

## Description

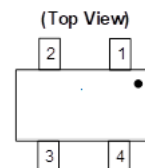
The AHE108 is an InSb (ultra-high sensitivity) Hall element with an output voltage of 370mV (max).

The AHE108 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)	Conditions
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	

## Pin Assignments



Input	1(±)	3(±)
Output	2(±)	4(±)

SOT23-4 (Type C)

## Features

- Ultra-High Sensitivity
  - It Works Even with a Fairly Weak Magnetic Field
- Classic SOT23-4 (Type C) 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/>

## 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

- 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.

## 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 +125	°C
$T_S$	Storage Temperature Range	-55 to +150	°C

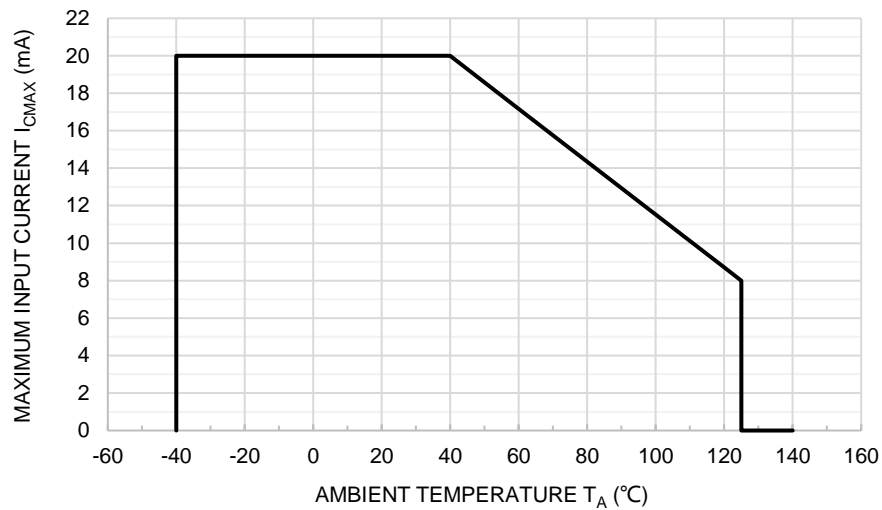


Figure 1. Maximum Input Current  $I_{Cmax}$  vs. Temperature

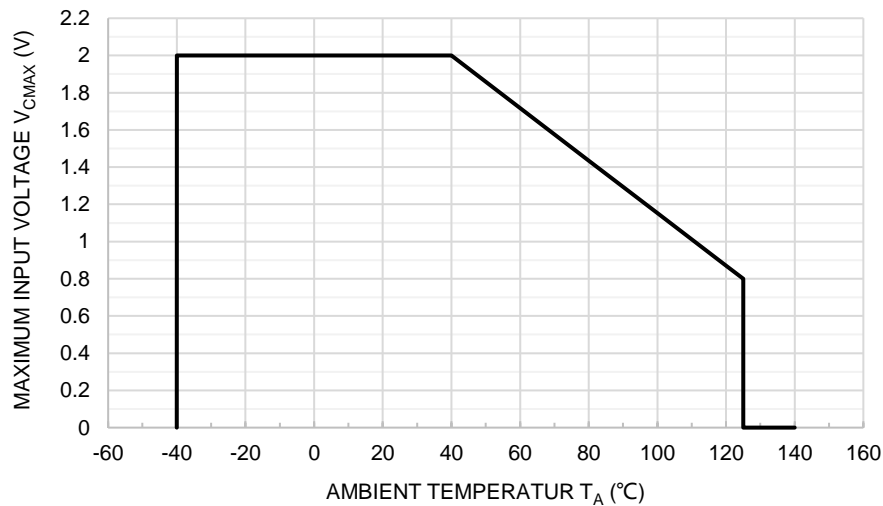


Figure 2. Maximum Input Voltage  $V_{Cmax}$  vs. Temperature

## Electrical Characteristics (T<sub>A</sub> = +25°C)

Table 1. Electrical Characteristics of AHE108

Item	Symbol	Test Condition	Min	Typ	Max	Unit
Hall Voltage	V <sub>H</sub>	B = 50mT, V <sub>C</sub> = 1V, T <sub>A</sub> = +25°C	168	—	370	mV
Input Resistance	R <sub>in</sub>	B = 0mT, I <sub>C</sub> = 0.1mA, T <sub>A</sub> = +25°C	250	—	550	Ω
Output Resistance	R <sub>out</sub>	B = 0mT, I <sub>C</sub> = 0.1mA, T <sub>A</sub> = +25°C	250	—	550	Ω
Offset Voltage	V <sub>os</sub>	B = 0mT, V <sub>C</sub> = 1V, T <sub>A</sub> = +25°C	-7	—	+7	mV
Temperature Coefficient of V <sub>H</sub>	αV <sub>H</sub>	B = 50mT, I <sub>C</sub> = 5mA, T <sub>A</sub> = 0°C to +40°C	—	-1.8	—	%/°C
Temperature Coefficient of R <sub>in</sub>	αR <sub>in</sub>	B = 0mT, I <sub>C</sub> = 0.1mA, T <sub>A</sub> = 0°C to +40°C	—	-1.8	—	%/°C

Notes:

1.  $V_H = V_{H-M} - V_{os}$   
In which V<sub>H-M</sub> is the output Hall voltage, V<sub>H</sub> is the Hall voltage and V<sub>os</sub> is the offset voltage under the identical electrical stimuli.
2.  $\alpha V_H = \frac{1}{V_H(T_1)} \times \frac{V_H(T_3) - V_H(T_2)}{(T_3 - T_2)} \times 100$
3.  $\alpha R_{in} = \frac{1}{R_{in}(T_1)} \times \frac{R_{in}(T_3) - R_{in}(T_2)}{(T_3 - T_2)} \times 100$   
T<sub>1</sub> = +20°C, T<sub>2</sub> = 0°C, T<sub>3</sub> = +40°C

## Typical Operating Characteristics

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

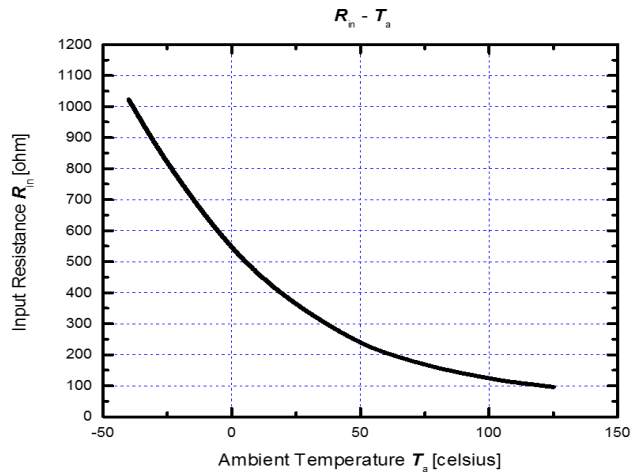


Figure 4. Hall Voltage  $V_H$  as a Function of Magnetic Flux Density  $B$

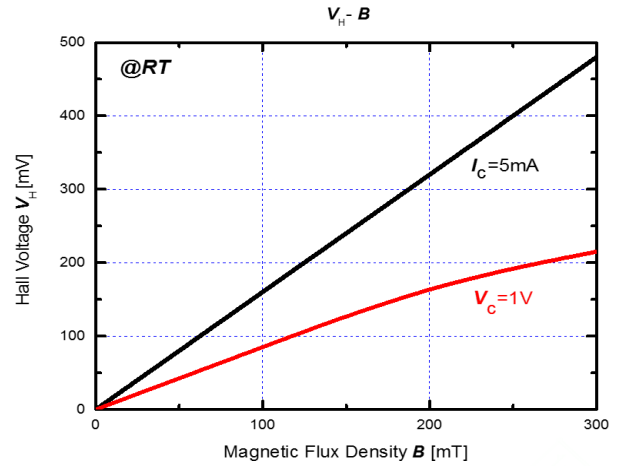


Figure 5. Hall Voltage  $V_H$  as a Function of Ambient Temperature  $T_a$

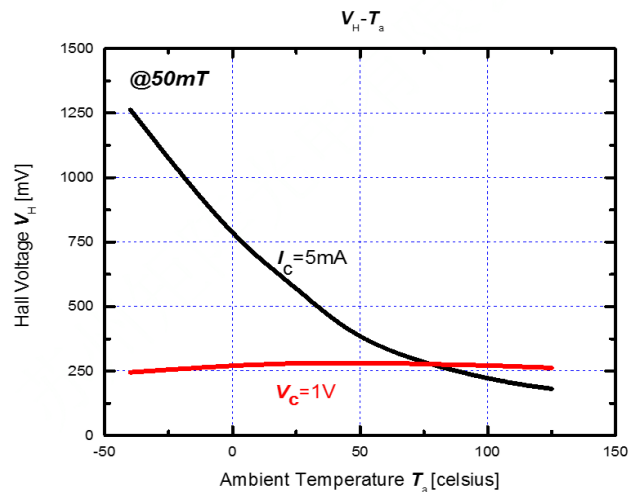


Figure 6. Hall Voltage  $V_H$  as a Function of Electrical Stimuli  $I_c/V_c$

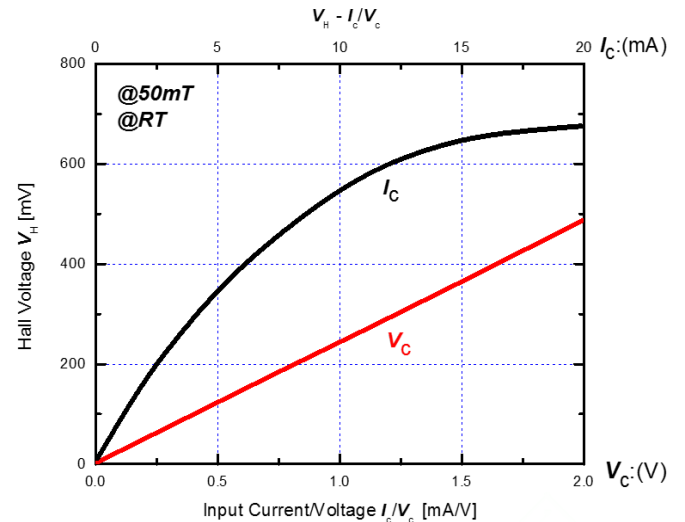
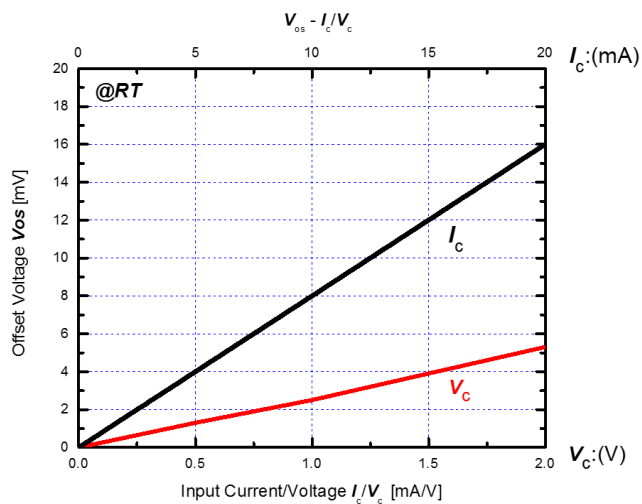
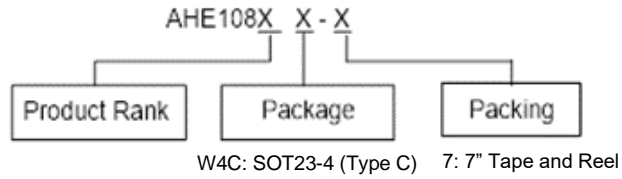


Figure 7. Offset Voltage  $V_{os}$  as a Function of Electrical Stimuli  $I_c/V_c$



Notes: All curves have to confirm to Matrix  
 $R_{in}$  vs temperature different to 601/602  
 Offset voltage also different to 601/602

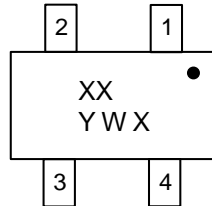
## Ordering Information



Orderable Part Number	Package Code	Package	Packing	
			Qty.	Carrier
AHE108C-W4C-7	W4C	SOT23-4 (Type C)	4000	7" Tape & Reel
AHE108D-W4C-7	W4C	SOT23-4 (Type C)	4000	7" Tape & Reel
AHE108E-W4C-7	W4C	SOT23-4 (Type C)	4000	7" Tape & Reel
AHE108F-W4C-7	W4C	SOT23-4 (Type C)	4000	7" Tape & Reel
AHE108G-W4C-7	W4C	SOT23-4 (Type C)	4000	7" Tape & Reel

## Marking Information

(Top View)



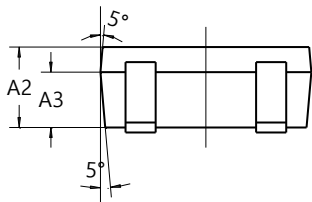
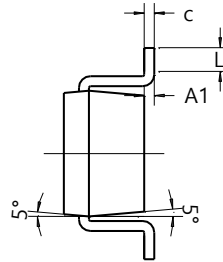
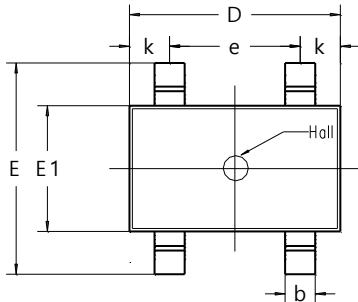
XX : Identification code  
 Y : Year 0 to 9  
 W : Week : A to Z : week 1 to 26;  
 a to z : week 27 to 52; z represents  
 52 and 53 week  
 X : Internal Code

Orderable Part Number	Package	Identification Code
AHE108C-W4C-7	SOT23-4 (Type C)	HC
AHE108D-W4C-7	SOT23-4 (Type C)	HD
AHE108E-W4C-7	SOT23-4 (Type C)	HE
AHE108F-W4C-7	SOT23-4 (Type C)	HF
AHE108G-W4C-7	SOT23-4 (Type C)	HG

## Package Outline Dimensions

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

SOT23-4 (Type C)

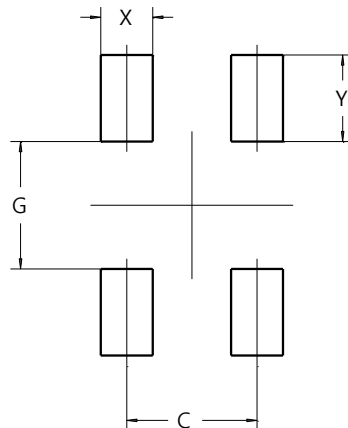


SOT23-4 (Type C)			
Dim	Min	Max	Typ
A1	0.00	0.10	--
A2	0.70	0.90	0.80
A3	--	--	0.55
b	--	--	0.30
c	--	--	0.10
D	2.00	2.20	2.10
E	1.90	2.30	2.10
E1	1.15	1.35	1.25
e	--	--	1.30
k	--	--	0.40
L	--	--	0.25
All Dimensions in mm			

## Suggested Pad Layout

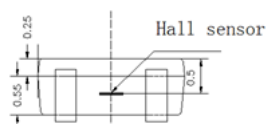
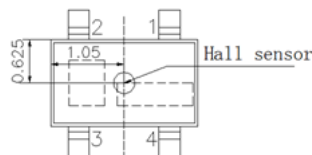
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23-4 (Type C)



Dimensions	Value (in mm)
C	1.275
G	1.250
X	0.508
Y	0.850

## Sensor Location



## 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) $T_A = 85 \pm 3^\circ\text{C}$ , $RH = 85 \pm 5\%$			1000 hrs
Reflow Soldering	(JEITA EIAJ ED-4701) $T_A = 260 \pm 5^\circ\text{C}$			10 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

- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.0061 grams (Approximate)

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