ANGSEMI

Datasheet

GaAs Hall Element

Differential Analog Output Hall Element

AS1576D

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 DFN2415-4L 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: 115mV to 145mV
- RoHS & Green Compliant
- DFN2415-4L Packages
- -40℃ to +125 ℃ Temperature Range

Applications

- Magnetic Field Measurement
- Brushless DC Motor
- Current Sensor
- Other small precision motors
- Non-contacting, rotation sensors, current sensors
- Magnetic flux sensors other than those above

Ordering Information

AS1576DXXX

Package：
D:DFN2415-4L

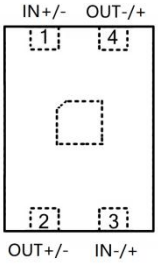
Packing：
R:Tape&Reel

Temperature Grade：
Y: -40°C~125°C

Part Number	Output Hall Voltage (mV, B=50mT, IC=5mA)	Package Type	Package Qty	Temperature	Eco Plan
AS1576DDRY	115 to 145	DFN2415-4L	7-in reel 4000pcs/reel	-40～125℃	Green

■ Marking & Pin Assignment

DFN2415-4L：



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

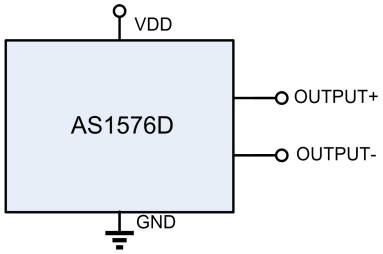


Figure 1, Typical Application Circuit of AS1576D

■ 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_H	Output Hall Voltage	B=50mT	V_C=6V	92	105	118	mV
			I_C=5mA[2]	115	130	145	mV
R_{IN}	Input Resistance	B=0mT, I_C=0.1mA		1150	1250	1350	Ω
R_{OUT}	Output Resistance	B=0mT, I_C=0.1mA		2200	2500	2900	Ω
V_{OS}	Offset Voltage	B=0mT, V_C=5V		-6	-	+6	mV
aV_H[3]	Temp. Coefficient of V_H	B=50mT, I_C=1mA, T_A = -40 to +125℃		-	-	-0.06	%/℃
aR_{IN}[4]	Temp. Coefficient of R_{IN}	B=0mT, I_C=0.1mA, T_A = -40 to +125℃		-	-	0.3	%/℃
△K[5]	Linearity	B=0.1T/0.5T, I_C=1mA		-	-	2	%

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

2, To reduce the influence of temperature on V_H, the I_C current should be less than 5mA;

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

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

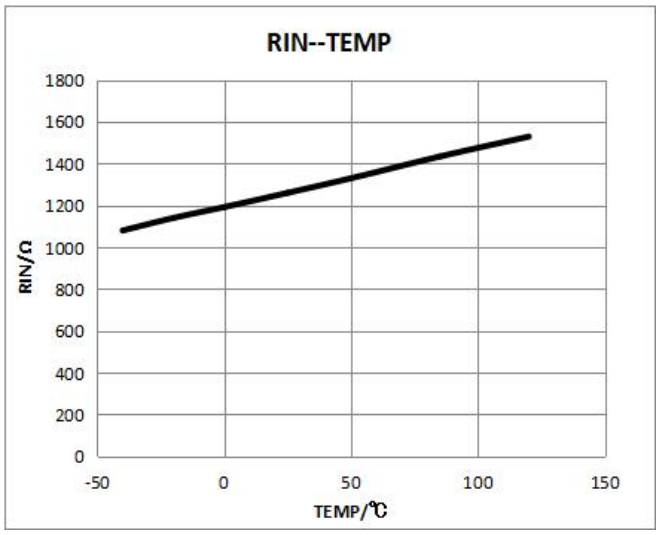
5, △K=[K(B1) - K(B2)] / {[K(B1) + K(B2)]/2};

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

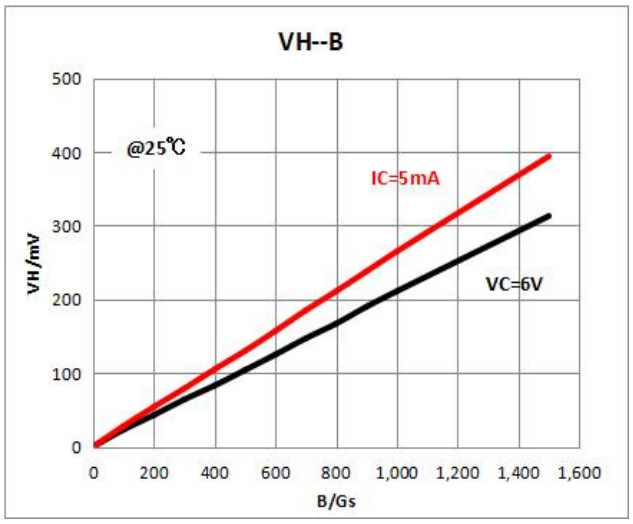
■ Typical Characteristics

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

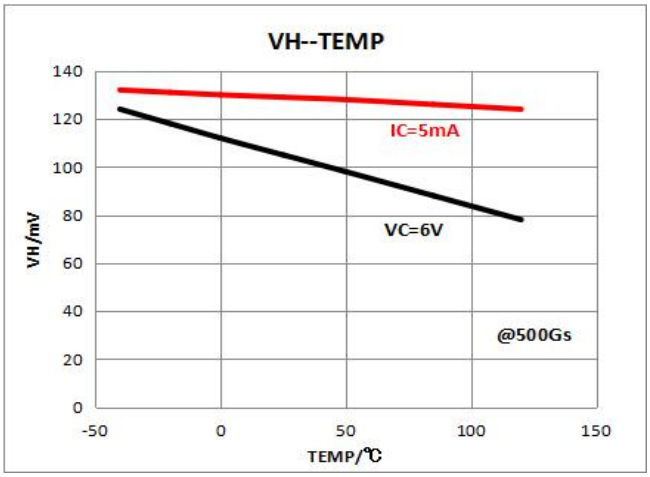
Input Resistance R_{IN} vs Temperature
(Input Resistance 1000Ω to 1500Ω)



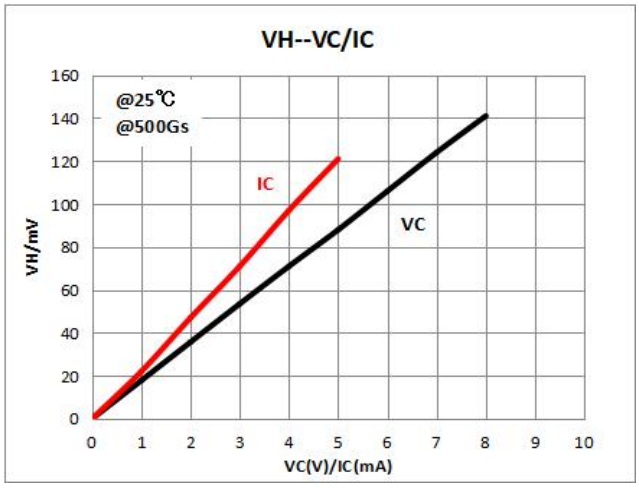
Hall Voltage V_H vs Magnetic Flux Density
(I_C=5mA, V_C=6V)



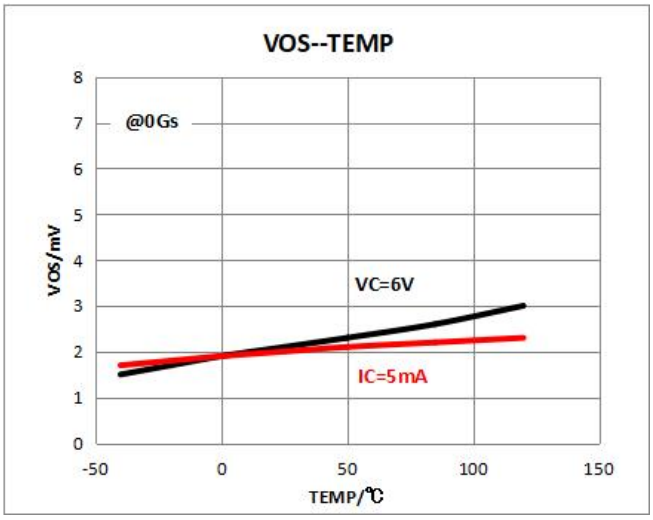
Hall Voltage V_H vs Temperature
(B=50mT, I_C=5mA, V_C=6V)



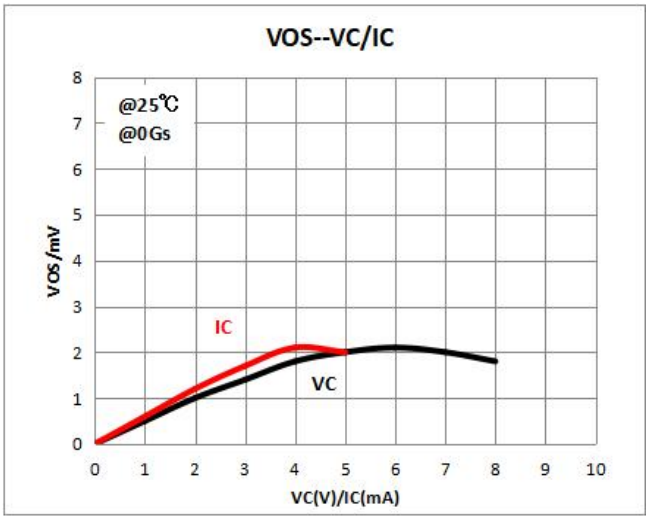
Hall Voltage V_H vs Input Current I_C or Voltage V_C
(B=50mT)



Offset Voltage V_{OS} vs Temperature
(B=0mT, I_C=5mA, V_C=6V)



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



Thermal Considerations

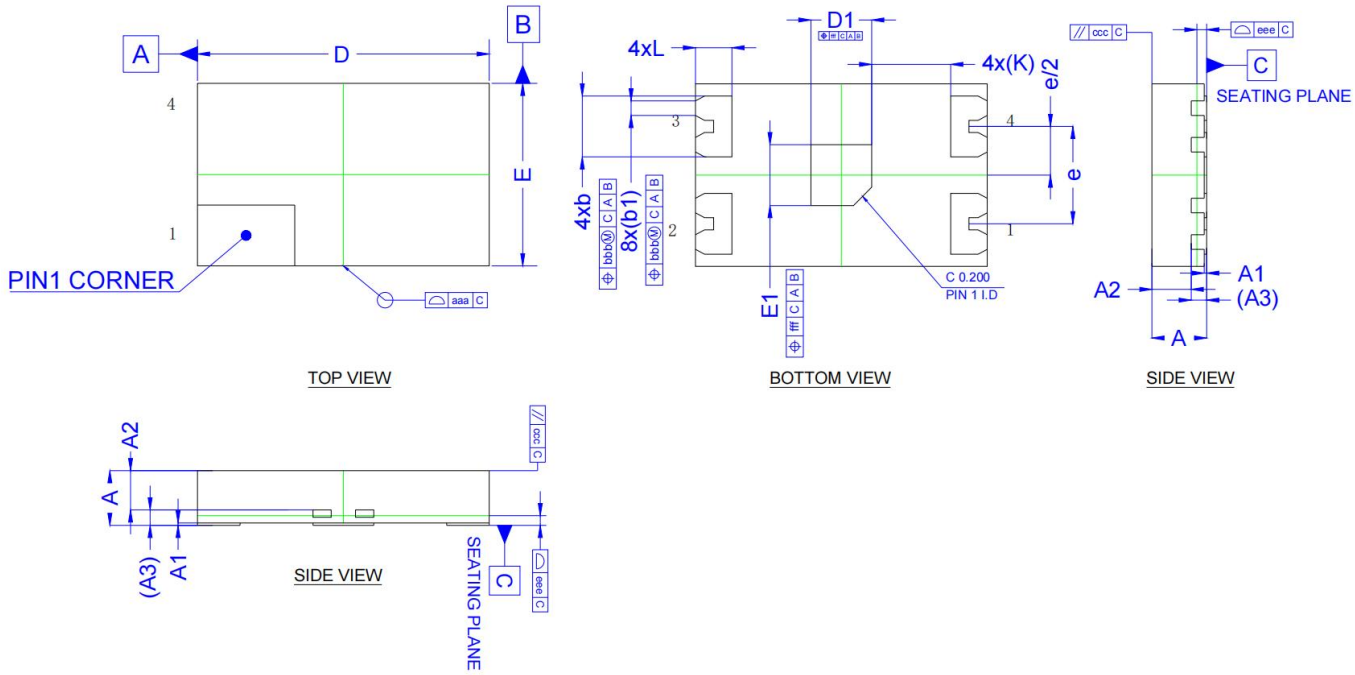
The maximum IC junction temperature should be restricted to 150°C under normal operating conditions. This restriction limits the power dissipation of the AS1576DD. Calculate the maximum allowable dissipation, $P_{D(max)}$, and keep the actual dissipation less than or equal to $P_{D(max)}$. The maximum-power-dissipation limit is determined using following equation:

$$P_{D(MAX)} = \frac{150℃ - T_A}{R_{\theta JA}}$$

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.

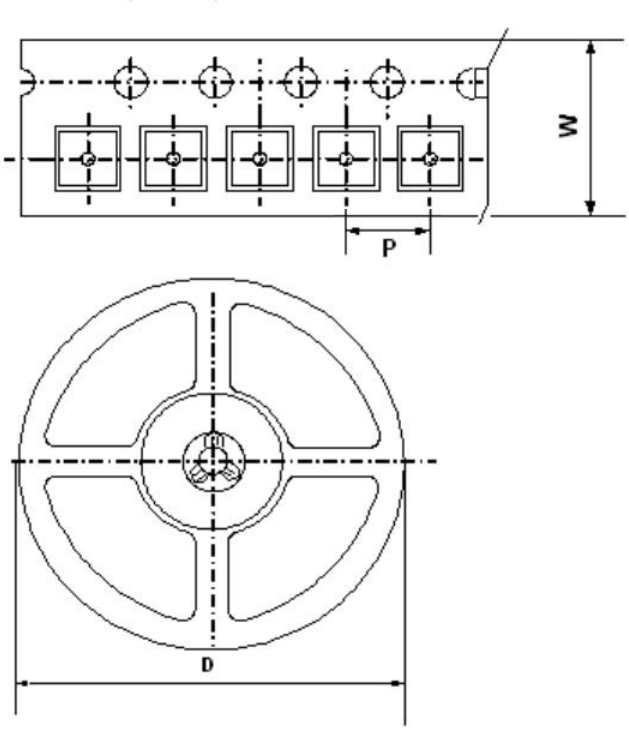
■ Package Information

DFN2415-4L:



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	2.300	2.500	0.091	0.098
E	1.400	1.600	0.055	0.063
D1	0.400	0.600	0.016	0.024
E1	0.400	0.600	0.016	0.024
A	0.400	0.500	0.016	0.020
A1	0.000	0.050	0.000	0.002
A2	0.273	0.373	0.011	0.015
A3	0.127 (REF)		0.005 (REF)	
b	0.450	0.550	0.018	0.022
b1	0.120 (REF)		0.005 (REF)	
e	0.800(BSC)		0.031(BSC)	
L	0.250	0.350	0.010	0.014
K	0.650 (REF)		0.026 (REF)	
aaa	0.100		0.004	
ccc	0.100		0.004	
eee	0.050		0.002	
bbb	0.100		0.004	
fff	0.100		0.004	

■ Packing Information



Package Type	Carrier Width(W)	Pitch(P)	Reel Size(D)	Packing Minimum
DFN2415-4L	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	4000pcs

Note: Carrier Tape Dimension, Reel Size and Packing Minimum