

MH282 is an 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 Halogen Free version was verified by third party organization. Halogen Free package is available by customer’s option.

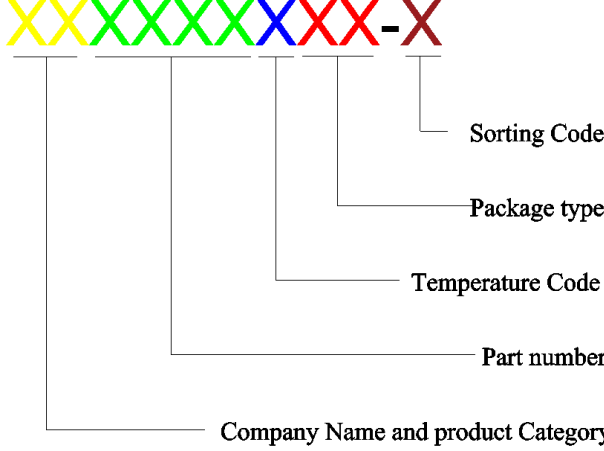
Features and Benefits

- DMOS Hall IC Technology.
- Reverse bias protection on power supply pin.
- 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.
- 100% tested at 125°C for K Spec.
- Custom sensitivity / Temperature selection are available.
- Good ESD Protection.
- RoHS compliant 2011/65/EU and Halogen Free

Applications

- Solid state switch.
- Limit switch.
- Current limit.
- Interrupter.
- Current sensing
- Magnet proximity sensor for reed switch replacement.

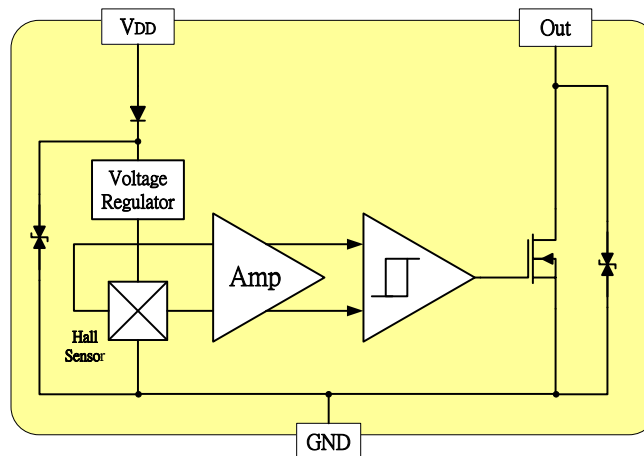
Ordering Information

	<p>Company Name and Product Category MH:MST Hall Effect/MP:MST Power IC</p> <p>Part number 181,182,183,184,185,248,249,276,477,381,381F,381R,382..... If part # is just 3 digits, the fourth digit will be omitted.</p> <p>Temperature range E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C</p> <p>Package type UA:TO-92S,VK:TO-92S(4pin),VF:TO-92S(5pin),SO:SOT-23, SQ:QFN-3,ST:TSOT-23,SN:SOT-553,SF:SOT-89(5pin), SS:TSOT-26,SD:DFN-6</p> <p>Sorting α, β, Blank.....</p>
---	---

Part No.	Temperature Suffix	Package Type
MH282KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH282KSO	K (-40°C to + 125°C)	SO (SOT-23)
MH282EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH282ESO	E (-40°C to + 85°C)	SO (SOT-23)

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

Functional Diagram



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

Characteristics		Values	Unit
Supply voltage, (V_{DD})		28	V
Output Voltage, (V_{out})		28	V
Reverse Voltage , (V_{DD})		-28	V
Magnetic flux density		Unlimited	Gauss
Output current , (I_{out})		50	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	(θ_{ja}) UA / SO	206 / 543	$^{\circ}\text{C}/\text{W}$
	(θ_{jc}) UA / SO	148 / 410	$^{\circ}\text{C}/\text{W}$
Package Power Dissipation, (P_D) UA / SO		606 / 230	mW

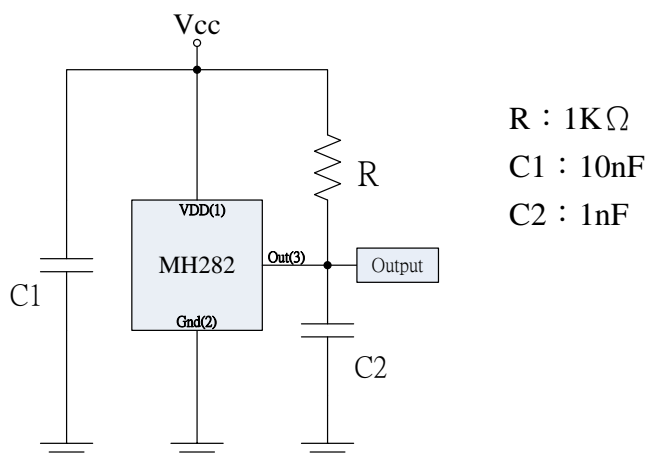
Note: Do not apply reverse voltage to V_{DD} and V_{OUT} Pin, It may be caused for Miss function or damaged device.

Electrical Specifications

DC Operating Parameters: $T_A=+25^{\circ}\text{C}$, $V_{DD}=12\text{V}$

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{DD})	Operating	2.5		24.0	V
Supply Current, (I_{DD})	$B < B_{OP}$		2.5	5.0	mA
Output Saturation Voltage, (V_{sat})	$I_{OUT} = 20 \text{ mA}$, $B > B_{OP}$			400.0	mV
Output Leakage Current, (I_{off})	I_{OFF} $B < B_{RP}$, $V_{OUT} = 20\text{V}$			10.0	μA
Output Rise Time, (T_R)	$R_L=1\text{k}\Omega$, $C_L=20\text{pF}$		0.04	0.45	μS
Output Fall Time, (T_F)	$R_L=820\Omega$; $C_L=20\text{pF}$		0.18	0.45	μS
Electro-Static Discharge	HMB	4			KV

Typical application circuit



MH282 Magnetic Specifications

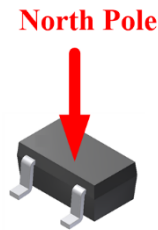
DC Operating Parameters: $T_A = +25^\circ\text{C}$, $V_{DD} = 12\text{V}$

Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Operate Point	B _{OP}		70		110	Gauss
Release Point	B _{RP}		50		90	Gauss
Hysteresis	B _{HYS}			20		Gauss

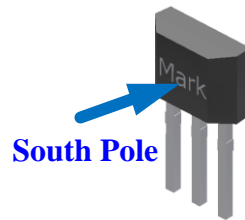
Output Behavior versus Magnetic Pole

DC Operating Parameters $T_a = -40$ to 125°C , $V_{DD} = 2.5$ to 24V

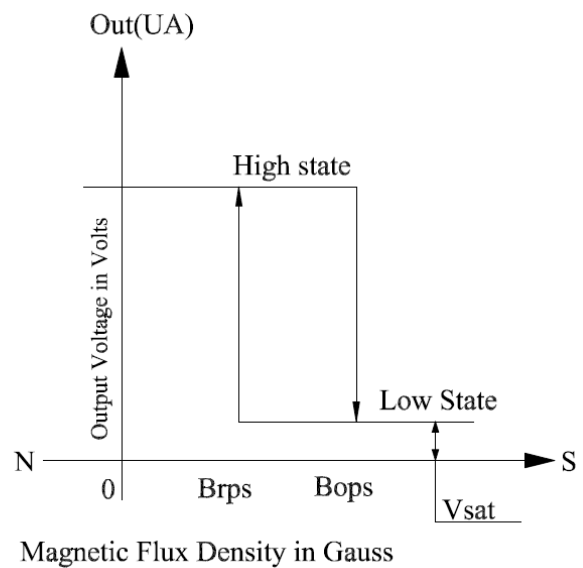
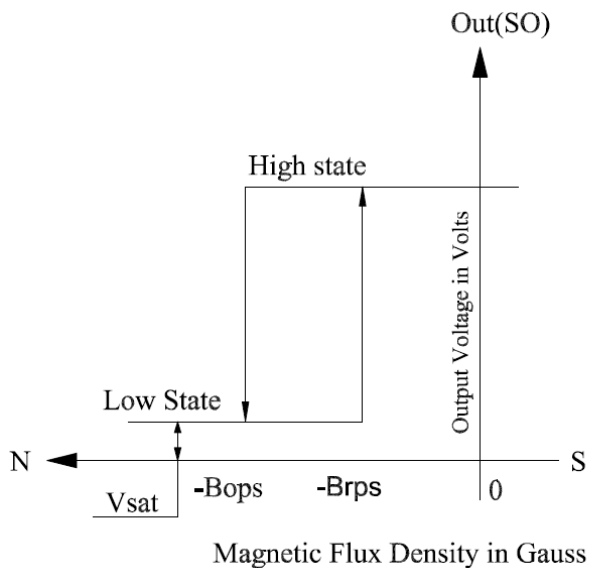
Parameter	Test condition	OUT(UA)	OUT(SO)
South pole	$B > B_{op}$ [(110) ~ (70)]	Low	Open (Pull-up Voltage)
Null or weak magnetic field	$-B_{rp} \sim +B_{rp}$	Open (Pull-up Voltage)	Open (Pull-up Voltage)
North pole	$B < -B_{op}$ (-70~-110)	Open (Pull-up Voltage)	Low



OUT=Low
SO package

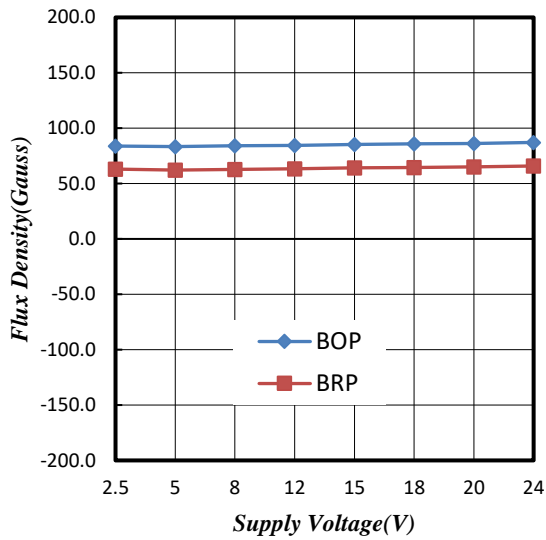


OUT=Low
 (V_{Dson})

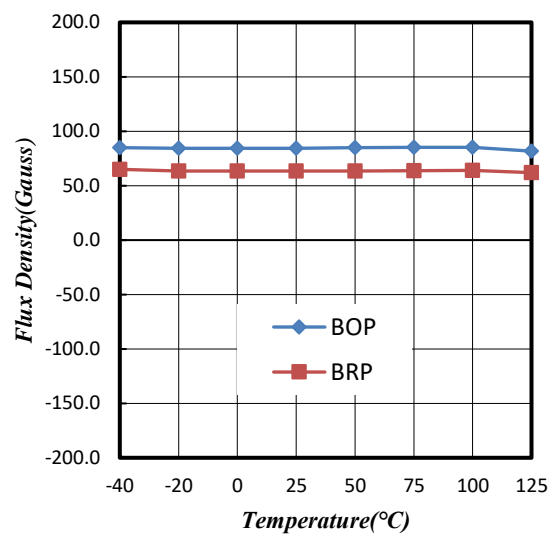


Performance Graph

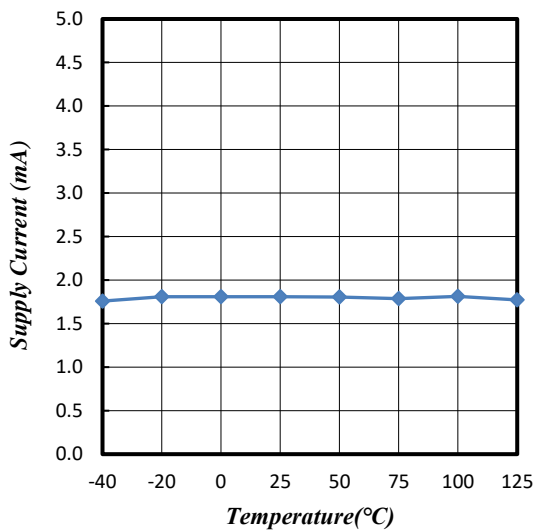
Typical Supply Voltage (V_{DD}) Versus Flux Density



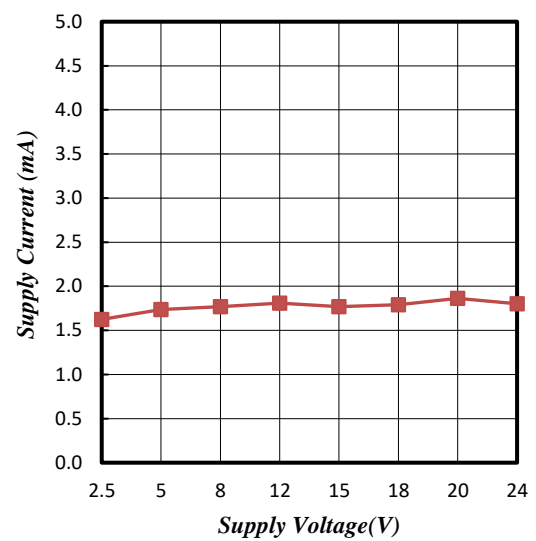
Typical Temperature (T_A) Versus Flux Density



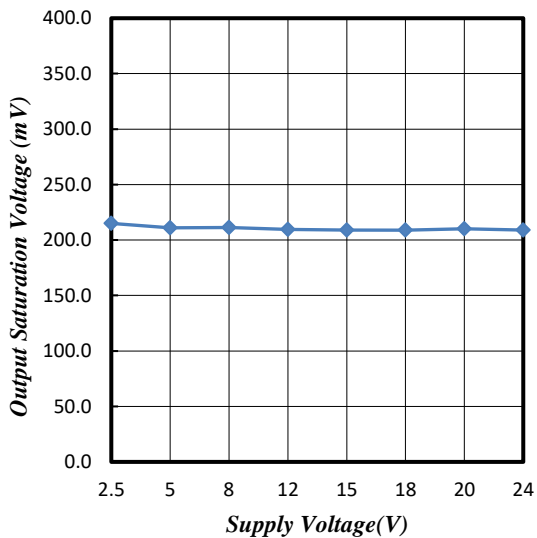
Typical Temperature (T_A) Versus Supply Current (I_{DD})



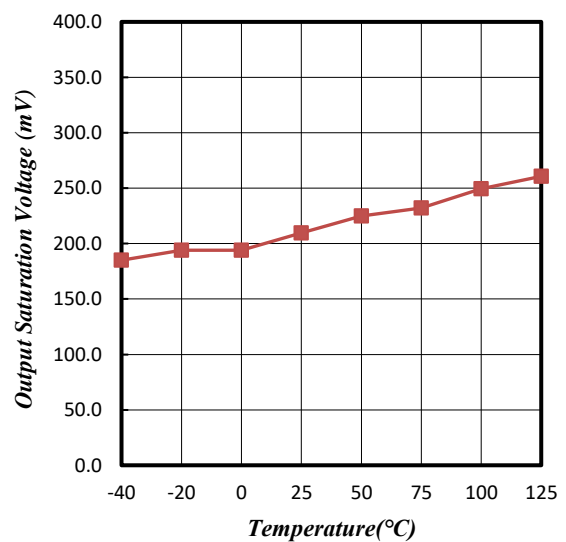
Typical Supply Voltage (V_{DD}) Versus Supply Current (I_{DD})



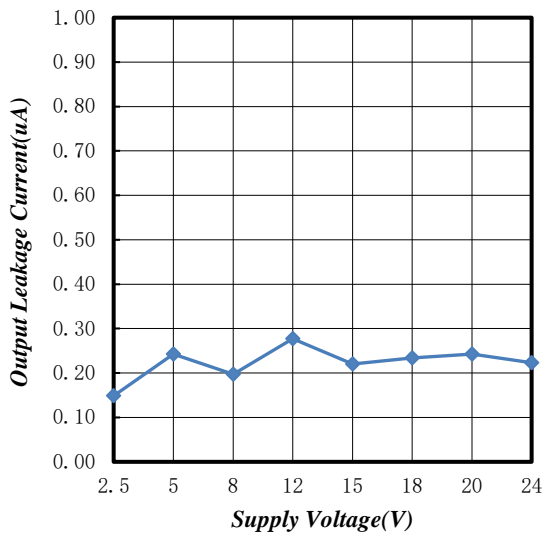
Typical Supply Voltage (V_{DD}) Versus Output Voltage (V_{DSON})



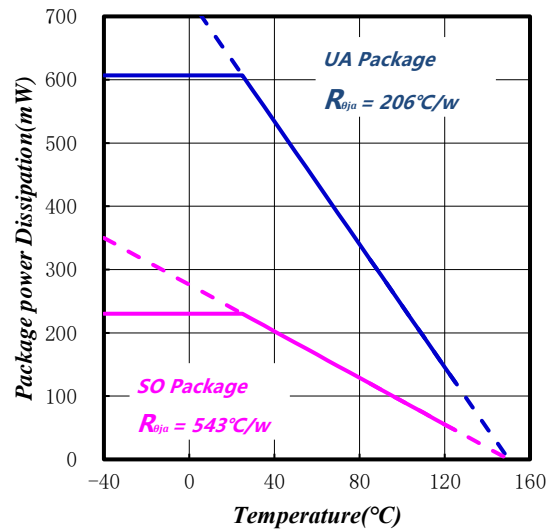
Typical Temperature (T_A) Versus Output Voltage (V_{DSON})



Typical Supply Voltage (V_{DD}) Versus Leakage Current (I_{OFF})



Power Dissipation versus Temperature (T_A)



Package Power Dissipation

The power dissipation of the Package is a function of the pad size. This can vary from the minimum pad size for soldering to a pad size given for maximum power dissipation. Power dissipation for a surface mount device is determined by $T_{J(max)}$, the maximum rated junction temperature of the die, $R_{\theta JA}$, the thermal resistance from the device junction to ambient, and the operating temperature, T_a . Using the values provided on the data sheet for the Package, PD can be calculated as follows:

$$P_D = \frac{T_{J(max)} - T_a}{R_{\theta ja}}$$

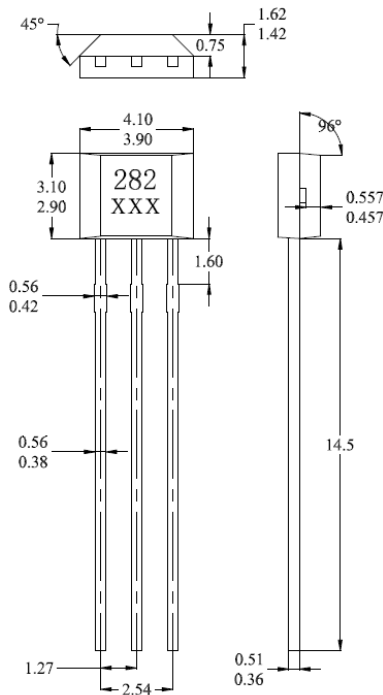
The values for the equation are found in the maximum ratings table on the data sheet. Substituting these values into the equation for an ambient temperature T_a of 25°C, one can calculate the power dissipation of the device which in this case is 606 milliwatts.

$$P_D (UA) = \frac{150^\circ\text{C} - 25^\circ\text{C}}{206^\circ\text{C}/\text{w}} = 606\text{mW}$$

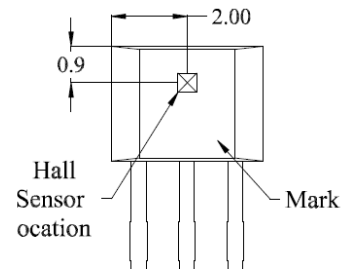
The 206°C/W for the UA package assumes the use of the recommended footprint on a glass epoxy printed circuit board to achieve a power dissipation of 606 milliwatts. There are other alternatives to achieving higher power dissipation from the Package. Another alternative would be to use a ceramic substrate or an aluminum core board such as Thermal Clad. Using a board material such as Thermal Clad, an aluminum core board, the power dissipation can be doubled using the same footprint.

Sensor Location, Package Dimension and Marking

UA Package



Hall Chip location

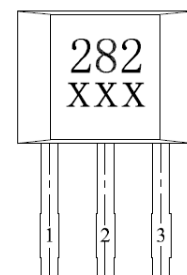


NOTES:

- 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 VCC
 Pin 2 GND
 Pin 3 Output

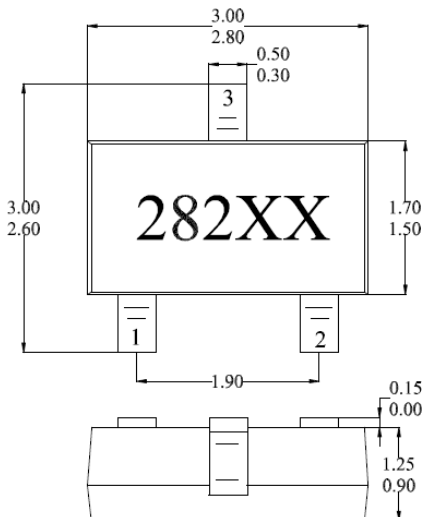
Output Pin Assignment

(Top view)



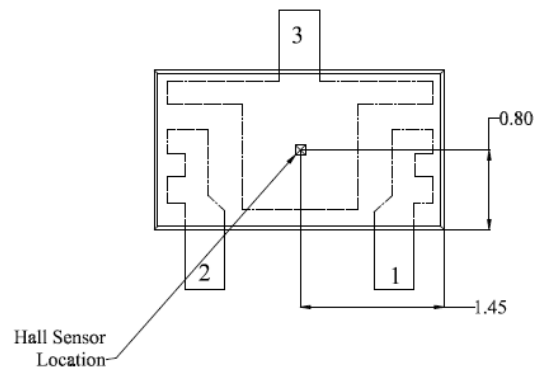
SO Package

(Top View)

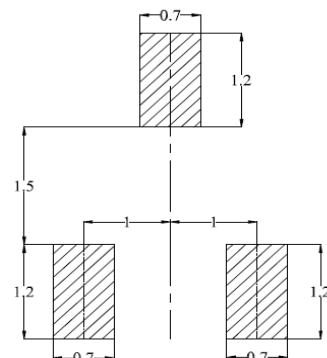


Hall Plate Chip Location

(Bottom view)



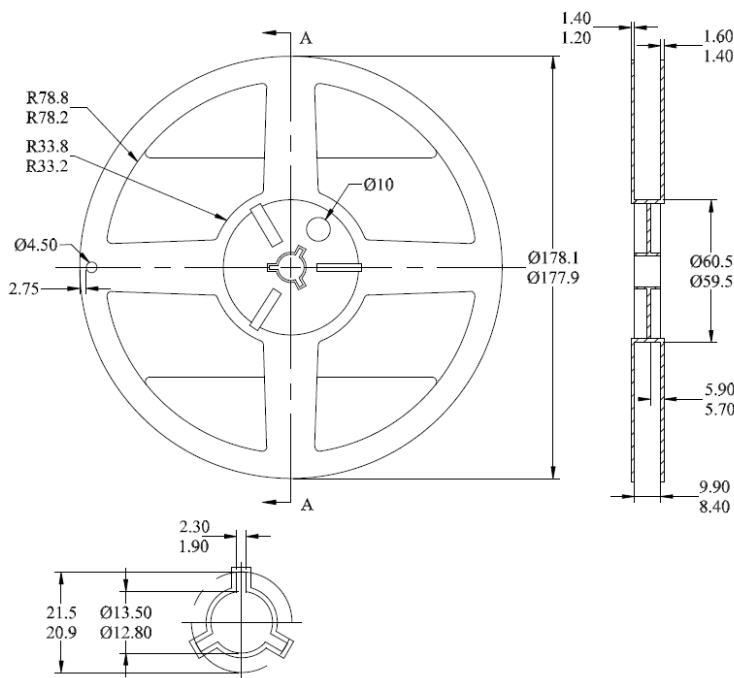
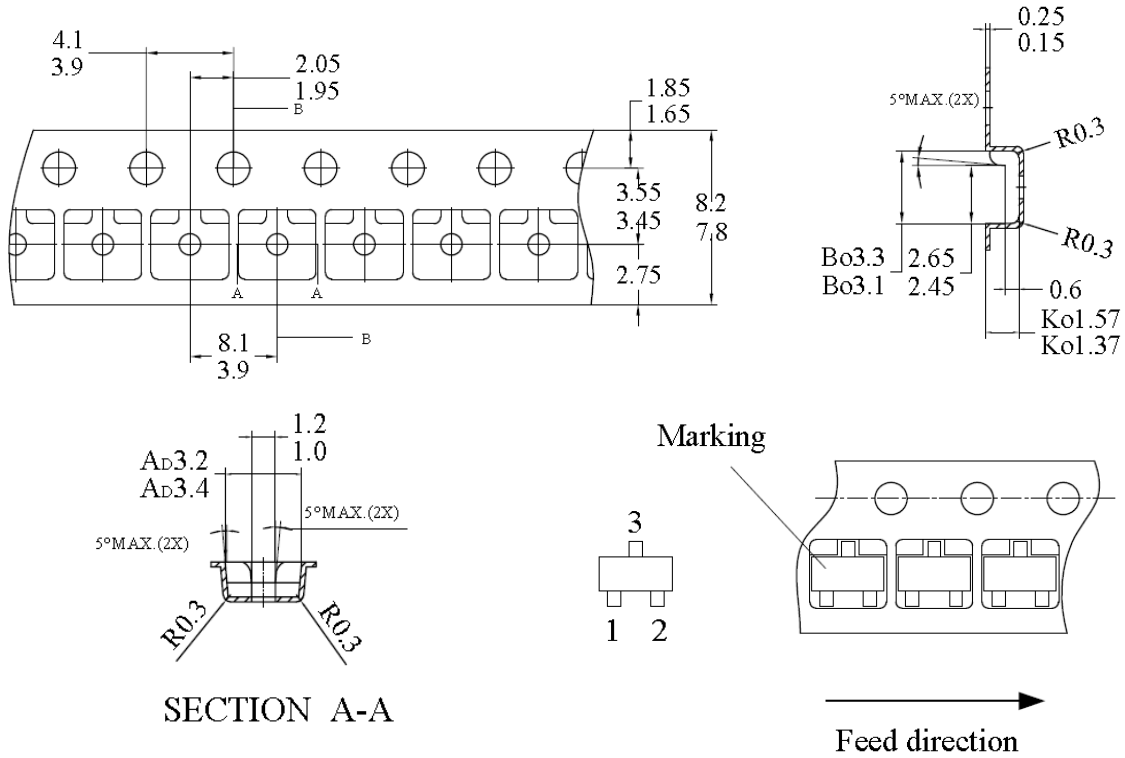
(For reference only) Land Pattern



NOTES:

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

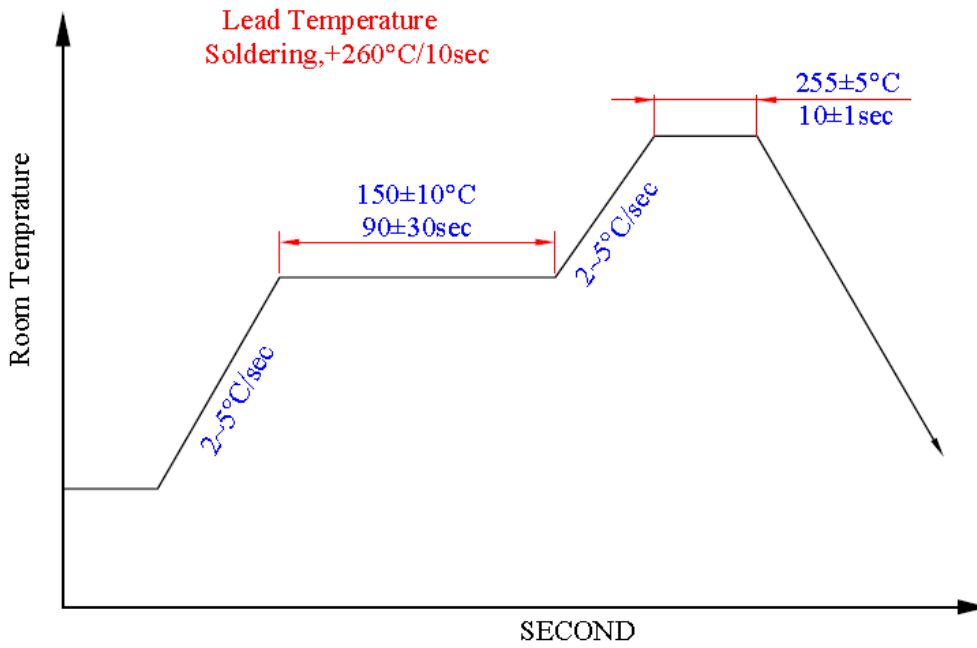
Sot-23 package Tape On Reel Dimension



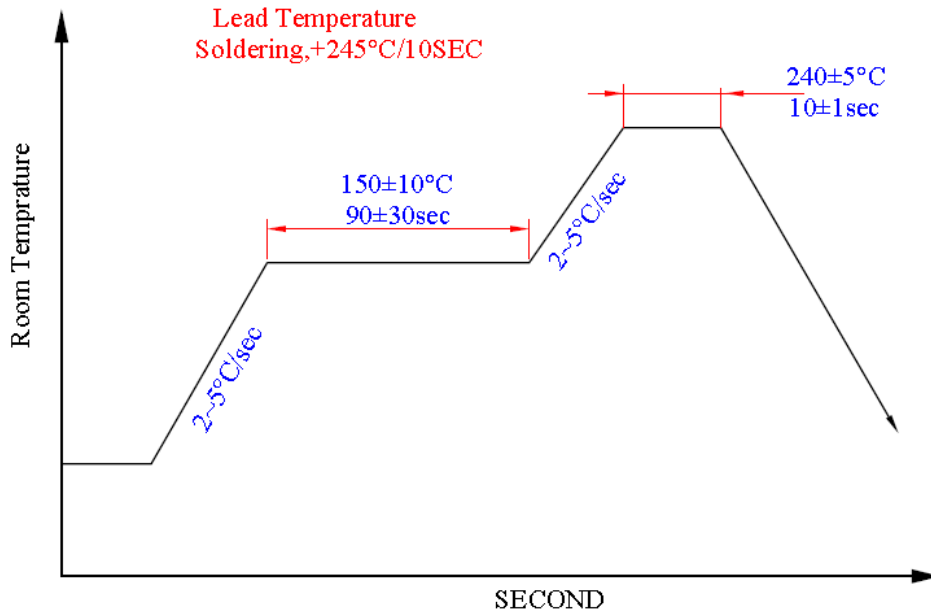
NOTES:

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. (S.R. OHM/SQ) Means surface electric resistivity of the carrier tape.

IR reflow curve



SO Soldering Condition



UA Soldering Condition

Packing specification:

Package	Bag	Box	Carton	Carton	Carton
TO-92S-3L	1,000pcs/Bag	10 Bags/Box	10 Boxes/Carton	5 Boxes/Carton	4 Boxes/Carton
SOT-23-3L	3,000pcs/Reel	5 Reels/Box	6 Boxes/Carton	6 Boxes/Carton	6 Boxes/Carton

TO-92S-3L	Weight	SOT-23-3L	Weight
1000pcs/Bag	0.11kg	3000pcs/Reel	0.13kg
10 Bags/Box	1.26kg	5 Reels/Box	0.73kg
10 Boxes/Carton	13.38kg	6 Boxes/Carton	4.84kg
5 Boxes/Carton	6.82kg	6 Boxes/Carton	4.84kg
4 Boxes/Carton	5.54kg	6 Boxes/Carton	4.84kg

SOT Package Inner box label : Size: 5cm*8cm



SOT Carton label : Size: 6 cm * 9cm



UA Package Inner box label : Size: 5cm*8cm



UA Carton label : Size: 6 cm * 9cm



Combine:

When combine lot, one reel could have two D/C and no more than two DC. One carton could have two devices, no more than two;