

Description

The AHE300 is an InSb (ultra-high sensitivity) Hall element with an output voltage of 370mV (max).

The AHE300 is a device that operates even in weak magnetic fields due to its ultra-high sensitivity.

Classification Hall Voltage V_H

Rank	V_H (mV)	Condition
C	168 to 204	B = 50mT, V_C = 1V
D	196 to 236	
E	228 to 274	
F	266 to 320	
G	310 to 370	

Features

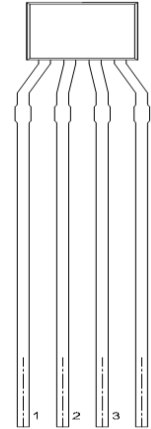
- Ultra-High Sensitivity
 - It Works Even with a Fairly Weak Magnetic Field
- Classic SIP-4 (Type MA) Package
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.
<https://www.diodes.com/quality/product-definitions/>

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Pin Assignments

SIP-4 (Type MA)



Input	1(±)	3(∓)
Output	2(±)	4(∓)

Applications

- Detection of opening and closing of mobile phones and PCs
- Detection with joysticks
- Magnetic encoders
- Current measurement with overhead wire ammeters (clamp type ammeters)
- Position detection with brushless motors, wheel rotation speed detection
- Contactless commutation, speed measurement, and angular position sensing/indexing in consumer home appliances, office equipment, and industrial applications

Absolute Maximum Ratings

Symbol	Characteristic	Value	Unit
I_{Cmax}	Maximum Input Current	20	mA
V_{Cmax}	Maximum Input Voltage	2	V
T_{OP}	Operating Temperature Range	-40 to +110	°C
T_S	Storage Temperature Range	-40 to +125	°C

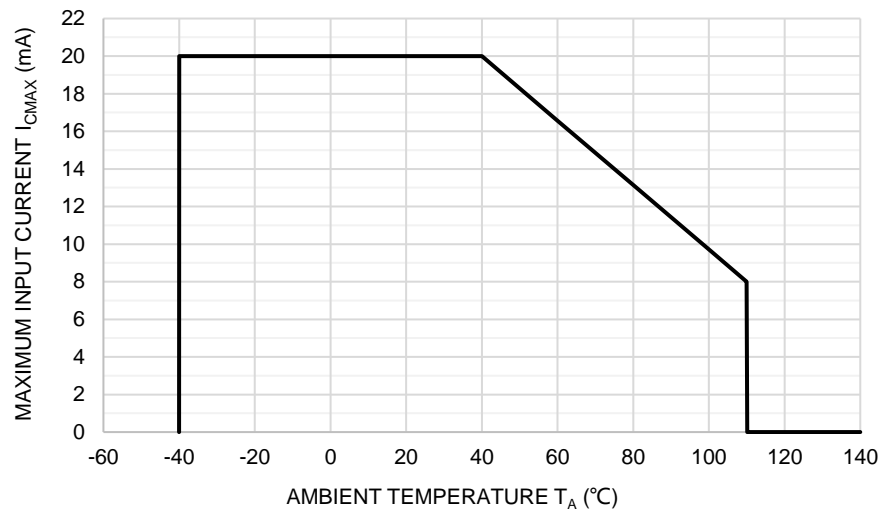


Figure 1. Maximum Input Current I_{Cmax} vs. Ambient Temperature

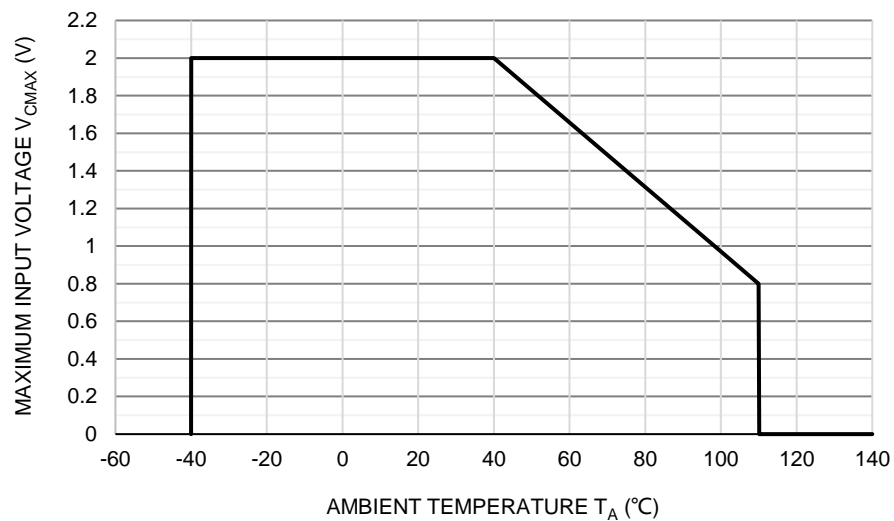


Figure 2. Maximum Input Voltage V_{Cmax} vs. Ambient Temperature

Electrical Characteristics ($T_A = +25^\circ\text{C}$)

Table 1. Electrical Characteristics of AHE300

Item	Symbol	Test Condition	Min	Typ	Max	Unit
Hall Voltage	V_H	$B = 50\text{mT}$, $V_C = 1\text{V}$, $T_A = +25^\circ\text{C}$	168	—	320	mV
Input Resistance	R_{in}	$B = 0\text{mT}$, $I_C = 0.1\text{mA}$, $T_A = +25^\circ\text{C}$	240	—	550	Ω
Output Resistance	R_{out}	$B = 0\text{mT}$, $I_C = 0.1\text{mA}$, $T_A = +25^\circ\text{C}$	240	—	550	Ω
Offset Voltage	V_{os}	$B = 0\text{mT}$, $V_C = 1\text{V}$, $T_A = +25^\circ\text{C}$	-7	—	+7	mV
Temperature Coefficient of V_H	αV_H	$B = 50\text{mT}$, $I_C = 5\text{mA}$, $T_A = 0^\circ\text{C to } +40^\circ\text{C}$	—	-1.8	—	%/ $^\circ\text{C}$
Temperature Coefficient of R_{in}	αR_{in}	$B = 0\text{mT}$, $I_C = 0.1\text{mA}$, $T_A = 0^\circ\text{C to } +40^\circ\text{C}$	—	-1.8	—	%/ $^\circ\text{C}$
Dielectric Strength	—	100VDC	1.0	—	—	M Ω

Notes:

- $V_H = V_{H-M} - V_{os}$
In which V_{H-M} is the output Hall voltage, V_H is the Hall voltage and V_{os} is the offset voltage under the identical electrical stimuli.
- $\alpha V_H = \frac{1}{V_H(T_1)} \times \frac{V_H(T_3) - V_H(T_2)}{(T_3 - T_2)} \times 100$
- $\alpha R_{in} = \frac{1}{R_{in}(T_1)} \times \frac{R_{in}(T_3) - R_{in}(T_2)}{(T_3 - T_2)} \times 100$
 $T_1 = +20^\circ\text{C}$, $T_2 = 0^\circ\text{C}$, $T_3 = +40^\circ\text{C}$

Typical Operating Characteristics

Figure 3. Input Resistance R_{in} as a Function of Ambient Temperature T_a

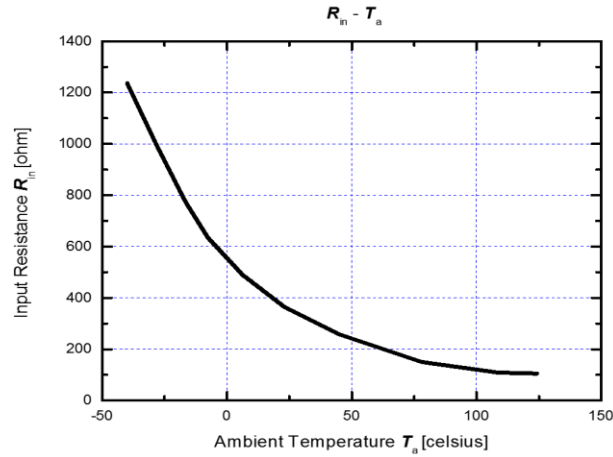


Figure 4. Hall Voltage V_H as a Function of Magnetic Flux Density B

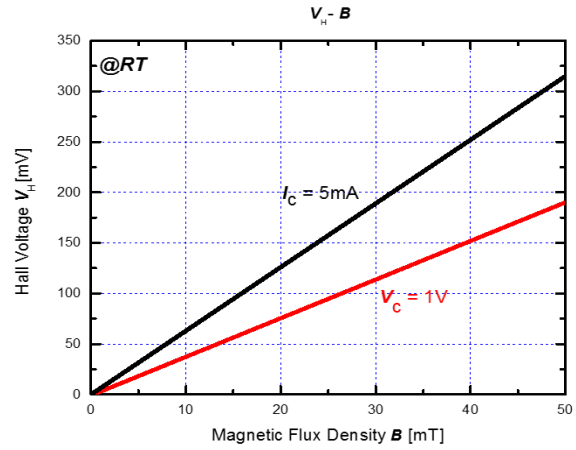


Figure 5. Hall Voltage V_H as a Function of Ambient Temperature T_a

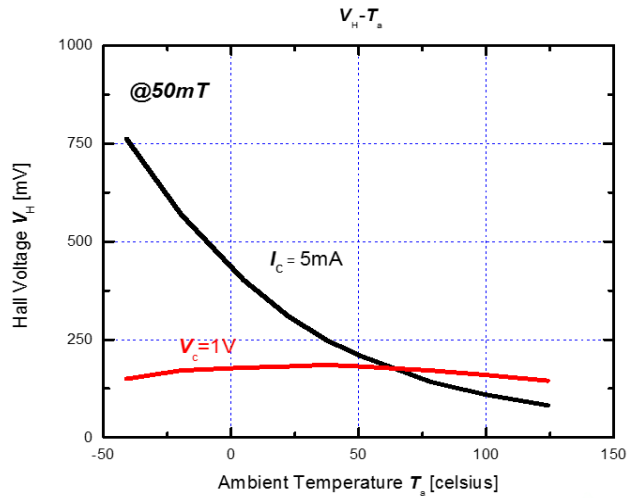


Figure 6. Hall Voltage V_H as a Function of Electrical Stimuli I_c/V_c

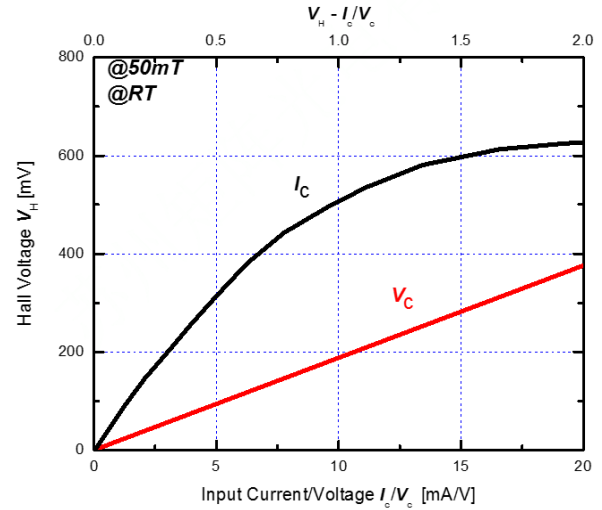
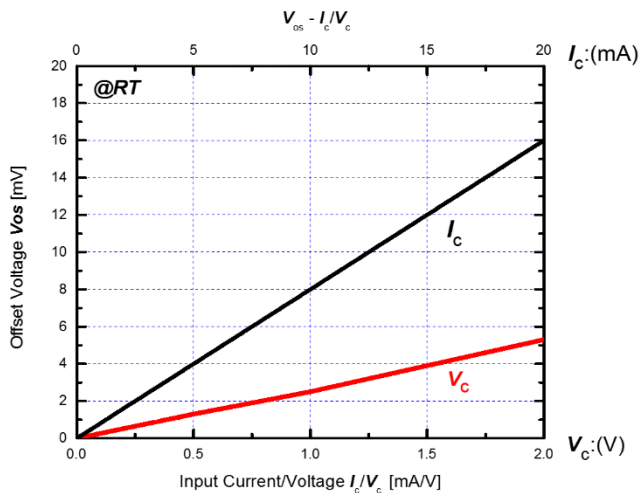
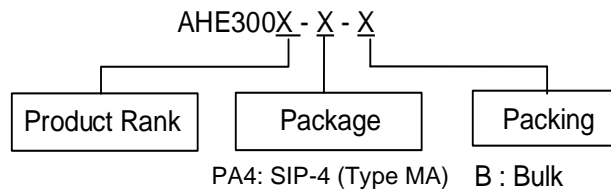


Figure 7. Offset Voltage V_{os} as a Function of Electrical Stimuli I_c/V_c



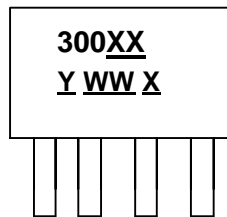
Ordering Information



Orderable Part Number	Package Code	Package	Packing	
			Qty.	Carrier
AHE300C-PA4-B	PA4	SIP-4 (Type MA)	500	Bulk
AHE300D-PA4-B	PA4	SIP-4 (Type MA)	500	Bulk
AHE300E-PA4-B	PA4	SIP-4 (Type MA)	500	Bulk
AHE300F-PA4-B	PA4	SIP-4 (Type MA)	500	Bulk
AHE300G-PA4-B	PA4	SIP-4 (Type MA)	500	Bulk

Marking Information

(Top View)



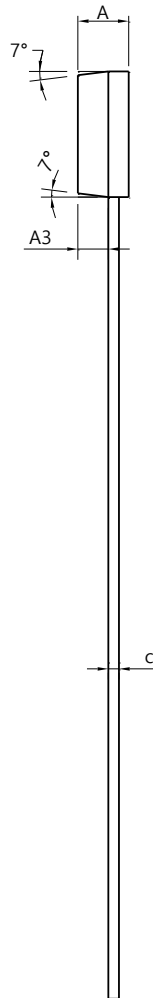
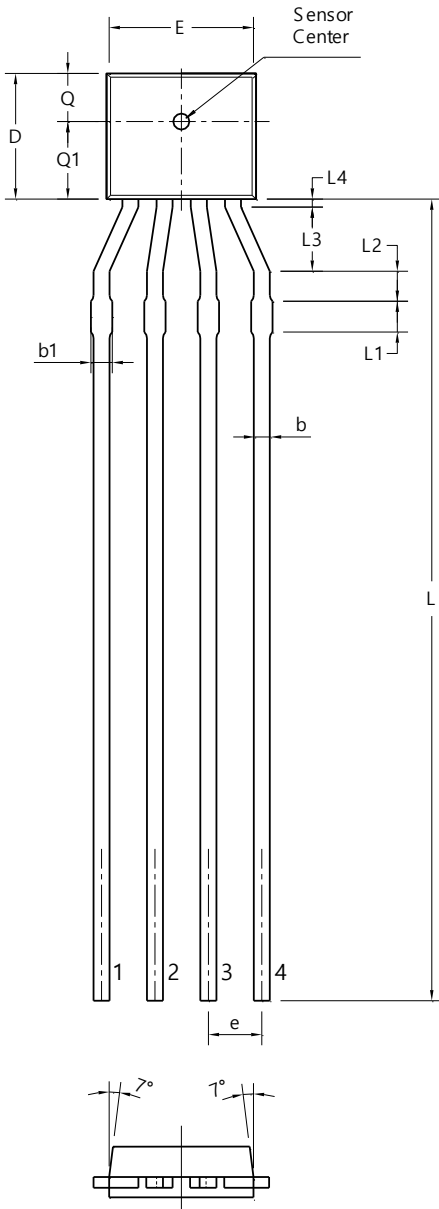
XX : Identification Code
Y : Year : 0 to 9 (ex: 5 = 2025)
WW : Week : 01 to 52, "52" represents week 52 and 53
X : Internal Code

Orderable Part Number	Package	Identification Code
AHE300C-PA4-B	SIP-4 (Type MA)	E2
AHE300D-PA4-B	SIP-4 (Type MA)	E3
AHE300E-PA4-B	SIP-4 (Type MA)	E4
AHE300F-PA4-B	SIP-4 (Type MA)	E5
AHE300G-PA4-B	SIP-4 (Type MA)	E6

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SIP-4 (Type MA)



SIP-4 (Type MA)			
Dim	Min	Max	Typ
A	0.85	0.95	0.90
A3	--	--	0.57
b	--	--	0.30
b1	--	--	0.40
c	--	--	0.20
D	2.25	2.45	2.35
e	--	--	1.00
E	2.70	2.90	2.80
L	14.00	16.00	15.00
L1	--	--	0.55
L2	--	--	0.55
L3	--	--	1.20
L4	--	--	0.25
Q	--	--	0.90
Q1	--	--	1.45
All Dimensions in mm			

Reliability Test Terms

Criteria:

Terms	Conditions			Duration
High Temperature Storage	(JEITA EIAJ ED-4701) $T_A = +150$ (0 to $+10$)°C			1000 hrs
Heat Cycle	(JEITA EIAJ ED-4701) $T_A = -55$ to $+150$ °C			30 cycles
	High Temperature	Normal Temperature	Low Temperature	
	30min	5min	30min	
Temperature Humidity Storage	(JEITA EIAJ ED-4701) $T_A = 85 \pm 3^\circ\text{C}$, $R_H = 85 \pm 5\%$			1000 hrs
Resistance to Hand Soldering Heat	(JEITA EIAJ ED-4701) Dipped in the $300 \pm 5^\circ\text{C}$ Solder up to the 1mm part from the body			5 sec
High Temperature Operating	$T_A = +125^\circ\text{C}$, $V_C = 1\text{V}$			1000 hrs

- Variation of Hall Voltage V_H and input/output resistances $R_{in/out}$ are less than 20%.
- Variation of offset voltage V_{os} is less than $\pm 16\text{mV}$.
- Other parameters in Table 1. are still within their ranges stated in Table 1.

Mechanical Data

- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.05 grams (Approximate)

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