

DH253 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.

DH253 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.

DH253 is rated for operation between the ambient temperatures  $-40^{\circ}\text{C}$  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  $125^{\circ}\text{C}$  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

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

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	( $\theta_{JA}$ ) UA / SO / SQ	206 / 543 / 543	$^\circ\text{C}/\text{W}$
	( $\theta_{JC}$ ) UA / SO / SQ	148 / 410 / 410	$^\circ\text{C}/\text{W}$
Package Power Dissipation, ( $P_D$ ) UA / SO / SQ		606 / 230 / 230	mW

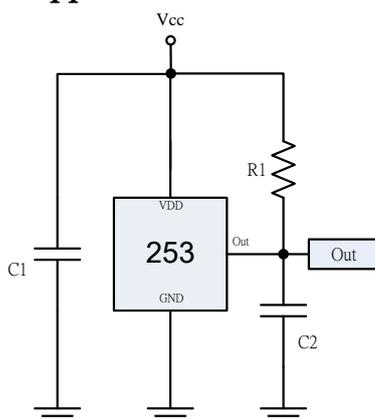
**Note:** Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

### Electrical Specifications

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

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, ( $V_{DSOL}$ )	$I_{OUT}=10\text{mA}$			400	mV
Output Leakage Current, ( $I_{off}$ )	$I_{OFF}$ B<BRP, $V_{OUT} = 5\text{V}$			10	$\mu\text{A}$
Output Rise Time, ( $T_R$ )	$R_L=10\text{k}\Omega$ , $C_L=20\text{pF}$			0.45	$\mu\text{s}$
Output Fall Time, ( $T_F$ )	$R_L=10\text{k}\Omega$ ; $C_L=20\text{pF}$			0.45	$\mu\text{s}$
Electro-Static Discharge	HBM	4			KV
Operate Point, ( $B_{OPS}$ )	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 ( $B_{RPS}$ )	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} - B_{RPx} $		5		Gauss

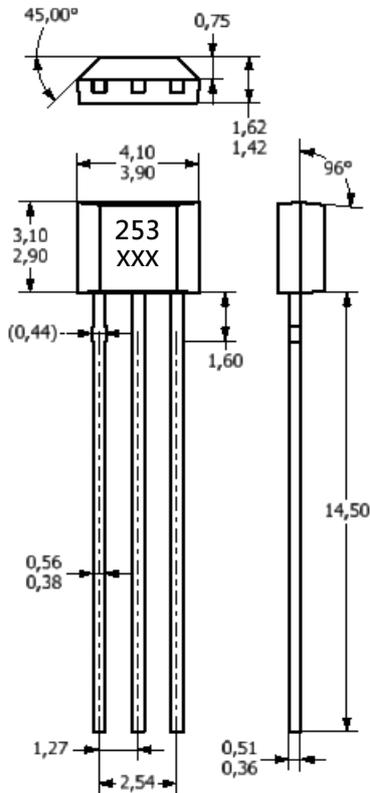
### Typical Application circuit



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

## Sensor Location, Package Dimension and Marking MH253 Package

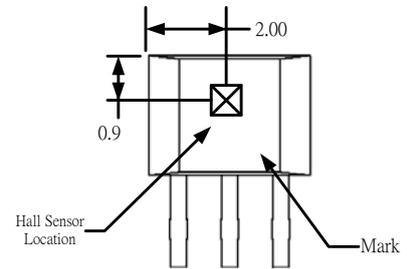
### UA Package



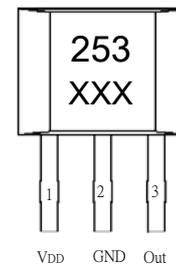
#### NOTES:

- 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

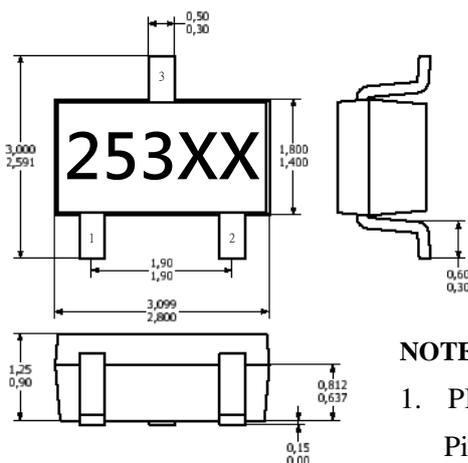
### Hall Chip location



### Output Pin Assignment (Top view)



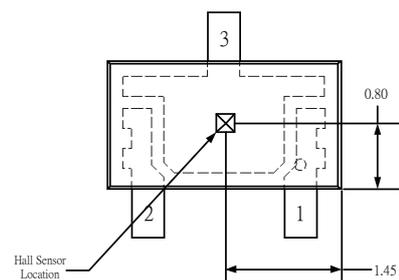
### SO Package (Top View)



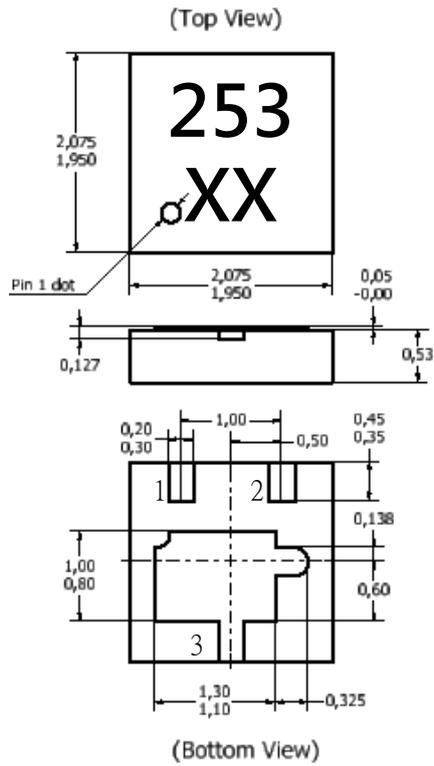
#### NOTES:

1. PINOUT (See Top View at left :)  
Pin 1      V<sub>DD</sub>  
Pin 2      Output  
Pin 3      GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum

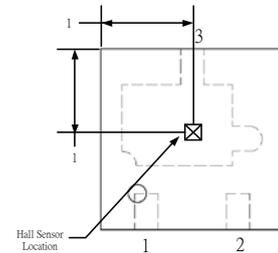
### Hall Plate Chip Location (Bottom view)



**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.