GaAs Hall Element

Differential Analog Output Hall Element

AS1582T

General Description

This is a high sensitivity type of ANGSemi hall element using evaporated GaAs 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 small DFN0408-4L package and is rated over the -40°C to 125°C. The all packages are RoHS and Green compliant.

Features

- High Linearity
- High sensitivity GaAs Hall Element
- Superior Temperature Stability
- Shipped in Package tape Real
- Differential Analog output
- Output Hall Voltage: 36mV to 54mV (I_C=5mA)
- RoHS & Green Compliant
- Thin DFN0408-4L Packages
- -40℃ to +125 ℃ Temperature Range

Applications

- Magnetic Field Measurement
- OIS Motor
- Brushless DC Motor
- Current Sensor
- 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

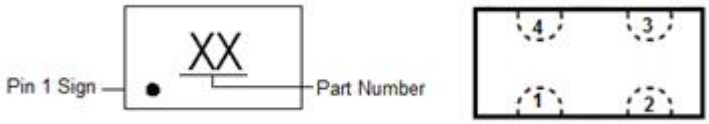
AS1582TXXX

Package:	Packing:	Temperature Grade:
D:DFN0408-4L	R:Tape&Reel	Y: -40°C~125°C

Part Number	Output Hall Voltage (mV, B=50mT, I_C=5mA)	Package Type	Package Qty	Temperature	Eco Plan
AS1582TDRY	36 to 54	DFN0408-4L	7-in reel 10000pcs/reel	-40～125℃	Green

■ Marking & Pin Assignment

DFN0408-4L



Pin Name	Pin No. DFN0408-4L		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

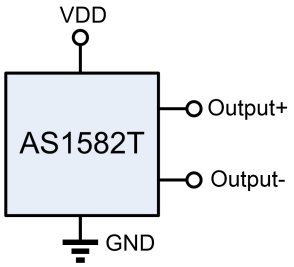


Figure 1, Typical Application Circuit of AS1582T

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

Parameter	Symbol	Rating	Unit
Max. Input Voltage	V_C	10	V
Maximum Power Dissipation	P_{DMAX}	150	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_{HC}	Output Hall Voltage	B=50mT, V_C=6V	46	58	70	mV
V_{HI}		B=50mT, I_C=5mA	36	45	54	mV
R_{IN}	Input Resistance	B=0mT, I_C=0.1mA	780	900	1020	Ω
R_{OUT}	Output Resistance	B=0mT, I_C=0.1mA	780	900	1020	Ω
V_{OS}	Offset Voltage	B=0mT, I_C=5mA	-5	-	+5	mV
aV_H	Temp. Coefficient of V_H	B=50mT, I_C=5mA, T_A = 25 to +125℃	-	-	-0.07	%/℃
aR_{IN}	Temp. Coefficient of R_{IN}	B=0mT, I_C=0.1mA, T_A = 25 to +125℃	-	-	0.3	%/℃
△K	Linearity	B=0.1T/0.5T, I_C=5mA	-2.0	-	+2.0	%

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

2, $aV_H=1/(V_{HT1})$ X $(V_{H(T2)} - V_{H(T1)})/(T2-T1)$ X100

3, $aR_{IN}=1/(R_{INT1})$ X $(R_{IN(T2)} – R_{IN(T1)})/(T2-T1)$ X100

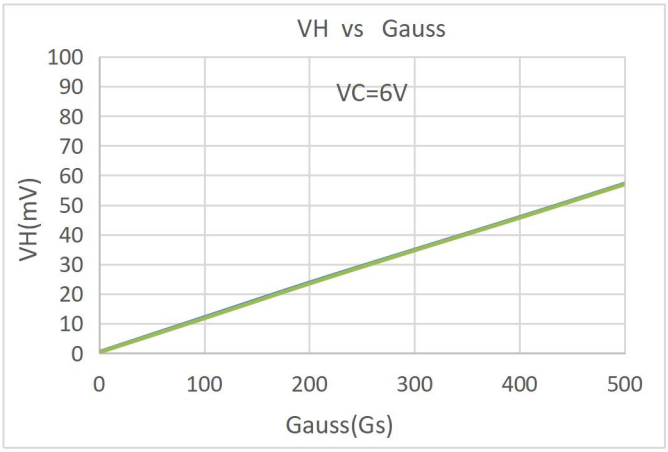
4, △K=[K(B1) - K(B2)] / {[K(B1) + K(B2)]/2}

T1=20℃, T2=125℃, $K=V_H/(I_C*B)$, B1=0.5T, B2=0.1T. ,

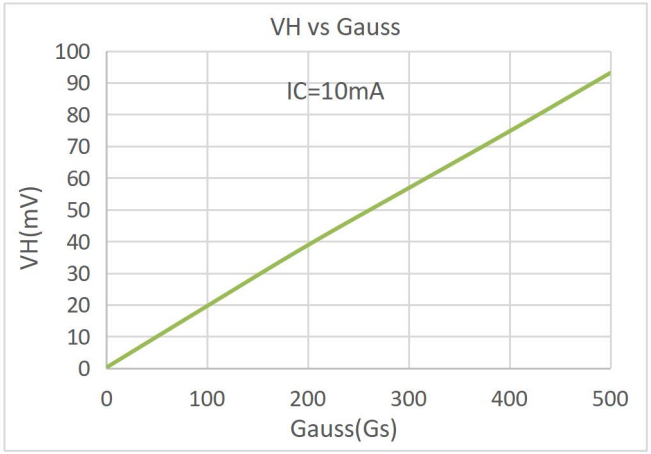
■ Typical Characteristics—AS1582T

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

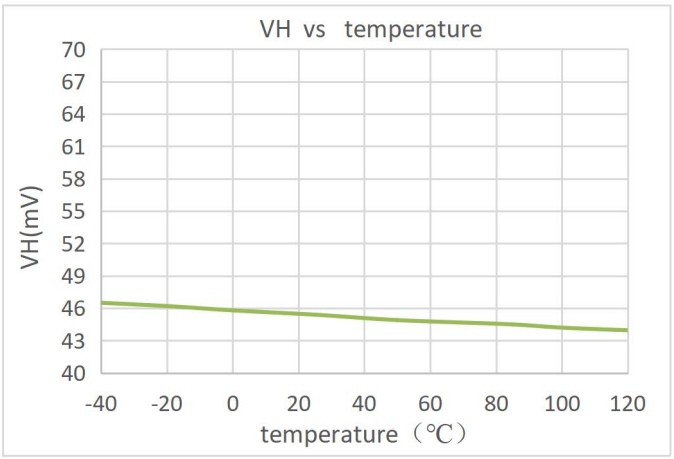
Hall Voltage V_H vs Magnetic Flux Density B
(V_C=6V)



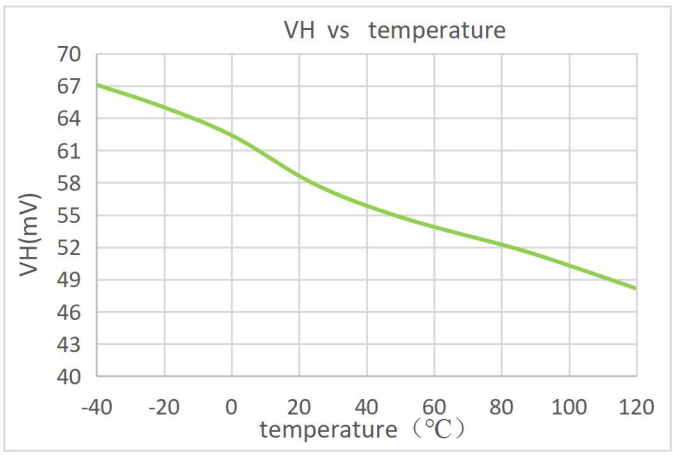
Hall Voltage V_H vs Magnetic Flux Density B
(I_C=10mA)



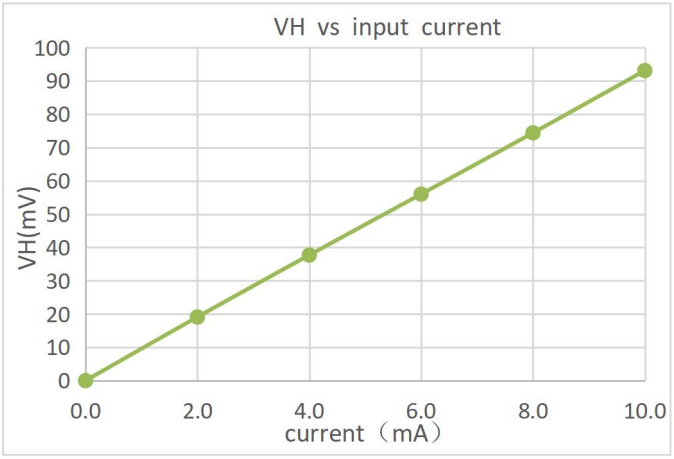
Hall Voltage V_H vs Temperature
(B=50mT, I_C=5mA)



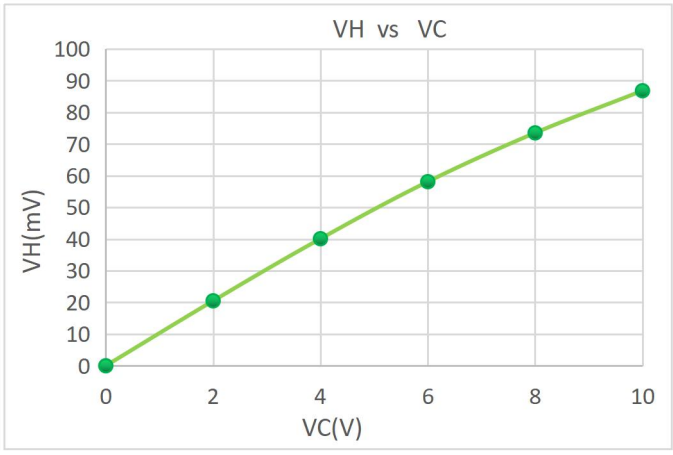
Hall Voltage V_H vs Temperature
(B=50mT, V_C=6V)



Hall Voltage V_H vs Input Current I_C
(B=50mT)



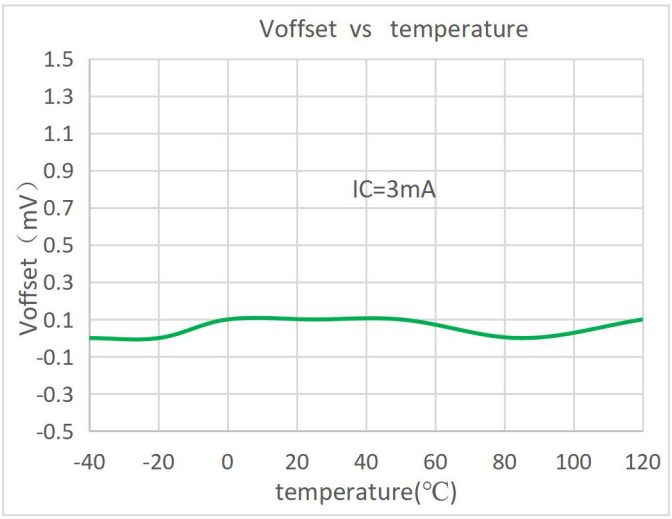
Hall Voltage V_H vs Input Voltage V_C
(B=50mT)



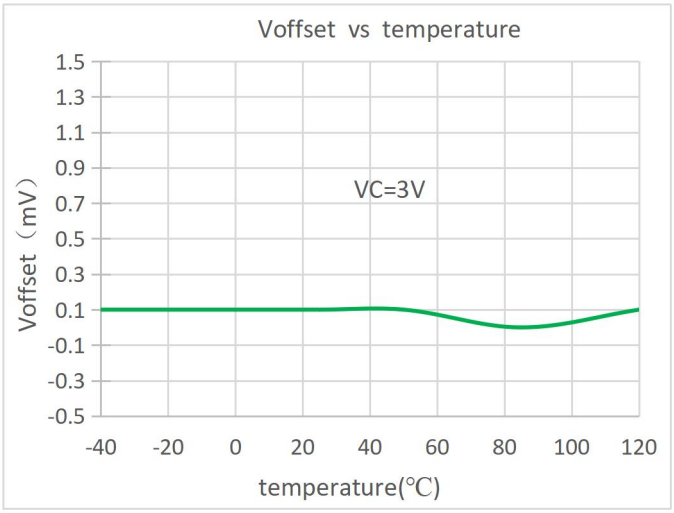
■ Typical Characteristics—AS1582T

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

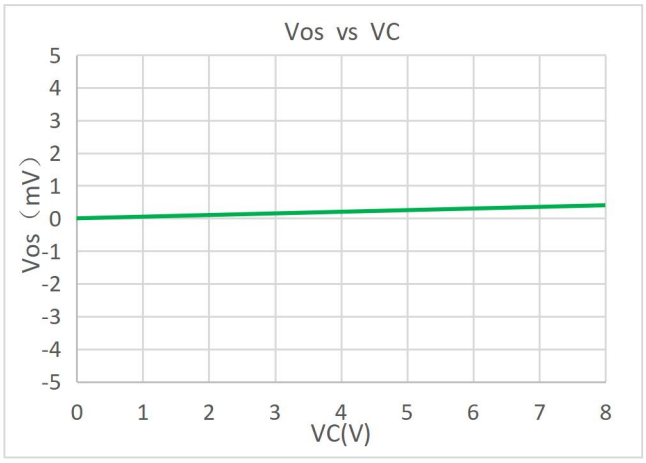
Offset Voltage V_{OS} vs Temperature
(B=0mT, I_C=3mA)



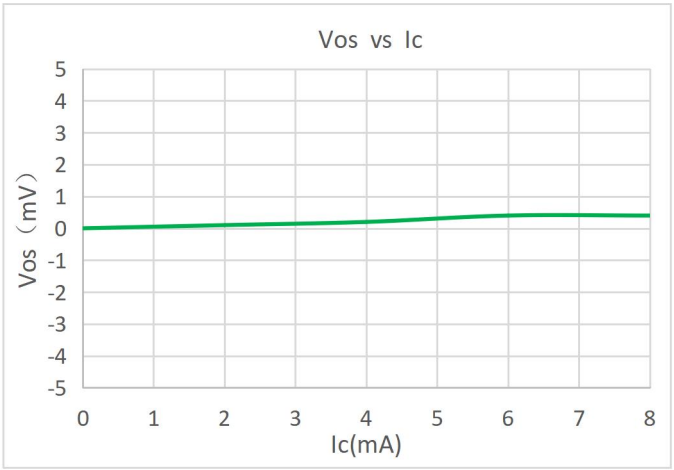
Offset Voltage V_{OS} vs Temperature
(B=0mT, V_C=3V)



Offset Voltage V_{OS} vs Input Voltage V_C
(B=0mT)



Offset Voltage V_{OS} vs Input Current I_C
(B=0mT)



Thermal Considerations

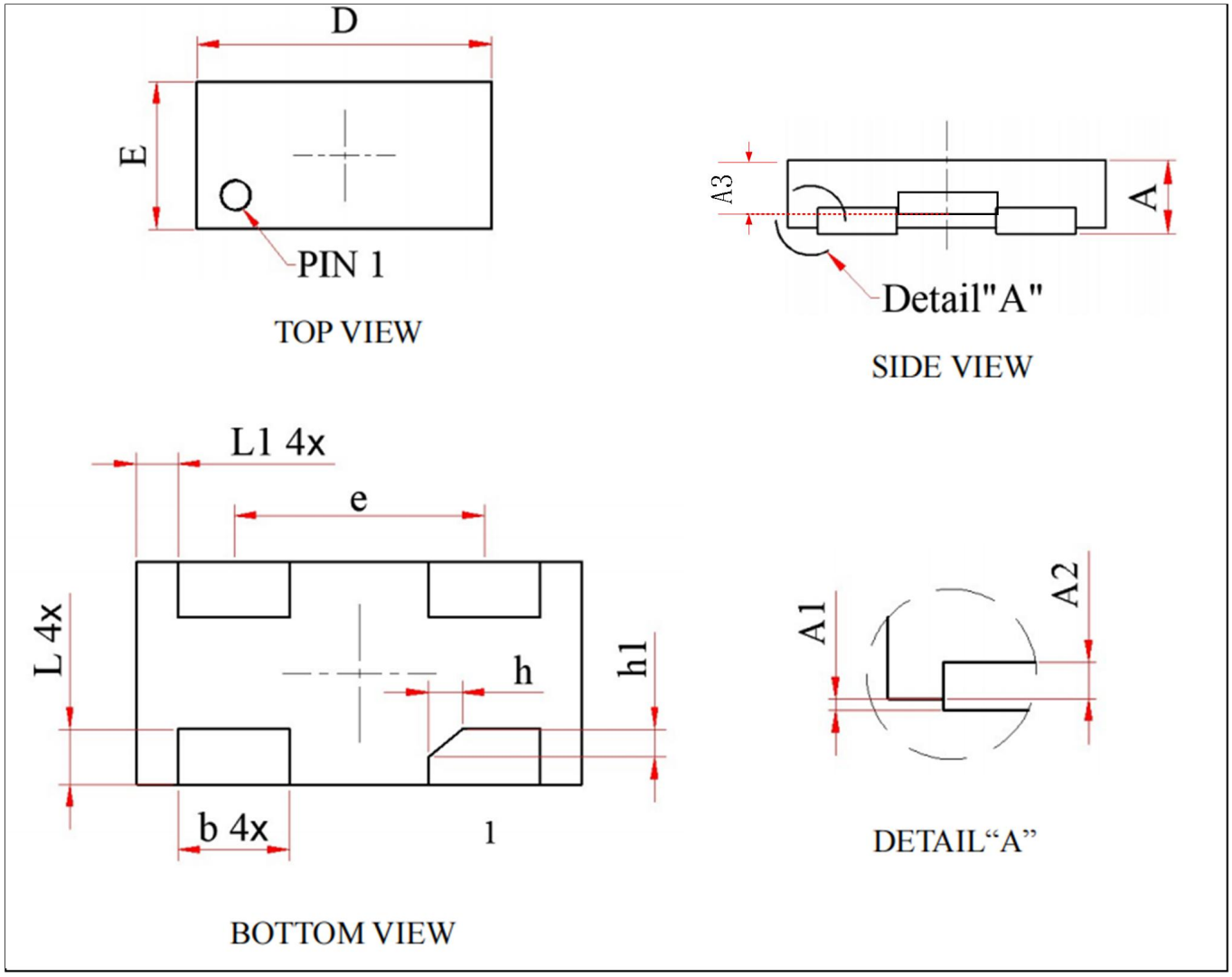
The maximum IC junction temperature should be restricted to 125°C under normal operating conditions. This restriction limits the power dissipation of the AS1582T. Calculate the maximum allowable dissipation, $P_{D(max)}$, and keep the actual dissipation less than or equal to $P_{D(max)}$. The maximum-power-dissipation 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.

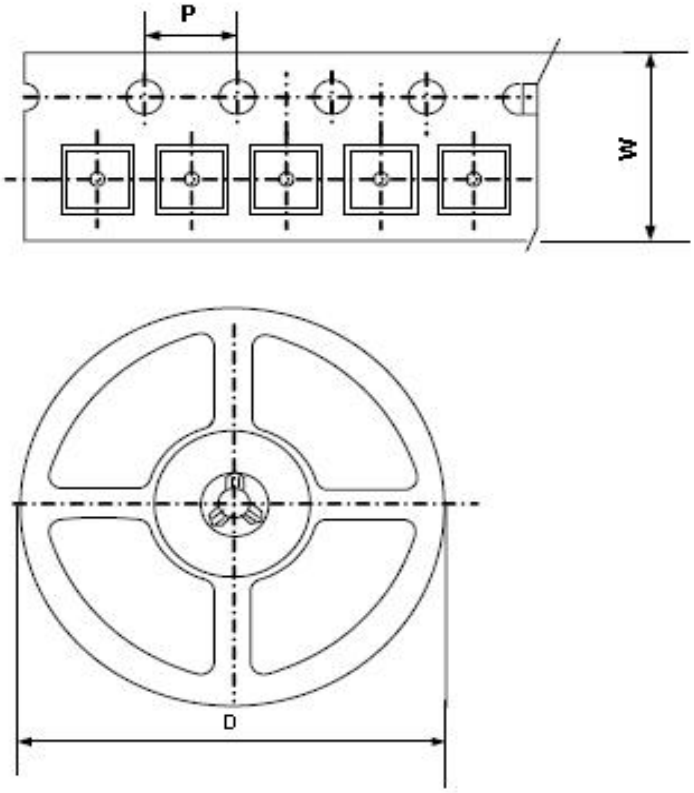
■ Package Information

DFN0408-4L:



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.160	0.185	0.210	0.006	0.007	0.008
A1	-	-	0.025	-	-	0.001
A2	0.025	-	0.150	0.001	-	0.006
A3	0.12 BSC			0.005 BSC		
D	0.750	0.800	0.850	0.029	0.031	0.033
E	0.350	0.400	0.450	0.014	0.016	0.018
b	0.165	0.200	0.235	0.006	0.008	0.009
L	0.060	0.100	0.140	0.002	0.004	0.006
L1	0.075 (REF)			0.003 (REF)		
h	0.060 (REF)			0.002 (REF)		
H1	0.050 (REF)			0.002 (REF)		
e	0.450 BSC			0.018 BSC		

■ Packing Information



Package Type	Carrier Width(W)	Pitch(P)	Reel Size(D)	Packing Minimum
DFN0408-4L	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	10000pcs

Note: Carrier Tape Dimension, Reel Size and Packing Minimum