

MHA100KN

FEATURES

- Low power CMOS process
- Wide operation voltage range: 1.65~5.5V
- Ultra-low power consumption, <5uA@1.8V
- Good RF noise immunity
- Omnipolar operation
- Dual output, Unipolar Hall switch for N and S
- -40°C to +85°C operation
- RoHS compliant
- DFN4 package with 1.0mmx1.4mmx0.37mm

APPLICATIONS

- TWS headset
- Smart meter
- Cover switch

DESCRIPTION

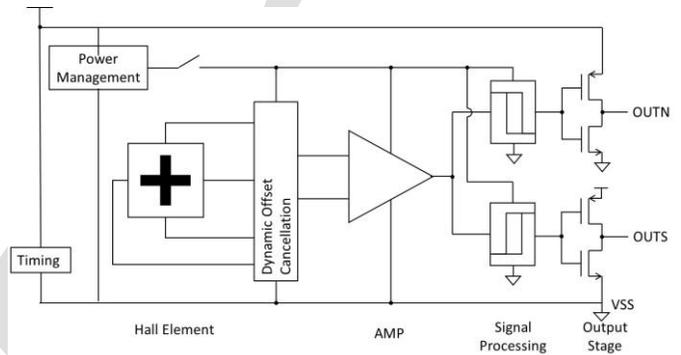


Figure 1: Signal Path

SPECIFICATIONS (Measurements @ 25 °C, unless otherwise noted; V_{DD}=1.8V unless otherwise specified)

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage (V _{DD})		1.65	1.8	5.5	V
Supply Current			2.5	5.0	μA
	-40~85 °C		2.5	10.0	μA
Power Down Current			1.0		nA
Operating Temperature		-40		85	°C
Storage Temperature		-55		125	°C
Awake Tim (T _{awake})			50	100	μs
Period (T _{period})			50	100	ms
Duty Cycle			0.05		%
Output High (V _{OH})	I _{OUT} =+0.5mA	V _{DD} -0.3	V _{DD} -0.1	V _{DD} +0.1	V
Output Low (V _{OL})	I _{OUT} =-0.5mA	-0.3	0.1	0.3	V
Output Current		-0.5		0.5	mA
Magnetic Opening Point (B _{OP})		27	37	47	Gauss
Magnetic Releasing Point (B _{RP})		20	30	40	Gauss
Hysteresis Window (B _{HYS})		2	7		Gauss

ORDERING GUIDE

MHA100KN

Package type

Code	Type
N	DFN package

Performance Grade

Code	Temp
K	-40 ~ 85°C

PIN DESCRIPTION

Pin NO.	Pin Name	Description
1	VDD	Power supplier
2	VSS	Connected to Ground
3	OUT2	S pole detection output
4	OUT1	N pole detection output

Caution: Electro Static Discharge (ESD) sensitive device.

PACKAGE ILLUSTRATION

DFN4 package with 1.0mmx1.4mmx0.37mm size.

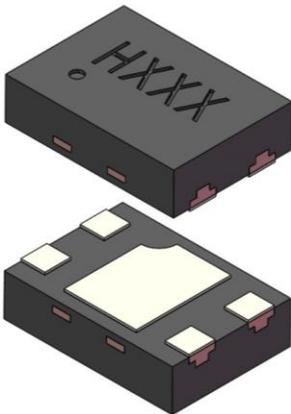


Figure 2: Package illustration

HARDWARE DESIGN CONSIDERATION

It is necessary to keep VDD voltage clean for best noise performance. A low-ESR bypass cap is required and recommended value is 0.1μF. It should be placed close to the device as much as possible.

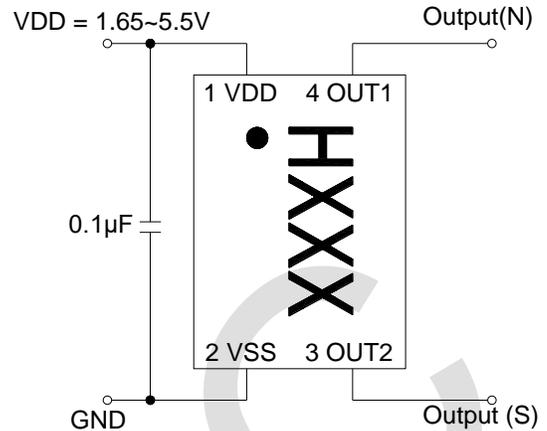
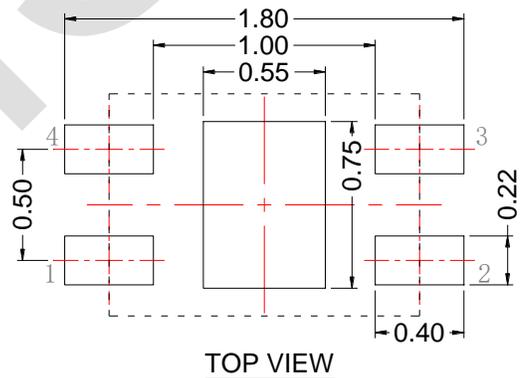


Figure 3: Connection diagram

LAND PATTERN

1. The device routing should be symmetric.
2. Recommended land pattern of PCB is shown in Figure 3.
3. Thickness of stencil should be 0.1mm.

Unit: mm



TOP VIEW

Figure 4: Recommended land pattern

THEORY OF OPERATION

This Hall switch is fully integrated CMOS IC. It output high-low signal following magnetic field changing. Normally it works with a magnet and detect the magnet close and away.

The Hall Effect

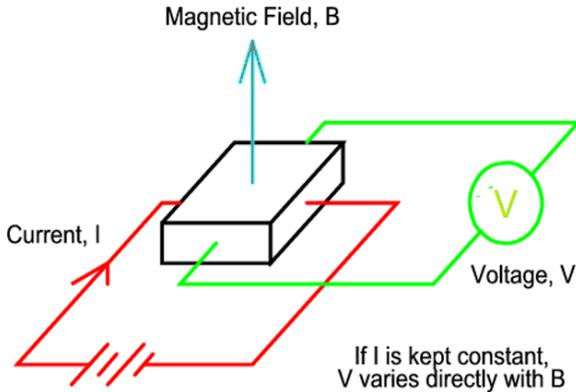


Figure 5: Hall Effect

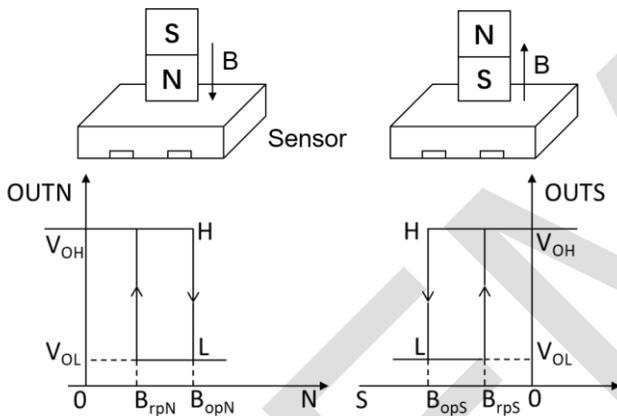


Figure 6: Output signals of OUTN and OUTS pins

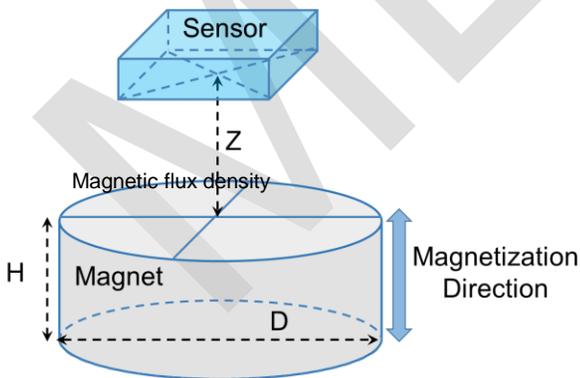


Figure 7: Sensor and magnet

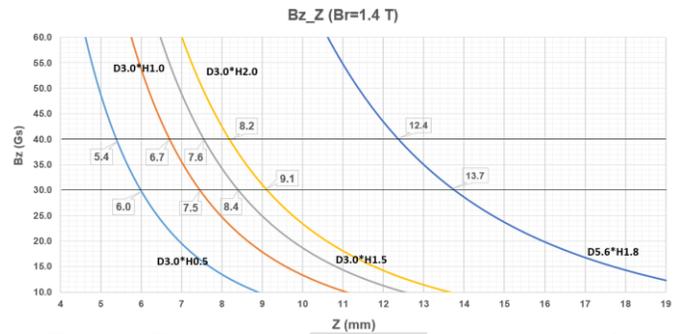


Figure 8: Field by magnet (different size and distance)

SOLDER REFLOW PROFILE

1. Reflow is limited by 2 times. Second reflow should be applied after device has cooled down to room temperature (25°C).
2. Recommended reflow profile for Pb free process is shown in Figure 3. The time duration of peak temperature (260°C) should be limited to 10 seconds.
3. Type 4 solder paste is recommended for a better SMT quality.

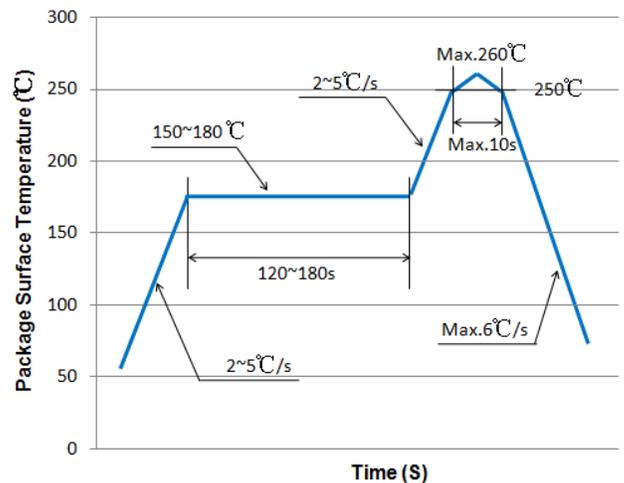


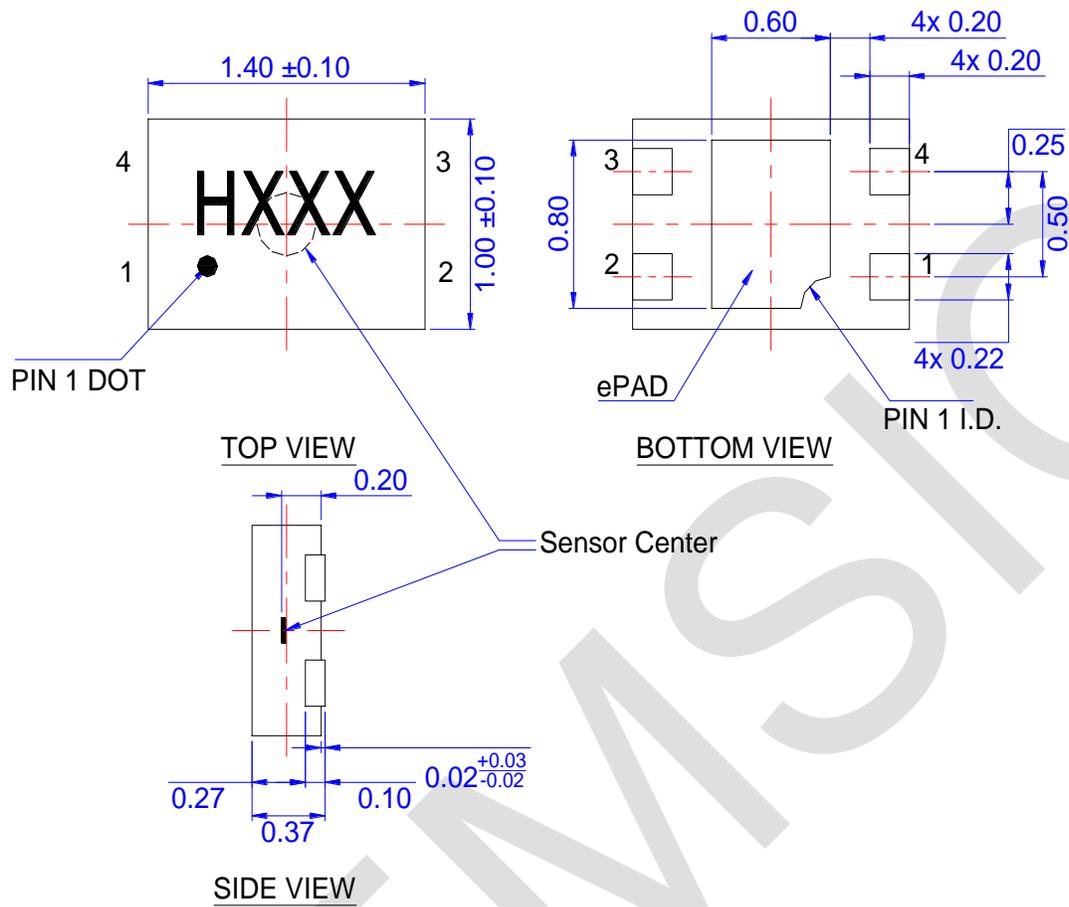
Figure 9: Recommended solder reflow profile

MANUAL SOLDERING

1. Soldering/repairing MHA100 manually via solder iron or heater gun is not recommended.
2. Avoid bending or torquing the PCB after the sensor is assembled.

PACKAGE OUTLINE DIMENSION

Unit: mm



Notes:

- Sensitive area located at the center of package within 0.3mm diameter circle.
- ePAD can be tied to the VSS or Floating.
- Unless otherwise specified, Tolerances is ± 0.05 mm.

