MH 248 Hall-effect sensor is a temperature stable, stress-resistant , 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.

The MH 248 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, and a short circuit protected open-drain output. 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 MH 248 is rated for operation between the ambient temperatures –40°C and + 85°C for the E temperature range. The four package styles available provide magnetically optimized solutions for most applications. Package types SO is an SOT-23(1.1 mm nominal height),ST is an Tsot-25(0.8 mm nominal height),SU is an USON(0.5 mm nominal height) ,a miniature low-profile surface-mount package, while package UA is a three-lead ultramini SIP for through-hole mounting.

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

Features and Benefits

- CMOS Hall IC Technology
- Solid-State Reliability
- Micro power consumption for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 2.5V
- High Sensitivity for direct reed switch replacement applications
- Multi Small Size option
- Custom sensitivity selection is available in optional package.
- Pb Free/Green chip is qualified by third party lab.

Applications

- Solid state switch
- Handheld Wireless Handset Awake Switch (Flip Cell/PHS Phone/Note Book/Flip Video Set)
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications

Ordering Information

XX-XXX X XX-X-XX XX-X

- Lead Free
- Handling Code
- Package Identification
- Sorting Code
- Package type
- Temperature code
- Part number
- Company Name and Product Category

Company Name and Product Category

MH:MST Hall Effect/MP:MST Power MOSFET

Part number

181,182,183,185,248,249,481,482…

Temperature range

E: 85 Degree C, K: 125 Degree C, L: 150 Degree C

Package type

UA:TO-92S,SO:SOT-23,ST:Tsot-25,SU:USON

Sorting

α,β,Blank…..

Package Identification Code

01,02,03…..

Handling Code

BLANK: ESD bag, TR: Tape & Reel

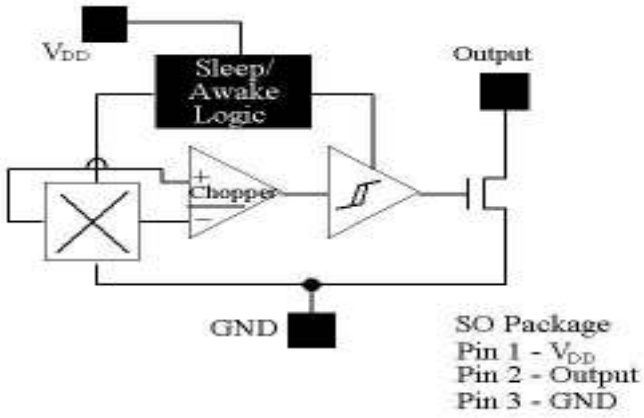
Lead Free Code

BLANK: Lead Free Device ,G: Green

Part No.	Temperature Suffix	Package Type	Package Identification
248	E (-40℃ to + 85℃)	UA (TO-92S)	01
	E (-40℃ to + 85℃)	SO (SOT-23)	05
	E (-40℃ to +85℃)	ST (TSOT-25)	06
	E (-40℃ to +85℃)	SU (USON)	07

- *Custom sensitivity selection is available*

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}	5V
Supply Current (Fault), I_{DD}	5mA
Output Voltage, V_{OUT}	5V
Output Current (Fault), I_{OUT}	5mA
Operating Temperature Range, T_A	-40℃ to +85℃
Storage Temperature Range, T_S	-55℃ to +150℃

Electrical Specifications

DC operating parameters: T_A = 25℃, V_{DD}=3V_{DC} (unless otherwise specified).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply Voltage	V_{DD}	Operating	2.5		3.5	V
Supply Current	I_{DD}	Average		8.0		μA
Awake supply Current		Awake On		1.5		mA
Output Current	I_{OUT}				1.0	mA
Saturation Voltage	V_{SAT}	I_{OUT} = 1mA			0.4	V
Awake mode time	Taw	Operating		175.0		μS
Sleep mode time	Tsl	Operating			70.0	mS

MH248ESO/UA/ST/SU Magnetic Specifications

DC operating parameters: T_A = 25℃, V_{DD}=3V_{DC} (unless otherwise specified).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OPS}	South pole to branded side, B > BOP, Vout On	0.6		6.0	mT
	B_{OPN}	North pole to branded side, B > BOP, Vout On	-6.0		-0.6	mT
Release Point	B_{RPS}	South pole to branded side, B < BRP, Vout Off	0.5		5.9	mT
	B_{RPN}	North pole to branded side, B < BRP, Vout Off	-5.9		-0.5	mT
Hysteresis	B_{HYS}	|BOPx - BRPx|		0.7		mT

Note: 1 mT = 10 Gauss.

MH248ESO/UA/ST/SU-α Magnetic Specifications

DC operating parameters: T_A = 25℃, V_{DD}=3V_{DC} (unless otherwise specified).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OPS}	North pole to branded side, B > BOP, Vout On	2.1		4.0	mT
	B_{OPN}		-6.0		-0.6	mT
Release Point	B_{RPS}	North pole to branded side, B < BRP, Vout Off	2.0		3.9	mT
	B_{RPN}		-5.9		-0.5	mT
Hysteresis	B_{HYS}	|BOPx - BRPx|		0.7		mT

Note: 1 mT = 10 Gauss.

MH248ESO/UA/ST/SU-β Magnetic Specifications

DC operating parameters: T_A = 25℃, V_{DD}=3V_{DC} (unless otherwise specified).

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OPS}	North pole to branded side, B > BOP, Vout On	3.1		6.0	mT
	B_{OPN}		-6.0		-0.6	mT
Release Point	B_{RPS}	North pole to branded side, B < BRP, Vout Off	3.0		5.9	mT
	B_{RPN}		-5.9		-0.5	mT
Hysteresis	B_{HYS}	|BOPx - BRPx|		0.7		mT

Note: 1 mT = 10 Gauss.

MH248ESO/UA/ST/SU-γ Magnetic Specifications

DC operating parameters: T_A = 25℃, V_{DD}=3V_{DC} (unless otherwise specified).

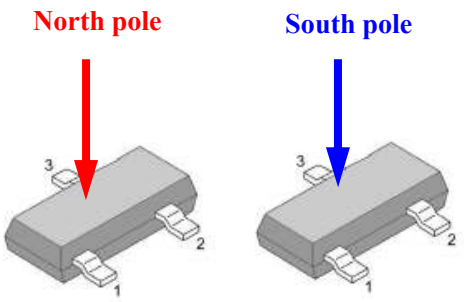
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	B_{OPS}	North pole to branded side, B > BOP, Vout On	0.6		3.5	mT
	B_{OPN}		-6.0		-0.6	mT
Release Point	B_{RPS}	North pole to branded side, B < BRP, Vout Off	0.5		3.4	mT
	B_{RPN}		-5.9		-0.5	mT
Hysteresis	B_{HYS}	|BOPx - BRPx|		0.7		mT

Note: 1 mT = 10 Gauss.

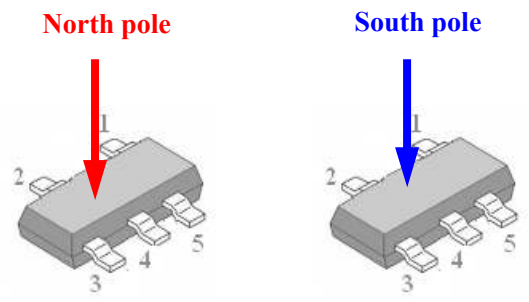
MH248ESO/UA/ST/SU Output Behavior versus Magnetic Polar

DC Operating Parameters Ta = -40 to 85℃, Vdd = 2.5 to 5V

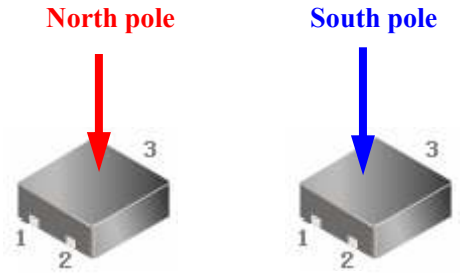
Parameter	Test condition	OUT(SO/ST)	Test condition	OUT(UA/SU)
South pole	**B>Bop[(-60)-(-6)]**	**low**	**B>Bop(6-60)**	**low**
Null or weak magnetic field	**B=0 or B < BRP**	**high**	**B=0 or B < BRP**	**high**
North pole	**B>Bop(6-60)**	**low**	**B>Bop[(-60)-(-6)]**	**low**



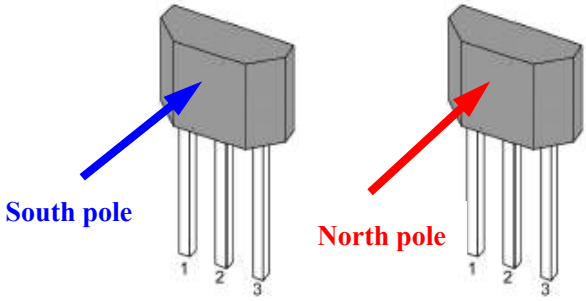
SO package



ST package



SU package

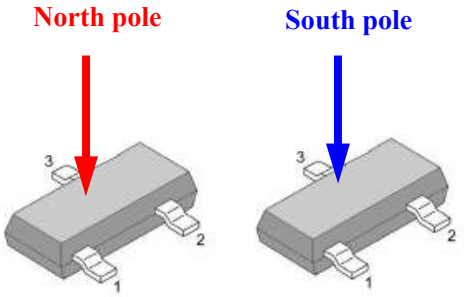


UA package

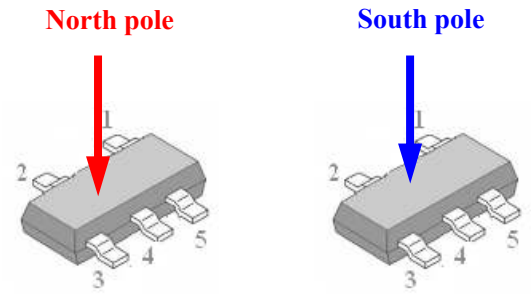
MH248ESO/UA/ST/SU-α Output Behavior versus Magnetic Polar

DC Operating Parameters Ta = -40 to 85℃, Vdd = 2.5 to 5V

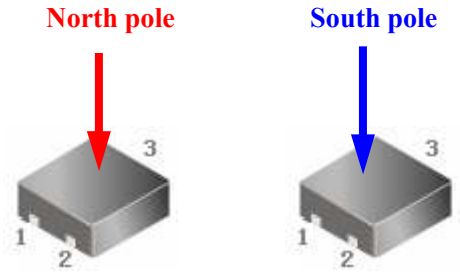
Parameter	*Test condition*	*OUT(SO/ST)*	*Test condition*	*OUT(UA/SU)*
South pole	B>Bop[(-60)-(-6)]	low	B>Bop(21-40)	low
Null or weak magnetic field	B=0 or B < BRP	high	B=0 or B < BRP	high
North pole	B>Bop(21-40)	low	B>Bop[(-60)-(-6)]	low



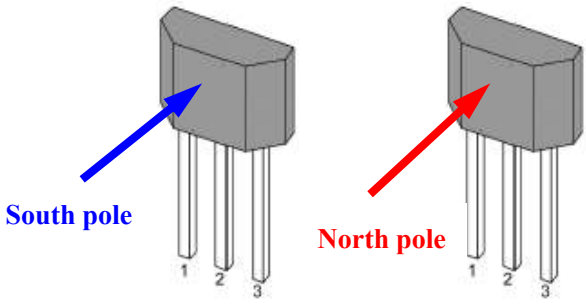
SO package



ST package



SU package

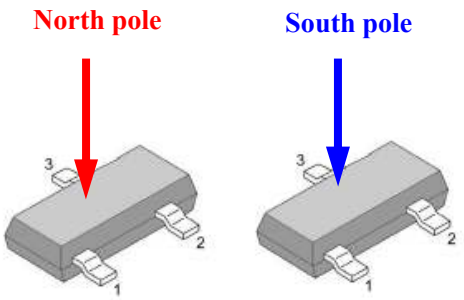


UA package

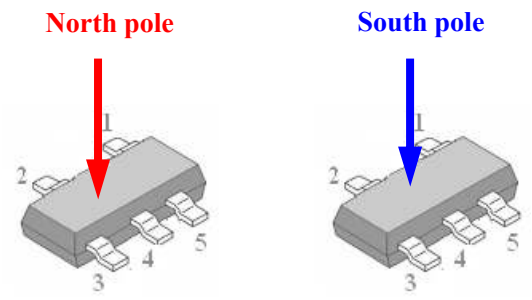
MH248ESO/UA/ST/SU-β Output Behavior versus Magnetic Polar

DC Operating Parameters Ta = -40 to 85℃, Vdd = 2.5 to 5V

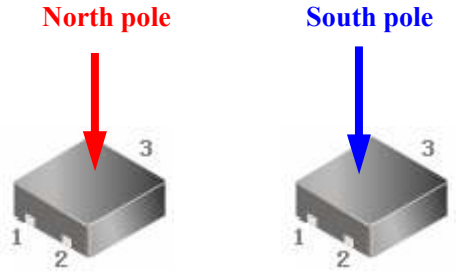
Parameter	*Test condition*	*OUT(SO/ST)*	*Test condition*	*OUT(UA/SU)*
South pole	B>Bop[(-60)-(-6)]	low	B>Bop(31-60)	low
Null or weak magnetic field	B=0 or B < BRP	high	B=0 or B < BRP	high
North pole	B>Bop(30-60)	low	B>Bop[(-60)-(-6)]	low



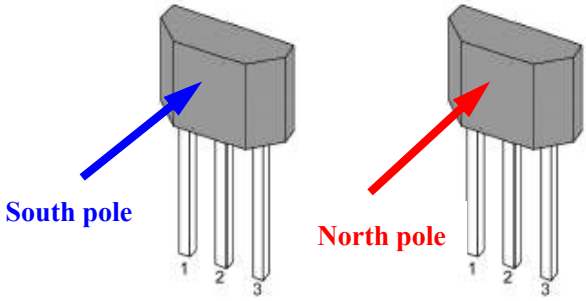
SO package



ST package



SU package

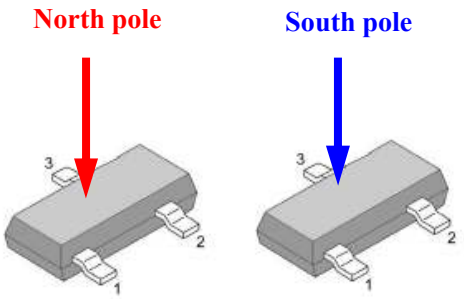


UA package

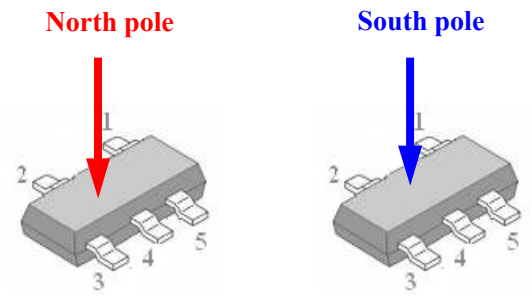
MH248ESO/UA/ST/SU-γ Output Behavior versus Magnetic Polar

DC Operating Parameters Ta = -40 to 85℃, Vdd = 2.5 to 5V

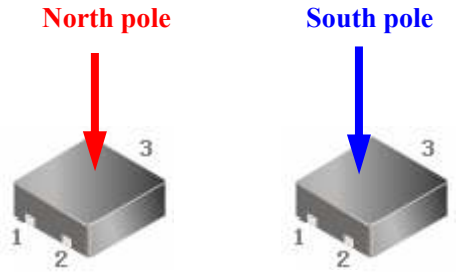
Parameter	*Test condition*	*OUT(SO/ST)*	*Test condition*	*OUT(UA/SU)*
South pole	B>Bop[(-60)-(-6)]	low	B>Bop(6-35)	low
Null or weak magnetic field	B=0 or B < BRP	high	B=0 or B < BRP	high
North pole	B>Bop(6-35)	low	B>Bop[(-60)-(-6)]	low



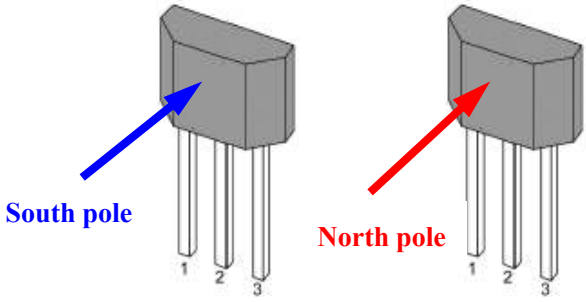
SO package



ST package

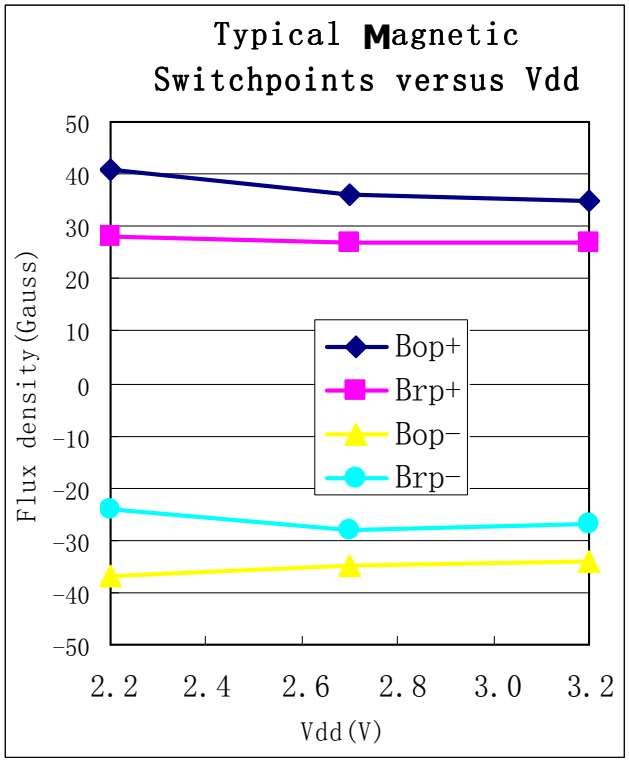


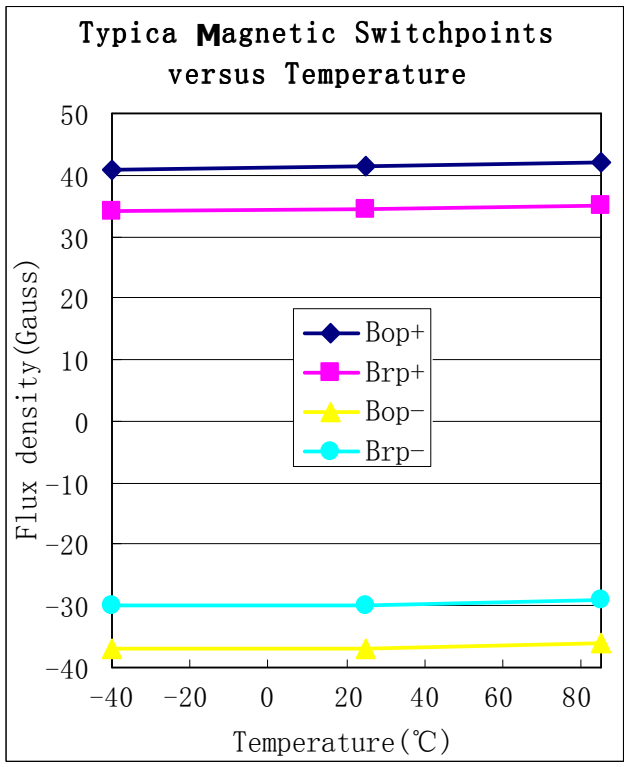
SU package

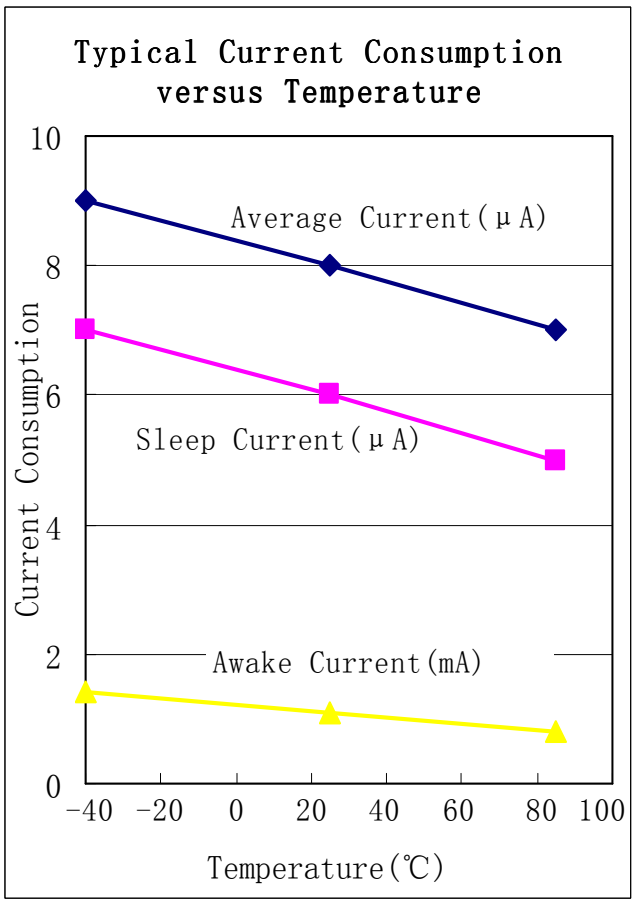


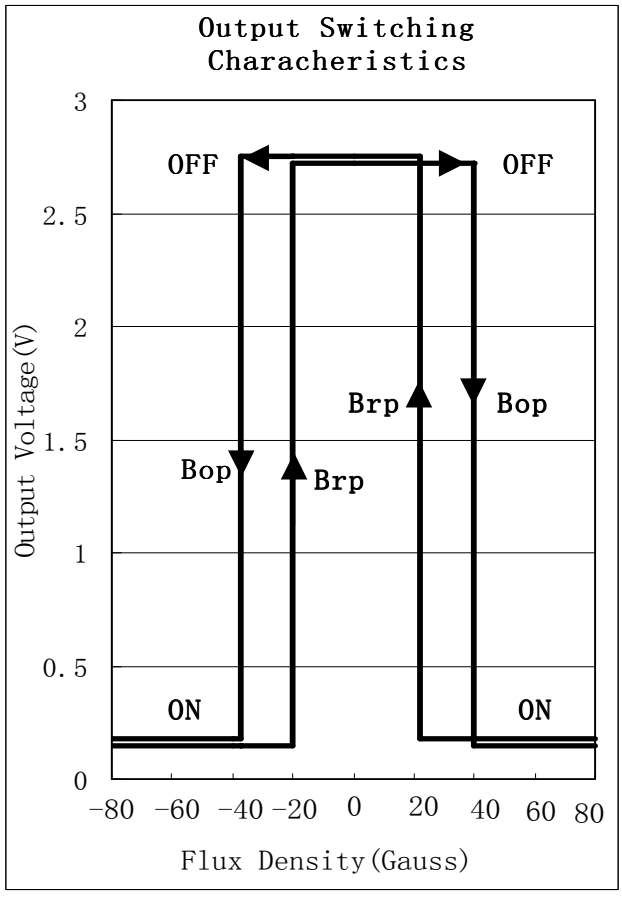
UA package

Performance Graphs





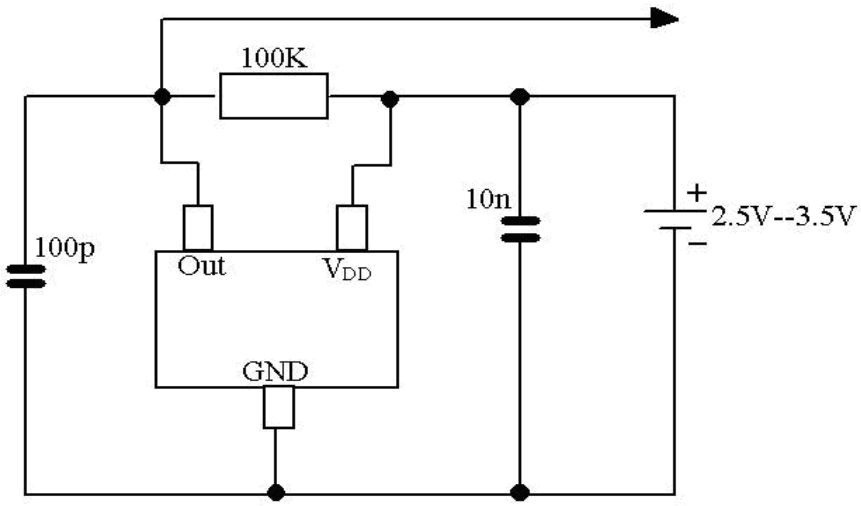




Installation Comments

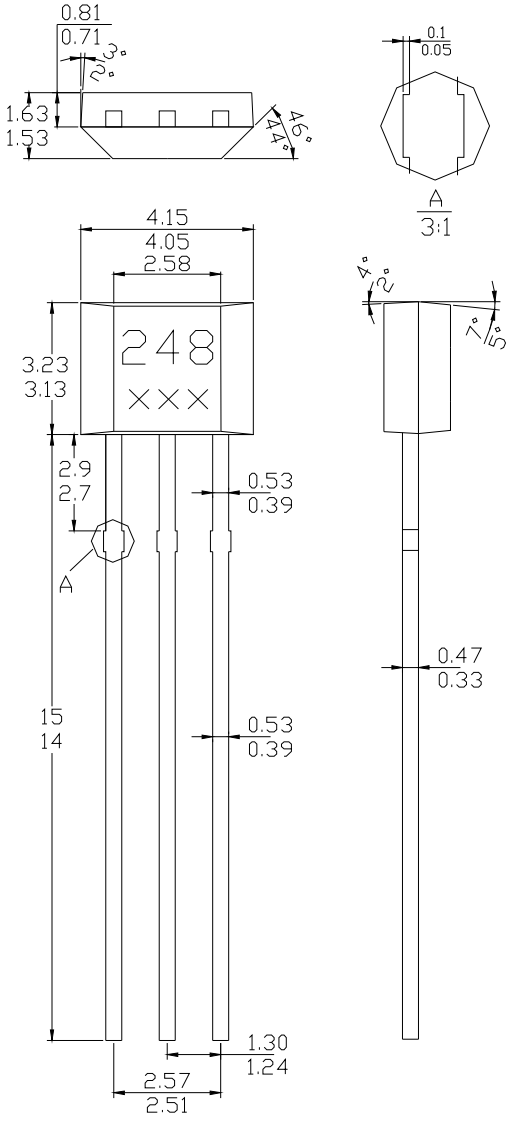
Consider temperature coefficients of Hall IC and magnetic, as well as air gap and life time variations. Observe temperature limits during wave soldering.

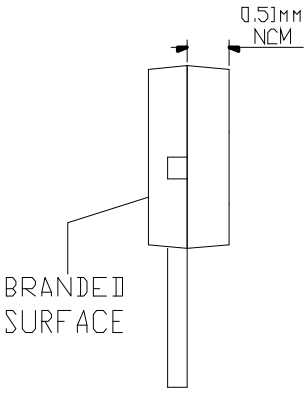
Typical Application



Sensor Location, package dimension and marking

MH 248 UA-01 Package



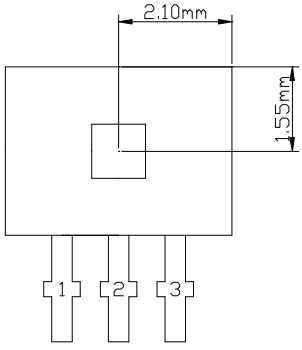


Active Area Depth

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:

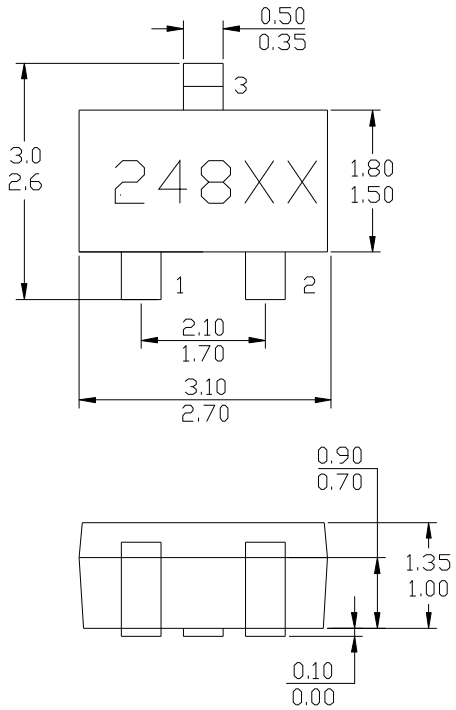
Pin 1	VDD
Pin 2	GND
Pin 3	Output



Sensor Location

MH 248 SO-05 Package

(Top View)

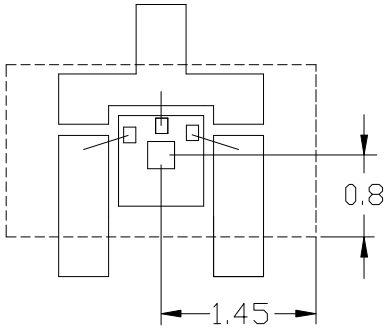


NOTES:

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

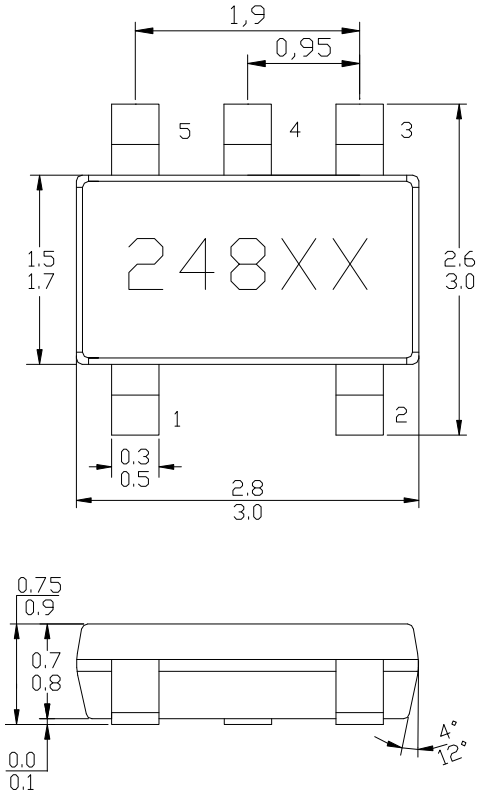
(Bottom view)



MH 248 ST-06 Package

TSOT-25 Package Dimension

(Top View)

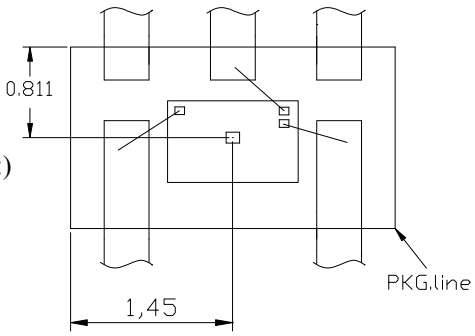


NOTES:

1. PINOUT (See Top View at left:)
   Pin 1 VDD
   Pin 2 Output
   Pin 3 NC
   Pin 4 GND
   Pin 5 NC
2. Controlling dimension: mm;
3. Chip rubbing will be 10mil maximum;
4. Chip must be in PKG. center.

TSOT-25 Hall Plate / Chip Location

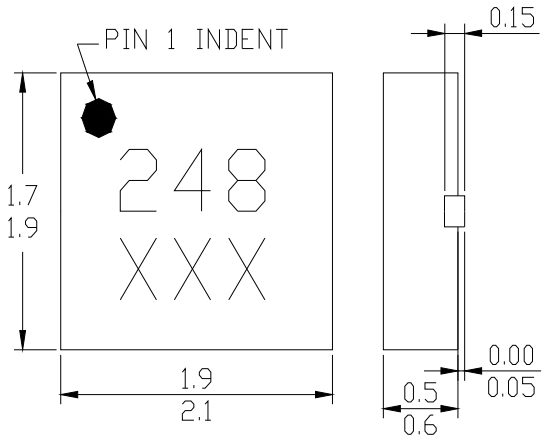
(Bottom view)

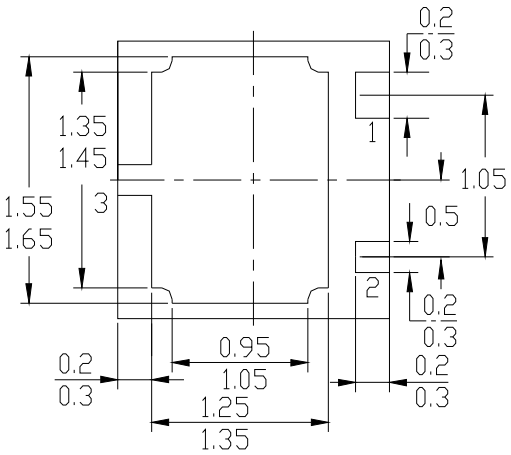


MH 248 SU-07 Package

USON Package Dimension

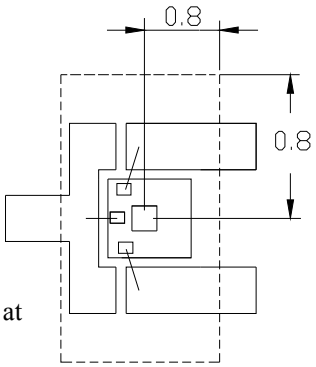
(Top View)





USON Hall Plate / Chip Location

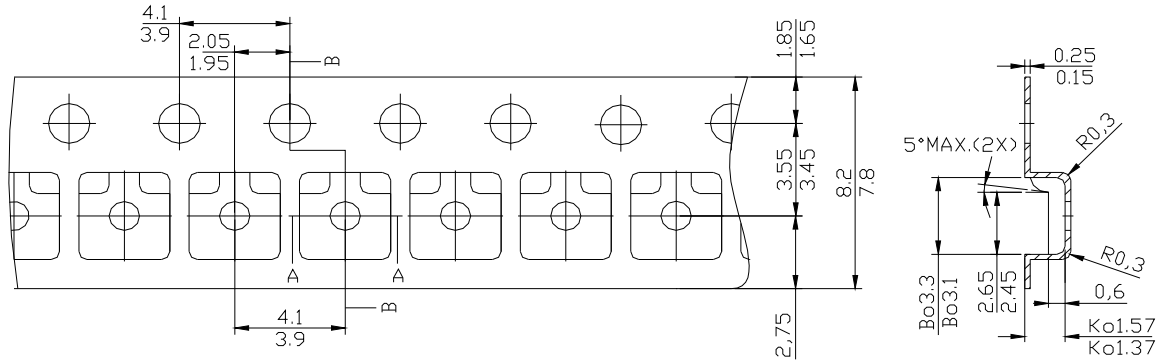
(Bottom view)

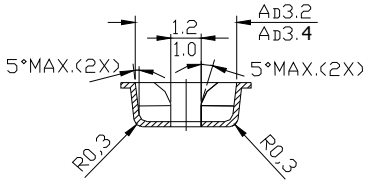


NOTES:

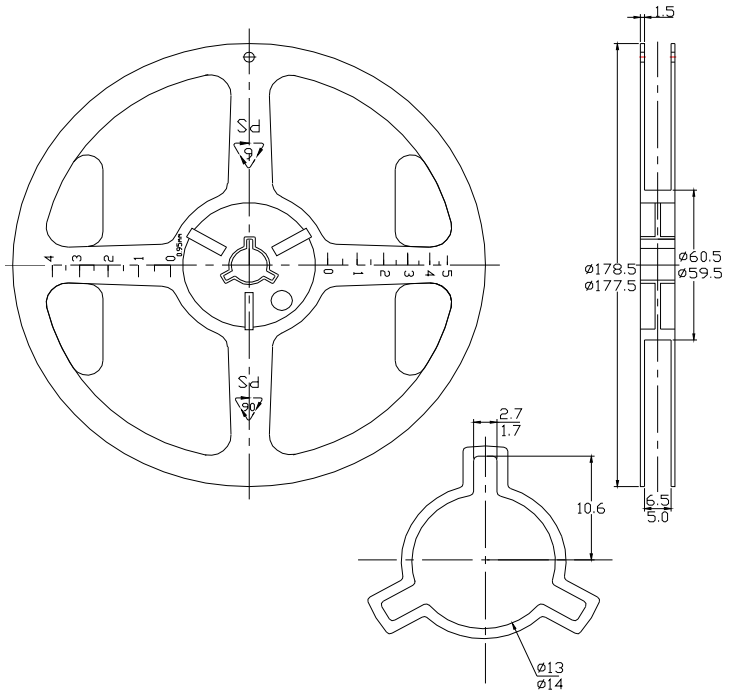
1. PINOUT (See Top View at left:)
   Pin 1 V_{DD}
   Pin 2 Output
   Pin 3 GND
2. Controlling dimension: mm;
3. Chip rubbing will be 10mil maximum;
4. Chip must be in PKG. center.

Sot 23 package Tape On Reel Dimension





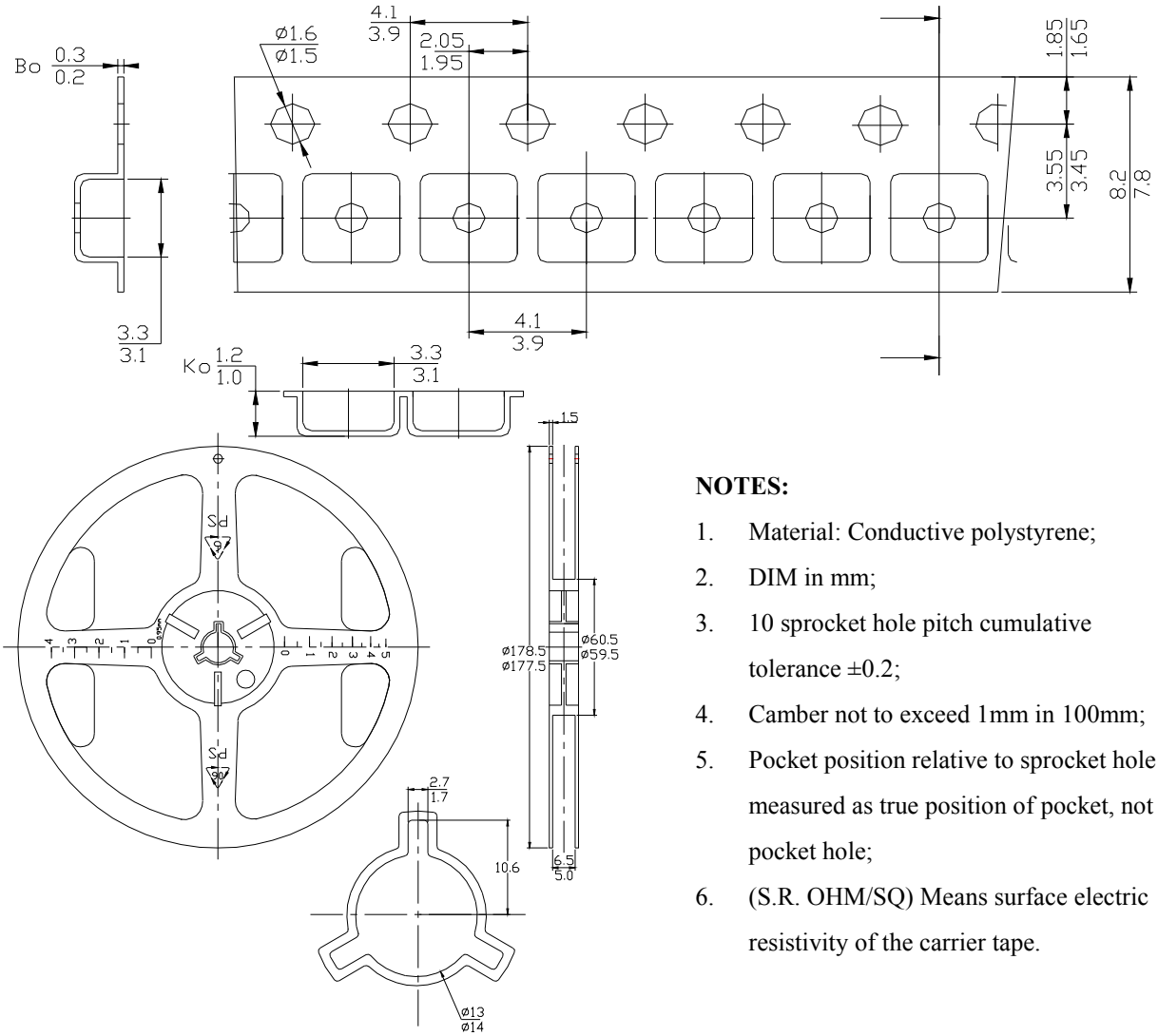
SECTION A-A



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

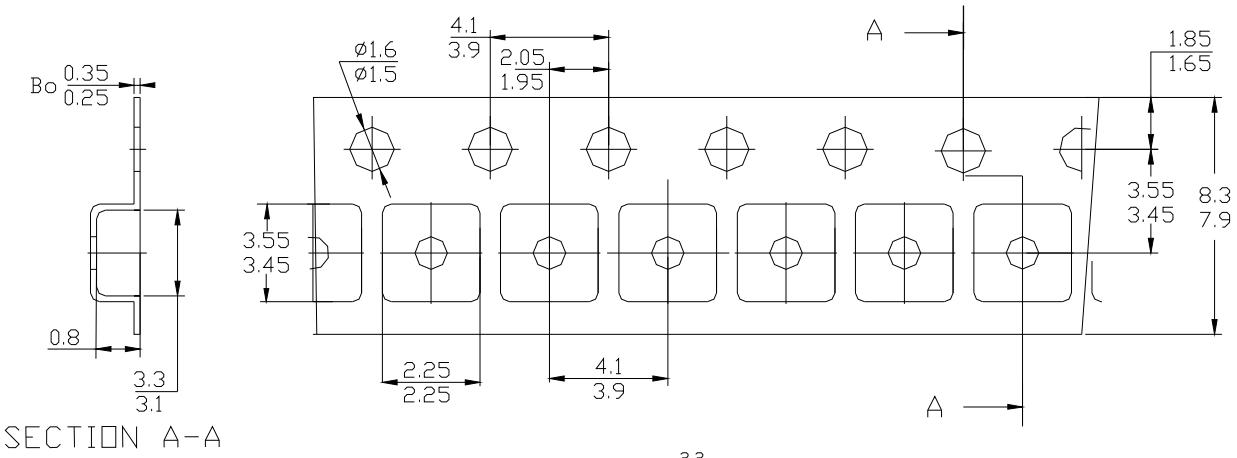
TSot 25 package Tape On Reel Dimension

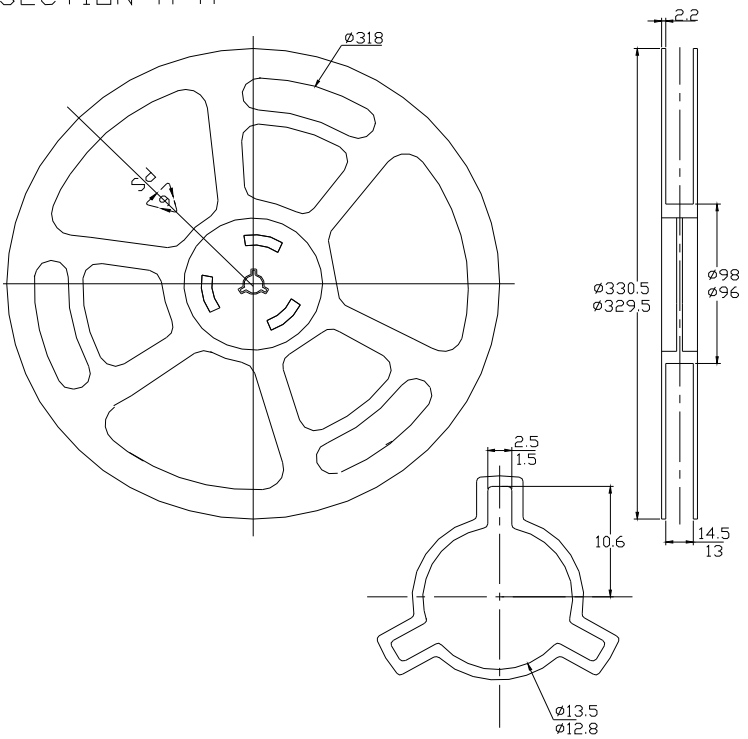


NOTES:

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.

USON package Tape On Reel Dimension



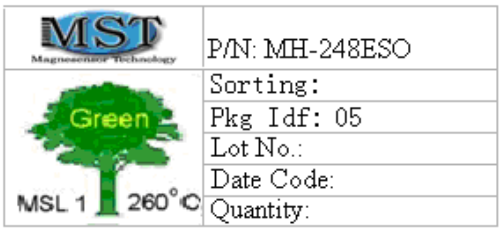


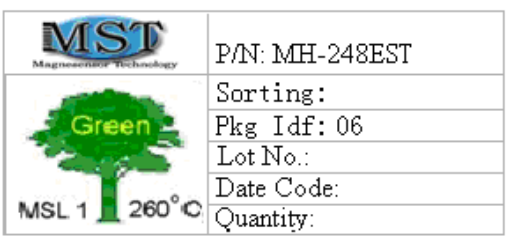
NOTES:

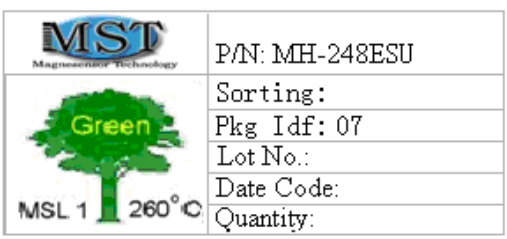
1. Material: Conductive polystyrene;
2. DIM in mm;
3. 10 sprocket hole pitch cumulative tolerance ±0.2;
4. Camber not to exceed 1mm in 100mm;
5. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole;
6. (S.R. OHM/SQ) Means surface electric resistivity of the carrier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

MH 248 Labeling on ESD beg in different selection

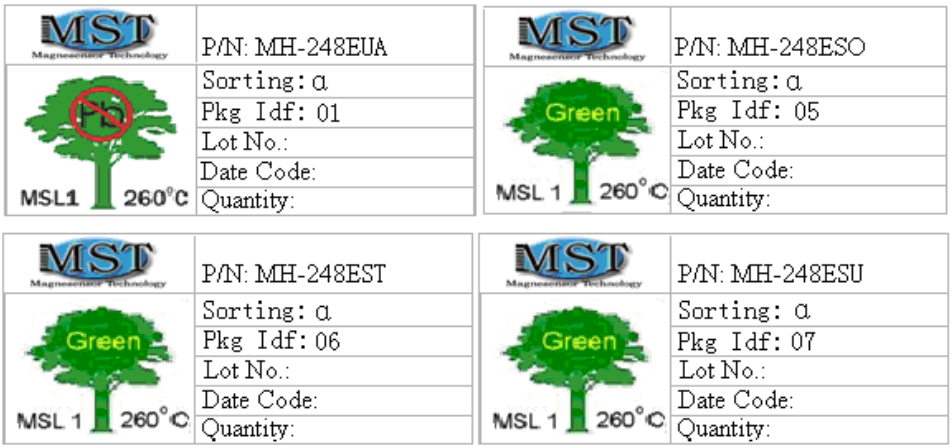
MH 248ESO/UA/ST/SU



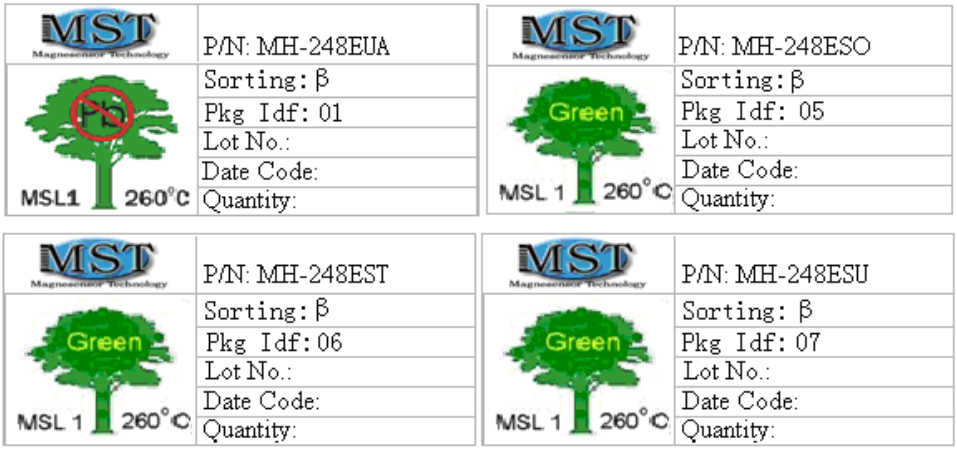




MH 248ESO/UA/ST/SU-α



MH 248ESO/UA/ST/SU- β



MH 248ESO/UA/ST/SU-γ