

MH248 Hall-effect sensor is a temperature stable, stress-resistant, 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.

MH248 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.

This device requires the presence of omni-polar magnetic fields for operation.

MH248 is rated for operation between the ambient temperatures -40°C and $+85^{\circ}\text{C}$ for the E temperature range. The four package styles available provide magnetically optimized solutions for most applications. Package types SO is an SOT-23(1.1 mm nominal height), SQ is an QFN2020-3(0.5 mm nominal height), Tsot-23 is an ST(0.7 mm nominal height), a miniature low-profile surface-mount package, while package UA is a three-lead ultra-mini SIP for through-hole mounting.

The package type in a lead Halogen Free version was verified by third party Lab.

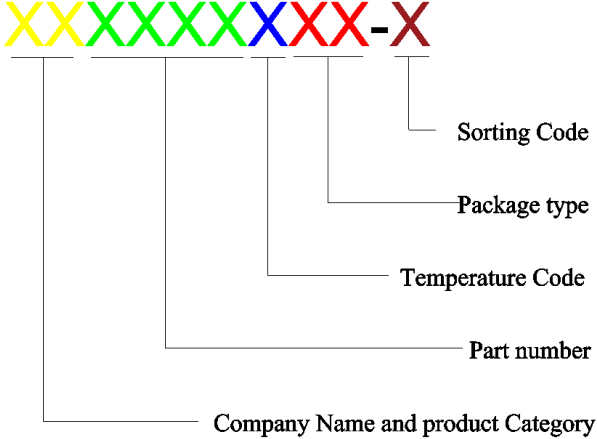
Features and Benefits

- CMOS Hall IC Technology
- Solid-State Reliability
- Micro power consumption for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 2.5 V and Max at 3.5V.
- High Sensitivity for direct reed switch replacement applications
- Multi Small Size option
- Custom sensitivity selection is available in optional package.
- 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

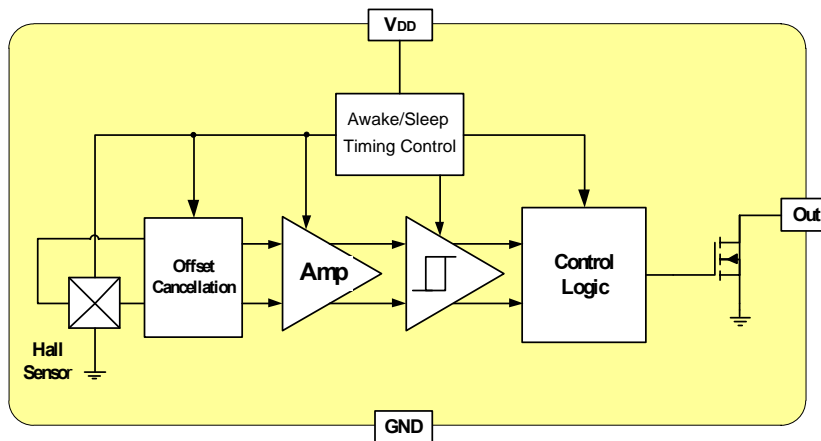
Ordering Information

	<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 forth 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
MH248EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH248ESO	E (-40°C to + 85°C)	SO (SOT-23)
MH248EST	E (-40°C to + 85°C)	ST (TSOT-23)
MH248ESQ	E (-40°C to + 85°C)	SQ (QFN2020-3)

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.

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

Characteristics		Values	Unit
Supply voltage, (V_{DD})		5	V
Output Voltage, (V_{out})		5	V
Reverse voltage, (V_{DD}) (V_{out})		-0.3	V
Magnetic flux density		Unlimited	Gauss
Output current (I_{out})		10	mA
Operating temperature range, (T_a)		-40 to +85	$^{\circ}\text{C}$
Storage temperature range, (T_s)		-55 to +150	$^{\circ}\text{C}$
Maximum Junction Temp, (T_j)		150	$^{\circ}\text{C}$
Thermal Resistance	(θ_{JA}) UA / SO / ST / SQ	206 / 543 / 310 / 543	$^{\circ}\text{C}/\text{W}$
	(θ_{JC}) UA / SO / ST / SQ	148 / 410 / 223 / 410	$^{\circ}\text{C}/\text{W}$
Package Power Dissipation, (P_D) UA / SO / ST / SQ		606 / 230 / 400 / 230	mW

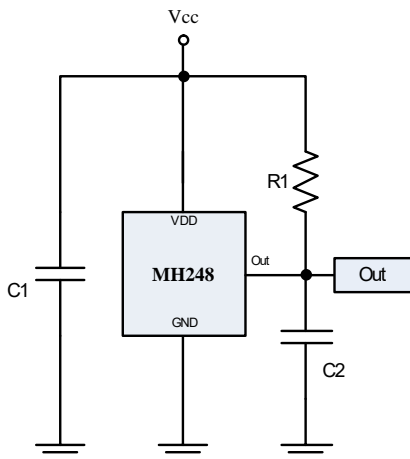
Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

Electrical Specifications

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

Parameters		Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{DD})		Operating	2.5		3.5	V
Supply Current, (I_{DD})	Awake State			2.5	4.0	mA
	Sleep State			8.0	12	μA
	Average				10	16
Output Leakage Current, (I_{off})		Output off			1	μA
Output Low Voltage, (V_{sat})		$I_{OUT}=1\text{mA}$			0.3	V
Awake mode time, (T_{aw})		Operating		70		μS
Sleep mode time, (T_{sl})		Operating		70		mS
Duty Cycle, (D, C)				0.1		%
Operate Point,	B_{OPS}	S pole to branded side, $B > BOP$,	6		60	Gauss
	B_{OPN}	N pole to branded side, $B > BOP$,	-60		-6	
Release Point	B_{RPS}	S pole to branded side, $B < BRP$,	5		59	Gauss
	B_{RPN}	N pole to branded side, $B < BRP$,	-60		-5	
Hysteresis, (B_{HYS})		$ B_{OPx} - BRPx $		7		Gauss

Typical Application circuit

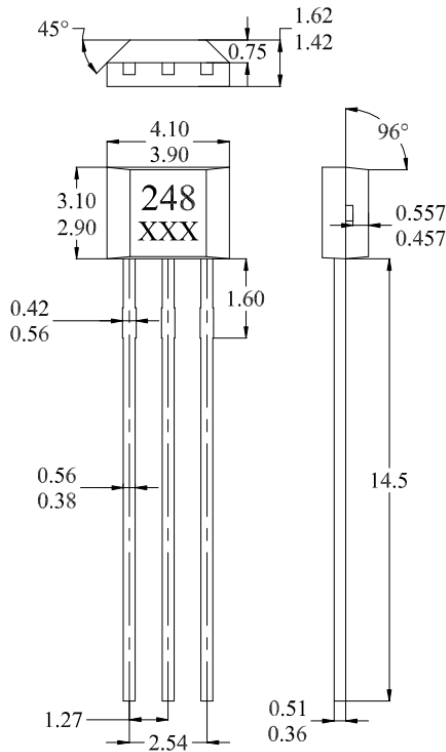


C1 : 10nF

C2 : 100pF

Sensor Location, Package Dimension and Marking

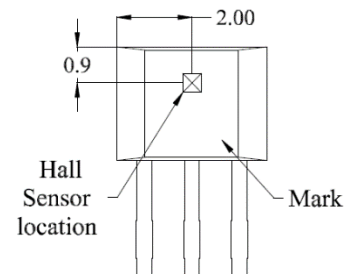
UA Package



NOTES:

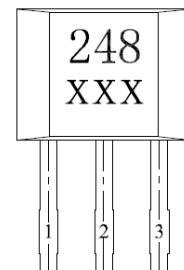
- Controlling dimension: mm
- Leads must be free of flash and plating voids
- Do not bend leads within 1 mm of lead to package interface.
- PINOUT:
Pin 1 VCC
Pin 2 GND
Pin 3 Output
- XXX; 1st X=Year;
2nd and 3rd XX=Week

Hall Chip location



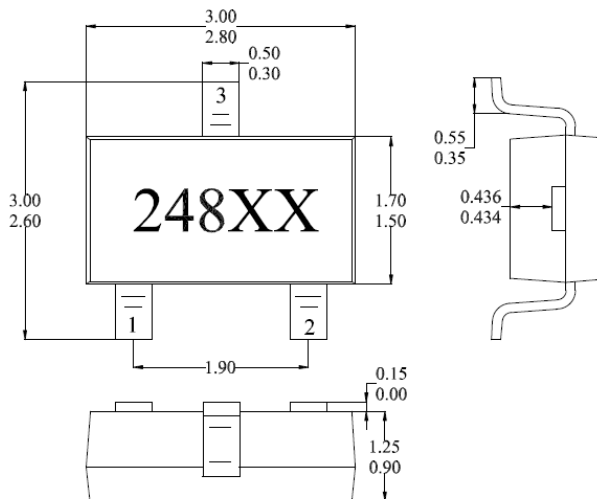
Output Pin Assignment

(Top view)



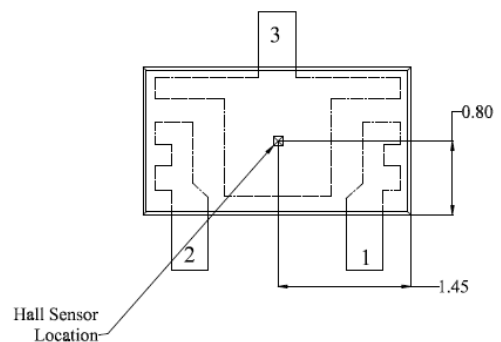
Package (SOT-23)

(Top View)

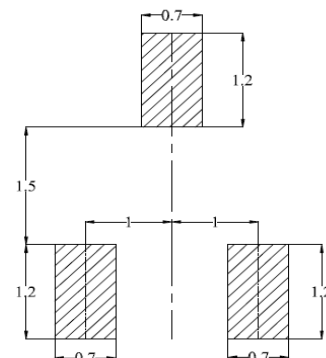


Hall Plate Chip Location

(Bottom view)



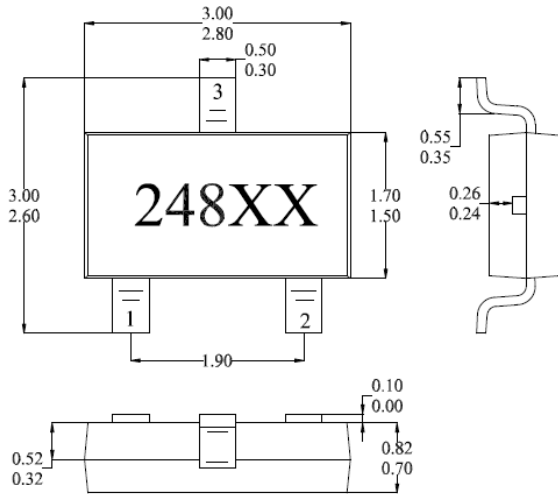
(For reference only) Land Pattern



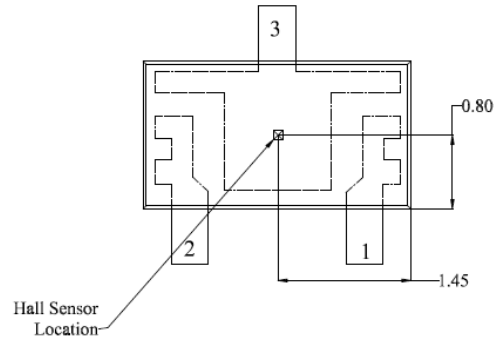
NOTES:

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

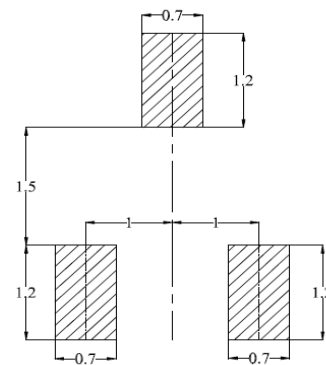
Package (TSOT-23) (Top View)



Hall Plate Chip Location (Bottom view)



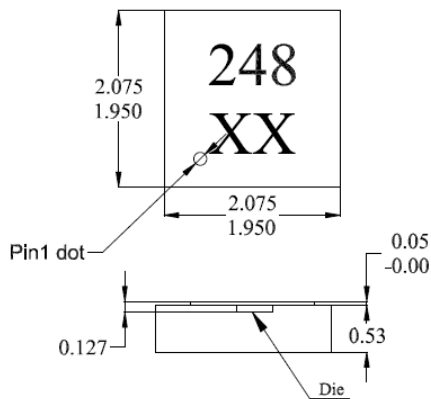
(For reference only) Land Pattern



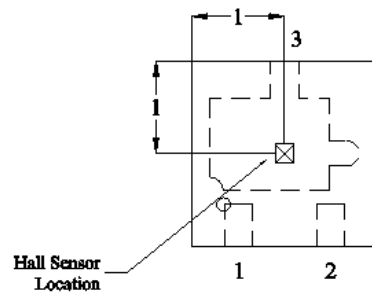
NOTES:

- PINOUT (See Top View at left :)
Pin 1 V_{DD}; 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

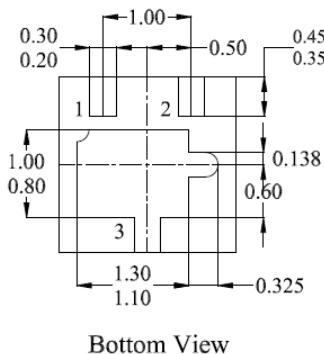
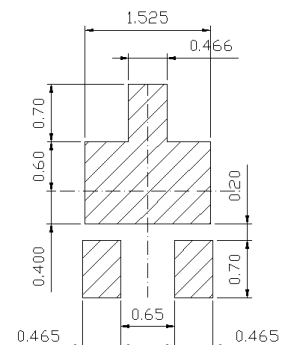
SQ Package (QFN2020-3) (Top View)



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.
- XX: Date Code, Refer to DC table