

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	$B = 50\text{mT}$, $V_C = 1\text{V}$
D	196 to 236	
E	228 to 274	
F	266 to 320	
G	310 to 370	

Features

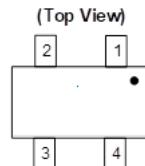
- Ultra-High Sensitivity
 - It Works Even with a Fairly Weak Magnetic Field
- Classic SOT23-4 (Type C) Package
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) 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



Input	1(±)	3(±)
Output	2(±)	4(±)

SOT23-4 (Type C)

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 +125	°C
T _s	Storage Temperature Range	-55 to +150	°C

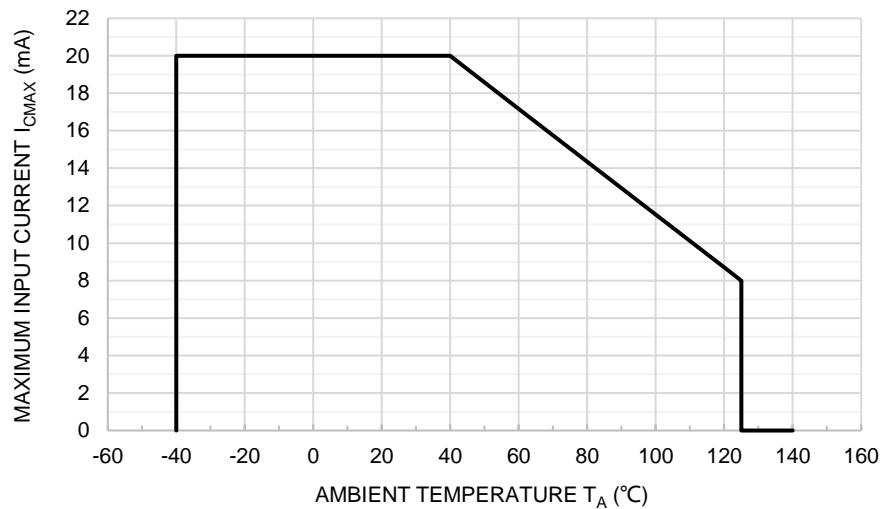


Figure 1. Maximum Input Current I_{cmax} vs. Temperature

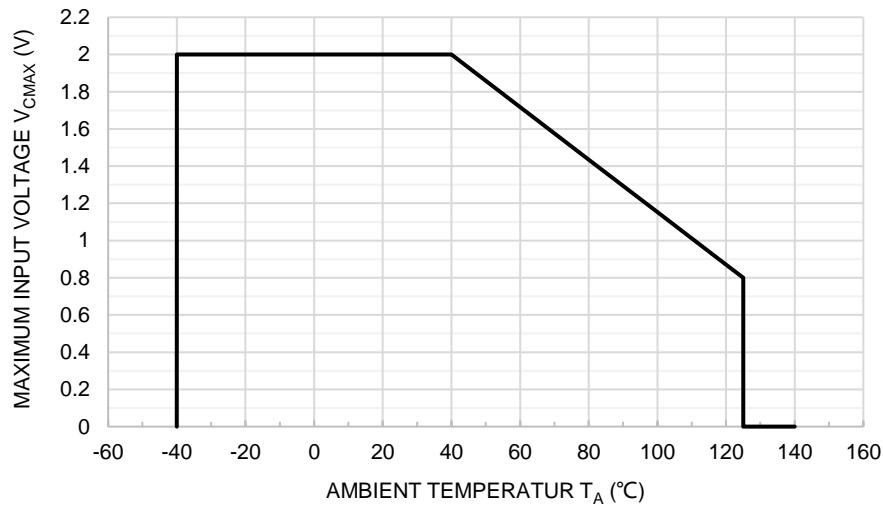


Figure 2. Maximum Input Voltage V_{cmax} vs. Temperature

Electrical Characteristics (T_A = +25°C)

Table 1. Electrical Characteristics of AHE108

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

Notes:

1. $V_H = V_{H-M} - V_{os}$
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.
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. $\alpha R_{in} = \frac{1}{R_{in}(T_1)} \times \frac{R_{in}(T_3) - R_{in}(T_2)}{(T_3 - T_2)} \times 100$
 $T_1 = +20^\circ\text{C}$, $T_2 = 0^\circ\text{C}$, $T_3 = +40^\circ\text{C}$

Typical Operating Characteristics

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

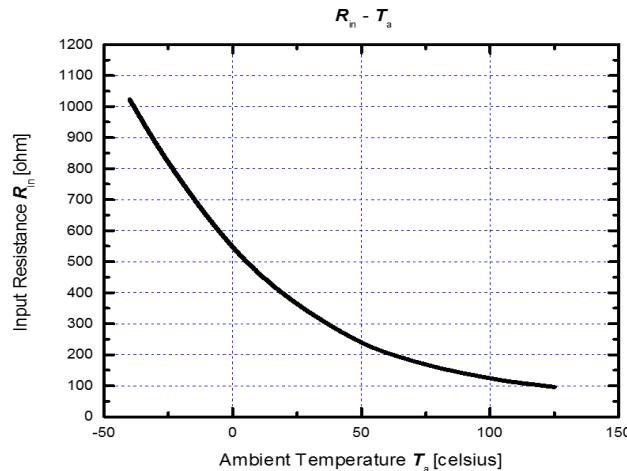


Figure 4. Hall Voltage V_H as a Function of Magnetic Flux Density B

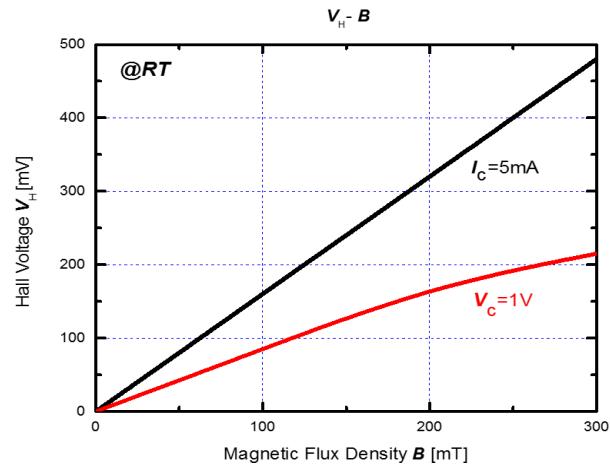


Figure 5. Hall Voltage V_H as a Function of Ambient Temperature T_a

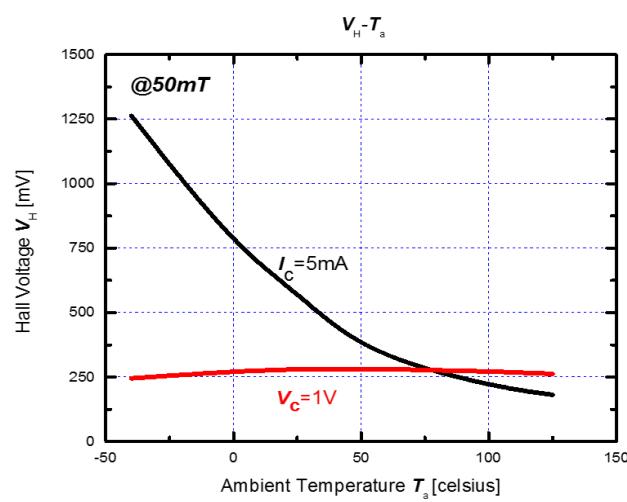


Figure 6. Hall Voltage V_H as a Function of Electrical Stimuli I_c/V_c

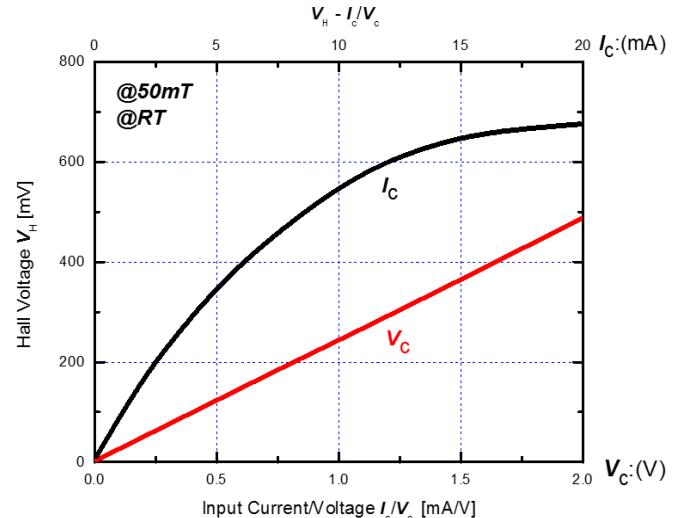
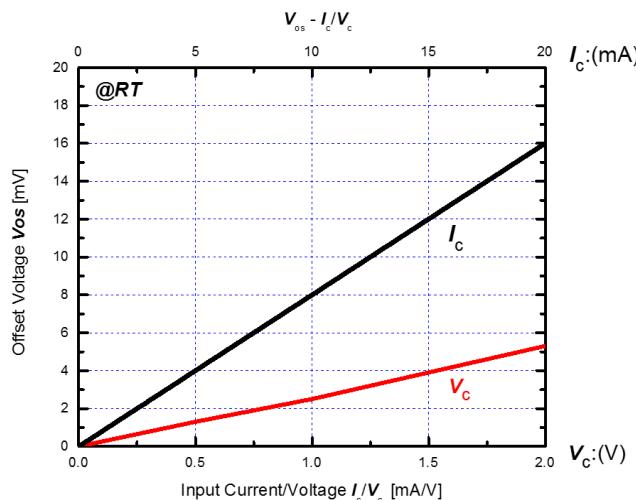
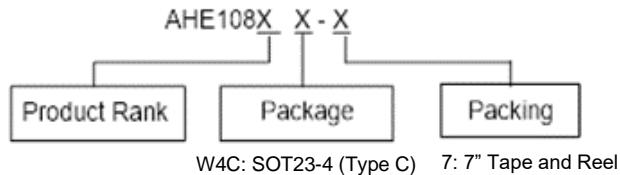


Figure 7. Offset Voltage V_{os} as a Function of Electrical Stimuli I_c/V_c



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

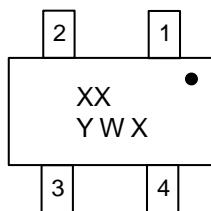
Ordering Information



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)



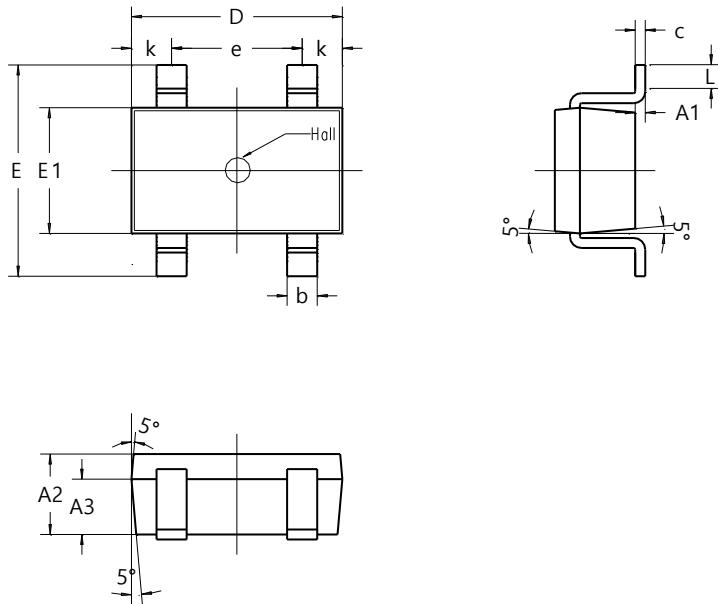
XX : Identification code
Y : Year 0 to 9
W : Week : A to Z : week 1 to 26;
a to z : week 27 to 52; z represents
52 and 53 week
X : Internal Code

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)



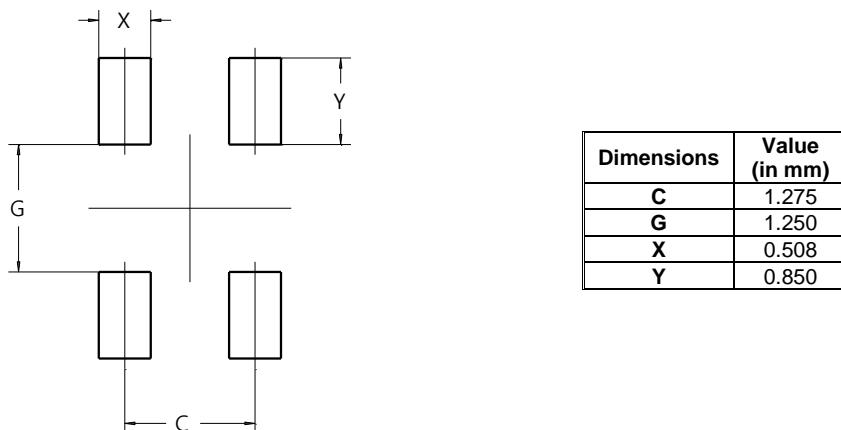
SOT23-4 (Type C)			
Dim	Min	Max	Typ
A1	0.00	0.10	--
A2	0.70	0.90	0.80
A3	--	--	0.55
b	--	--	0.30
c	--	--	0.10
D	2.00	2.20	2.10
E	1.90	2.30	2.10
E1	1.15	1.35	1.25
e	--	--	1.30
k	--	--	0.40
L	--	--	0.25

All Dimensions in mm

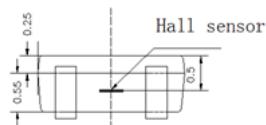
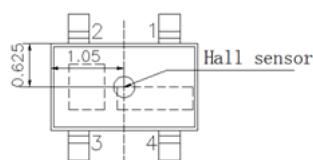
Suggested Pad Layout

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

SOT23-4 (Type C)



Sensor Location



Reliability Test Terms

Criteria:

Terms	Conditions			Duration
High Temperature Storage	(JEITA EIAJ ED-4701) $T_A = +150$ (0 to +10) $^{\circ}\text{C}$			1000 hrs
Heat Cycle	(JEITA EIAJ ED-4701) $T_A = -55$ to $+150$ $^{\circ}\text{C}$			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	$T_A = +125$ $^{\circ}\text{C}$, $V_C = 1V$			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 ± 16 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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