MH252 Hall-effect sensor is a temperature stable, stress-resistant, Low Tolerance of Sensitivity micro-power switch. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. This method reduces the offset voltage normally caused by device over molding, temperature dependencies, and thermal stress.

MH252 is special made for low operation voltage, 1.65V, to active the chip which is includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, CMOS output driver. Advanced CMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low input-offset errors, and small component geometries. This device requires the presence of omni-polar magnetic fields for operation.

The package type is in a Halogen Free version has been verified by third party Lab.

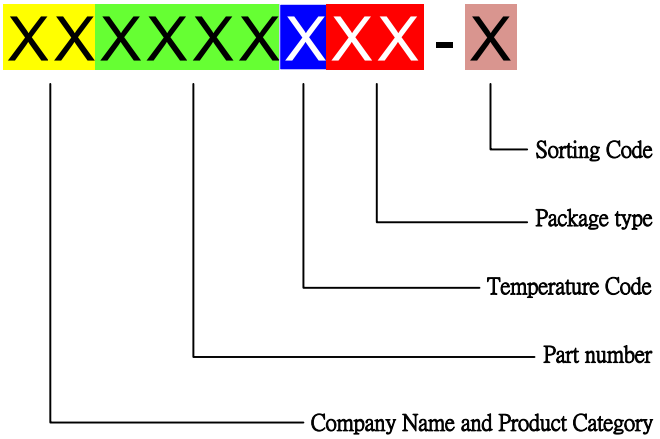
Features and Benefits

- CMOS Hall IC Technology
- Strong RF noise protection
- 1.65 to 3.5V for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 1.65V, Micro power consumption
- High Sensitivity for reed switch replacement applications
- Direction detection
- Low sensitivity drift in crossing of Temp. range
- Ultra Low power consumption at 5uA (Avg)
- High ESD Protection, HBM > ±4KV(min)
- Operation with South Pole (OUT1) or North Pole (OUT2)
- Totem-pole output

Applications

- Solid state switch
- Handheld Wireless Handset Awake Switch (Flip Cell/PHS Phone/Note Book/Flip Video Set)
- Magnet proximity sensor for reed switch replacement in low duty cycle applications
- Water Meter
- PDA
- PDVD
- NB
- Pab PC

Ordering Information



Company Name and Product Category

MH:MST Hall Effect/MP:MST Power MOSFET

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 ℃, I: 105 ℃, K: 125 ℃, L: 150 ℃

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)

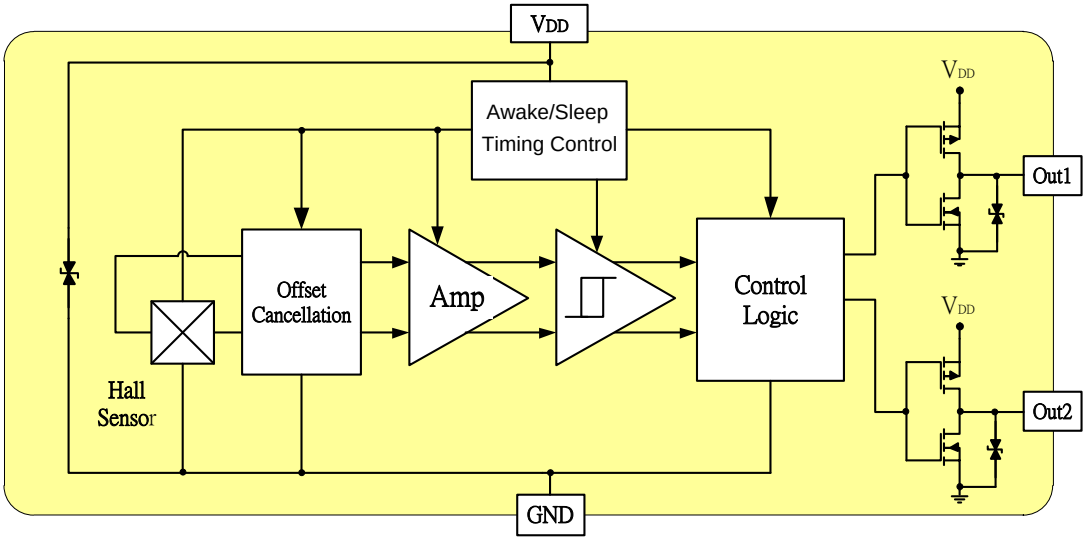
Sorting

α, β,Blank…..

Part No.	Temperature Suffix	Package Type
MH252EVK	E (-40°C to + 85°C)	VK (4-pin TO-92S)
MH252ESN	E (-40°C to + 85°C)	SN (SOT-553)
MH252ESH	E (-40°C to + 85°C)	SH (SOT23-5L)

Custom sensitivity selection is available by MST sorting technology

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.*

MH252, HBM > ±4KV which is verified by third party lab.

Absolute Maximum Ratings *At(Ta=25℃)*

Characteristics		Values	Unit
Supply voltage, (V_{DD})		4.5	V
Output Voltage, (*Vout*)		4.5	V
Reverse Voltage, (V_{DD}) (V_{OUT})		-0.3	V
Magnetic flux density		Unlimited	Gauss
Output current, (I_{OUT})		1	mA
Operating temperature range, (*Ta*)		-40 to +85	℃
Storage temperature range, (*Ts*)		-65 to +150	℃
Maximum Junction Temp, (*Tj*)		150	℃
Thermal Resistance	(θJA) VK / SN / SH	227 / 540 / 141	℃/W
	(θJC) VK / SN / SH	49 / 390 / 81	℃/W
Package Power Dissipation, (P_D) VK / SN / SH		550 / 230 / 885	mW

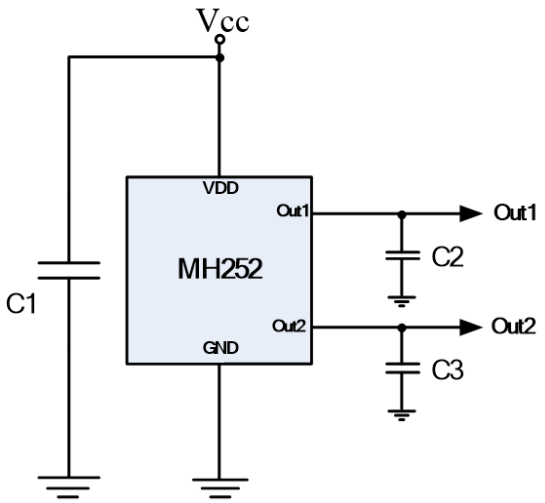
Note: *Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.*

Electrical Specifications

DC Operating Parameters ：Ta=25℃, V_{DD}=1.8V

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage,(V_{DD})	Operating	1.65		3.5	Volts
Supply Current,(I_{DD})	Awake State		1.4	3	mA
	Sleep State		3.6	7	μA
	Average		5	10	μA
Output Leakage	Output off			1	uA
Output High Voltage,(V_{OH})	I_{OUT}=0.5mA(Source)	V_{DD}-0.			V
Output Low Voltage,(V_{OL})	I_{OUT}=0.5mA(Sink)			0.2	V
Awake mode time,(T_{aw})	Operating		40	80	uS
Sleep mode time,(T_{SL})	Operating		40	80	mS
Duty Cycle,(*D,C*)			0.1		%
Electro-Static Discharge	HBM	4			KV

Typical application circuit



C1：10nF
C2：100pF
C3：100pF

MH252E VK / SN/SH Magnetic Specifications

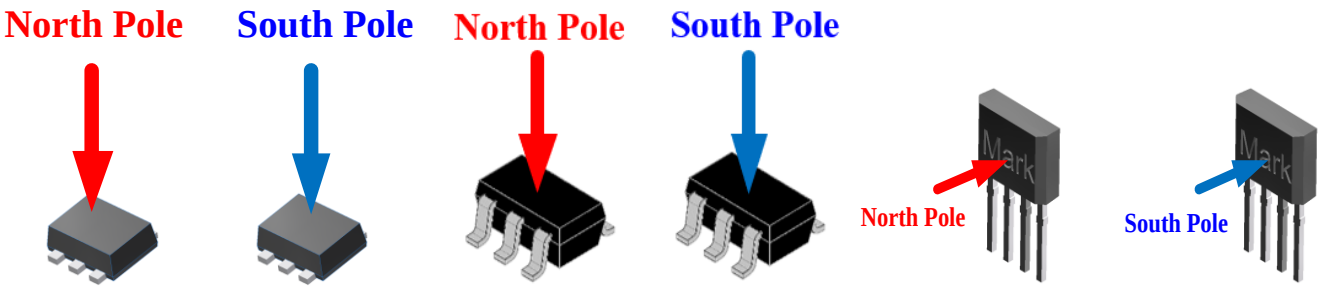
DC Operating Parameters：Ta=25℃, V_{DD}=1.8V

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OPS}	S pole to branded side, B > BOP, OUT1 On		30	50	Gauss
	B_{OPN}	N pole to branded side, B< BOP, OUT2 On	-50	-30		Gauss
Release Point	B_{RPS}	S pole to branded side, B < BRP, Vout Off	10	20		Gauss
	B_{RPN}	N pole to branded side, B > BRP, Vout Off		-20	-10	Gauss
Hysteresis	B_{HYS}	|BOPx - BRPx|		10		Gauss

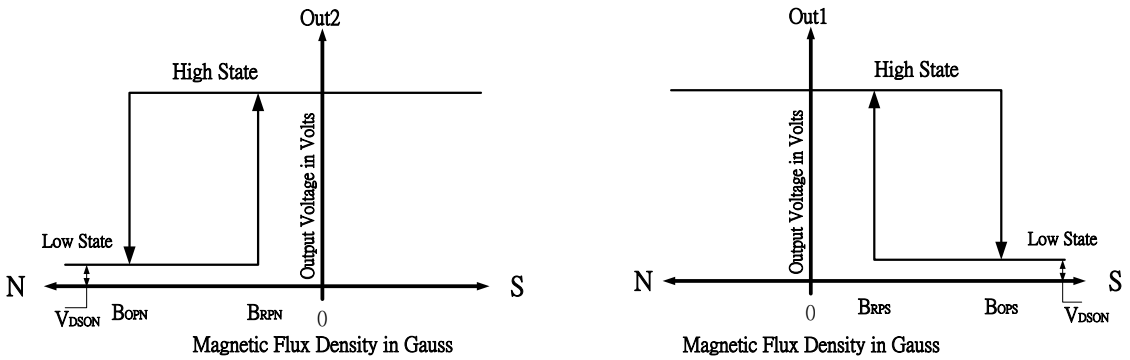
MH252E VK/ SN / SH Output Behavior versus Magnetic Polar

DC Operating Parameters： Ta = -40 to 85℃, V_{DD} =1.8V to 3.5V

Parameter	Test condition	OUT1	Test condition	OUT2
South pole	B>Bop [(55) ~ (-10)]	Low	B<Bop [(-55) ~ (-10)]	High
Null or weak magnetic field	B=0 or B < BRP	High	B=0 or B < BRP	High
North pole	B>Bop (55~10)	High	B>Bop (55~10)	Low

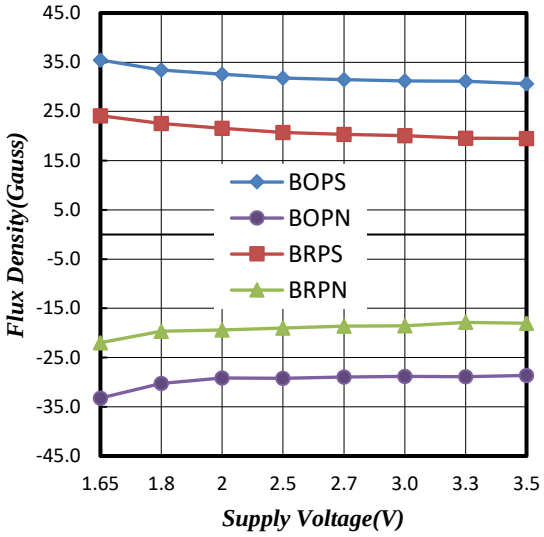


SN Package *SH Package* *VK Package*

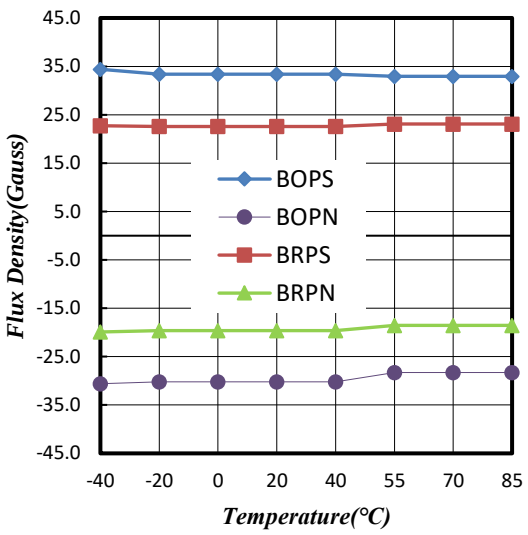


Performance Graph

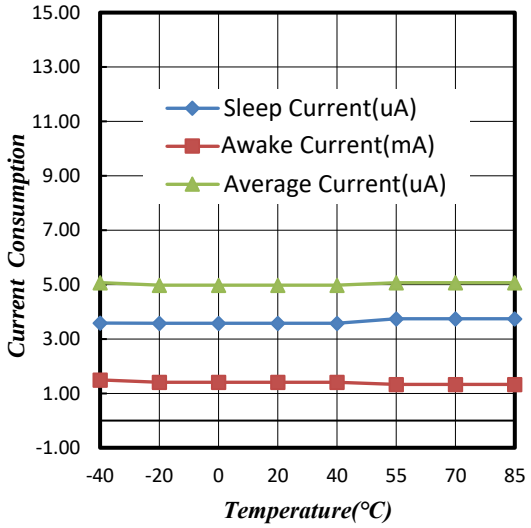
Typical Supply Voltage(V_{DD}) Versus Flux Density



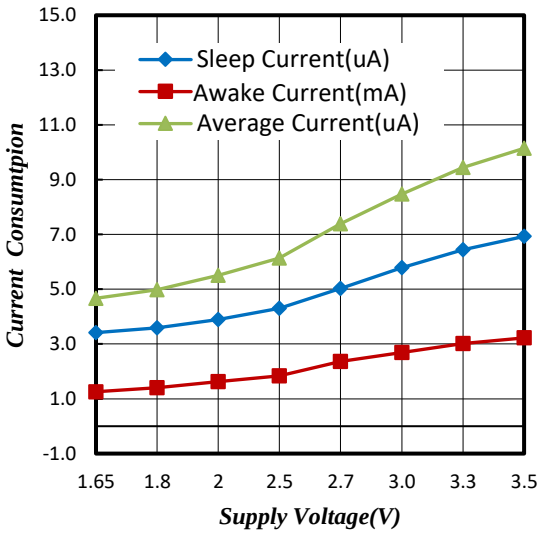
Typical Temperature(T_A) Versus Flux Density



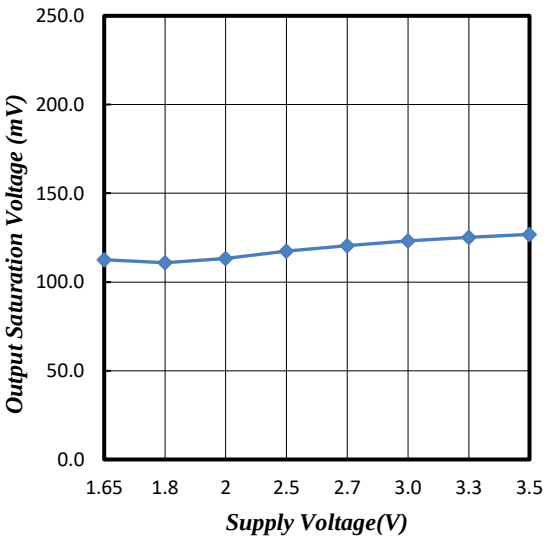
Typical Temperature(T_A) Versus Supply Current(I_{DD})



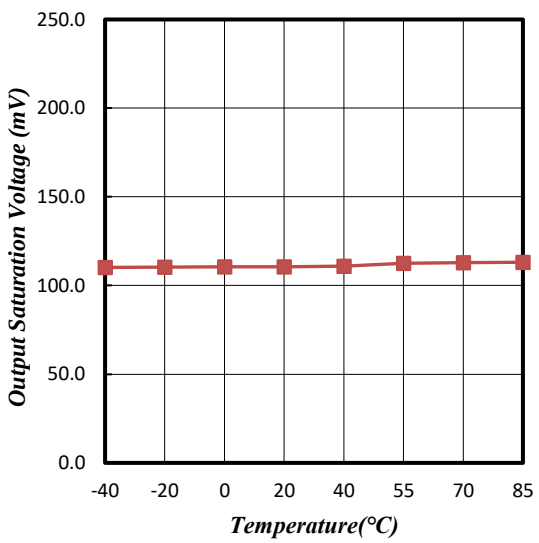
Typical Supply Voltage(V_{DD}) Versus Supply Current(I_{DD})



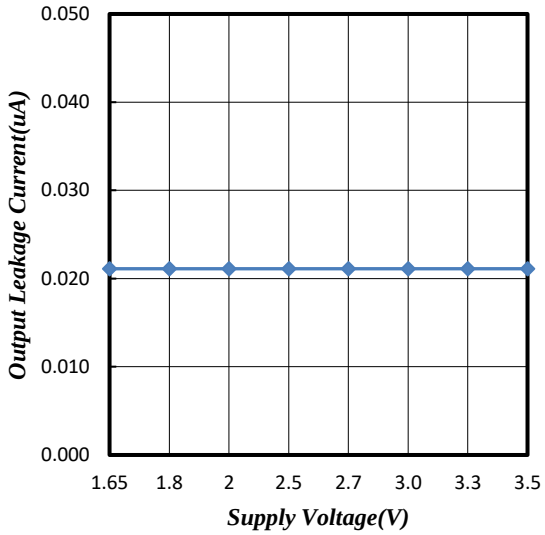
Typical Supply Voltage(V_{DD}) Versus Output Voltage(V_{DSON})



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



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



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, Ta. Using the values provided on the data sheet for the package, PD can be calculated as follows:

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

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 Ta of 25°C, one can calculate the power dissipation of the device which in this case is 230 milliwatts.

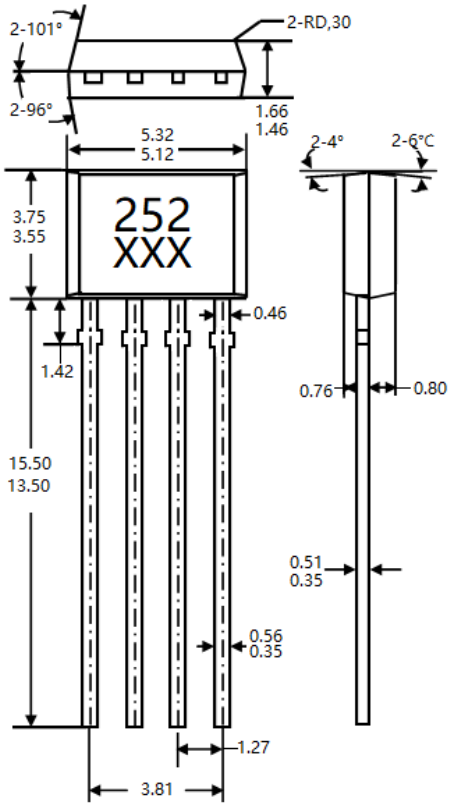
$$P_D(SN) = \frac{150℃ - 25℃}{540℃/W} = 230mW$$

The 540℃/W for the SN package assumes the use of the recommended footprint on a glass epoxy printed circuit board to achieve a power dissipation of 230 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

MH252 Package

VK Package (4-pin TO-92S)

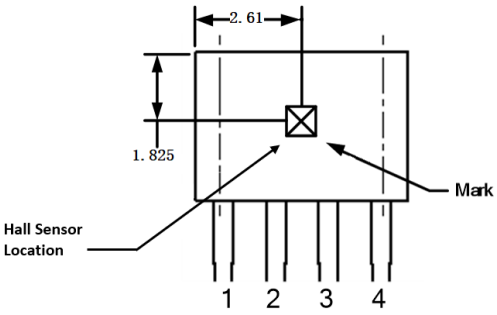


NOTES:

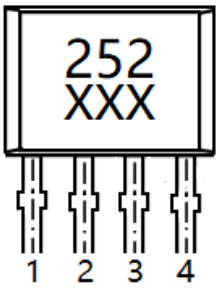
1). Controlling dimension: mm
2). Leads must be free of flash and plating voids
3). Do not bend leads within 1 mm of lead to package interface.
4). PINOUT:

Pin 1	V_{DD}
Pin 2	Out2
Pin 3	Out1
Pin 4	GND

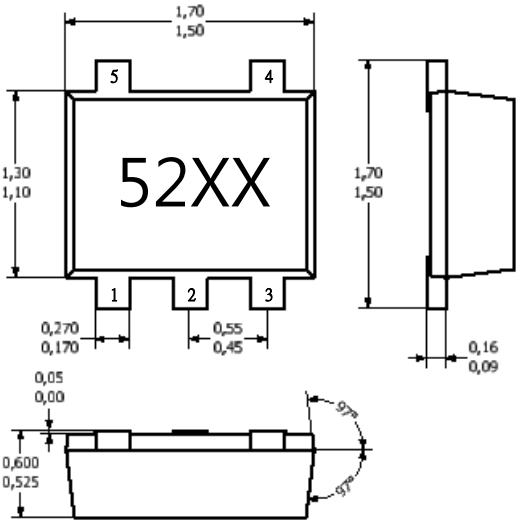
Hall Chip location



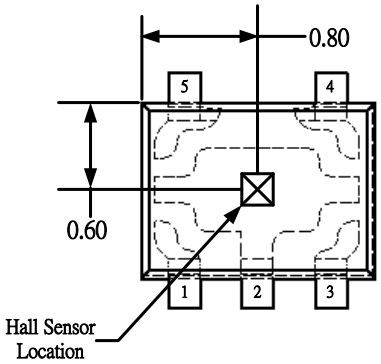
Output Pin Assignment



SN Package (SOT-553)
(Top View)



Hall Plate Chip Location
(Top View)



NOTES:

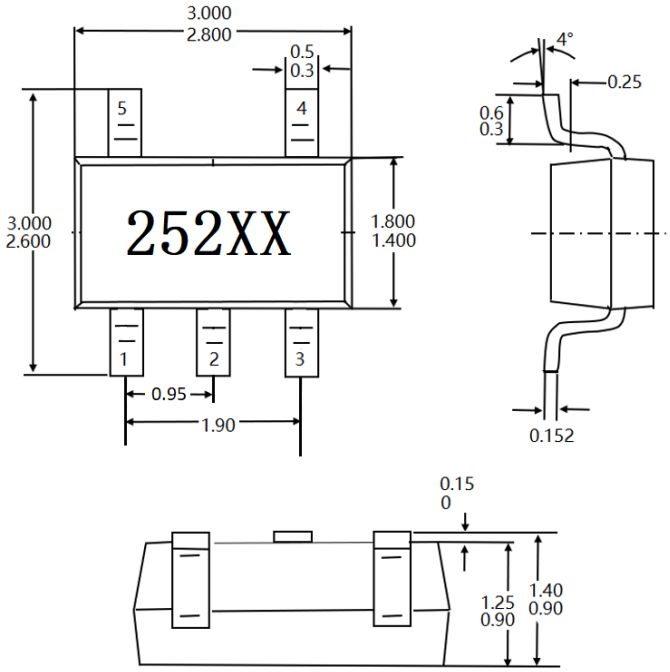
1. PINOUT (See Top View at left:)

Pin 1	Out2
Pin 2	GND
Pin 3	NC
Pin 4	VDD
Pin 5	Out1

2. Controlling dimension: mm;

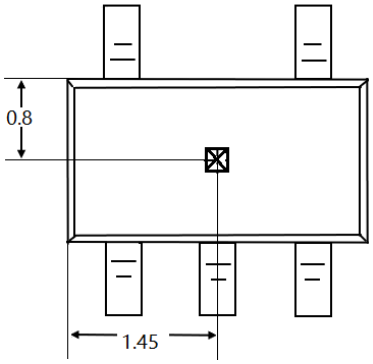
SH Package (SOT23-5L)

(Top View)



Hall Plate Chip Location

(Top View)



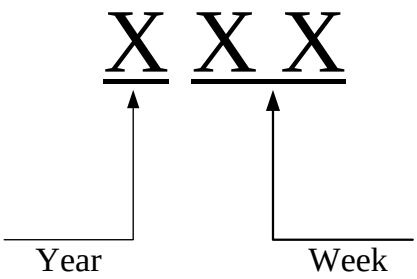
NOTES:

1. PINOUT (See Top View at left:)

Pin 1	Out2
Pin 2	GND
Pin 3	NC
Pin 4	VDD
Pin 5	Out1

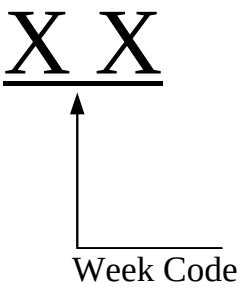
2. Controlling dimension: mm;

MH252EVK (4-pin TO-92S) Date Code



EX：2018 Year_8 Week → 808

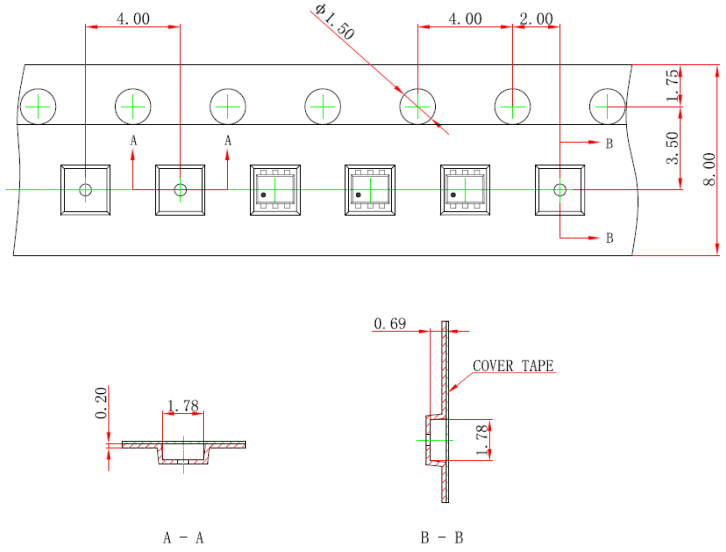
MH 252 SN(SOT-553) SH(SOT23-5L) Package Date Code



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

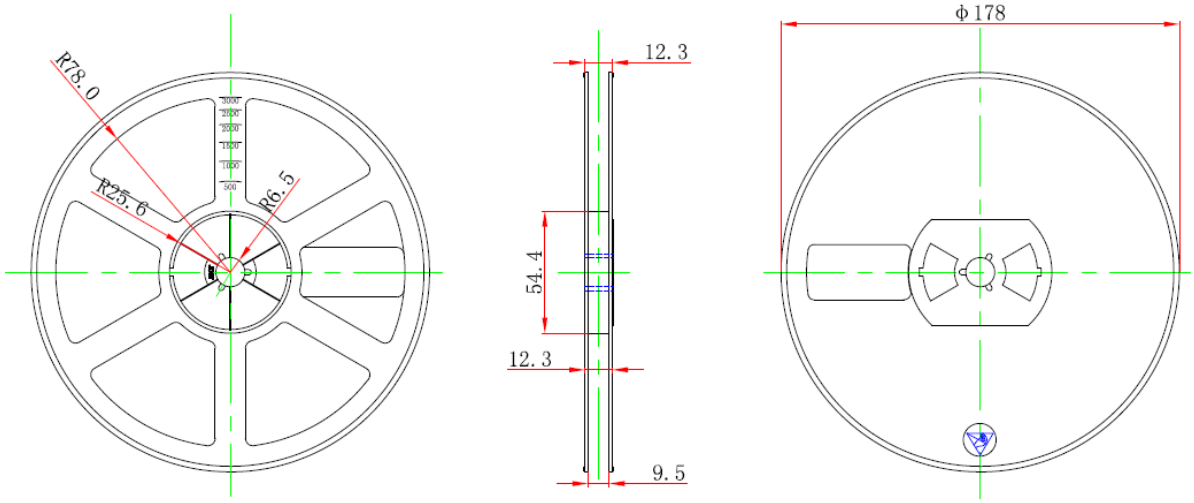
EX：2018 Year_8 Week → AH

SOT-553 Tape On Reel Dimension

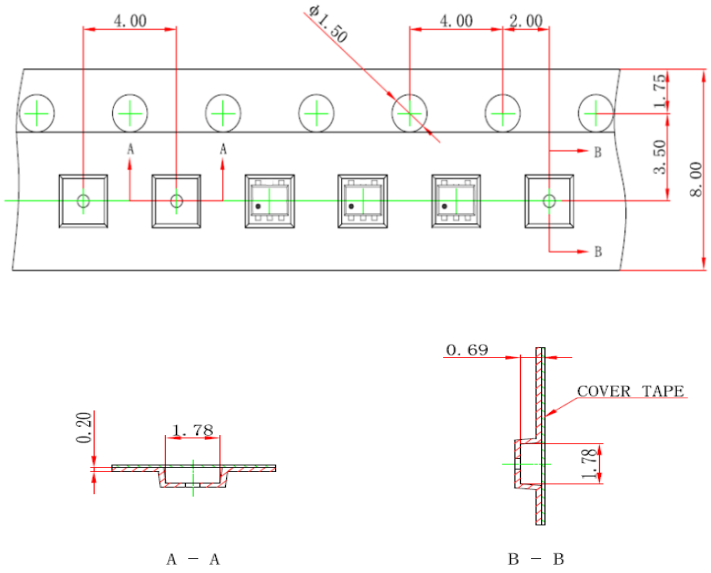


NOTES:

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.

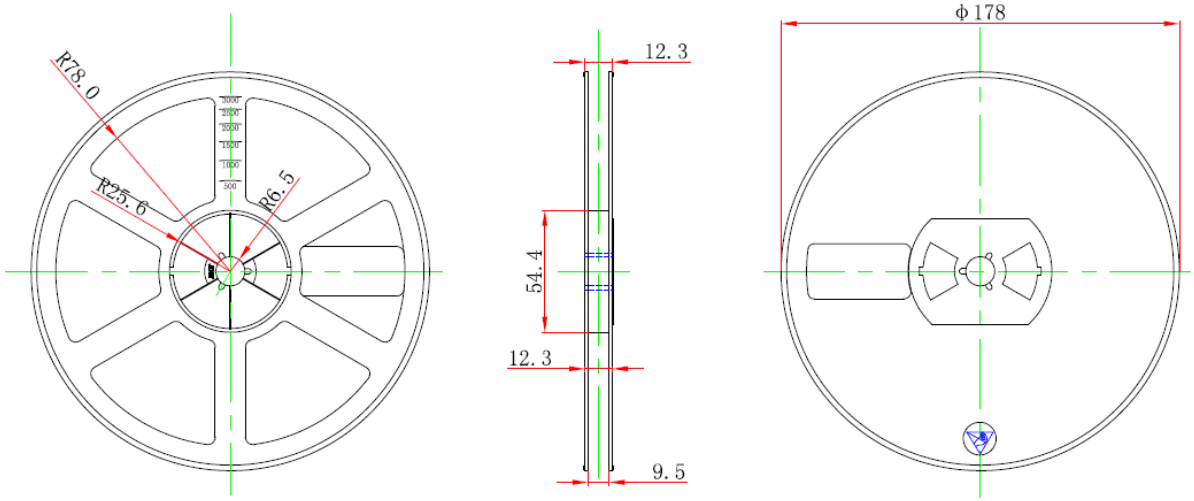


SOT23-5L Tape On Reel Dimension

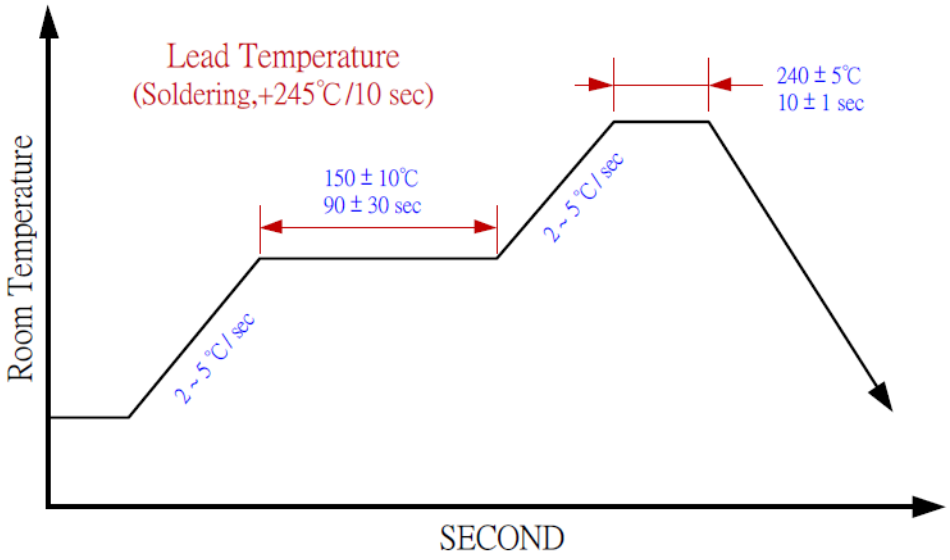


NOTES:

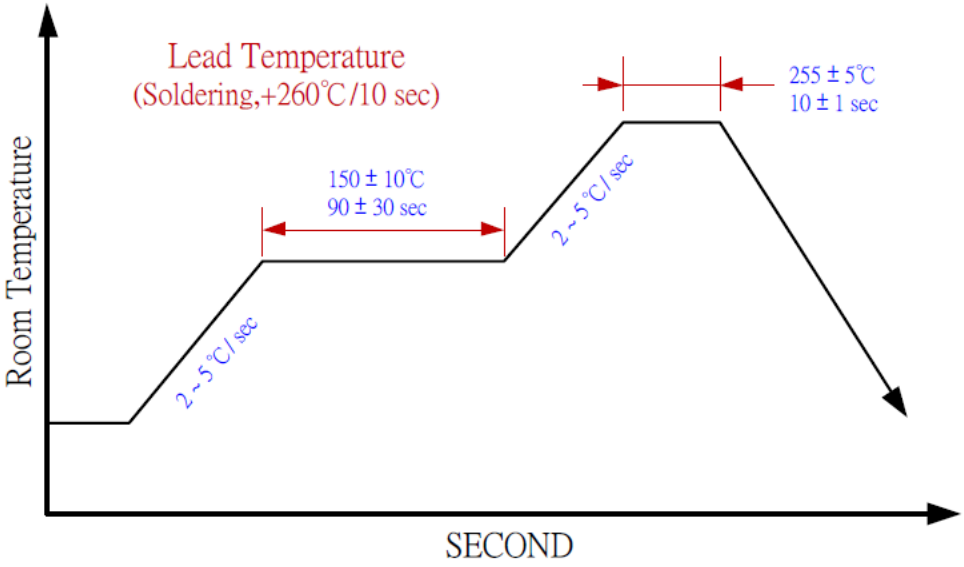
7. Material: Conductive polystyrene;
8. DIM in mm;
9. 10 sprocket hole pitch cumulative tolerance ±0.2;
10. Camber not to exceed 1mm in 100mm;
11. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole;
12. (S.R. OHM/SQ) Means surface electric resistivity of the carrier tape.



IR reflow curve



VK Soldering Condition



SN/SH Soldering Condition

Packing specification:

Package	Bag	Box	Carton
VK(TO92-4L)	1,000pcs/bag	10bag /box	8 box/carton
SOT-553(SN)	3,000pcs/reel	10 reel/box	2 box/carton
SOT23-5L(SH)	3,000pcs/reel	10 reel/box	2 box/carton

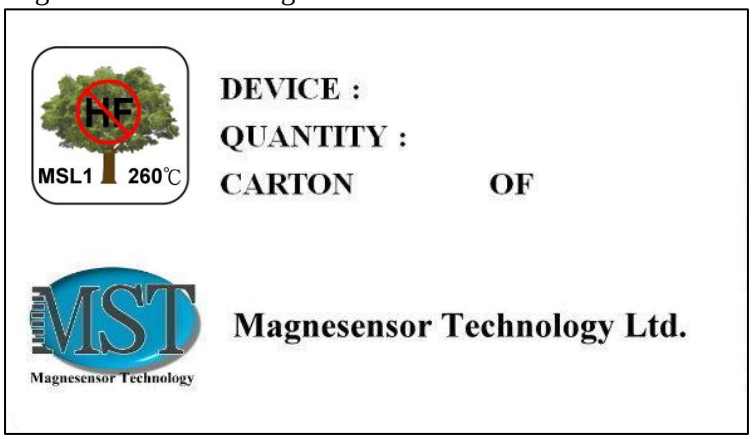
VK(TO92-4L)	Weight	SOT-553(SN)	Weight	SOT23-5L(SH)	Weight
1000pcs/bag	0.167kg	3000pcs/reel	0.13kg	3000pcs/reel	0.12kg
10 bags/box	1.81kg	10 reels/box	1.40kg	10 reels/box	1.30kg
10 boxes/carton	19.1kg	2 boxes/carton	3.70kg	2 boxes/carton	3.60kg

SOT-553/SOT23-5L Package Inner box label ：Size: 3.4cm*6.4cm

Bag and inner box Halogen Free Label

SOT-553/SOT23-5L Carton label ：Size: 5.6 cm * 9.8 cm

Bag and inner box Halogen Free Label



VK Package Inner box label ：Size: 3.4cm*6.4cm
Bag and inner box Halogen Free Label

VK 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;