

MH253 Hall-effect sensor is a temperature stable, stress-resistant 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.

MH253 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.

MH253 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(0.55 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 is in a Halogen Free version was verified by third party Lab.

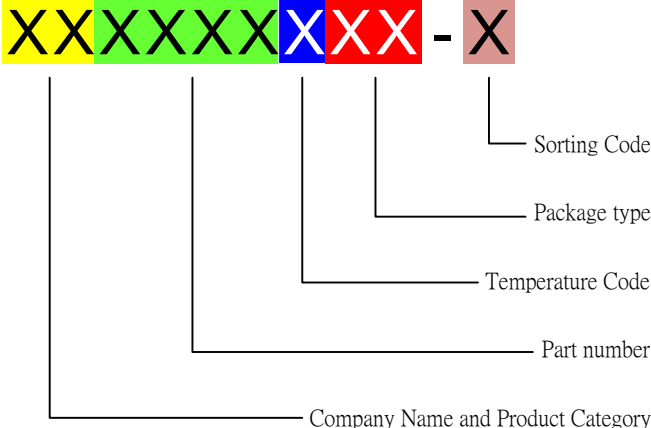
Features and Benefits

- CMOS Hall IC Technology
- Solid-State Reliability much better than reed switch
- Omni polar output switches with absolute value of North or South pole from magnet
- Low power consumption(2.6mA)
- High Sensitivity for reed switch replacement
- 100% tested at 125°C for K.
- Small Size
- ESD HBM $\pm 4\text{KV}$ Min
- COST competitive

Applications

- Solid state switch
- Lid close sensor for power supply devices
- Magnet proximity sensor for reed switch replacement in high duty cycle applications.
- Safety Key on sporting equipment
- Revolution counter
- Speed sensor
- Position Sensor
- Rotation Sensor
- Safety Key

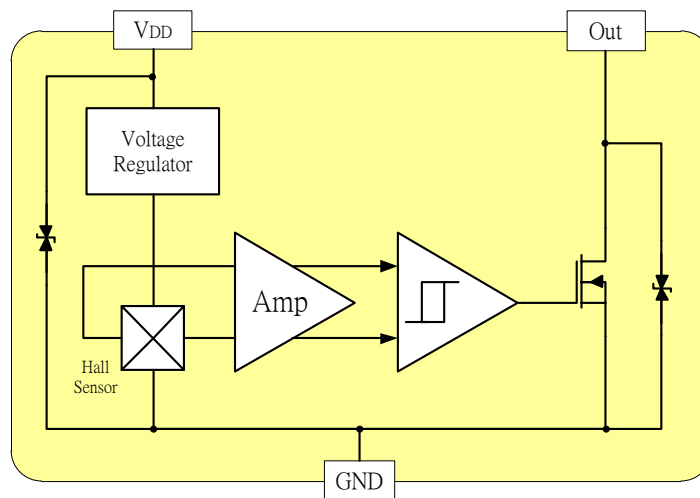
Ordering Information

	<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,SG:SOT-89(3pin)</p> <p>Sorting α, β, Blank.....</p>
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Part No.	Temperature Suffix	Package Type
MH253KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH253EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH253ESO	E (-40°C to + 85°C)	SO (SOT-23)
MH253ESQ	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 ($T_a=25\text{ }^\circ\text{C}$)

Characteristics		Values	Unit
Supply voltage, (V_{DD})		7	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})		25	mA
Operating Temperature Range, (T_a)	“E” version	-40 to +85	$^\circ\text{C}$
	“K” version	-40 to +125	$^\circ\text{C}$
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 / SQ	206 / 543 / 543	$^\circ\text{C}/\text{W}$
	(θ_{JC}) UA / SO / SQ	148 / 410 / 410	$^\circ\text{C}/\text{W}$
Package Power Dissipation, (P_D) UA / SO / SQ		606 / 230 / 230	mW

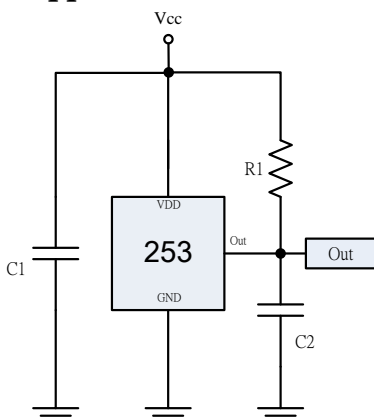
Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

Electrical Specifications

DC Operating Parameters $T_A=+25\text{ }^\circ\text{C}$, $V_{DD}=5.0\text{V}$

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{DD})	Operating	2.5		6	V
Supply Current, (I_{DD})	Average		2.6	6.0	mA
Output Low Voltage, ($V_{DS(ON)}$)	$I_{OUT}=10\text{mA}$			400	mV
Output Leakage Current, (I_{off})	I_{OFF} B<BRP, $V_{OUT} = 5\text{V}$			10	μA
Output Rise Time, (T_R)	$R_L=10\text{k}\Omega$, $C_L=20\text{pF}$			0.45	μs
Output Fall Time, (T_F)	$R_L=10\text{k}\Omega$; $C_L=20\text{pF}$			0.45	μs
Electro-Static Discharge	HBM	4			KV
Operate Point, (B_{OPS}) (B_{OPN})	S pole to branded side, B > BOP, V_{out} On		30	60	Gauss
	N pole to branded side, B > BOP, V_{out} On	-60	-30		
Release Point (B_{RPS}) (B_{RPN})	S pole to branded side, B < BRP, V_{out} Off	5	25		Gauss
	N pole to branded side, B < BRP, V_{out} Off		-25	-5	
Hysteresis, (B_{HYS})	$ B_{OPx} - BRPx $		5		Gauss

Typical Application circuit

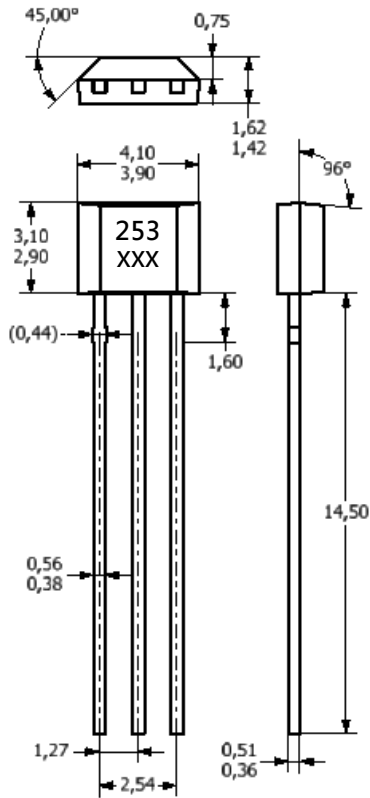


$C1 : 10\text{nF}$
 $C2 : 100\text{pF}$
 $R1 : 10\text{K}\Omega$

Sensor Location, Package Dimension and Marking

MH253 Package

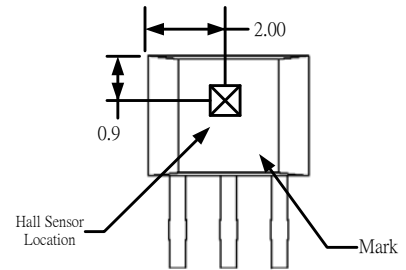
UA Package



NOTES:

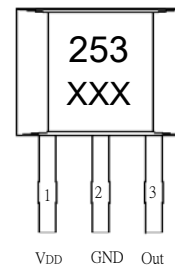
- 1).Controlling dimension: mm
- 2).Leads must be free of flash and plating voids
- 3).Do not bend leads within 1 mm of lead to package interface.
- 4).PINOUT:
 Pin 1 VDD
 Pin 2 GND
 Pin 3 Output

Hall Chip location



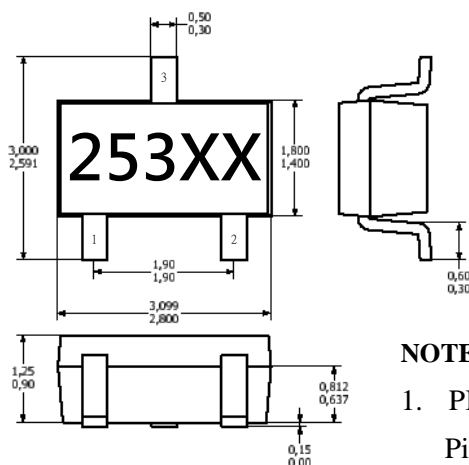
Output Pin Assignment

(Top view)



SO Package

(Top View)

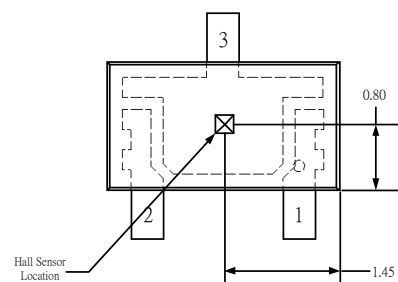


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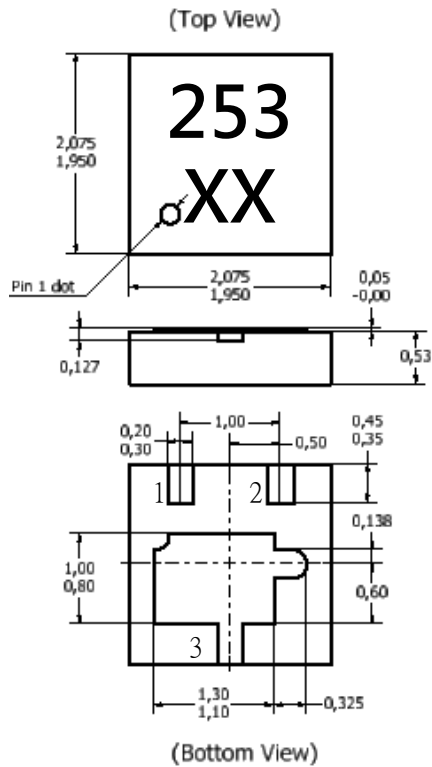
1. PINOUT (See Top View at left :)
 Pin 1 V_{DD}
 Pin 2 Output
 Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum

Hall Plate Chip Location

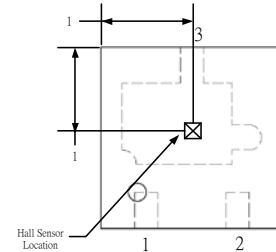
(Bottom view)



SQ Package



Hall Plate Chip Location
(Top view)



NOTES:

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