MH 183

CMOS Unipolar Hall Switch

MH 183 is a unipolar Hall effect sensor IC. It incorporates advanced chopper stabilization technology to provide accurate and stable magnetic switch points. The design, specifications and performance have been optimized for applications of solid state switches.

The output transistor will be switched on (BOP) in the presence of a sufficiently strong South pole magnetic field facing the marked side of the package. Similarly, the output will be switched off (BRP) in the presence of a weaker South field and remain off with "0" field.

The package type is in a lead (Pb)-free version was verified by third party organization.

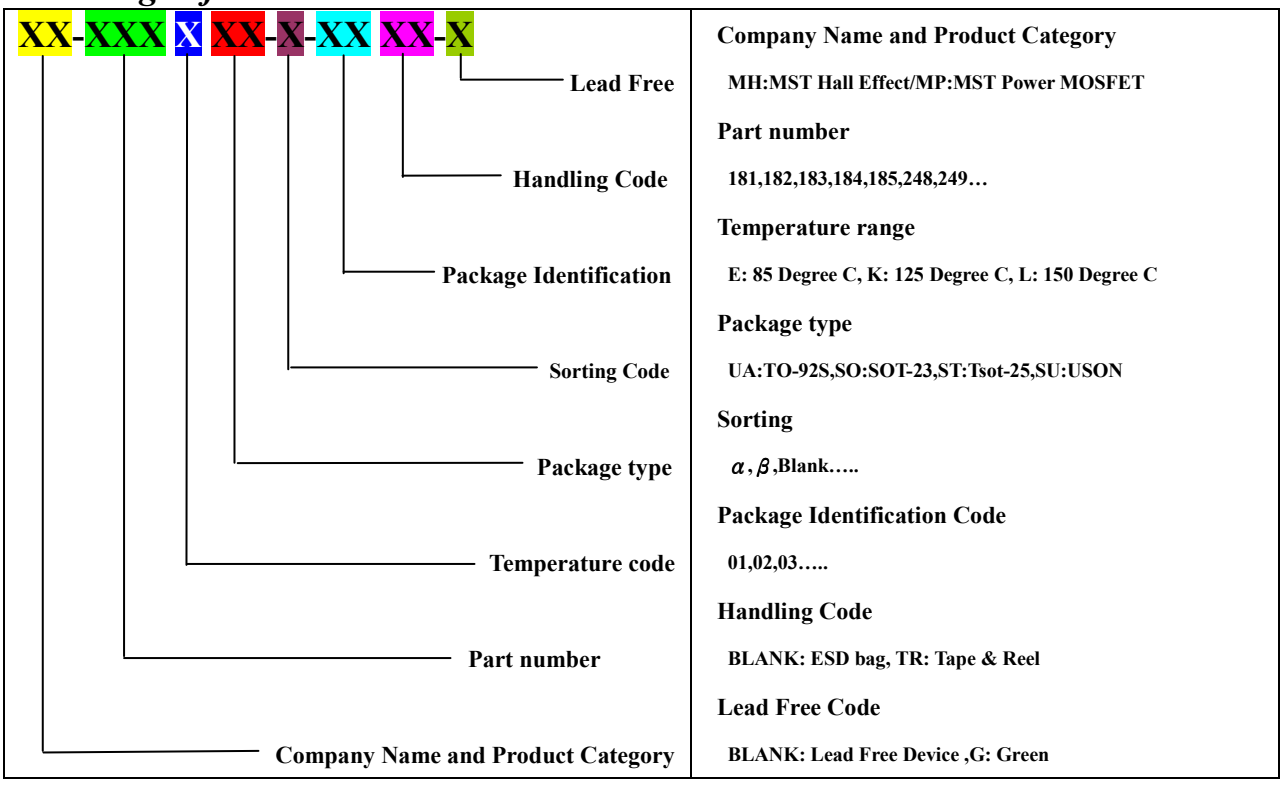
Features and Benefits

- CMOS Hall IC Technology
- Solid-State Reliability
- Chopper stabilized amplifier stage
- Unipolar, output switches with absolute value of South pole from magnet
- Operation down to 2.5V
- High Sensitivity for direct reed switch replacement applications
- Small Size in To 92S or Sot 23 package.
- 100% tested at 125℃ for K Spec.
- Custom sensitivity / Temperature selection are available.

Applications

- Solid state switch
- Limit switch
- Current limit
- Interrupter
- Current sensing
- Magnet proximity sensor for reed switch replacement in low duty cycle applications

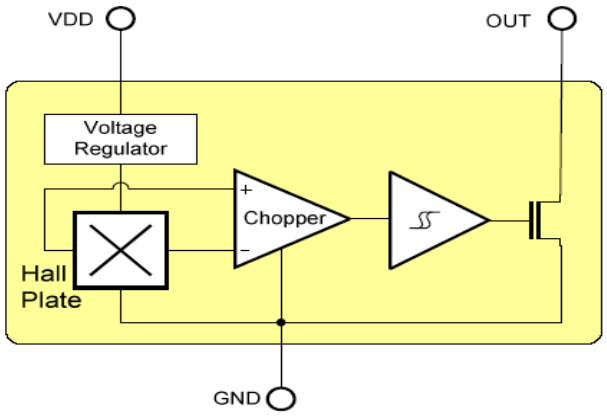
Ordering Information



Part No.	Temperature Suffix	Package Type	Package Identification
183	K (-40℃ to + 125℃)	UA (TO-92S)	01
	K (-40℃ to + 125℃)	SO (SOT-23)	05
	E (-40℃ to + 85℃)	UA (TO-92S)	01
	E (-40℃ to + 85℃)	SO (SOT-23)	05

K spec is using in industrial and automotive application. Special Hot Testing is utilized.

Functional Diagram



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

Absolute Maximum Ratings

Supply Voltage (Operating), V_{DD}	28V
Supply Voltage (Reverse) V_{DD}	-0.3V
Supply Current (Fault), I_{DD}	50mA
Output Voltage, V_{OUT}	24V
Output reverse Voltage, V_{OUT}	-0.3V
Output Current (Fault), I_{OUT}	50mA
Operating Temperature Range "K", T_A	-40℃ to +125℃
Operating Temperature Range"E", T_A	-40℃ to +85℃
Storage Temperature Range, T_S	-55℃ to +150℃

Note: Do not apply reverse voltage to V_{DD} and V_{OUT} Pin, It may be caused for Missfunction or damaged device.

MH-183 Electrical Specifications

DC operating parameters: T_A = 25℃, V_{DD}=12V_{DC} (unless otherwise specified).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply Voltage	V_{DD}	Operating	2.5		27	V
Supply Current	I_{DD}	Average		2.5	5.0	mA
Output Leakage	I_{OFF}	B<Brp,Vout=20V			10.0	μA
Saturation Voltage	V_{SAT}	Iout=20mA, B>Bop			0.5	V
Output Rise Time	Tr	Vdd=12V,RL=1.1Kohm,CL=20pf		.04		μS
Output Fall Time	Tf	Vdd=12V,RL=1.1Kohm,CL=20pf		.18	70.0	μS

Magnetic Specifications

DC operating parameters: T_A = 25℃, V_{DD}=12V_{DC} (unless otherwise specified).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OP}				25	mT
Release Point	B_{RP}		5			mT
Hysteresis	B_{HYS}			4.5		mT

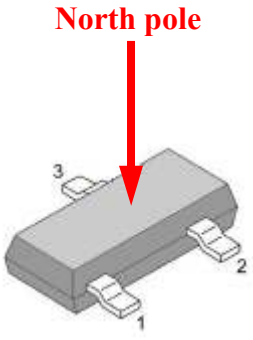
Note: 1 mT = 10 Gauss.

Custom sensitivity selection is available.

Output Behaviour versus Magnetic Pole

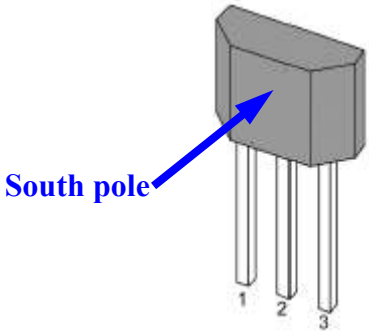
DC Operating Parameters Ta = -40 to 125℃, Vdd = 2.5 to 27V (unless otherwise specified)

Parameter	Test condition(SO)	OUT(SO)	OUT(UA)
South pole	B<Brp	high	Low
Null or weak magnetic field	B=0 or B < BRP	high	high
North pole	B>Bop	low	high



OUT=low(Vdson)

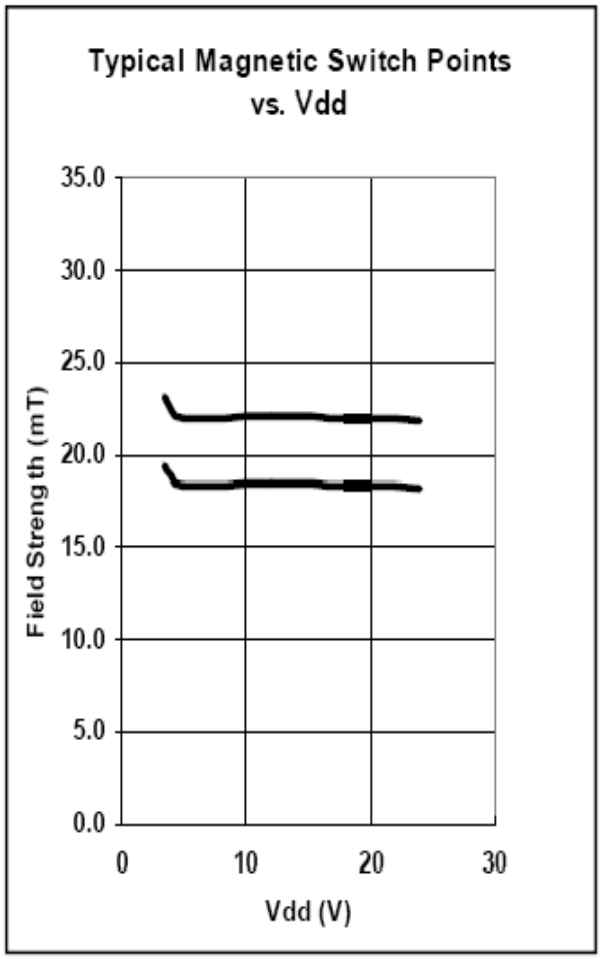
SO package

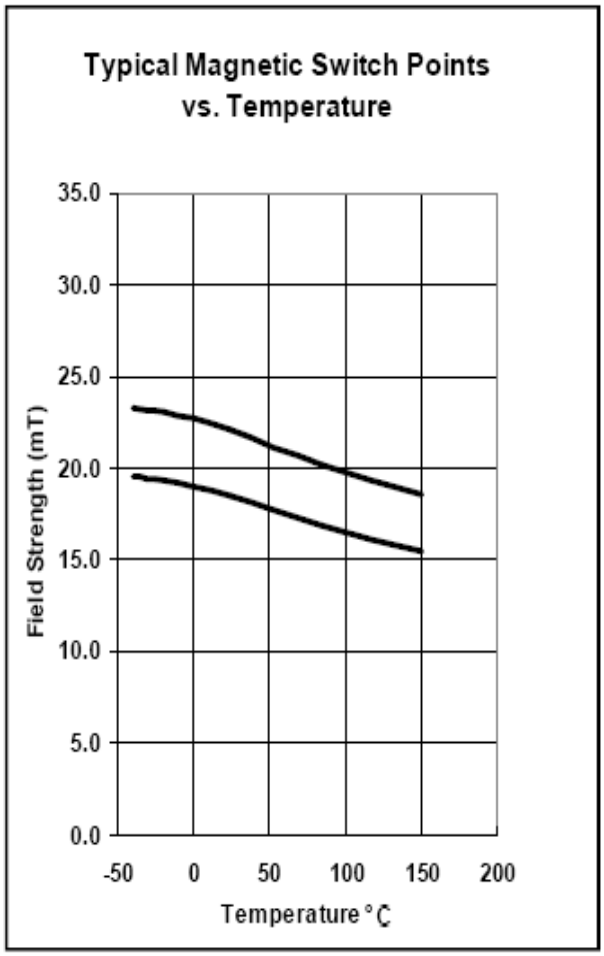


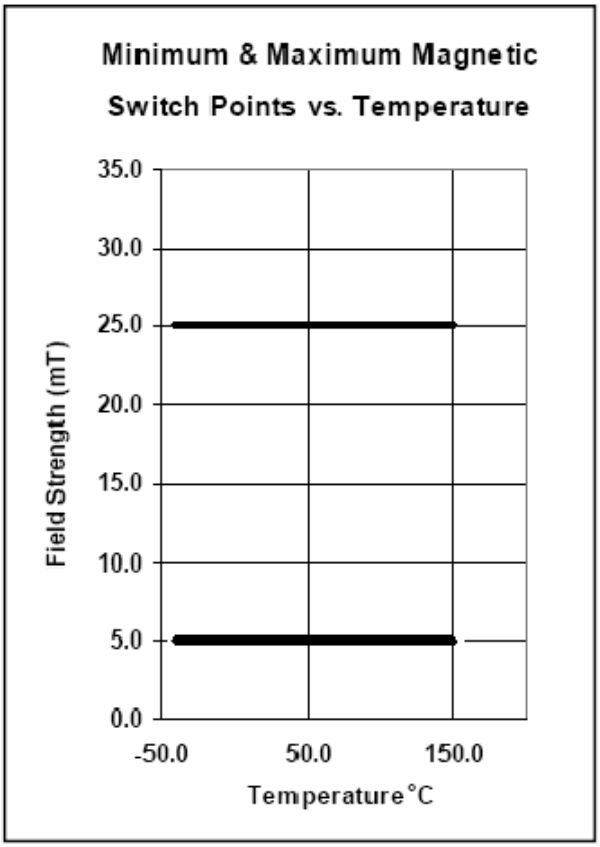
OUT=low(Vdson)

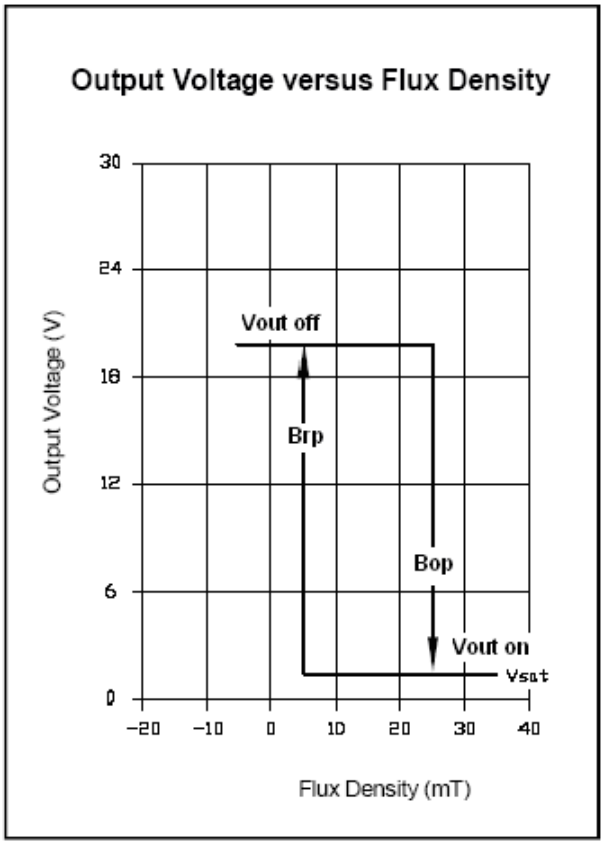
UA package

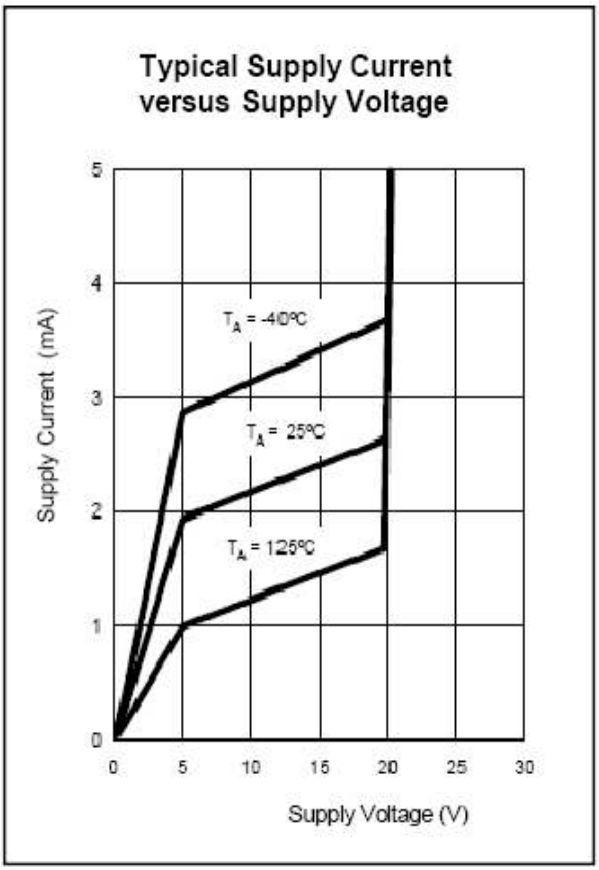
Performance Graphs

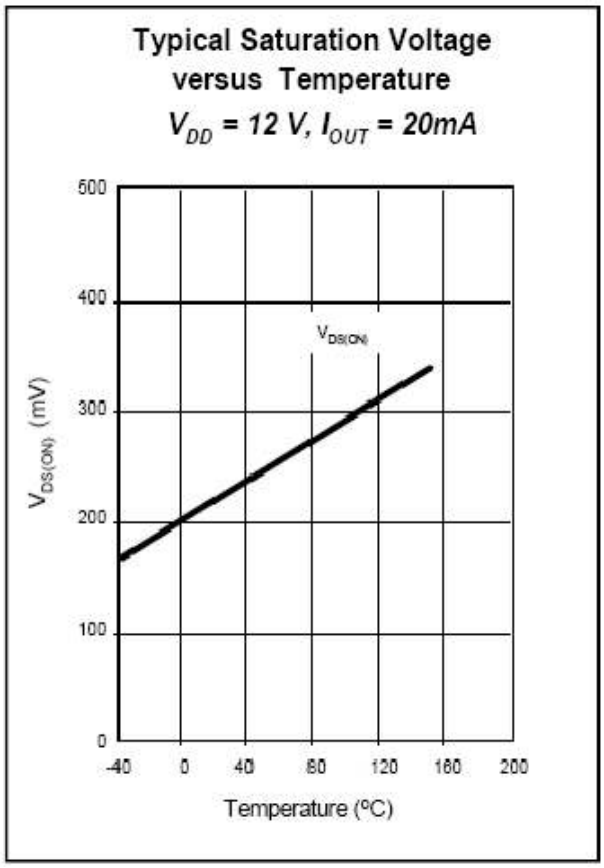





Minimum & Maximum Magnetic
Switch Points vs. Temperature
Field Strength (mT)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-50.0
50.0
150.0
Temperature °C

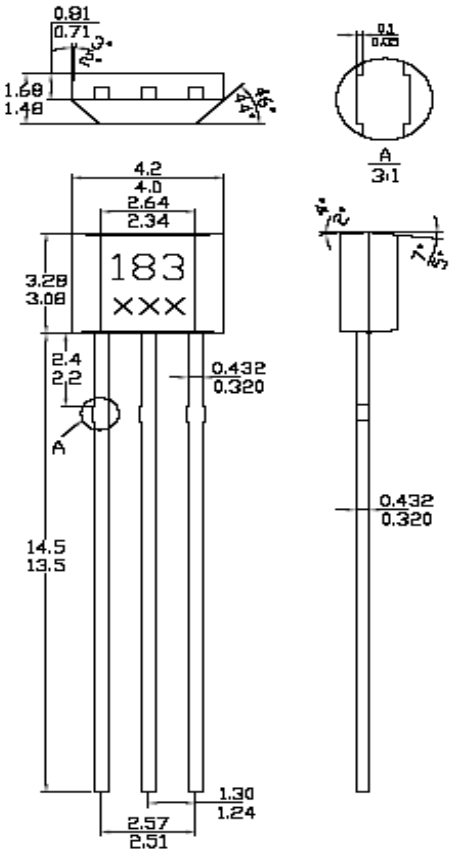

Output Voltage versus Flux Density
Output Voltage (V)
30
24
18
12
6
0
Vout off
Brp
Bop
Vout on
Vsat
-20
-10
0
10
20
30
40
Flux Density (mT)


Typical Supply Current
versus Supply Voltage
Supply Current (mA)
5
4
3
2
1
0
T_A = -40°C
T_A = 25°C
T_A = 125°C
0
5
10
15
20
25
30
Supply Voltage (V)


Typical Saturation Voltage
versus Temperature
V_{DD} = 12 V, I_{OUT} = 20mA
$V_{DS(ON)}$ (mV)
500
400
300
200
100
0
$V_{DS(ON)}$
-40
0
40
80
120
160
200
Temperature (°C)

Sensor Location, package dimension and marking

MH 183 UA-01 Package



NOTES:

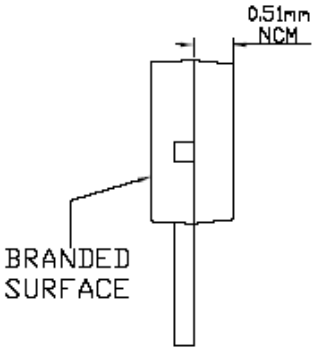
1).Controlling dimension: mm

2).Leads must be free of flash and plating voids;

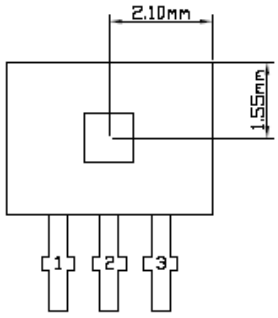
3).Do not bend leads within 1 mm of lead to package interface;

4).PINOUT:

Pin 1	VDD
Pin 2	GND
Pin 3	Output



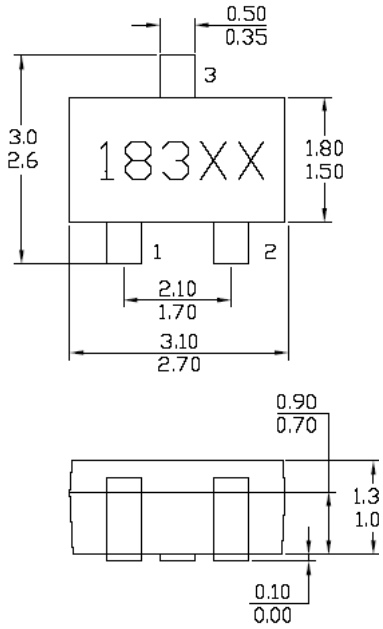
Active Area Depth



Sensor Location

MH 183 SO-05 (SOT-23) Dimensions

(Top view)



NOTES:

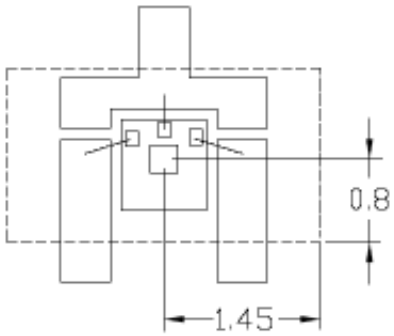
1. PINOUT (See Top View at left :)

Pin 1	VDD
Pin 2	Output
Pin 3	GND

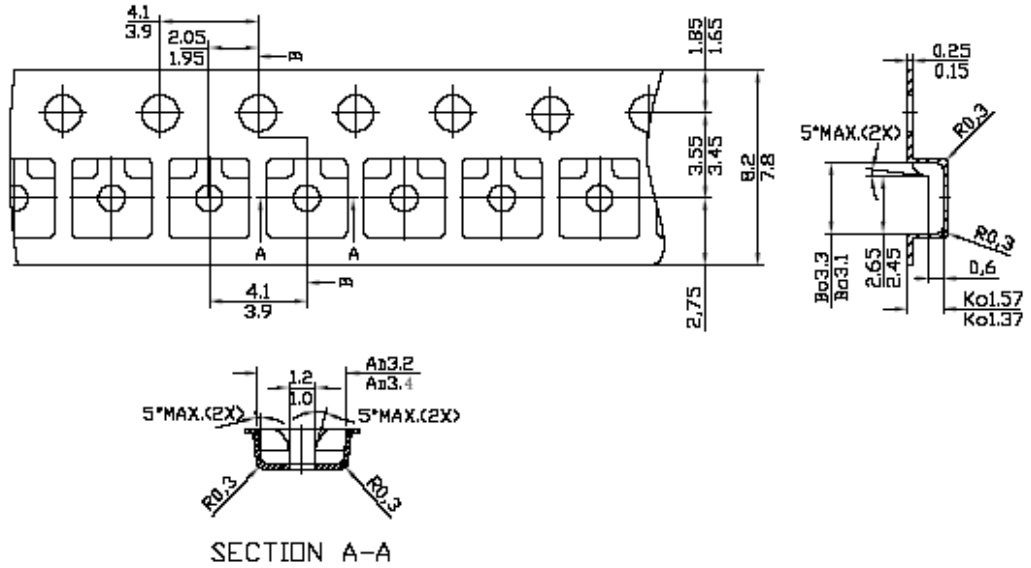
2. Controlling dimension: mm;
3. Lead thickness after solder plating will be 0.254mm maximum.

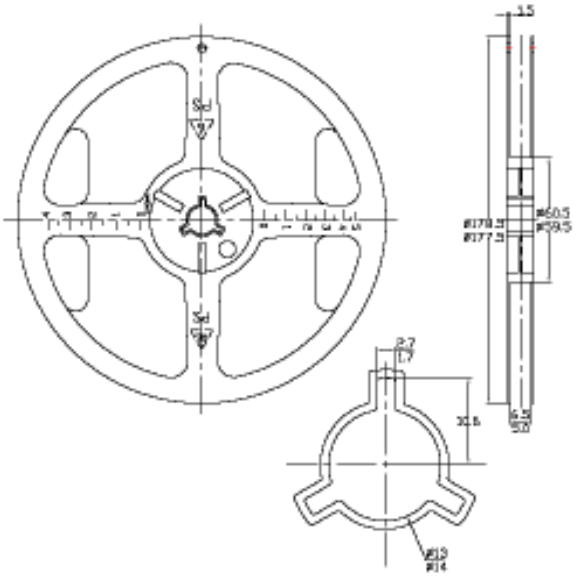
SOT-23 Hall plate/ Chip location

(Bottom view)



Tape On Reel Dimension for Sot 23 package





NOTES:

1. Material: Conductive polystyrene;
2. DIM in mm;
3. 10 sprocket hole pitch cumulative tolerance ±0.2;
4. Camber not to exceed 1mm in 100mm;
5. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole;
6. (SR OHM/SQ) Means surface electric resistivity of the carrier tape.