

MH190, Hall-Effect sensor, designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall Voltage, and a Schmitt trigger to provide switching hysteresis for noise rejection, open collector output. An internal band gap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range. The device is identical except for magnetic switch points.

A south pole of sufficient strength will turn the output on. The North Pole is necessary to turn the output off. An on-board regulator permits operation with supply voltages of 4V to 30 V.

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

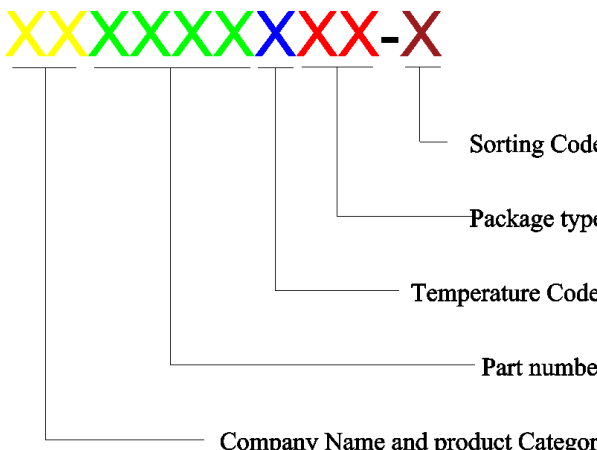
### Features and Benefits

- Optimized for BLDC motor applications
- High Peak Voltage of 65V
- 100% tested at 125 °C for K.
- Temperature compensation function
- RoHS compliant 2011/65/EU and Halogen Free

### Applications

- High temperature Fan motor
- 3 phase BLDC motor application
- Fan motor application
- Speed sensing
- Revolution counting
- E-Bike

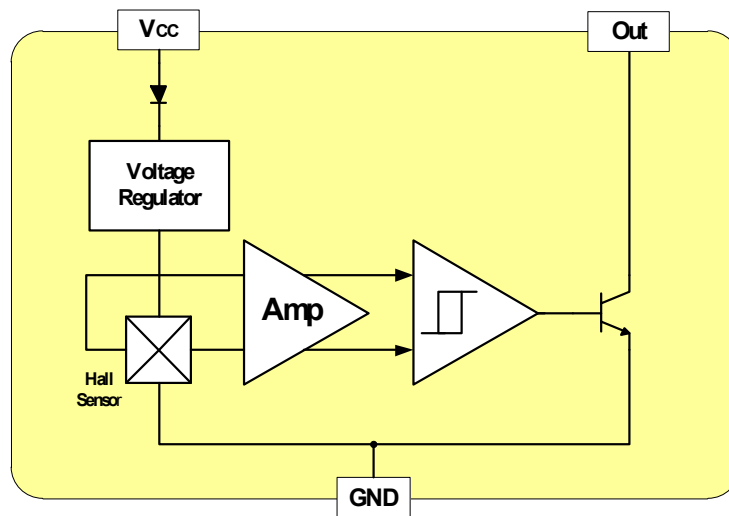
### Ordering Information

	<p><b>Company Name and Product Category</b> MH:MST Hall Effect/MP:MST Power IC</p> <p><b>Part number</b> 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><b>Temperature range</b> E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C</p> <p><b>Package type</b> 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><b>Sorting</b> α,β,Blank.....</p>
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Part No.	Temperature Suffix	Package Type
MH190KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH190KSO	K (-40°C to + 125°C)	SO (SOT-23)
MH190EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH190ESO	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, ( $V_{CC}$ )		65	V
Out voltage, ( $V_{OUT}$ )		65	V
Reverse voltage, ( $V_{CC}$ ) ( $V_{OUT}$ )		-32	V
Magnetic flux density		Unlimited	Gauss
Output current, ( $I_{OUT}$ )		25	mA
Operating Temperature Range, ( $T_a$ )	“E” version	-40 to +85	°C
	“K” version	-40 to +125	°C
Storage temperature range, ( $T_s$ )		-65 to +150	°C
Maximum Junction Temp, ( $T_j$ )		150	°C
Thermal Resistance	( $\theta_{ja}$ ) UA / SO	206 / 543	°C/W
	( $\theta_{jc}$ ) UA / SO	148 / 410	°C/W
Package Power Dissipation, ( $P_D$ ) UA / SO		606 / 230	mW

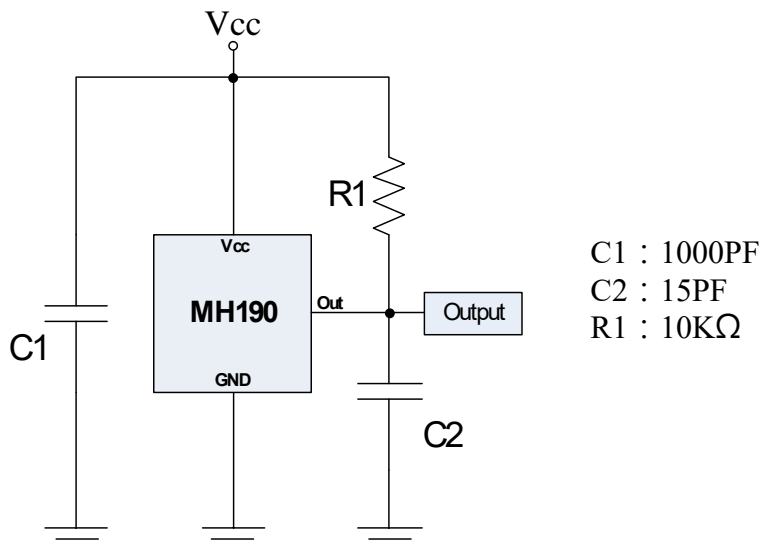
**Note:** Do not apply reverse voltage to  $V_{CC}$  and  $V_{OUT}$  Pin, It may be caused for Miss function or damaged device.

### Electrical Specifications

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

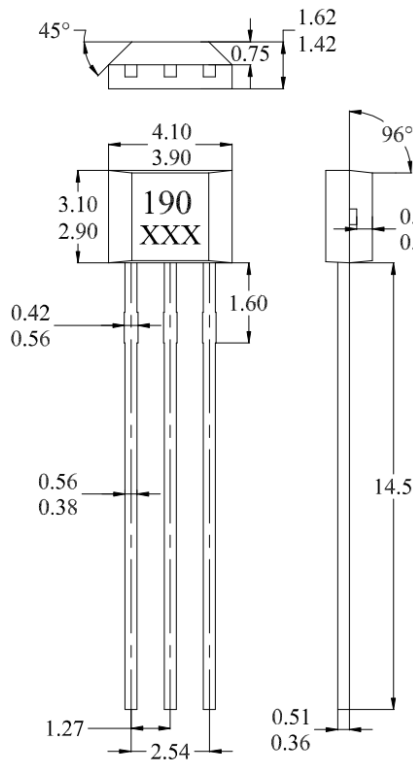
Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage ( $V_{CC}$ )	Operating	4.0		30.0	V
Supply Current ( $I_{CC}$ )	$B < B_{OP}$		3.0	8.0	mA
Output Saturation Voltage, ( $V_{SAT}$ )	$I_{OUT} = 5\text{ mA}$ , $B > B_{OP}$			500.0	mV
Output Leakage Current, ( $I_{OFF}$ )	$I_{OFF}$ $B < B_{RP}$ , $V_{OUT} = 24\text{V}$			10.0	uA
Output Rise Time, ( $T_R$ )	$R_L = 820\Omega$ , $C_L = 20\text{pF}$		1.5		uS
Output Fall Time, ( $T_F$ )	$R_L = 820\Omega$ ; $C_L = 20\text{pF}$		1.5		uS
Operate Point ( $B_{OP}$ )		10		110	Gauss
Release Point ( $B_{RP}$ )		-110		-10	Gauss
Hysteresis ( $B_{HYS}$ )			100		Gauss

### Typical application circuit



**Sensor Location, Package Dimension and Marking**

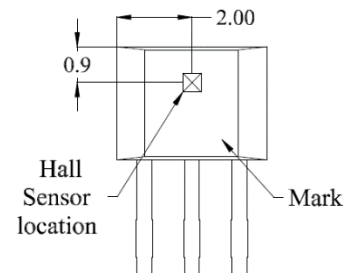
**UA Package**



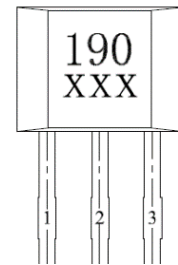
**NOTES:**

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 VDD  
 Pin 2 GND  
 Pin 3 Output
5. XXX; 1<sup>st</sup> X=Year;  
 2<sup>nd</sup> and 3<sup>rd</sup> XX=Week

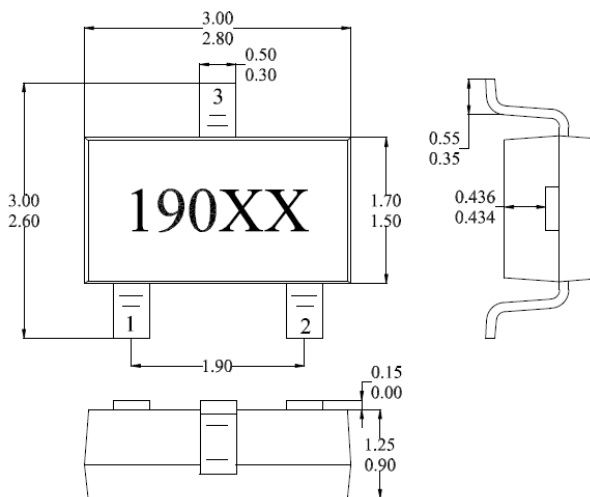
**Hall Chip location**



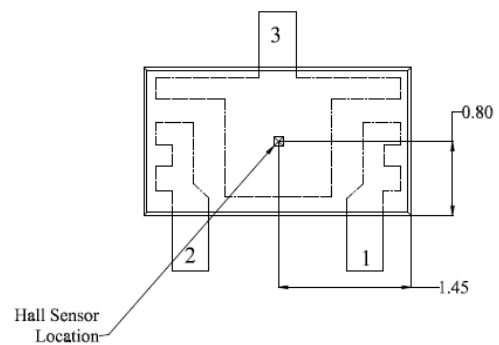
**Output Pin Assignment (Top view)**



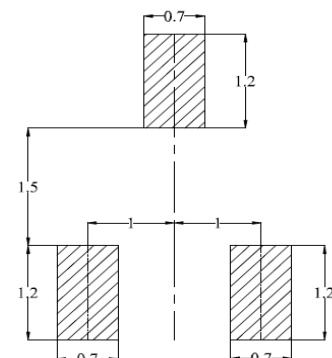
**Package (SOT-23) (Top View)**



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



**(For reference only) Land Pattern**



**NOTES:**

1. PINOUT (See Top View at left :)  
 Pin 1 V<sub>DD</sub>; Pin 2 Output; Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum
4. XX: Date Code, Refer to DC table