MH187 Hall-effect sensor is a temperature stable, stress-resistant latch. 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.

MH187 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, ESD circuit protection, 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 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.

MH187 is rated for operation between the ambient temperatures –40℃ and 85℃ for the E temperature range, and –40℃ to 125℃ for the K temperature range. The three package styles available provide magnetically optimized solutions for most applications. Package types SO is an SOT-23(1.1 mm nominal height),SQ is an QFN2020-3(0.5 mm nominal height), a miniature low-profile surface-mount package, while package UA is a three-lead ultra-mini SIP for through-hole mounting.

The UA package SO type and SQ type are Halogen Free package. All of them have been verified by third party Lab.

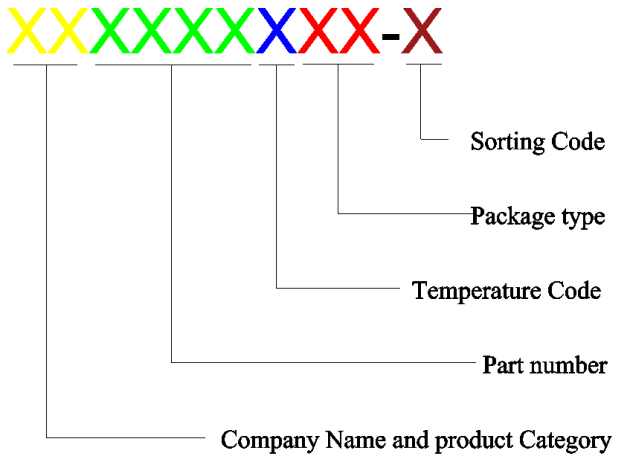
Features and Benefits

- Chopper stabilized amplifier stage
- Optimized for BLDC motor applications
- Reliable and low shifting on high Temp condition
- Good ESD Protection
- 100% tested at 125 ℃ for K.
- 100% tested at 150 ℃ for L.
- 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



Company Name and Product Category

MH:MST Hall Effect/MP:MST Power IC

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),
SS:TSOT-26,SD:DFN-6

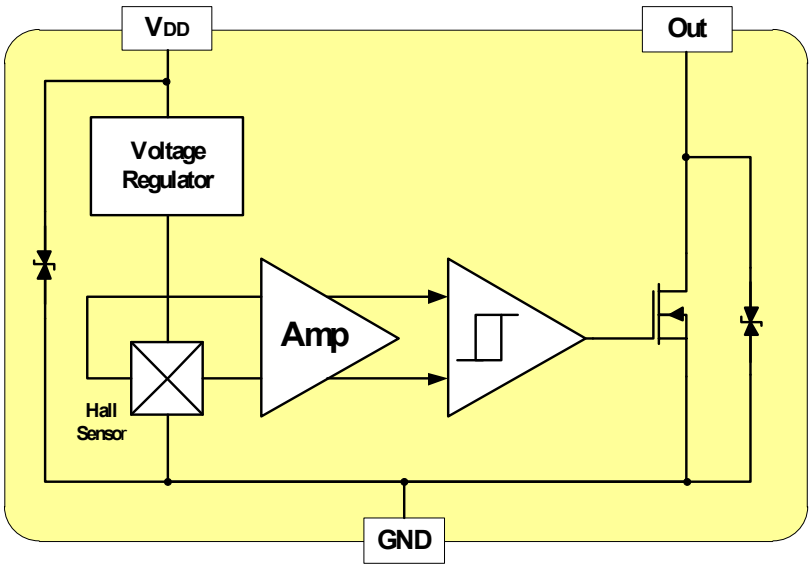
Sorting

α,β,Blank…..

Part No.	Temperature Suffix	Package Type
MH187LUA	L (-40°C to + 150°C)	UA (TO-92S)
MH187KUA	K (-40°C to + 125°C)	UA (TO-92S)
MH187KSO	K (-40°C to + 125°C)	SO (SOT-23)
MH187KSQ	K (-40°C to + 125°C)	SQ (QFN2020-3)
MH187EUA	E (-40°C to + 85°C)	UA (TO-92S)
MH187ESO	E (-40°C to + 85°C)	SO (SOT-23)
MH187ESQ	E (-40°C to + 85°C)	SQ (QFN2020-3)

KUA spec is using in industrial and automotive application. Special Hot Testing is utilized.

Functional Diagram



Absolute Maximum Ratings *At (Ta=25℃)*

Characteristics		Values	Unit
Supply voltage, (V_{DD})		28	V
Output Voltage,(*Vout*)		28	V
Reverse voltage, (V_{DD}) (V_{OUT})		-0.3	V
Output current, (I_{OUT})		50	mA
Operating Temperature Range, (*Ta*)	"E" version	-40 to +85	℃
	"K" version	-40 to +125	℃
	"L" version	-40 to +150	℃
Storage temperature range, (*Ts*)		-65 to +175	℃
Maximum Junction Temp,(*Tj*)		175/150	℃
Thermal Resistance	(θja) UA / SO / SQ	206 / 543 / 543	℃/W
	(θjc) UA / SO / SQ	148 / 410 / 410	℃/W
Package Power Dissipation, (P_D) UA / SO / SQ		728 / 230 / 230	mW

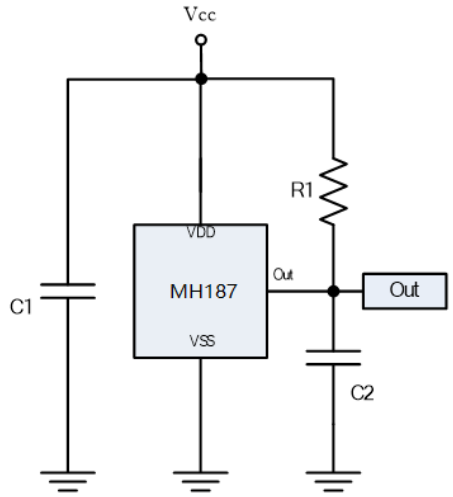
***Note**: Do not apply reverse voltage to* V_{DD} *and* V_{OUT} *Pin, It may be caused for Miss function or damaged device.*

Electrical Specifications

DC Operating Parameters： T_A*=+25℃,* V_{DD}*=12V*

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage,(V_{DD})	Operating	3.0		26.0	V
Supply Current,(I_{DD})	B<BOP			5.0	mA
Output Saturation Voltage, (*Vsat*)	IOUT = 20 mA, B>BOP			400.0	mV
Output Leakage Current, (*Ioff*)	IOFF B<BRP, VOUT = 12V			15.0	uA
Output Rise Time, (*TR*)	RL=1.1KΩ, CL =20pF			0.45	uS
Output Fall Time, (*TF*)	RL=820Ω; CL =20pF			0.45	uS
Electro-Static Discharge	HBM	4			KV
Operate Point,(*BOP*)		15		60	Gauss
Release Point,(*BRP*)		-60		-15	Gauss
Hysteresis,(*BHYS*)			80		Gauss

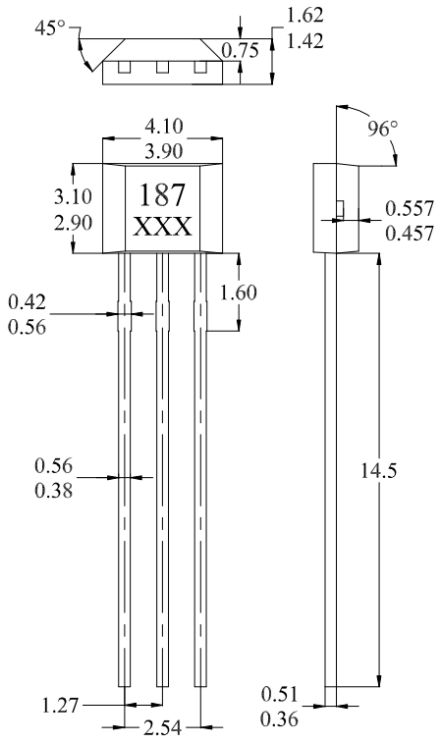
Typical application circuit



C1：10nF
C2：1nF
R1：1KΩ

Sensor Location, package dimension and marking

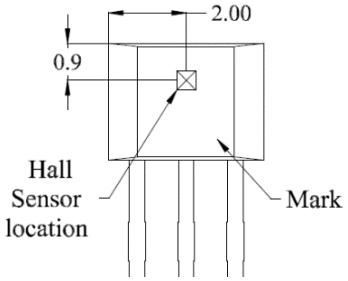
UA Package



NOTES:

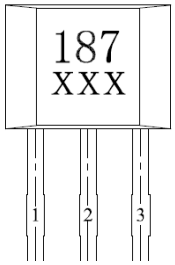
1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Do not bend leads within 1mm of lead to package interface.
4. PINOUT:
   Pin 1 VDD
   Pin 2 GND
   Pin 3 Output
5. XXX ; 1st X=Year ; 2nd and 3rd XX=Week

Hall Chip location

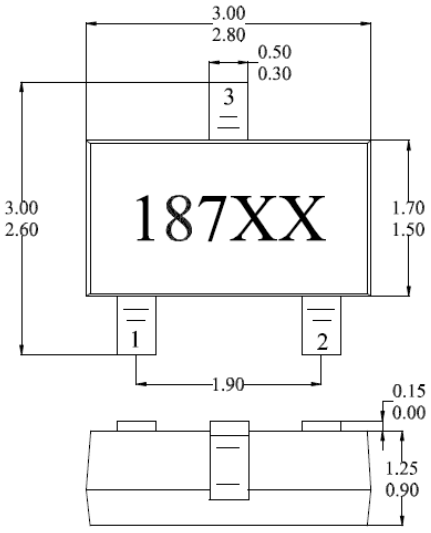


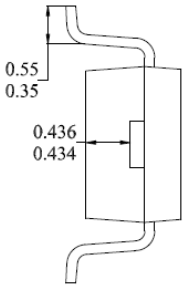
Output Pin Assignment

(Top view)

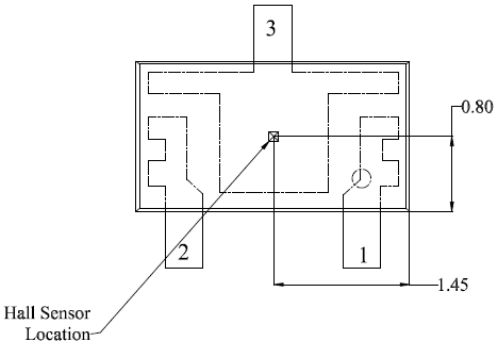


SO Package
(Top View)





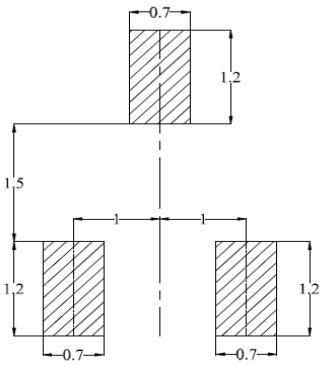
Hall Plate Chip Location
(Bottom View)



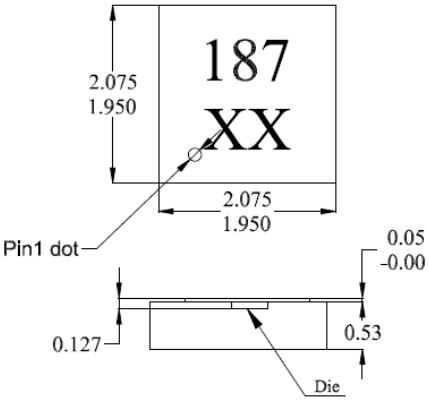
NOTES:

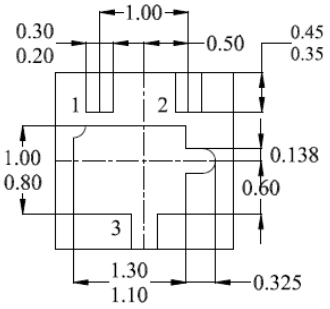
1. PINOUT (See Top View at left :)
   Pin 1 V_{DD}; Pin 2 Output; Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum
4. XX: Date Code, Refer to DC table

(For reference only) Land Pattern

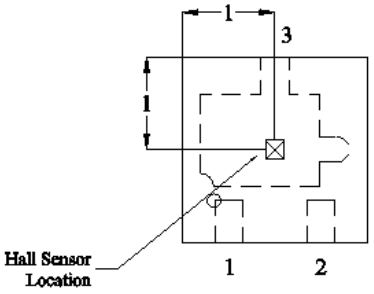


SQ Package
（Top View）

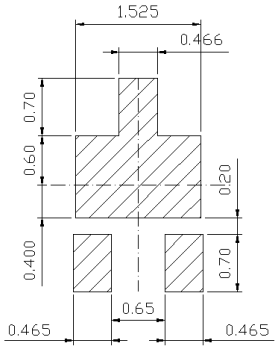




Bottom View



(For reference only)Land Pattern



NOTES:

1. PINOUT (See Top View at left)
   Pin 1 VDD
   Pin 2 Output
   Pin 3 GND
2. Controlling dimension: mm;
3. Chip rubbing will be 10mil maximum;
4. Chip must be in PKG. center.
5. XX: Date Code, Refer to DC table