InSb Hall Element

Differential Analog Output Hall Element

AS300H

General Description

This is a ultra-high sensitivity type of ANGSemi hall element using evaporated InSb film. It performs effectively in low magnetic fields due to the high sensitivity. The input and output resistance values are suitable for transistor circuits.

The device is available in SIP-4L package and is rated over the -40°C to 125°C. The all packages are RoHS and Green compliant.

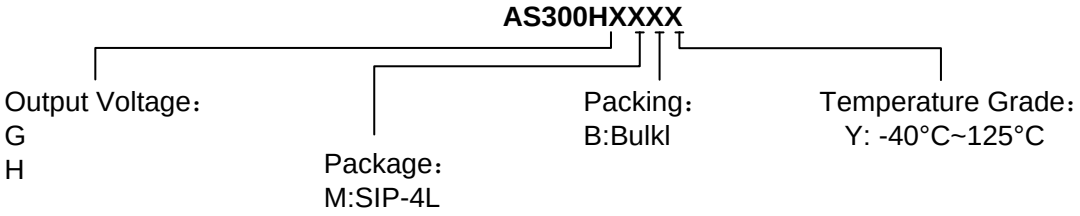
Features

- Ultra-High sensitivity InSb Hall Element
- Shipped in Package tape Real
- Differential Analog output
- Output Hall Voltage (mV)
  - G: 310mV to 370mV
  - H: 360mV to 415mV
- RoHS & Green Compliant
- Thin 4pin SIP Packages
- -40℃ to +125 ℃ Temperature Range

Applications

- Brushless DC Motor
- Other small precision motors
- DVD, CD-ROM, floppy disk drive
- Non-contacting, rotation sensors, current sensors
- Magnetic flux sensors other than those above

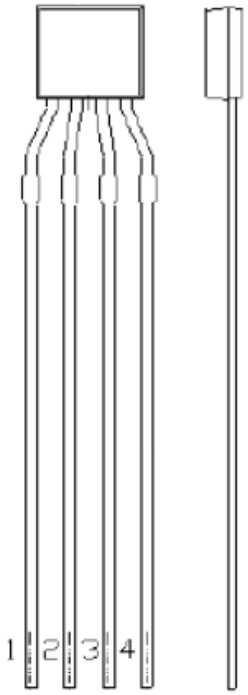
Ordering Information



Part Number	Output Hall Voltage (mV, B=50mT, VC=1V)	Package Type	Package Qty	Temperature	Eco Plan
AS300HGMBY	310 to 370	SIP-4L	Bulk 500pcs/package	-40～125℃	Green
AS300HHMBY	360 to 415	SIP-4L	Bulk 500pcs/package	-40～125℃	Green

■ Marking & Pin Assignment

SIP-4L:



Pin Name	Pin No. SOT23-4L		I/O	Pin Function
Input	1 (+)	3 (-)	I/P	Input Pins +/-
	1 (-)	3 (+)	I/P	Input Pins -/+
OUTPUT	2 (+)	4 (-)	I/P	Output Pins +/-
	2 (-)	4 (+)	I/P	Output Pins -/+

■ Typical Application Circuit

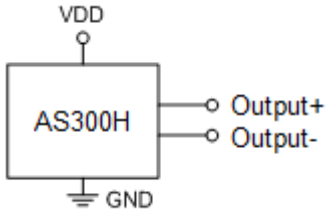


Figure 1, Typical Application Circuit of AS300H

■ Absolute Maximum Ratings[1] (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Unit
Max. Input Current	I_{MAX}	20	mA
Maximum Power Dissipation	P_{DMAX}	300	mW
Storage Temperature Range	T_S	-55 to +150	℃
Operating Junction Temperature Range	T_{OP}	-40 to +125	℃
Maximum Soldering Temperature (at leads, 10 sec)	T_{LEAD}	260	℃

Note: 1: Stresses above those listed in absolute maximum ratings may cause permanent damage to the device. Functional operation at conditions other than the operating conditions specified is not implied. Only one absolute maximum rating should be applied at any one time.

2: The device is not guaranteed to function outside of its operating conditions.

■ Electrical Characteristics

(T_A = -40 to +125℃ unless otherwise noted. Typical values are at T_A = +25℃, 1mT=10Gauss)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_H	Output Hall Voltage	Const. Voltage Drive, B=50mT, V_C=1V	310	-	415	mV
R_{IN}	Input Resistance	B=0mT, I_C=0.1mA	240	-	550	Ω
R_{OUT}	Output Resistance	B=0mT, I_C=0.1mA	240	-	550	Ω
V_{OS}	Offset Voltage	B=0mT, V_C=1V	-7	-	+7	mV
aV_H	Temp. Coefficient of V_H	B=50mT, I_C=1mA	-	-1.8	-	%/℃
aR_{IN}	Temp. Coefficient of R_{IN}	B=0mT, I_C=5mA	-	-1.8	-	%/℃
-	Dielectric Strength	100V D.C	1.0	-	-	MΩ

Notes: 1, $V_H=V_{HM}-V_{OS}$ (V_{HM}: meter indication)

2, $aV_H=1/(V_{HT1})$ X $(V_{H(T3)} - V_{H(T2)})/(T3-T2)$ X100

3, $aR_{IN}=1/(R_{INT1})$ X $(R_{IN(T3)} – R_{IN(T2)})/(T3-T2)$ X100

T1=20℃, T2=0℃, T3=40℃.

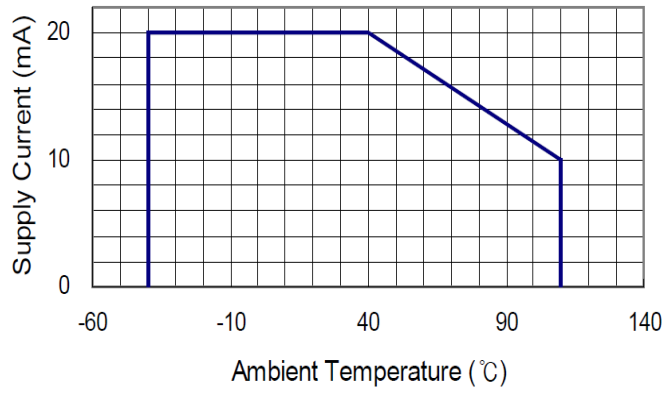
■ Classification of Output Hall Voltage (V_H)

Rank	V_H(mV)	Conditions
G	310 to 370	B=50mT, V_C=1V, Constant Voltage Drive
H	360 to 415	

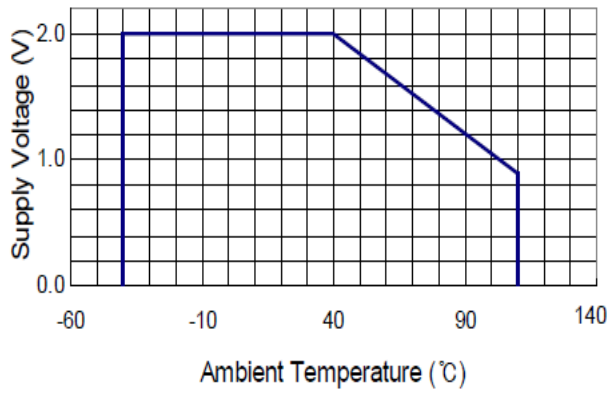
■ Typical Characteristics—AS300H

(Unless otherwise noted, Typical values are at T_A = +25℃, 1mT=10Gauss)

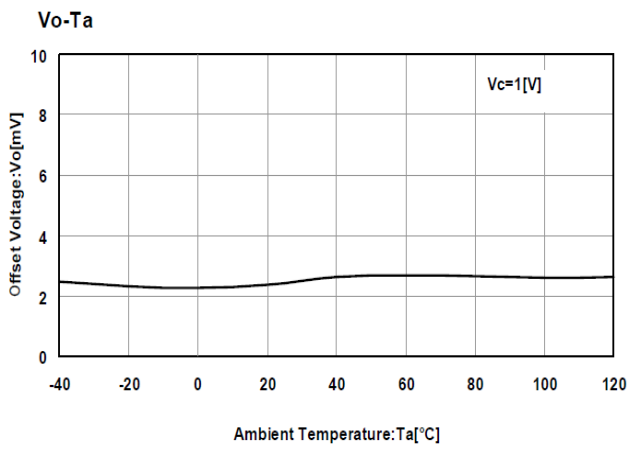
Input Current Derating Curve
(Input & Output Resistance 240Ωto 550Ω)



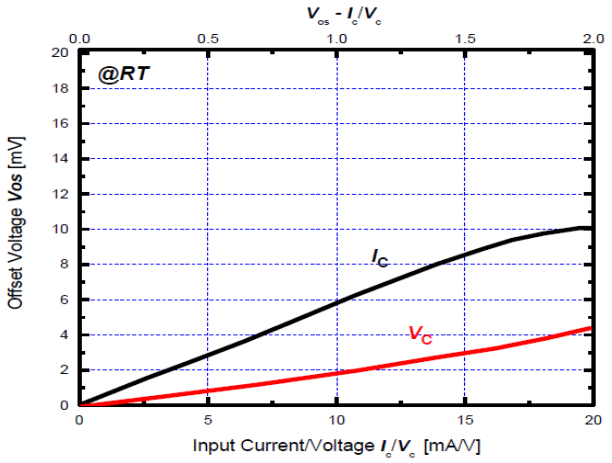
Input Voltage Derating Curve
(Input & Output Resistance 240Ωto 550Ω)



Offset Voltage vs. Temperature



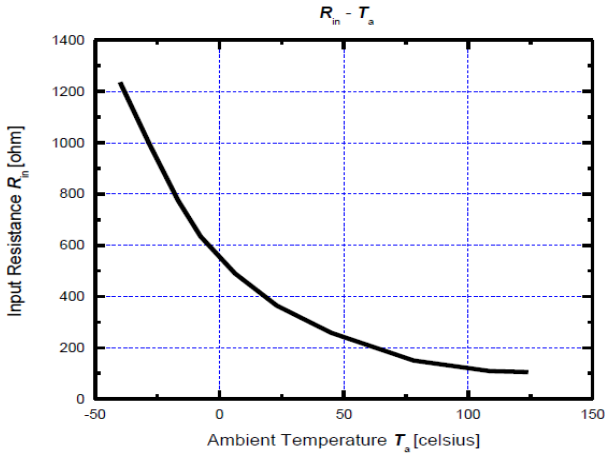
Offset Voltage vs. IC/VC



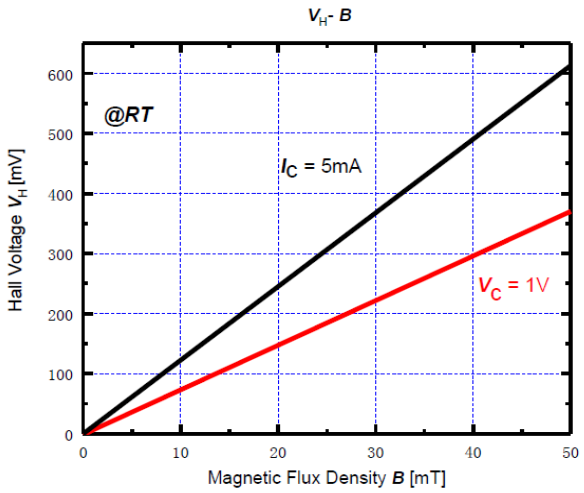
■ Typical Characteristics—AS300H

(Unless otherwise noted, Typical values are at T_A = +25℃, 1mT=10Gauss)

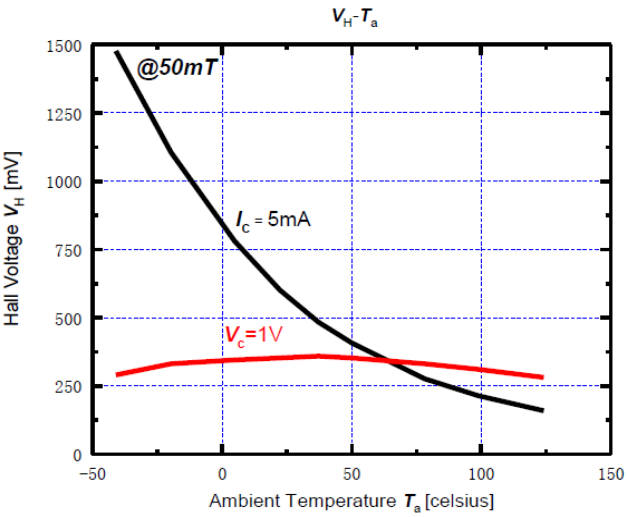
Input Resistance Rin vs. Temperature



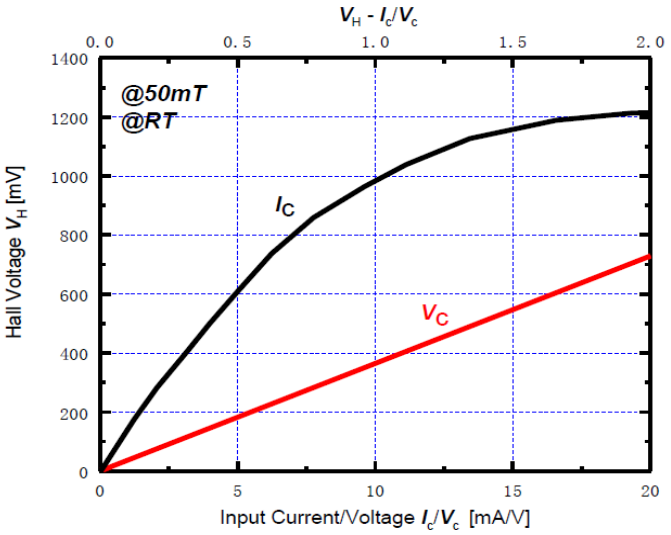
Hall Voltage VH vs. Magnetic Flux Density B



Hall Voltage VH vs. Temperature



Hall Voltage VH vs. IC/VC



Thermal Considerations

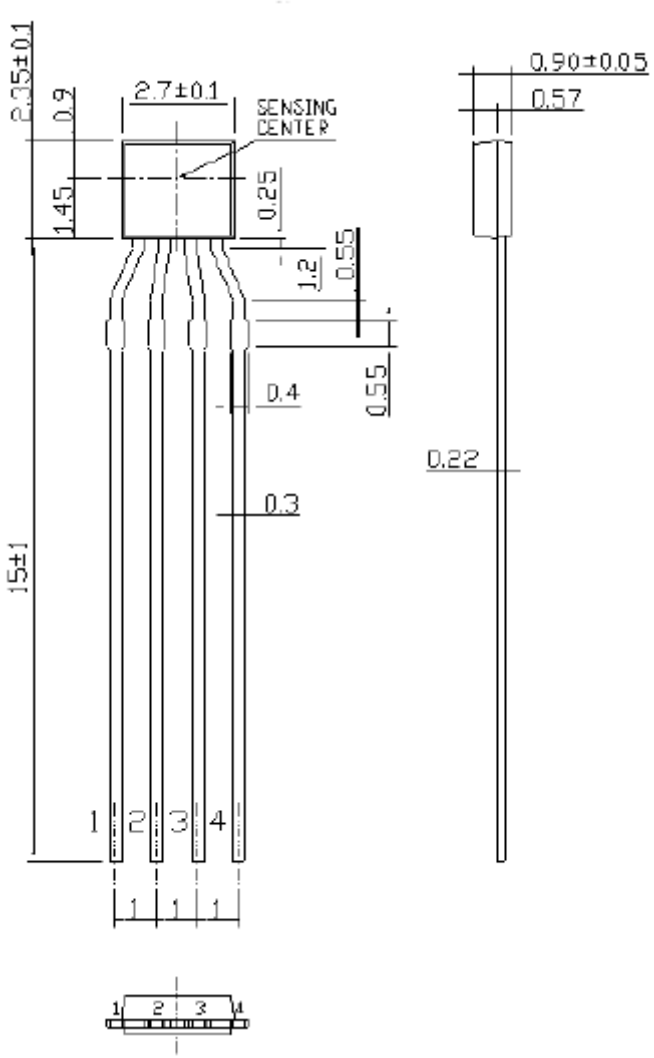
The maximum IC junction temperature should be restricted to 125°C under normal operating conditions. This restriction limits the power dissipation of the AS300H. Calculate the maximum allowable dissipation, $P_{D(max)}$, and keep the actual dissipation less than or equal to $P_{D(max)}$. The maximum-power-dissipation limit is determined using following equation:

$$P_{D(MAX)} = \frac{125℃ - T_A}{R_{\theta JA}}$$

Where, T_A is the maximum ambient temperature for the application. $R_{\theta JA}$ is the thermal resistance junction-to-ambient given in Power Dissipation Table.

■ Package Information

SIP-4L: (unit: mm)



■ Packing Information

1. Packing type: Bulk
2. Packing minimum: 500pcs