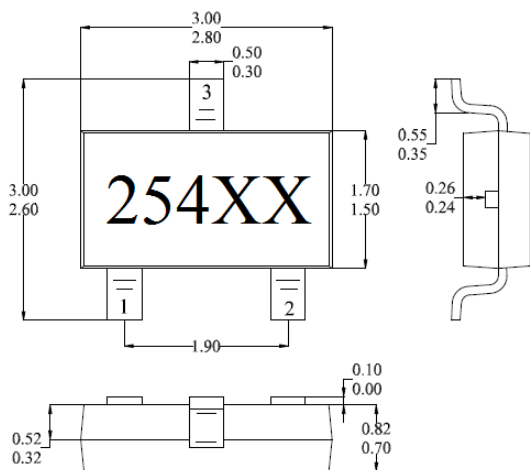


C1 : 10nF
C2 : 100pF

Sensor Location, package dimension and marking

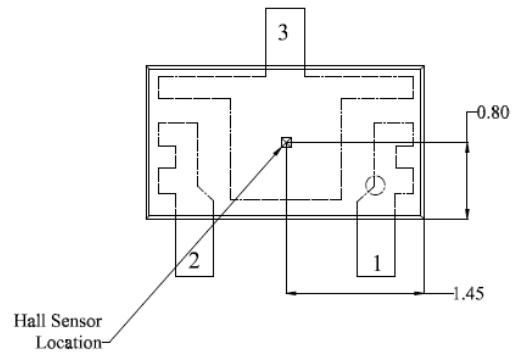
ST Package(TSOT-23)

(Top View)

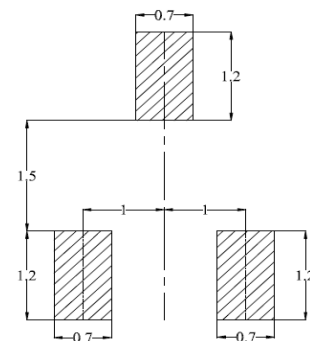


Hall Plate Chip Location

(Bottom view)



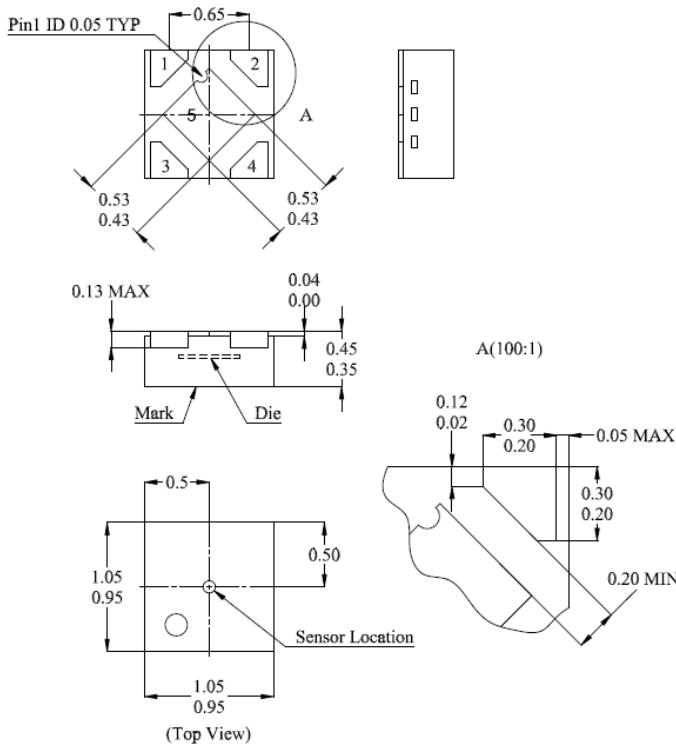
(For reference only) Land Pattern



NOTES:

1. PINOUT (See Top View at left):
Pin 1 VDD
Pin 2 Output
Pin 3 GND
2. Controlling dimension: mm;

SS Package (DFN 1.0*1.0) (Bottom View)

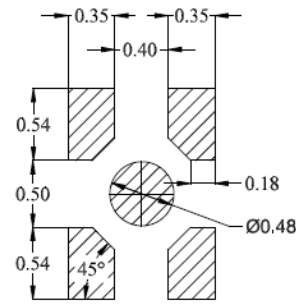


NOTES:

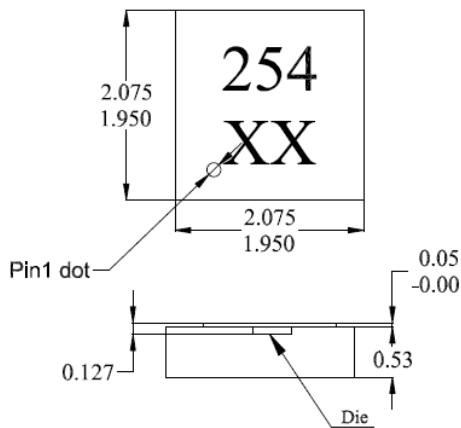
- Controlling dimension: mm
- Leads must be free of flash and plating voids
- Lead thickness after solder plating will be 0.254mm maximum
- PINOUT:

Pin No.	Pin Name	Function
1	V _{DD}	Power Supply
2/5	GND	Ground
3	NC	
4	V _{OUT}	Output

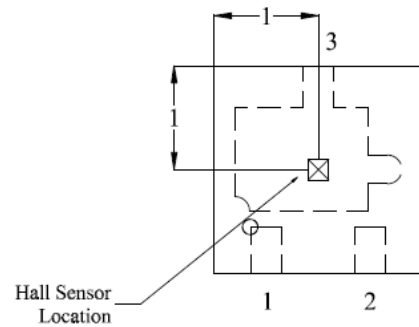
5. (For reference only) Land Pattern



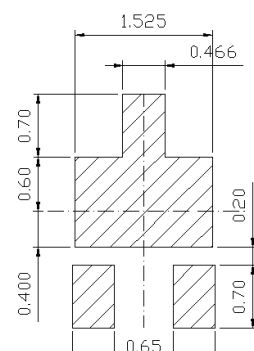
SQ Package (QFN2020-3) (Top View)



Hall Plate Chip Location (Top view)

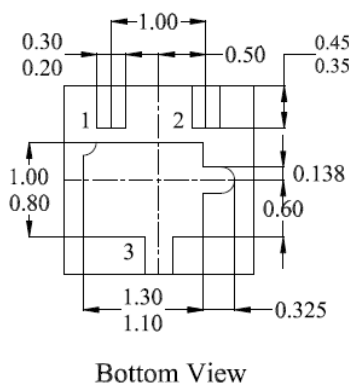


(For reference only) Land Pattern

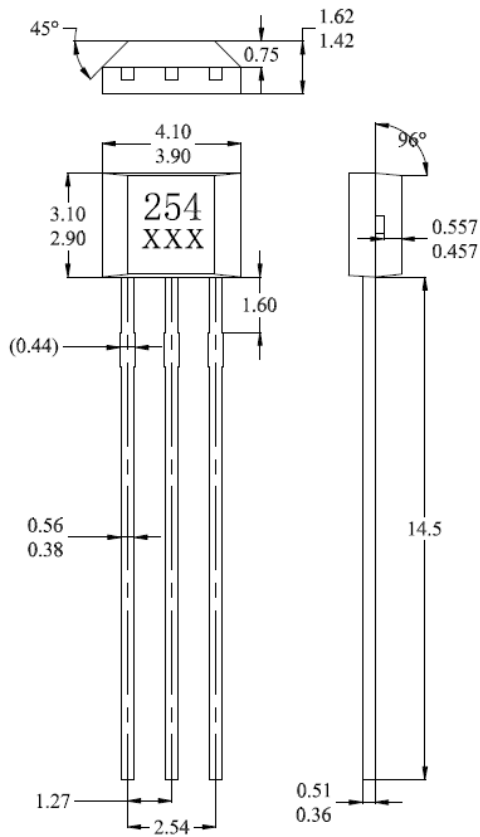


NOTES:

- PINOUT (See Top View at left)
Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND
- Controlling dimension: mm;
- Chip rubbing will be 10mil maximum;
- Chip must be in PKG. center.



UA Package (TO-92S)



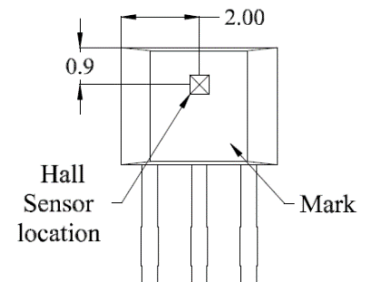
NOTES:

- 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

Hall Chip location



Output Pin Assignment

(Top view)

