

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.

Applications

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

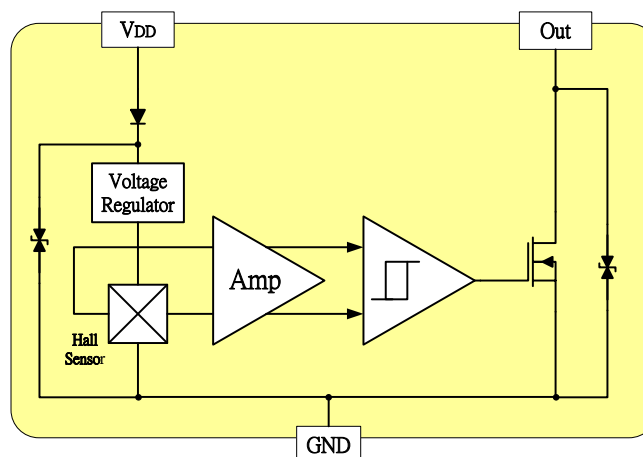
Ordering Information

	Company Name and Product Category
	MH:MST Hall Effect/MP:MST Power IC
	Part number
	181,182,183,184,185,248,249,276,477,381,381F,381R,382.....
	If part # is just 3 digits, the forth digit will be omitted.
	Temperature range
	E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C
	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
	Sorting
	α , β , Blank.....

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 ($T_a=25^{\circ}\text{C}$)

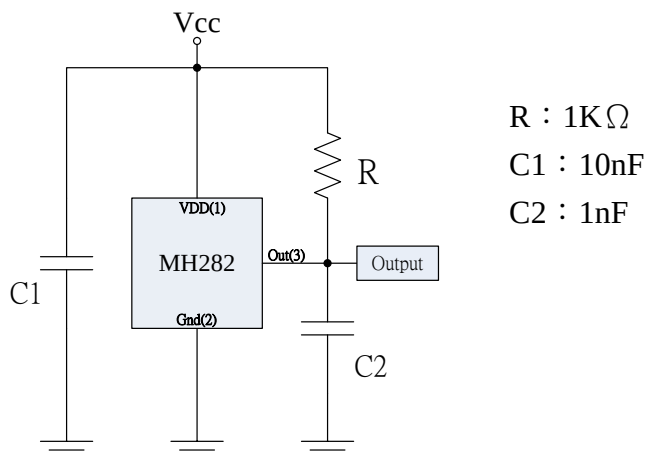
Characteristics		Values	Unit
Supply voltage, (V_{DD})		28	V
Output Voltage, (V_{out})		28	V
Reverse Voltage , (V_{DD})		-28	V
Magnetic flux density		Unlimited	Gauss
Output current , (I_{OUT})		50	mA
Operating Temperature Range, (T_a)	“E” version	-40 to +85	$^{\circ}\text{C}$
	“K” version	-40 to +125	$^{\circ}\text{C}$
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

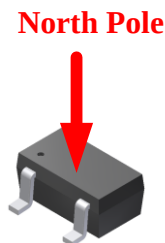
DC Operating Parameters: $T_A = +25^\circ\text{C}$, $V_{DD} = 12\text{V}$

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

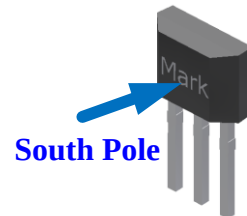
DC Operating Parameters $T_a = -40$ to 125°C , $V_{DD} = 2.5$ to 24V

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



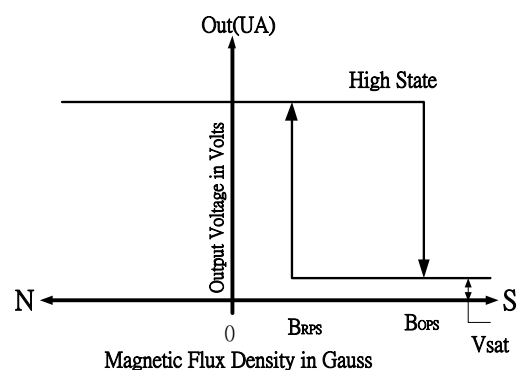
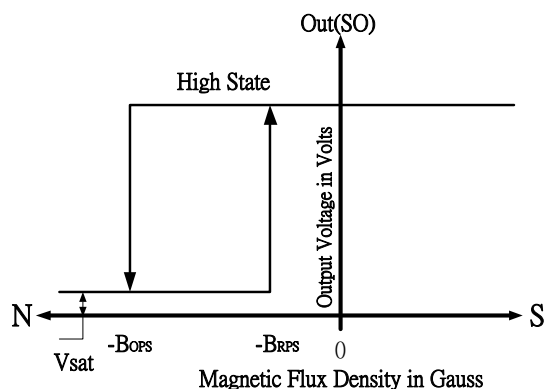
OUT=Low
(V_{DSON})

SO package



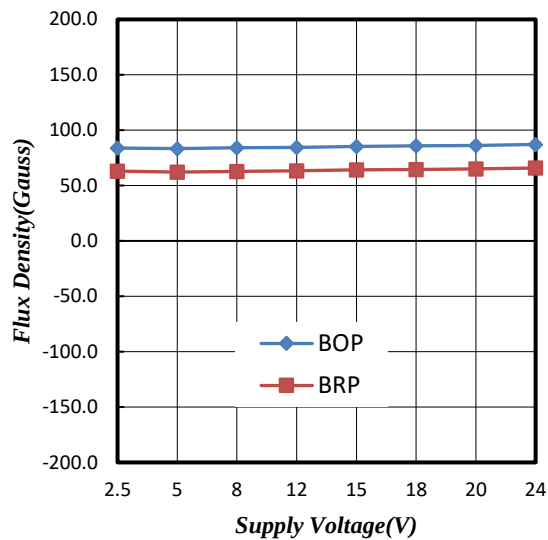
OUT=Low
(V_{DSON})

UA package

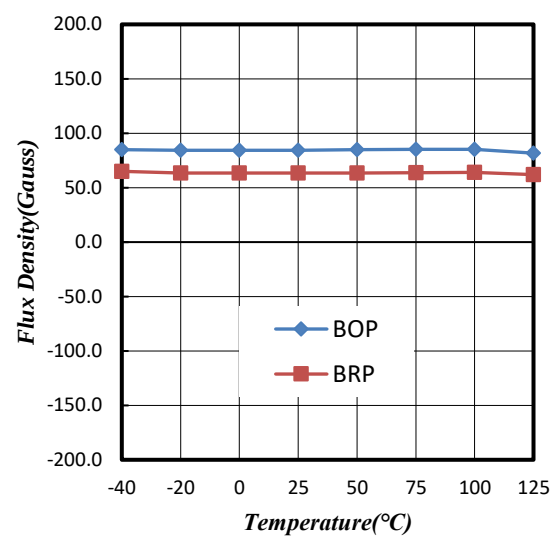


Performance Graph

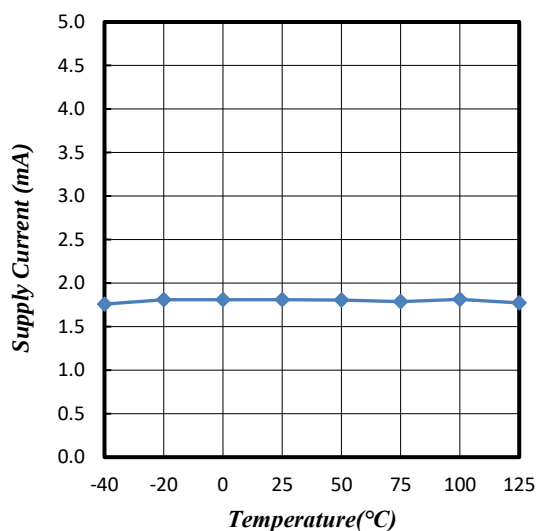
Typical Supply Voltage(V_{DD}) Versus Flux Density



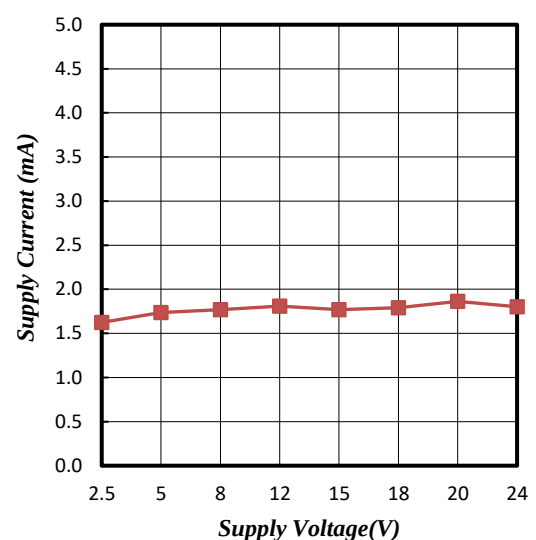
Typical Temperature(T_A) Versus Flux Density



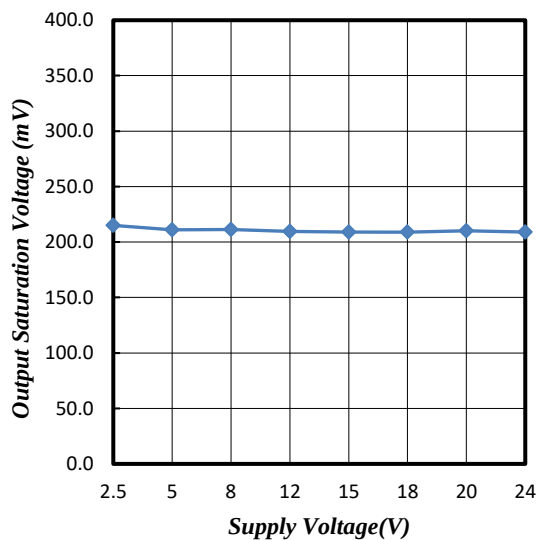
Typical Temperature(T_A) Versus Supply Current(I_{DD})



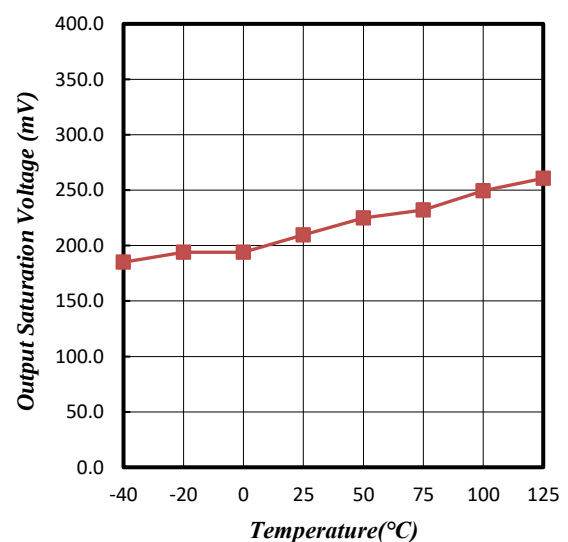
Typical Supply Voltage(V_{DD}) Versus Supply Current(I_{DD})



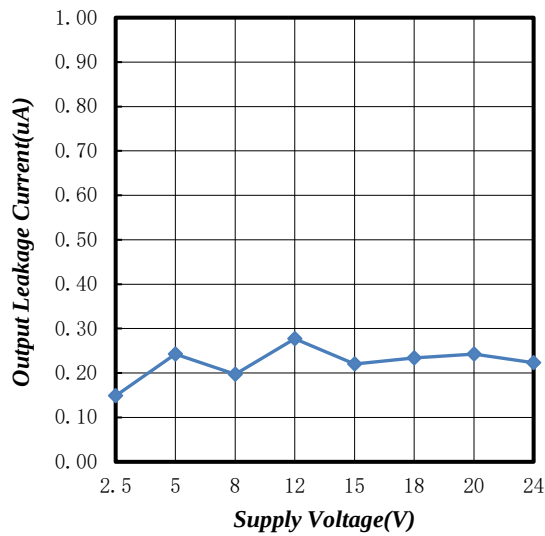
Typical Supply Voltage(V_{DD}) Versus Output Voltage($V_{DS(on)}$)



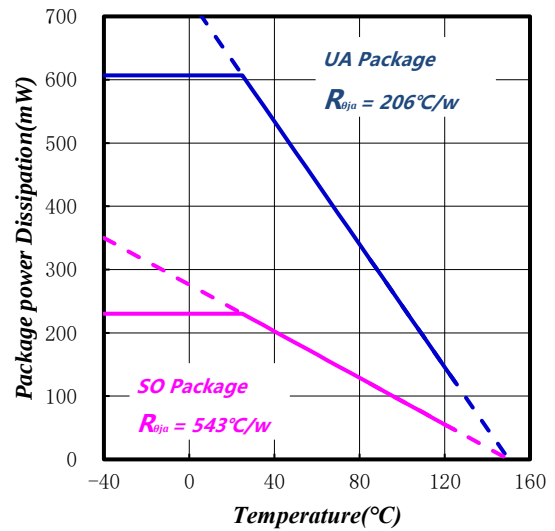
Typical Temperature(T_A) Versus Output Voltage($V_{DS(on)}$)



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.

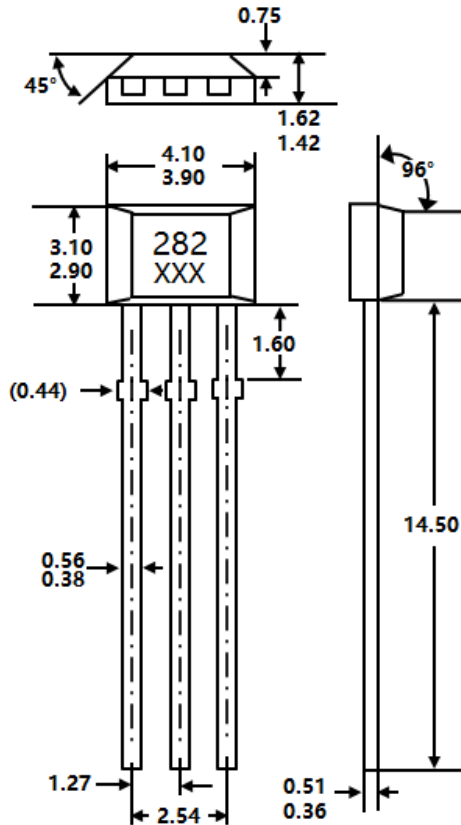
$$P_D(UA) = \frac{150^\circ\text{C} - 25^\circ\text{C}}{206^\circ\text{C}/\text{W}} = 606\text{mW}$$

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

MH282 Package

UA Package

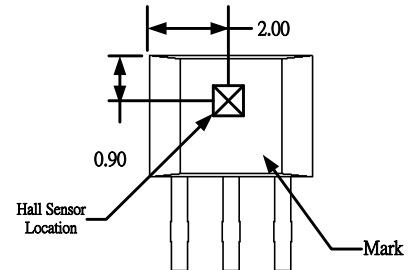


NOTES:

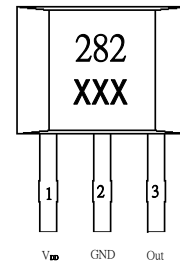
- 1).Controlling dimension: mm
- 2).Leads must be free of flash and plating voids
- 3).Do not bend leads within 1 mm of lead to package interface.
- 4).PINOUT:

Pin 1	V _{DD}
Pin 2	GND
Pin 3	Output

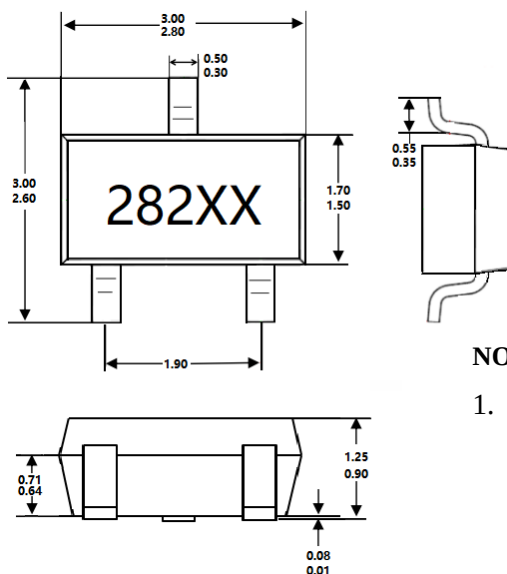
Hall Chip location



Output Pin Assignment (Top view)



Package (SOT-23) (Top View)

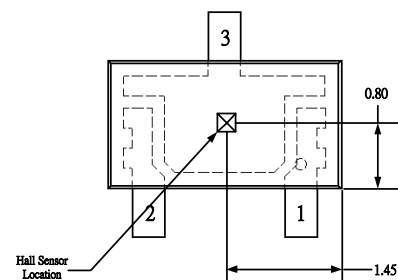


NOTES:

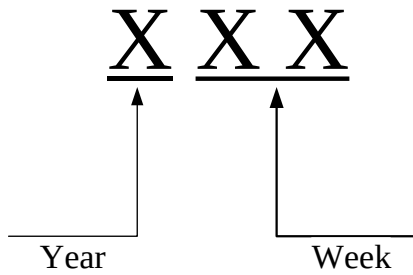
1. PINOUT (See Top View at left :)

Pin 1	V _{DD}
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)

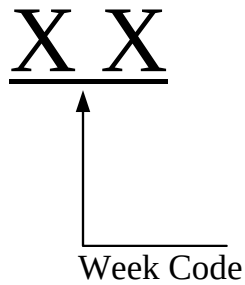


MH282 UA(TO-92S) Package Date Code



EX : 2018 Year_8 Week → 808

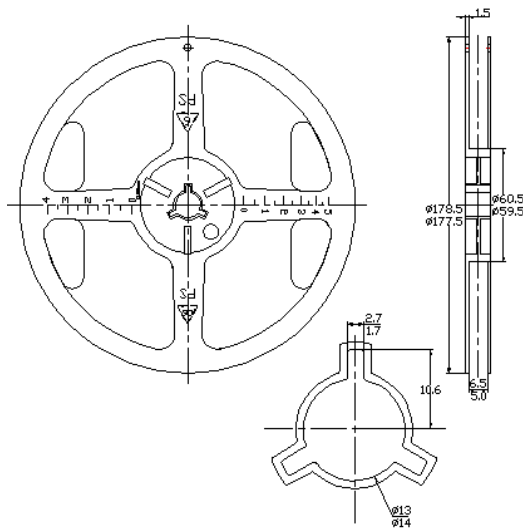
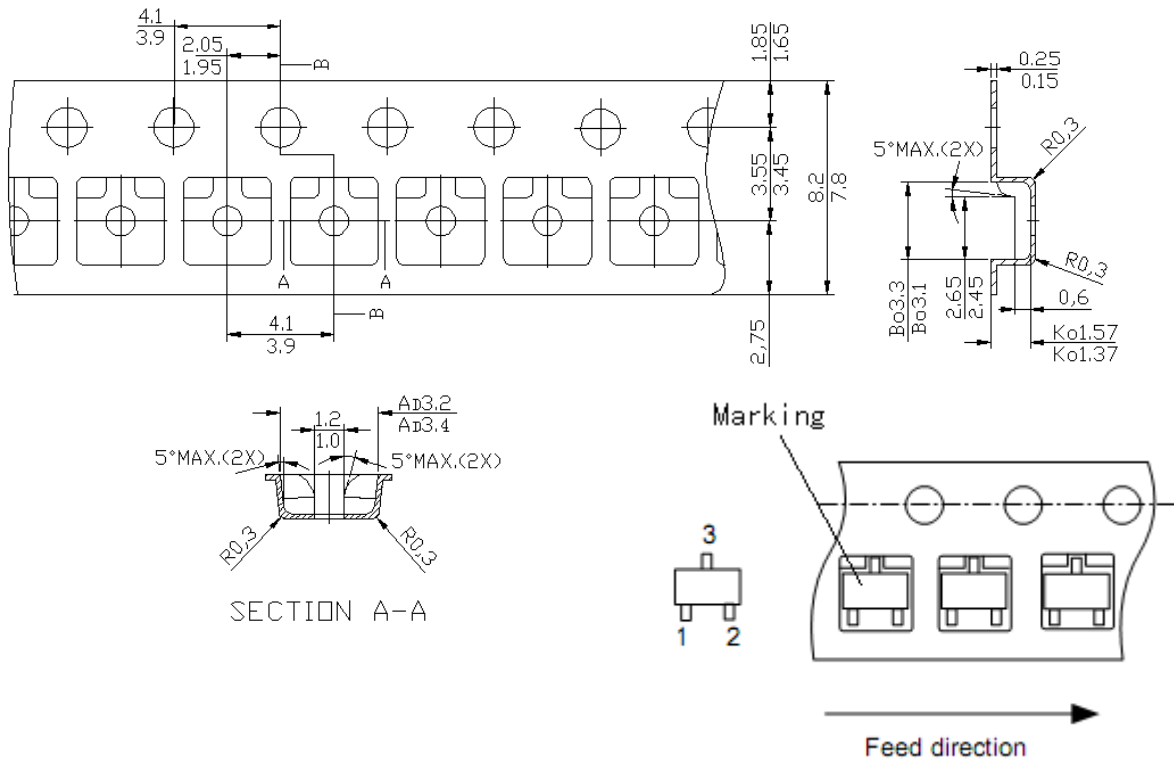
MH282 SO(SOT-23) Package Date Code



week	1	2	3	4	5	6	7	8	9	10	11	12	13
code	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
week	14	15	16	17	18	19	20	21	22	23	24	25	26
code	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
week	27	28	29	30	31	32	33	34	35	36	37	38	39
code	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM
week	40	41	42	43	44	45	46	47	48	49	50	51	52
code	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ

EX : 2018 Year_8 Week → AH

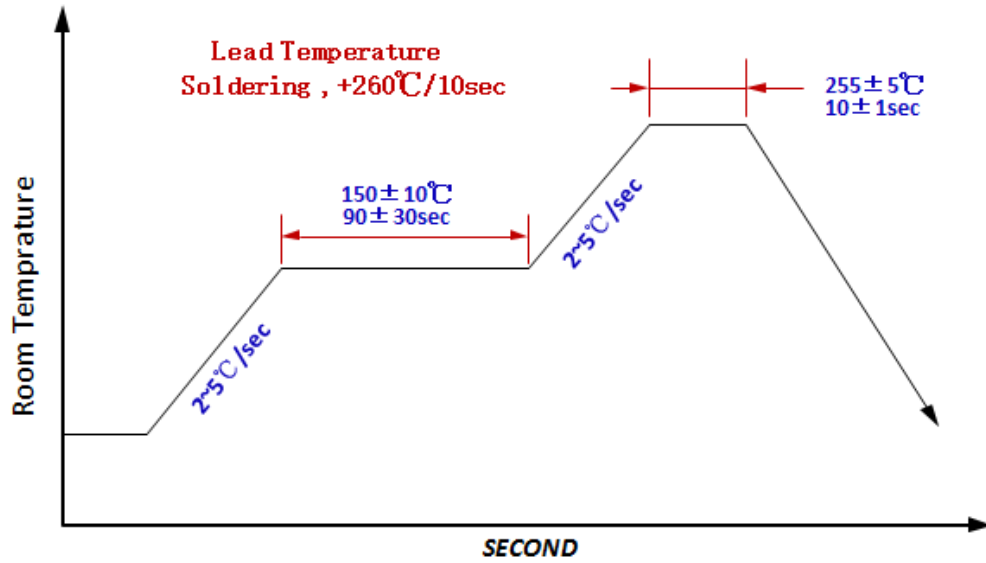
Sot-23 package Tape On Reel Dimension



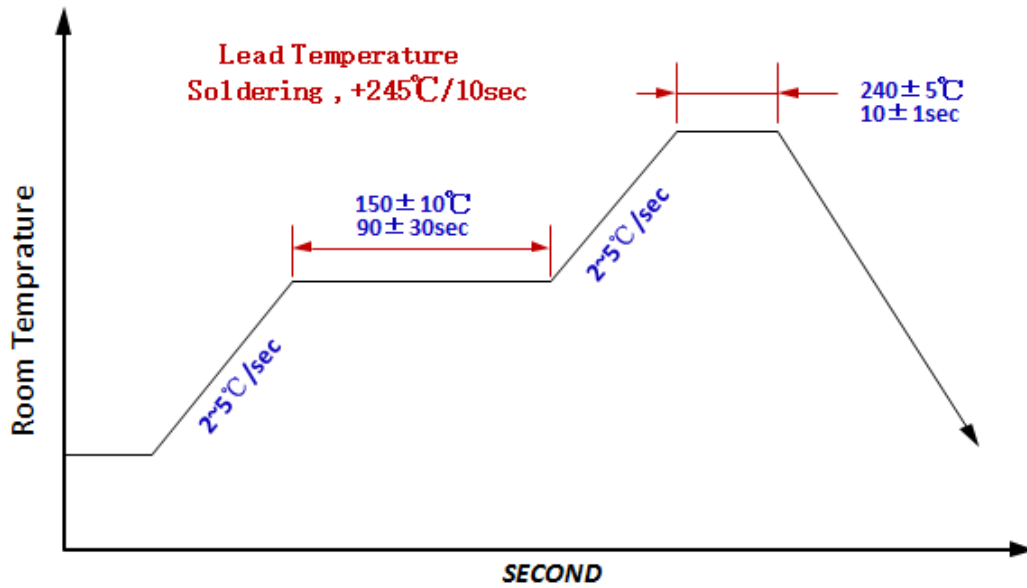
NOTES:

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
TO-92S-3L	1,000pcs/bag	10bag /box	8 box/carton
SOT-23-3L	3,000pcs/reel	10 reel/box	2 box/carton

TO-92S-3L	Weight	SOT-23-3L	Weight
1000pcs/bag	0.11kg	3000pcs/reel	0.18kg
10 bags/box	1.24kg	10 reels/box	1.99kg
10 boxes/carton	12.57kg	2 boxes/carton	4.9kg

SOT/TSOT/QFN Package Inner box label : Size: 3.4cm*6.4cm

Bag and inner box Halogen Free Label



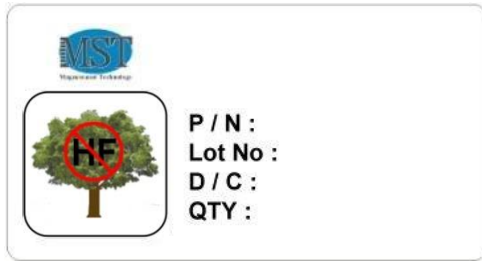
SOT/TSOT/QFN Carton label : Size: 5.6 cm * 9.8 cm

Bag and inner box Halogen Free Label



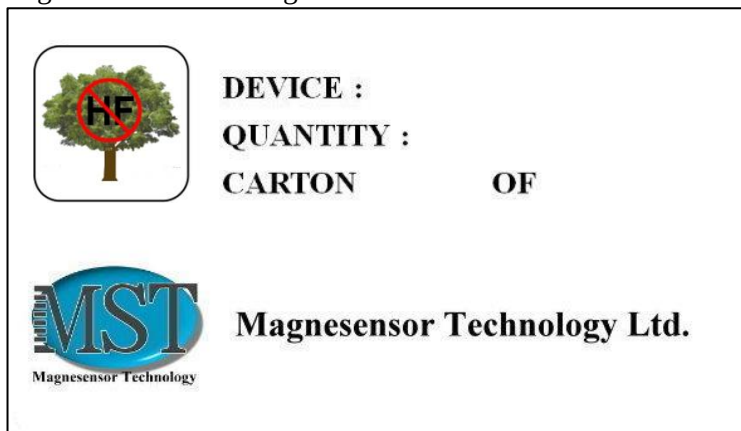
UA Package Inner box label : Size: 3.4cm*6.4cm

Bag and inner box Halogen Free Label



UA Carton label : Size: 5.6 cm * 9.8 cm

Bag and inner box Halogen Free Label



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;