

MH163 Hall-Effect sensor is a larger output load capacity and the most competitive latch Hall IC. This device also has wide operating voltage range and temperature range. The high sensitivity Hall-Effect for wide application scopes to common condition.

MH163 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, open-drain output, Thermal shutdown protection and high ESD protection.

This device requires the presence of both south and north polarity magnetic fields for operation. In the presence of a south polarity field of sufficient strength, the device output latches on, and only switches off when a north polarity field of sufficient strength is present.

MH163 is rated for operation between the ambient temperatures -40°C and 85°C for the E temperature range, and -40°C to 125°C for the K temperature range. Package SO is a SOT-23, a miniature low-profile surface-mount package.

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

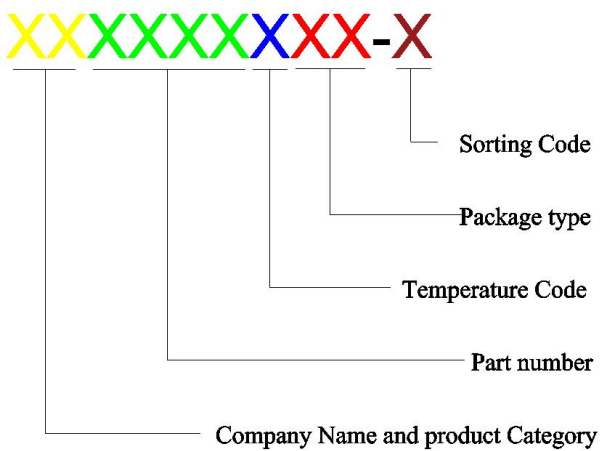
Features and Benefits

- Wide operating voltage range: 3.5V to 24V
- Maximum output sink current 100mA
- Open-Drain output.
- 100% tested at 125°C for K.
- Custom temperature selection is available.
- V_{DD} reverse protection
- Good ESD Protection
- RoHS compliant 2011/65/EU and Halogen Free

Applications

- Fan motor application
- 3 phase BLDC motor application in “K” Spec
- Speed sensing
- Revolution counting

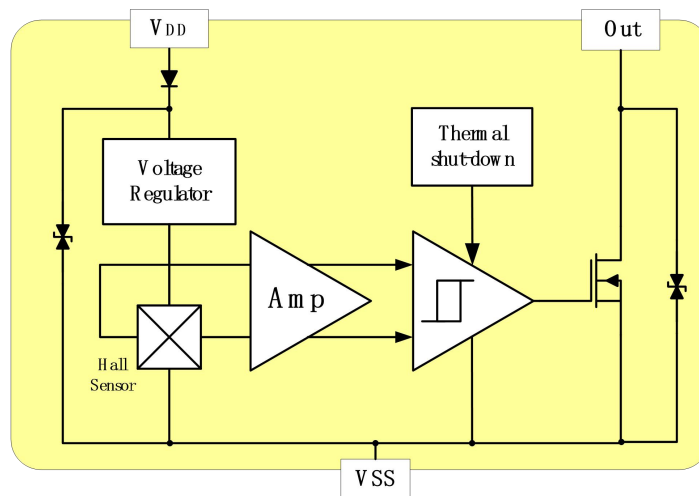
Ordering Information

	<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 forth 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>
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Part No.	Temperature Suffix	Package Type
MH163KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH163EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH163KSO	K (-40°C to + 125°C)	SO (SOT-23)
MH163ESO	E (-40°C to + 85°C)	SO (SOT-23)

Custom sensitivity selection is available by MST sorting technology

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} / V_{out})		-0.3	V
Output current, (I_{SINK})		100	mA
Operating Temperature Range, (T_A)	“E” Class	-40 ~ +85	$^{\circ}\text{C}$
	“K” Class	-40 ~ +125	$^{\circ}\text{C}$
Storage temperature Range, (T_s)		-65 ~ +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

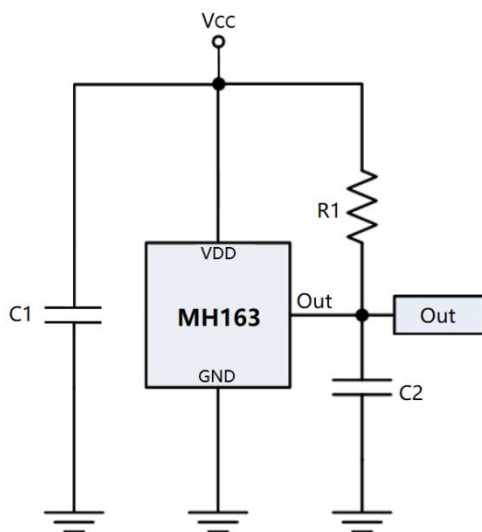
Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

Electrical Specifications

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

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, (V_{DD})	Operating	3.5		24.0	V
Supply Current, (I_{DD})	$B < B_{OP}$		3.5	8.0	mA
Output Saturation Voltage, ($V_{DS(ON)}$)	$I_{out}=80\text{mA}, B > B_{OP}$			200.0	mV
Output Leakage Current, (I_{off})	$I_{OFF} B < B_{RP}, V_{OUT} = 12\text{V}$			10.0	μA
Output Rise Time, (T_R)	$R_L=1\text{k}\Omega, C_L=20\text{pF}$			0.5	μs
Output Fall Time, (T_F)	$R_L=1\text{k}\Omega; C_L=20\text{pF}$			0.5	μs
Thermal shut-down Temp		150			$^{\circ}\text{C}$
Thermal shut-down Hysteresis			30		$^{\circ}\text{C}$
Electro-Static Discharge	HBM	4			KV

Typical Application Circuit



C1: 10nF
C2: 1nF
R1: 1k Ω

MH163 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}	SO(UA)	0(-60)		60(-10)	Gauss
Release Point	B _{RP}	SO(UA)	-60(10)		0(60)	Gauss
Hysteresis	B _{HYS}			60		Gauss

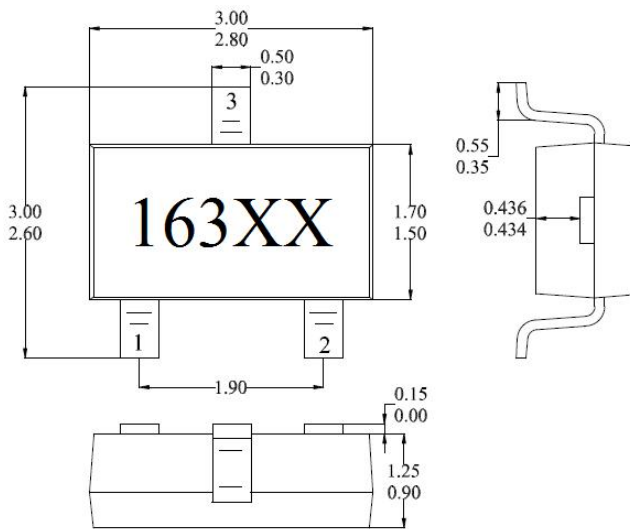
MH163 Output Behavior versus Magnetic Polar

DC Operating Parameters $T_A = -40$ to 125°C , $V_{DD} = 3.5$ to 24V

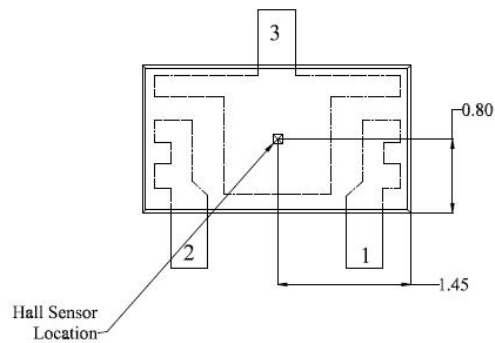
Parameter	Test condition	OUT(SO)	OUT(UA)
South pole	B > B _{OP}	Low(V _{DSON})	Open(Pull-up Voltage)
North pole	B < B _{RP}	Open(Pull-up Voltage)	Low(V _{DSON})

Sensor Location, Package Dimension and Marking

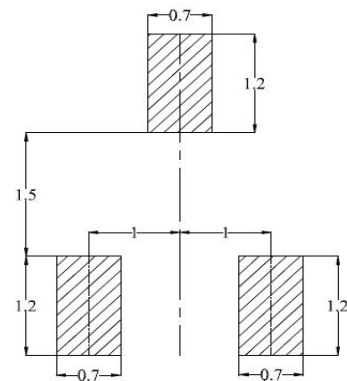
**SO Package
(Top View)**



**Hall Plate Chip Location
(Bottom View)**



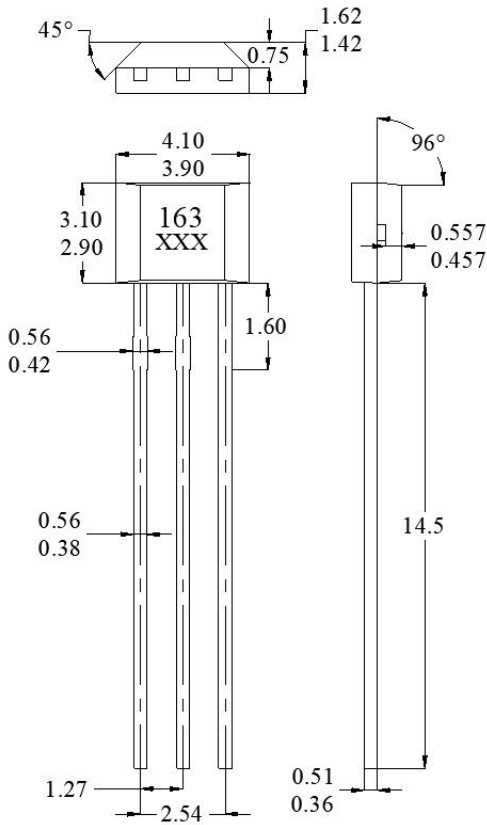
(For reference only) Land Pattern



NOTES:

- PINOUT (See Top View at left :)
 Pin 1 V_{DD}
 Pin 2 Output
 Pin 3 GND
- Controlling dimension: mm
- Lead thickness after solder plating will be 0.254mm maximum

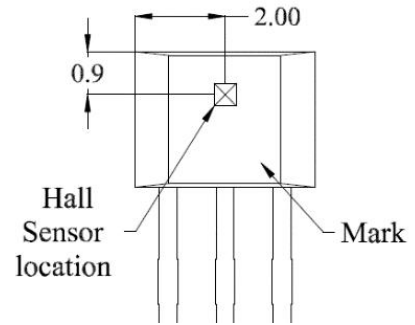
UA Package(TO-92S)



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 VCC
Pin 2 GND
Pin 3 Output
5. XXX ; 1st X=Year ; 2nd and 3rd XX=Week

Hall Chip Location



Output Pin Assignment

(Top view)

