InSb Hall Element

Differential Analog Output Hall Element

AS101A

General Description

This is a 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 SOT23-4L and flat pins SOT23-4L packages is rated over the -40°C to 125°C. The all packages are RoHS and Green compliant.

Features

- High sensitivity InSb Hall Element
- Shipped in Package tape Real
- Differential Analog output
- Output Hall Voltage (mV)
  - D: 196mV to 236mV (DD)
  - E: 228mV to 274mV (DE)
  - F: 266mV to 320mV (DF)
  - G: 310mV to 370mV (DG)
  - H: 360mV to 430mV (DH)
- RoHS & Green Compliant
- Thin 4pin SMT SOT23 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

Typical Application Circuit

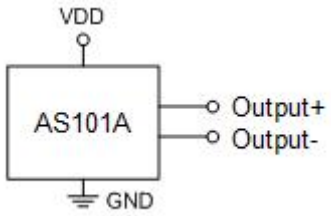


Figure 1, Typical Application Circuit of AS101A

Ordering Information

AS101AXXXX

Output Voltage：
DD DE
DF DG
DH

Package：
W:SOT23-4L
FST：Flat SOT23-4L

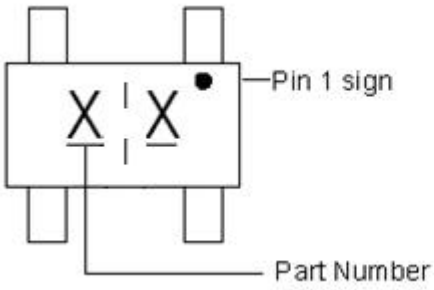
Packing：
R:Tape&Reel

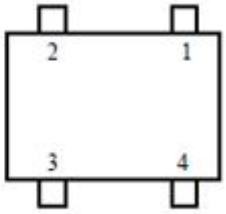
Temperature Grade：
Y: -40°C~125°C

Part Number	Output Hall Voltage (mV, B=50mT, VC=1V)	Package Type	Package Qty	Temperature	Eco Plan
AS101ADDWRY	196 to 236	SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADEWRY	228 to 274	SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADFWRY	266 to 320	SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADGWRY	310 to 370	SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADHWRY	360 to 430	SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADDFSTRY	196 to 236	Flat SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADEFSTRY	228 to 274	Flat SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADFFSTRY	266 to 320	Flat SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADGFSTRY	310 to 370	Flat SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green
AS101ADHFSTRY	360 to 430	Flat SOT23-4L	7-in reel 3000pcs/reel	-40～125℃	Green

■ Marking & Pin Assignment

SOT23-4L/Flat SOT23-4L:





Pin Name	Pin No. SOT23-4L/Flat 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 -/+

■ 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	122	-	430	mV
R_{IN}	Input Resistance	B=0mT, I_C=0.1mA	340	-	650	Ω
R_{OUT}	Output Resistance	B=0mT, I_C=0.1mA	340	-	650	Ω
V_{OS}	Offset Voltage	B=0mT, V_C=1V	-7	-	+7	mV
aV_H	Temp. Coefficient of V_H	B=50mT, I_C=5mA	-	-1.8	-	%/℃
aR_{IN}	Temp. Coefficient of R_{IN}	B=0mT, I_C=0.1mA	-	-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℃.

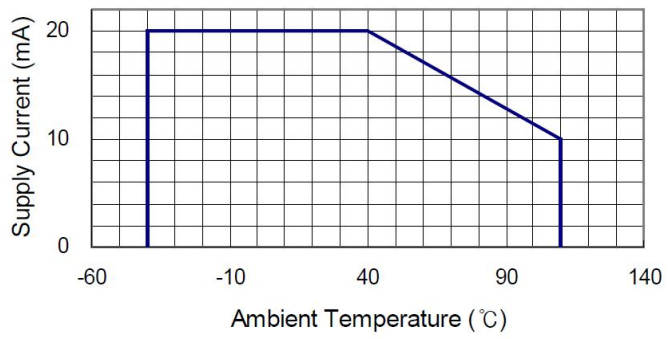
■ Classification of Output Hall Voltage (V_H)

Rank	V_H(mV)	Conditions
D	196 to 236	B=50mT, V_C=1V, Constant Voltage Drive
E	228 to 274	
F	266 to 320	
G	310 to 370	
H	360 to 430	

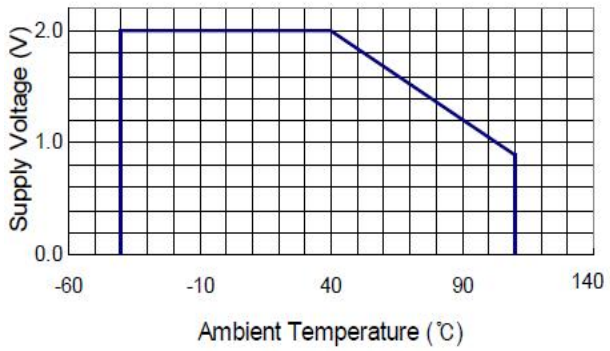
■ Typical Characteristics—AS101A

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

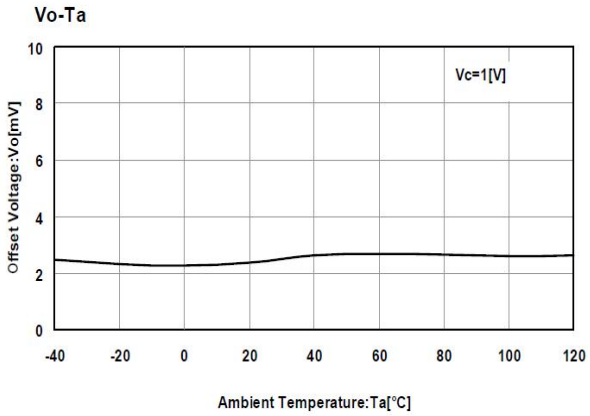
Input Current Derating Curve
(Input & Output Resistance 240Ωto 550Ω)



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



Offset Voltage vs. Temperature



Thermal Considerations

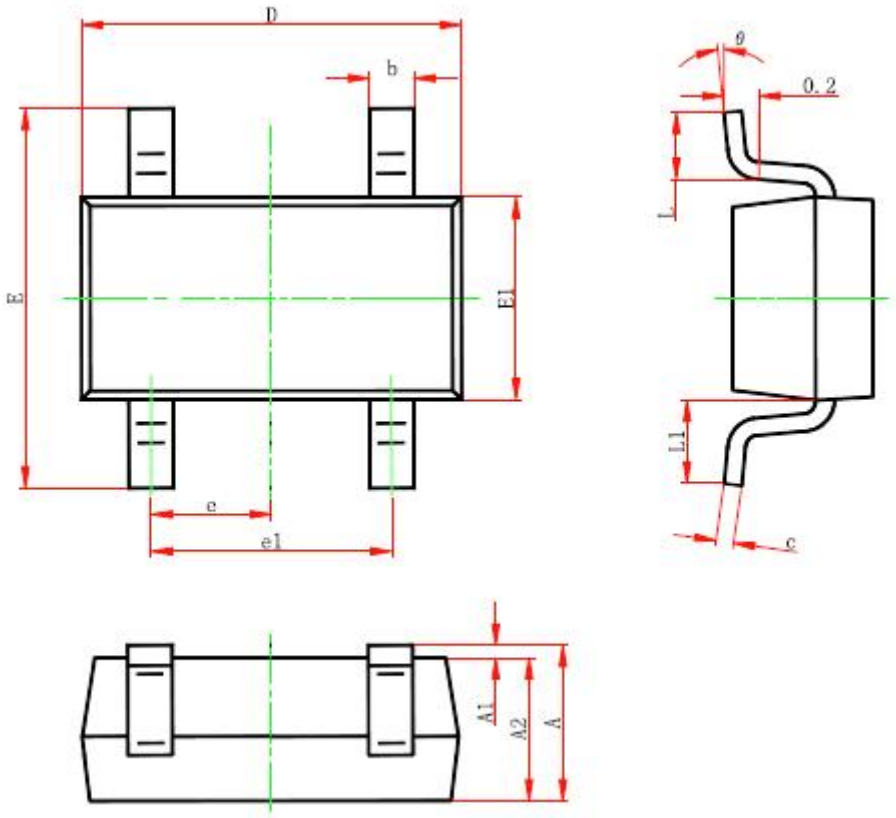
The maximum IC junction temperature should be restricted to 125°C under normal operating conditions. This restriction limits the power dissipation of the AS101A. Calculate the maximum allowable dissipation, $P_{D(max)}$, and keep the actual dissipation less than or equal to $P_{D(max)}$. The maximum-power-dissipation 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.

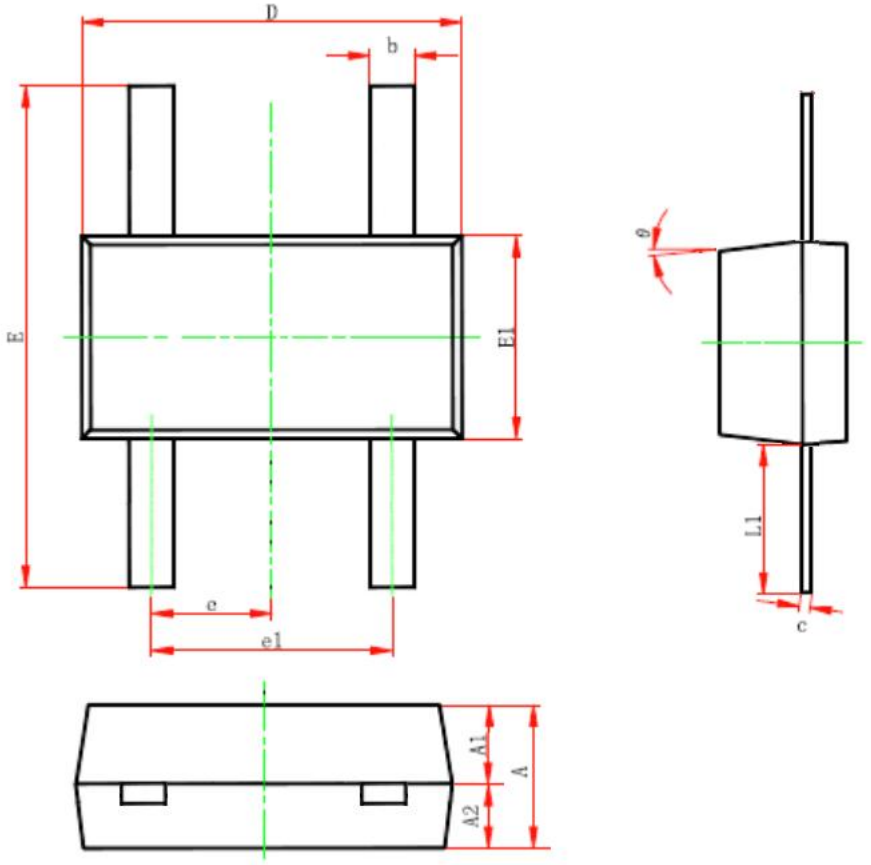
■ Package Information

SOT23-4L (W):



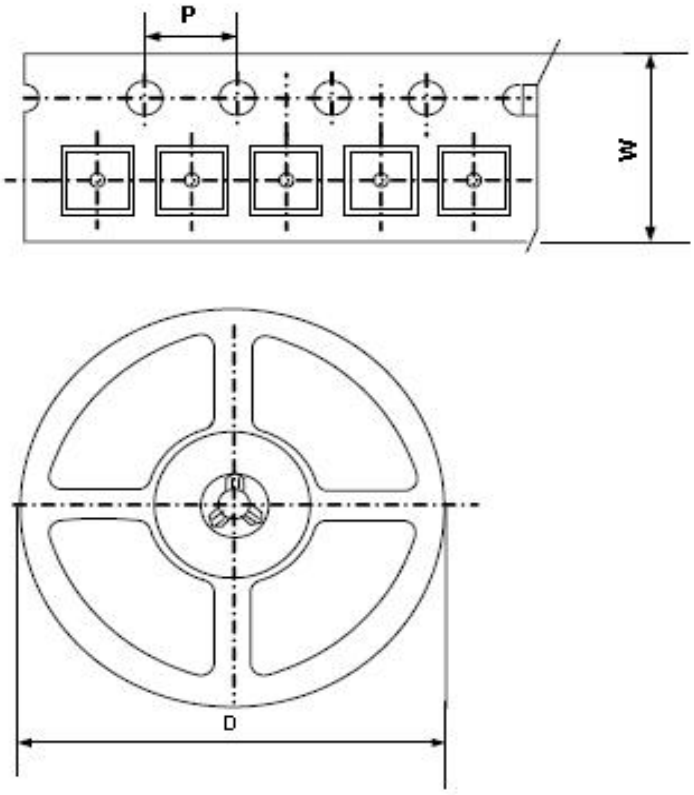
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0,008
D	2.820	3.020	0.111	0.119
E	2.700	3.100	0.106	0.122
E1	1.500	1.700	0.059	0.067
e	0.950 (BSC)		0.037 (BSC)	
e1	1.90(BSC)		0.075(BSC)	
L	0.300	0.600	0.012	0.024
L1	0.600 REF.		0.024 REF.	
θ	0°	8°	0°	8°

Flat SOT23-4L (FST):



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.000	1.200	0.039	0.047
A1	0.820 (BSC)		0.032 (BSC)	
A2	0.300 (BSC)		0.012 (BSC)	
b	0.300	0.500	0.012	0.020
c	0.120 (BSC)		0.005 (BSC)	
D	2.800	3.000	0.110	0.118
E	3.700	4.100	0.146	0.161
E1	1.400	1.600	0.055	0.063
e	0.950 (BSC)		0.037 (BSC)	
e1	1.90 (BSC)		0.075(BSC)	
L1	1.200 REF.		0.047 REF.	
θ	10° (BSC)		10° (BSC)	

■ Packing Information



Package Type	Carrier Width(W)	Pitch(P)	Reel Size(D)	Packing Minimum
SOT23-4L	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	3000pcs
Flat SOT23-4L	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	3000pcs

Note: Carrier Tape Dimension, Reel Size and Packing Minimum