



MH193 Specifications

Ultra High Sensitivity Built-in Pull High Res Hall Effect Latch

MH193 Hall-effect sensor is a temperature stable, stress-resistant sensor. 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.

MH193 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, Pull-up resistor output. Advanced DMOS 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 both south and north polarity magnetic fields for operation. In the presence of a south polarity field of sufficient strength, the device output sensor on, and only switches off when a north polarity field of sufficient strength is present.

MH193 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. The two package styles available provide magnetically optimized solutions for most applications. Package SO is an SOT-23, a miniature low-profile surface-mount package, while package UA is a three-lead ultra mini SIP for through-hole mounting.

Packages is Halogen Free standard and which have been verified by third party lab.

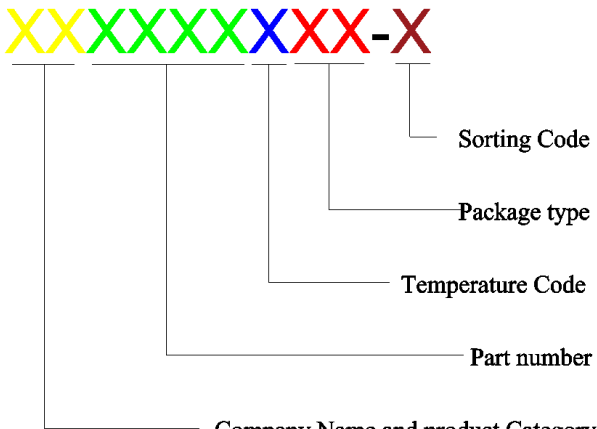
Features and Benefits

- DMOS Hall IC Technology
- Chopper stabilized amplifier stage.
- Optimized for BLDC motor applications.
- Reliable and low shifting on high Temp condition.
- Switching offset compensation at typically 69kHz
- Pull-up resistor output
- Good ESD Protection.
- 100% tested at 125°C for K.
- Custom sensitivity / Temperature selection are available.
- RoHS compliant 2011/65/EU and Halogen Free

Applications

- High temperature Fan motor
- 3 phase BLDC motor application
- Speed sensing
- Position sensing
- Current sensing
- Revolution counting
- Solid-State Switch
- Linear Position Detection
- Angular Position Detection
- Proximity Detection
- High ESD Capability

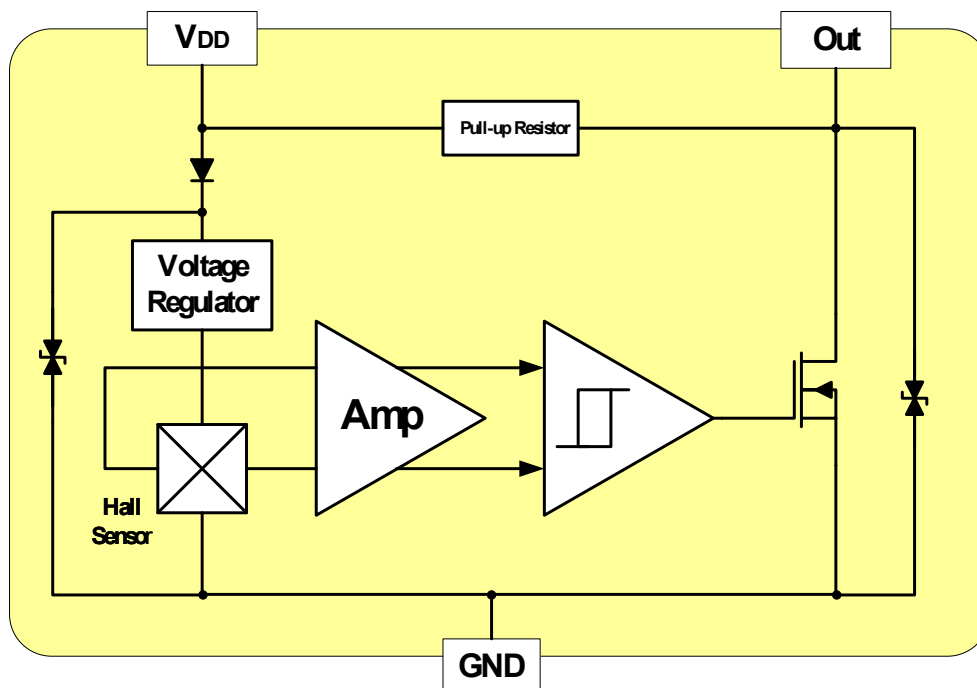
Ordering Information

	<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
MH193KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH193KSO	K (-40°C to + 125°C)	SO (SOT-23)
MH193EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH193ESO	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} / V_{out})		-0.3	V
Output current, (I_{SINK})		25	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 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

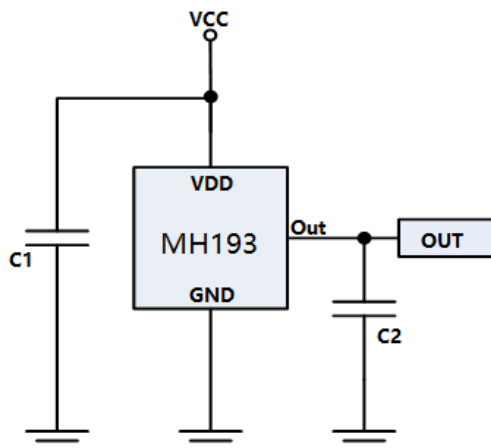
Note: Do not apply reverse voltage to V_{DD} and V_{OUT} Pin, It may be caused for Miss function or damaged device.

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		26	V
Supply Current, (I_{DD})	$B < B_{OP}$			5.0	mA
Output Saturation Voltage, (V_{sat})	$B > B_{OP}$			400.0	mV
Output Leakage Current, (I_{off})	$I_{OFF} B < B_{RP}$, $V_{OUT} = 12\text{V}$			10.0	μA
Internal Oscillator Chopper Frequency, (f_{OSC})			69		kHz
Output Rise Time, (T_R)	$R_L=1.1\text{K}\Omega$, $C_L=20\text{pF}$		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
Pull-up Resistor, (R_a)			10		$\text{K}\Omega$
Operate Point, (BOP)		5		25	GS
Release Point, (BRP)		-25		-5	GS
Hysteresis, (BHYS)			30		GS

Typical application circuit

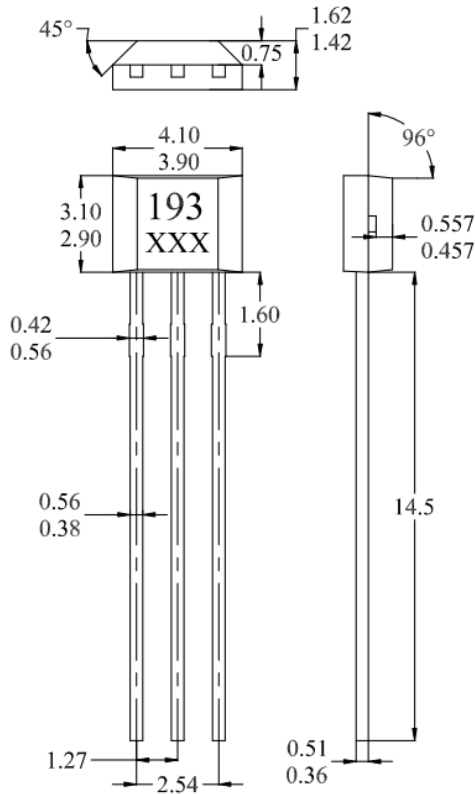


C1 : 10nF

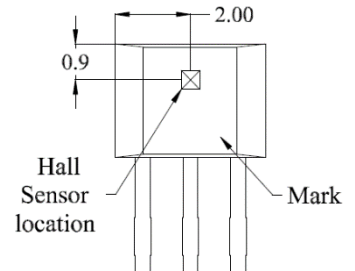
C2 : 1nF

Sensor Location, Package Dimension and Marking

UA Package

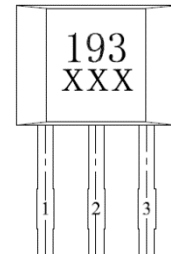


Hall Chip location



Output Pin Assignment

(Top view)

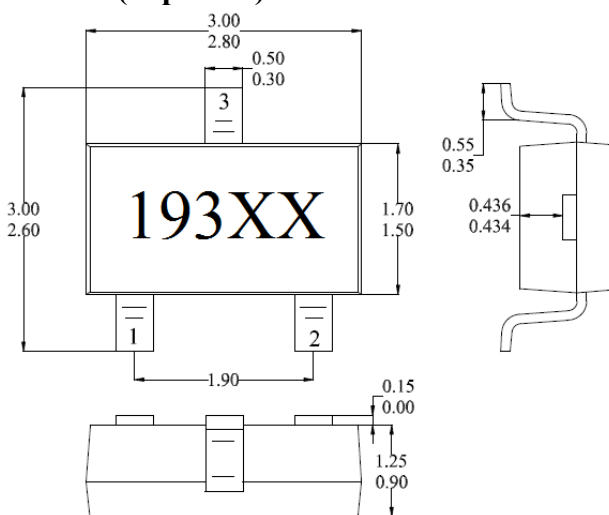


NOTES:

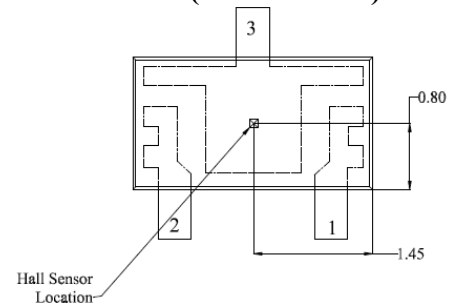
- Controlling dimension: mm
- Leads must be free of flash and plating voids
- Do not bend leads within 1 mm of lead to package interface.
- PINOUT:

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

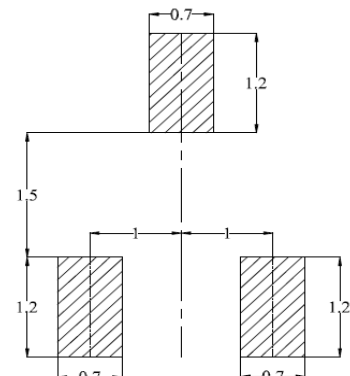
SO Package (Top View)



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
- XX: Date Code, Refer to DC table