2.5-6.0V V_{DD} High Sensitivity Omni-Polar Hall Effect Switch

1. Description

MH253EUA 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.

MH253EUA includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small signal amplifier, chopper stabilization, Schmitt trigger, open drain output and push pull 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.

MH253EUA is rated for operation between the ambient temperatures 40℃ and +85℃ for the E temperature range.

2. Features

- 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.

3. Applications

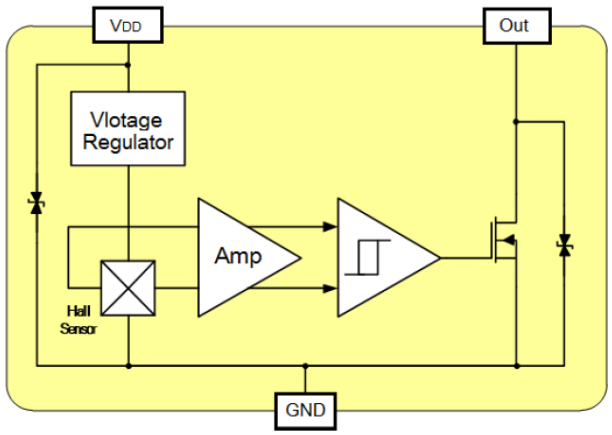
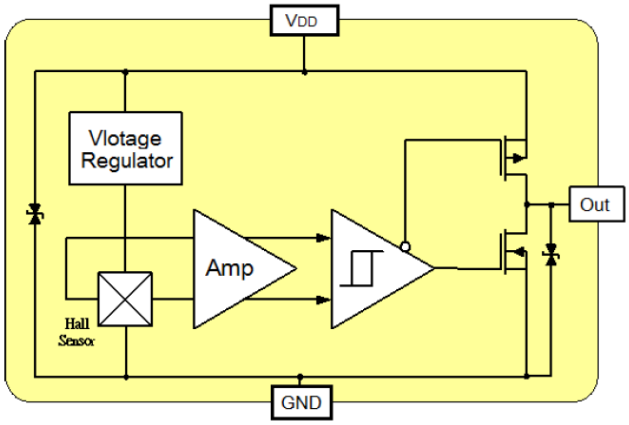
- Solid state switch
- Lid close sensor for power supply devices
- Magnet proximity sensor for reed switch replacement in high duty cycle applications.
- Safety Key on sporting equipment
- Revolution counter
- Speed sensor
- Position Sensor
- Rotation Sensor
- Safety Key

4. Ordering Information

Part Number	Temperature Suffix	Package Type B_{RP}(Typ.)
MH253EUA	E (40℃ to + 85℃)	(TO-92S)

Table-1 Ordering information

5. Functional Diagram

Open Drain	Push Pull
	

Note: Static sensitive device; please observe ESD precautions. Reverse VDD protection is not included. For reverse voltage protection, a 100Ω resistor in series with VDD is recommended.

6. Specification

6.1 Absolute Maximum rating

At (Ta=25°C)

Parameters	Symbol	Values	Unit
Supply voltage	V_{DD}	7.0	V
Output voltage	V_{OUT}	6.0	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	-40 to +85	°C
Storage temperature range	T_s	-55 to +150	°C
Thermal Resistance	θ_{JA}	206	°C/W
	θ_{JC}	148	°C/W
Maximum junction temperature	T_J	150	°C
Package Power Dissipation	P_D	606	mW

Table-3 Absolute Maximum rating

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

6.2. Electric Characteristics

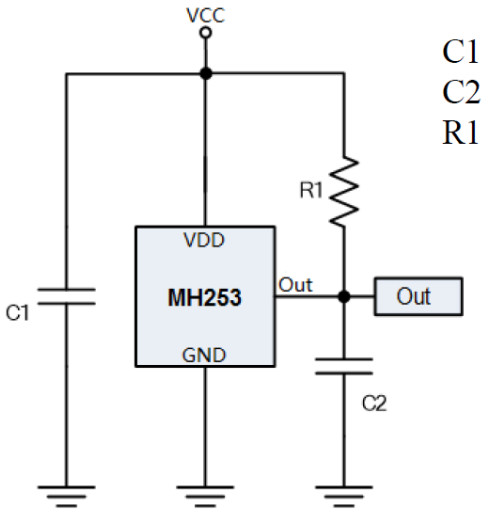
DC Operating Parameters TA=+25℃℃, VDD=5.0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Operating voltage	V_{DD}	Operating	2.5	--	6.0	V
Output Low Voltage	V_{DSON}	I_{OUT}=10mA		--	400	mV
Operating supply current	I_{DD}	Average	--	2.6	6.0	mA
Output Leakage Current	I_{off}	I_{OFF} B<BRP, V_{OUT} = 5V	--		10	uA
Electro Static Discharge	HBM		4	--		KV
Hysteresis	B_{HYS}	$\|BOP_x - BRP_x\|$	--	10	--	Gauss
Output rise time	t_r	R_L=10kΩ， C_L=20pF	--		0.45	uS
Output fall time	t_f	R_L=10kΩ， C_L=20pF	--		0.45	uS
Release Point	B_{RPS}	S pole to branded side, B < BRP, V_{out} Off	5.0	20		Gauss
	B_{RPN}	N pole to branded side, B < BRP, V_{out} Off		-20	-5	
Operate Point	B_{OPS}	S pole to branded side, B > BOP, V_{out} On		30	60	Gauss
	B_{OPN}	N pole to branded side, B > BOP, V_{out} On	-60	-30		

Table-4 Electric Characteristics

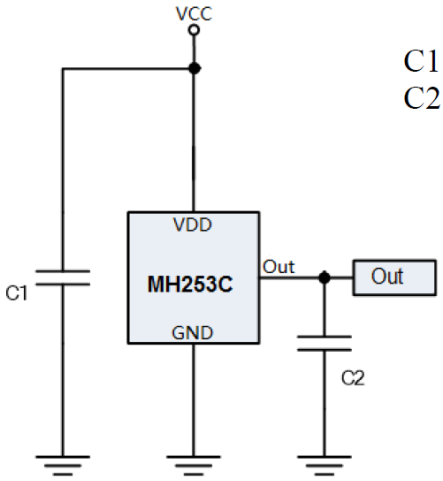
7. Typical Application circuit

Open Drain



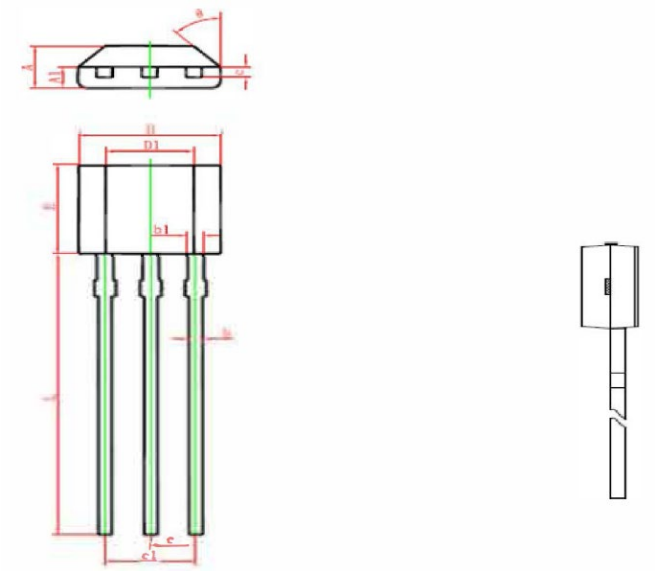
C1 : 10nF
C2 : 100pF
R1 : 10KΩ

Push Pull



C1 : 10nF
C2 : 100pF

8. Dimension (TO-92S)



Dimension; mm

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.420	1.620	0.056	0.064
A1	0.660	0.860	0.026	0.034
b	0.350	0.480	0.014	0.019
b1	0.400	0.550	0.016	0.022
c	0.360	0.510	0.014	0.020
D	3.900	4.100	0.154	0.161
D1	2.280	2.680	0.090	0.106
E	3.050	3.250	0.120	0.128
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	15.100	15.500	0.594	0.610
θ	45°TYP.		45°TYP	

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