

FEATURES

- Low power CMOS process
- Wide operation voltage range: 1.65~5.5V
- Ultra-low power consumption, <5uA @1.8V
- Good RF noise immunity
- -40°C to +85°C operation
- RoHS compliant

APPLICATIONS

- TWS headset
- Smart meter
- Cover switch
- Domestic appliances
- Laptop
- Industry

DESCRIPTION

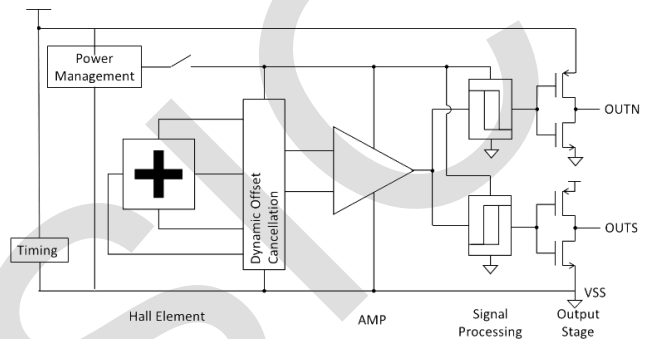


Figure 1: Signal Path

Information furnished by MEMSIC is believed to be accurate and reliable. However, no responsibility is assumed by MEMSIC for its use, or for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of MEMSIC.

© MEMSIC Semiconductor (Tianjin) Co., Ltd.
www.memsic.com

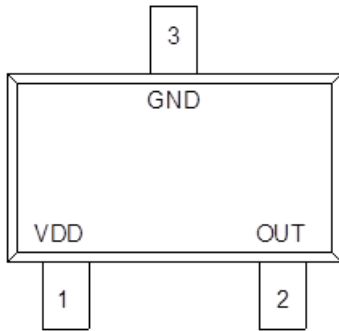
Devices List

Devices	Package	Polarity	Output	ESD-HBM	Quantity / Reel
MHA182AS-S	SOT553	Single output S unipolar	push pull	$\pm 3.5\text{KV}$	3000
MHA183AS	SOT23-3L	Single output Omnipolar	push pull	$\pm 4.5\text{KV}$	3000

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

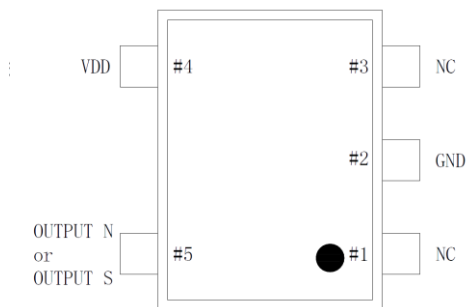
Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage (V_{DD})		1.65	1.8	5.5	V
Supply Current			2.5	5.0	μA
	-40~85 °C		2.5	10.0	μA
Power Down Current			1.0		nA
Operating Temperature		-40		85	°C
Storage Temperature		-55		125	°C
Awake Tim (T_{awake})			50	100	μs
Period (T_{period})			50	100	ms
Duty Cycle			0.05		%
Output High (V_{OH})	$I_{OUT}=+0.5\text{mA}$	$V_{DD}-0.3$	$V_{DD}-0.1$	$V_{DD}+0.1$	V
Output Low (V_{OL})	$I_{OUT}=-0.5\text{mA}$	-0.3	0.1	0.3	V
Output Current		-0.5		0.5	mA
Sampling Frequency			20		Hz
Magnetic Opening Point (B_{OP})		27	37	47	Gauss
Magnetic Releasing Point (B_{RP})		17	27	37	Gauss
Hysteresis Window (B_{HYS})		3	10	17	Gauss

SOT23 PIN DESCRIPTION



Pin NO.	Pin name	Description
1	VDD	Power supply
2	OUT	S or N pole detection output
3	GND	Ground

SOT553 PIN DESCRIPTION



Pin NO.	Pin name	Description
1	NC	
2	GND	Ground
3	NC	
4	VDD	Power supply
5	OUT	S or N pole detection output

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

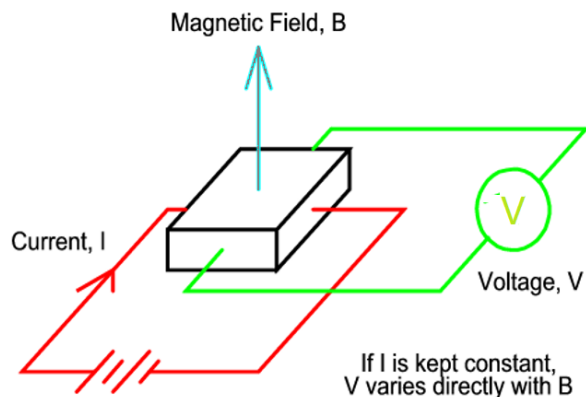


Figure 5: Hall Effect

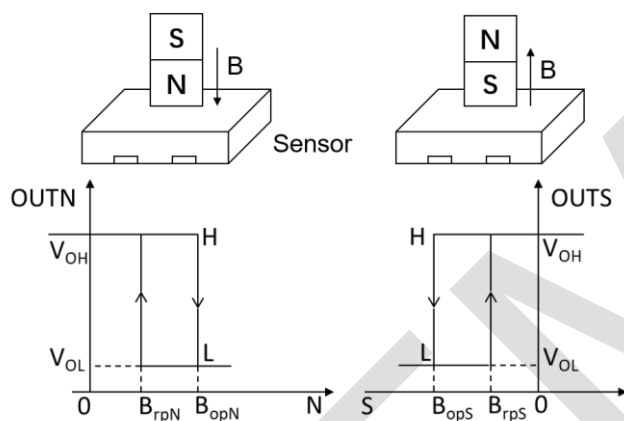


Figure 6: Output signals of OUTN and OUTS pins

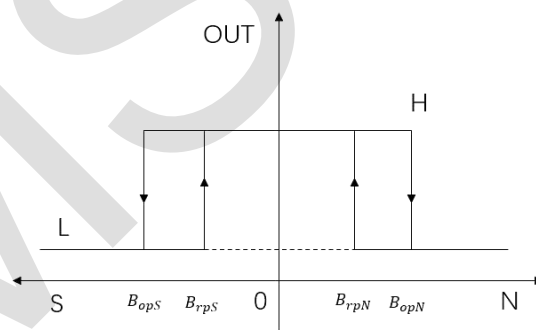


Figure 7: Output signals Omnipolar OUT pins

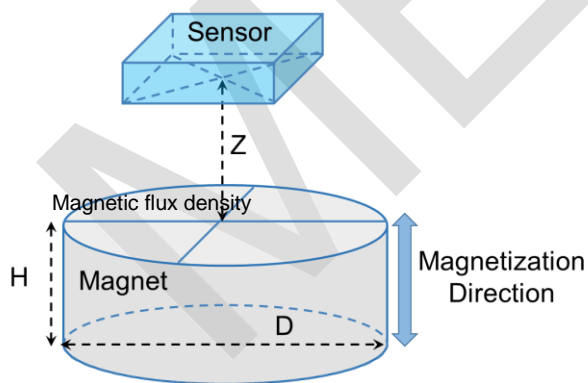


Figure 8: Sensor and magnet

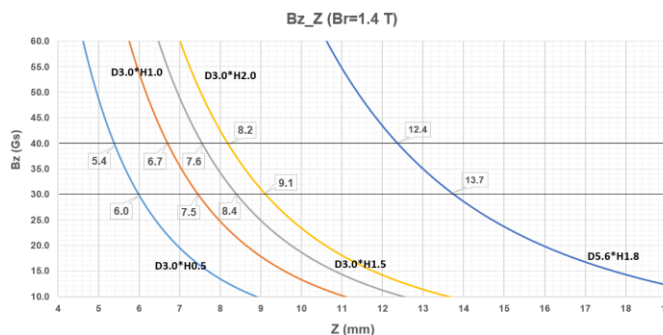


Figure 9: Field by magnet (different size and distance)

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.

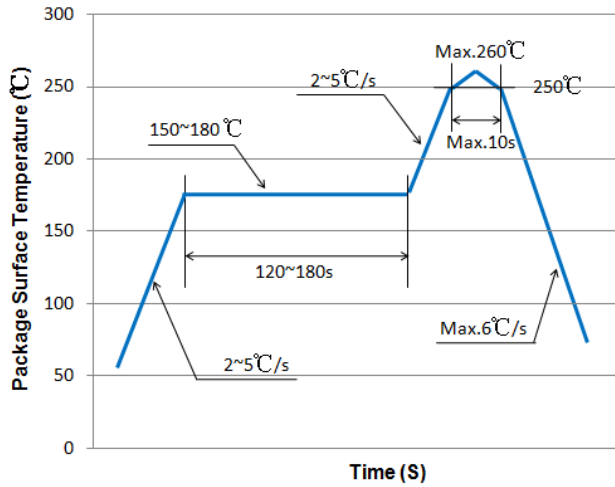


Figure 10: Recommended solder reflow profile

MANUAL SOLDERING

1. Soldering/repairing MHA18x manually via solder iron or heater gun is not recommended.
2. Avoid bending or torquing the PCB after the sensor is assembled.

SOT23 PACKAGE OUTLINE DIMENSION

Unit: mm

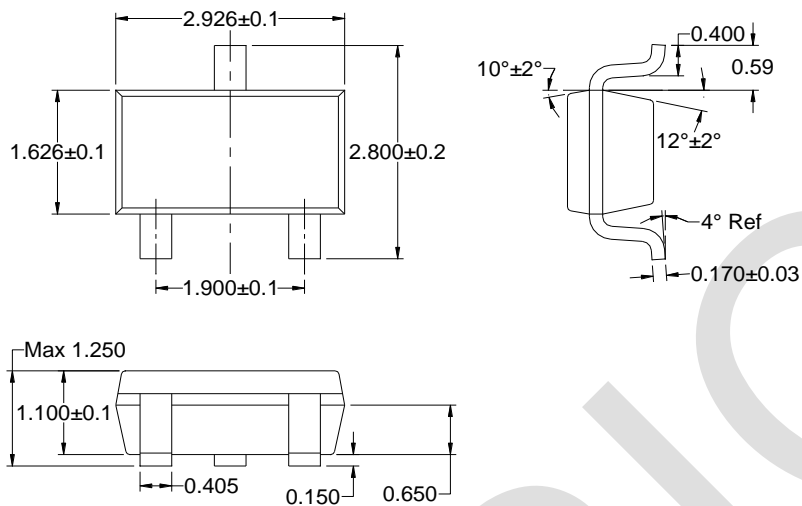


Figure 13: Mechanical package outline dimensions

Notes:

- Sensitive area located at the center of package within 0.3mm diameter circle.
- Unless otherwise specified, Tolerances is $\pm 0.05\text{mm}$.

SOT23 PACKAGE TAPE AND REEL PACKING

Products are put into carrier tape according to package type. The quantity for each full reel is 3000pcs per reel with 7" lock reel. Please refer to below Figure

Details for tape and reel packing as below:

- Tape and reel carriers are in accordance with ANSI/EIA-481
- Tape and reels are NOT designed to be baked at high temperatures
- Each tape and reel is typically dry packed in a moisture barrier bag (MSL1).

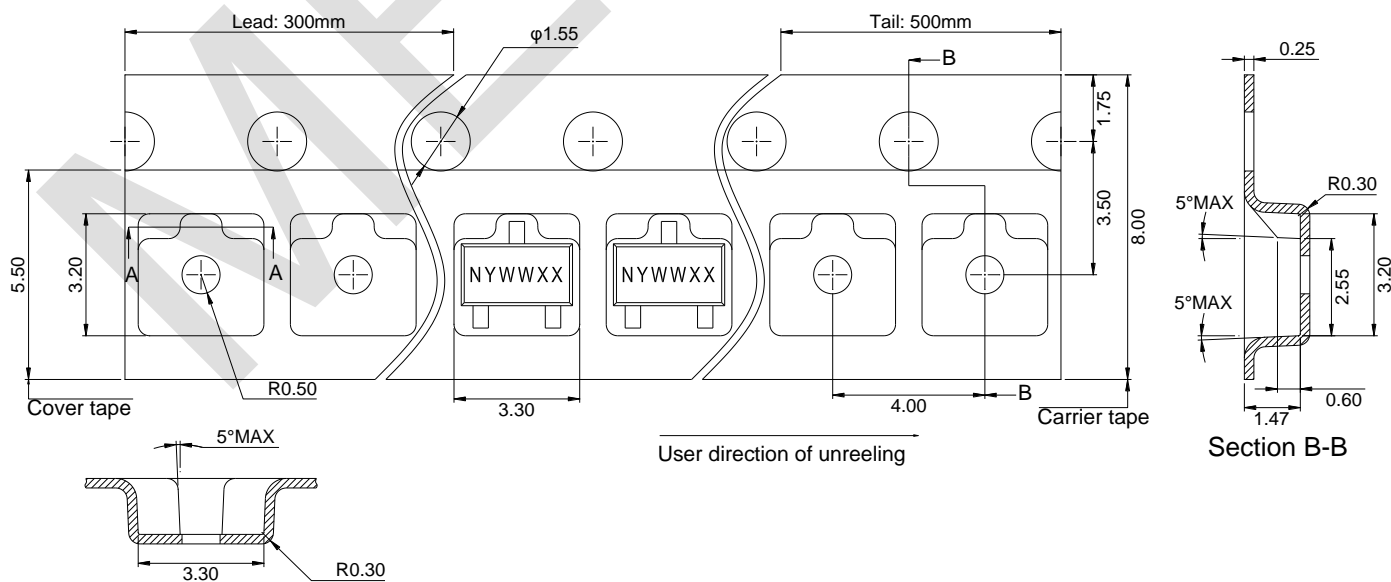
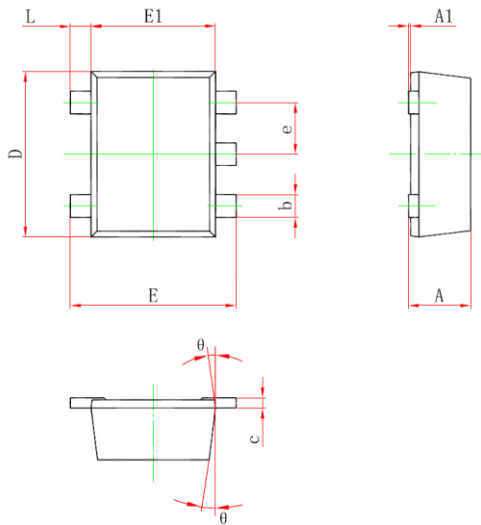


Figure 14: Carrier tape dimension and device orientation

SOT553 PACKAGE OUTLINE DIMENSION

Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.525	0.600	0.021	0.024
A1	0.000	0.050	0.000	0.002
e	0.450	0.550	0.018	0.022
c	0.090	0.160	0.004	0.006
D	1.500	1.700	0.059	0.067
b	0.170	0.270	0.007	0.011
E1	1.100	1.300	0.043	0.051
E	1.500	1.700	0.059	0.067
L	0.100	0.300	0.004	0.012
θ	7° REF.		7° REF.	

Figure 15: Mechanical package outline dimensions

Notes:

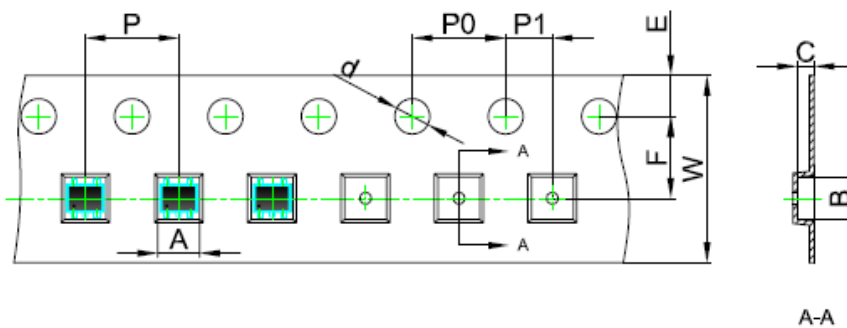
- c) Sensitive area located at the center of package within 0.3mm diameter circle.
- d) Unless otherwise specified, Tolerances is $\pm 0.05\text{mm}$.

SOT553 TAPE AND REEL

Products are put into carrier tape according to package type. The quantity for each full reel is 3000pcs per reel with 7" lock reel. Please refer to below Figure

Details for tape and reel packing as below:

- a) Tape and reel carriers are in accordance with ANSI/EIA-481
- b) Tape and reels are NOT designed to be baked at high temperatures
- c) Each tape and reel is typically dry packed in a moisture barrier bag (MSL1).



Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-553	1.78	1.78	0.69	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
(Tolerance)	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1

Figure 16: Carrier tape dimension and device orientation