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℃ and +85℃ 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), 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.

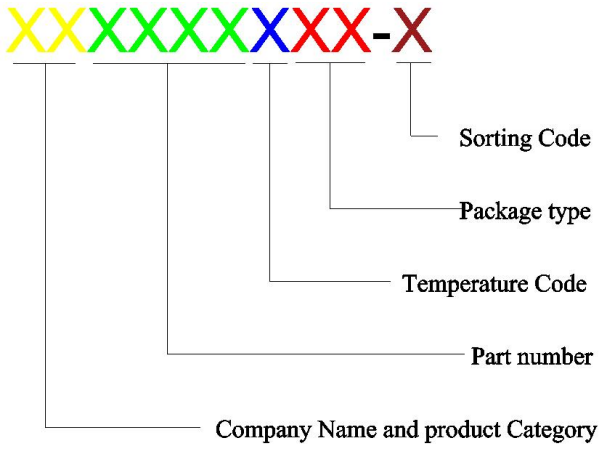
Features and Benefits

- CMOS Hall IC Technology
- Solid-State Reliability much better than reed switch
- Omni polar output switches
- High Sensitivity for reed switch replacement
- 100% tested at 125℃ for K.
- Small Size
- ESD HBM ±4KV Min
- COST competitive
- RoHS compliant 2011/65/EU and Halogen Free.

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



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

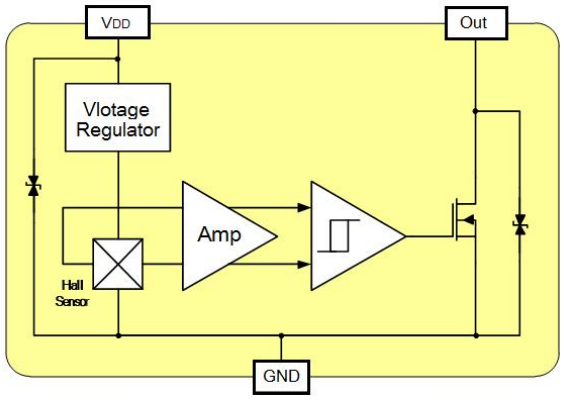
α , β ,Blank…..

Part No.	Temperature Suffix	Package Type
MH253KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH253EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH253KSO	K (-40°C to + 125°C)	SO (SOT-23)
MH253ESO	E (-40°C to + 85°C)	SO (SOT-23)

Custom sensitivity selection is available by MST sorting technology

Functional Diagram

Open Drain



***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 (Ta=25℃)

Characteristics		Values	Unit
Supply voltage,(V_{DD})		7	V
Output Voltage,(*Vout*)		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, (*Ta*)	"E" version	-40 to +85	℃
	"K" version	-40 to +125	℃
Storage temperature range, (*Ts*)		-55 to +150	℃
Maximum Junction Temp,(*Tj*)		150	℃
Thermal Resistance	(θ_{JA}) UA / SO	206 / 543	℃/W
	(θ_{JC}) UA / SO	148 / 410	℃/W
Package Power Dissipation, (*PD*) UA / SO		606 / 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.*

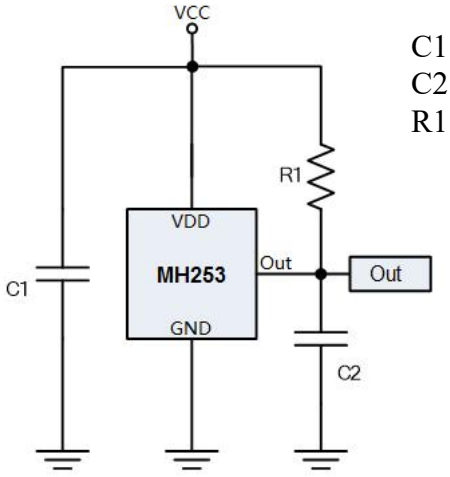
Electrical Specifications

DC Operating Parameters T_A=+25℃, V_{DD}=5.0V

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	I_{OUT}=10mA			400	mV
Output Leakage	B<BRP, V_{OUT} = 5V			10	uA
Output Rise Time,(T_R)	CL =20pF			0.45	uS
Output Fall Time,(T_F)	CL =20pF			0.45	uS
Electro-Static Discharge	HBM			4	KV

Typical Application Circuit

Open Drain



C1：10nF
C2：100pF
R1：10K Ω

MH253UA Magnetic Specifications

DC Operating Parameters T_A=+25 ℃, V_{DD}=5.0V

Parameter	*Symbol*	*Test Conditions*	*Min.*	*Typ.*	*Max.*	*Units*
Operating Point	B_{OPS}	S pole to branded side, B > BOP, Vout On		30	60	Gauss
	B_{OPN}	N pole to branded side, B > BOP, Vout On	-60	-30		Gauss
Release Point	B_{RPS}	S pole to branded side, B < BRP, Vout Off	5	20		Gauss
	B_{RPN}	N pole to branded side, B < BRP, Vout Off		-20	-5	Gauss
Hysteresis	B_{HYS}	|BOPx - BRPx|		10		Gauss

MH253SO Magnetic Specifications

DC Operating Parameters T_A=+25 ℃, V_{DD}=5.0V

Parameter	*Symbol*	*Test Conditions*	*Min.*	*Typ.*	*Max.*	*Units*
Operating Point	B_{OPS}	N pole to branded side, B > BOP, Vout On		30	60	Gauss
	B_{OPN}	S pole to branded side, B > BOP, Vout On	-60	-30		Gauss
Release Point	B_{RPS}	N pole to branded side, B < BRP, Vout Off	5	20		Gauss
	B_{RPN}	S pole to branded side, B < BRP, Vout Off		-20	-5	Gauss
Hysteresis	B_{HYS}	|BOPx - BRPx|		10		Gauss

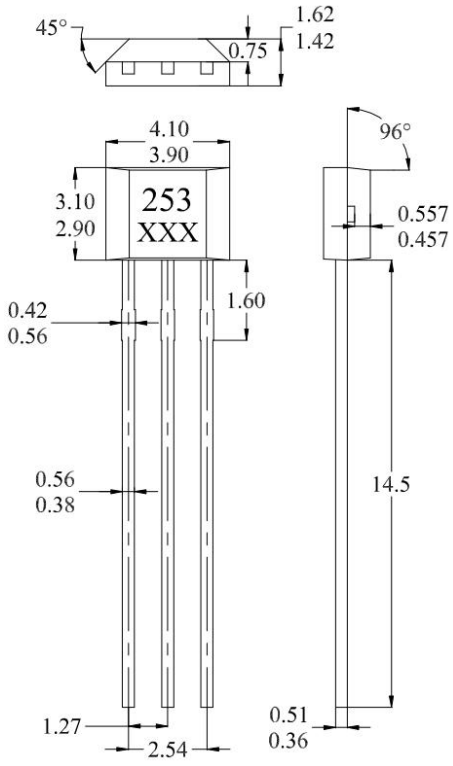
MH253UA/SO Output Behavior versus Magnetic Polar

DC Operating Parameters Ta = -40 to 85 ℃, V_{DD} =2.5 to 5 V

Parameter	*Test condition*	*OUT(SO)*	*Test condition*	*OUT(UA)*
South pole	B<Bop-N	Low	B>Bop-S	Low
Null or weak magnetic field	B=0 or B < BRP	High	B=0 or B < BRP	High
North pole	B>Bop-S	Low	B<Bop-N	Low

Sensor Location, Package Dimension and Marking

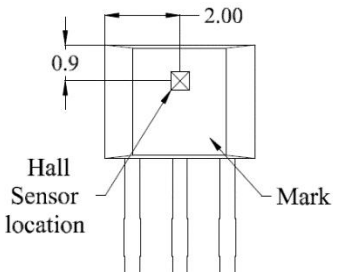
UA Package



NOTES:

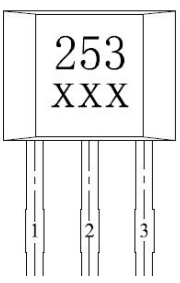
1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Do not bend leads within 1 mm of lead to package interface.
4. PINOUT:
   Pin 1 VDD
   Pin 2 GND
   Pin 3 Output
5. XXX; 1st X=Year;
   2nd and 3rd XX=Week

Hall Chip location



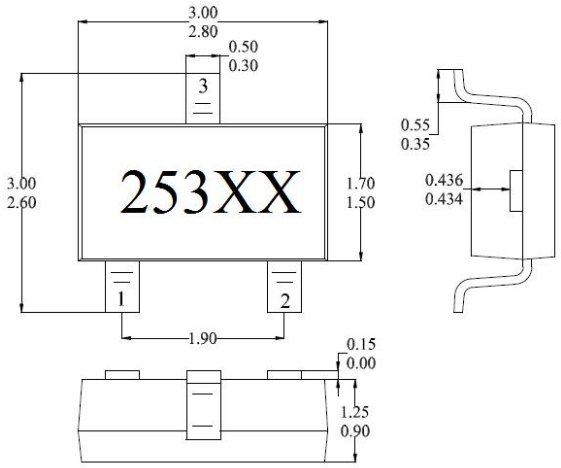
Output Pin Assignment

(Top view)



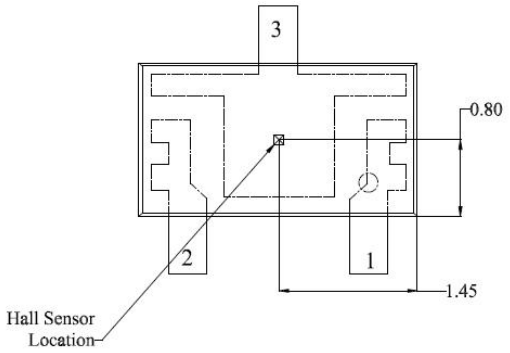
SO Package

(Top View)

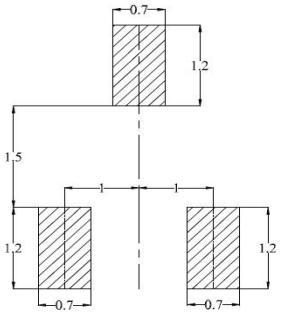


Hall Plate Chip Location

(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