Ratiometric Linear Hall Effect Sensors

❖ GENERAL DESCRIPTION

AX8801, a linear Hall-effect sensor, is composed of hall sensor, linear amplifier and emitter-follower output stage. The integrated circuitry features low noise output, which makes it unnecessary to use external filtering. It also includes thin film resistors to provide increased temperature stability and accuracy. These linear Hall sensors have an operating Temperature range of -40°C to +100°C, appropriate for commercial, consumer, and industrial environments.

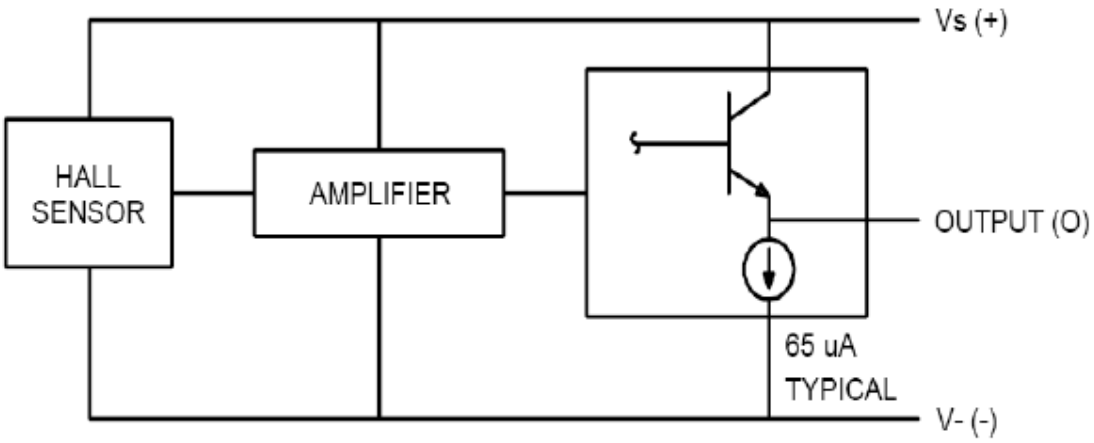
The high sensitivity of Hall Effect sensor accurately tracks extremely small changes in magnetic flux density. The linear sourcing output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. Typical operation current is 2.5 mA and operating voltage range is 3.5 volts to 5.5 volts.

AX8801 is rated for operation between the ambient temperatures –40°C and 100°C for the E temperature range. The package style available provides magnetically optimized solutions for most applications.

❖ FEATURES

- Operating Voltage Range: 3.5V~5.5V
- Power consumption of 2.5 mA at 5 Vdc for energy efficiency
- Low-Noise Operation
- Linear output for circuit design flexibility
- Responds to either positive or negative gauss
- Cost competitive
- Robust ESD performance
- SIP-3L Pb-Free packages.

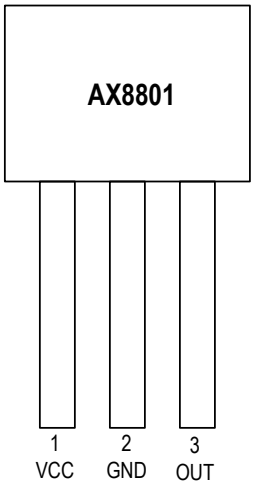
❖ BLOCK DIAGRAM



❖ PIN ASSIGNMET

The packages of AX8801 are SIP-3L; the pin assignment is given by:

(Top View)



Name	Description
VCC	Power Input
OUT	Output Pin (active Low)
GND	Ground

❖ ORDER/MARKING INFORMATION

Order Information	Top Marking (SIP-3L)
AX8801XX X Package Type I3: SIP-3L Packing Blank : Bag	4 8 1 X X X Year Week EX：2015 Year_32 Week → 532

❖ ABSOLUTE MAXIMUM RATINGS (at T_A=25°C)

Characteristics	Symbol	Rating	Unit
Supply Voltage	V_{CC}	-0.5 to 8	V
Output Current	I_{OUT}	10	mA
Operating Temperature Range	T_A	-40 to +100	°C
Storage Temperature Range	T_S	-65 to +150	°C
Magnetic Flux Density		unlimited	Gauss
Thermal Resistance from Junction to case	θ_{JC}	148	°C/W
Thermal Resistance from Junction to ambient	θ_{JA}	206	°C/W

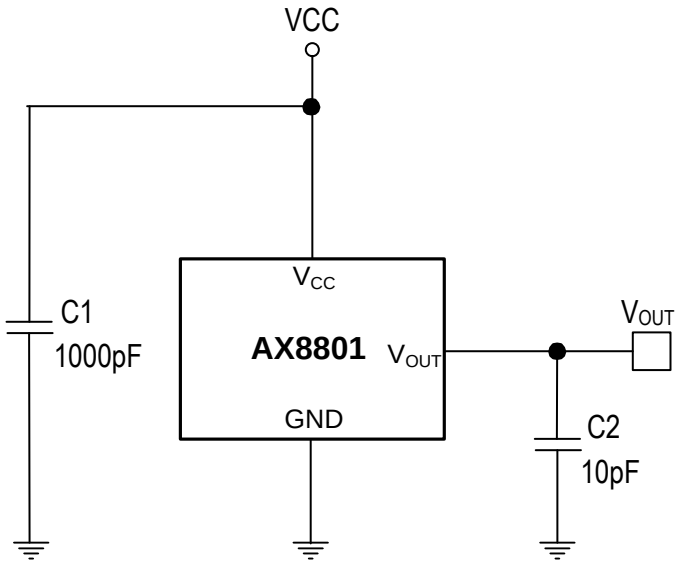
Note:

1. θ_{JA} is measured with the PCB copper area of approximately 1 in^2(Multi-layer).
2. Do not apply revere roltage to V_{CC} and V_{OUT} Pin, it may be caused for miss function or damaged device.

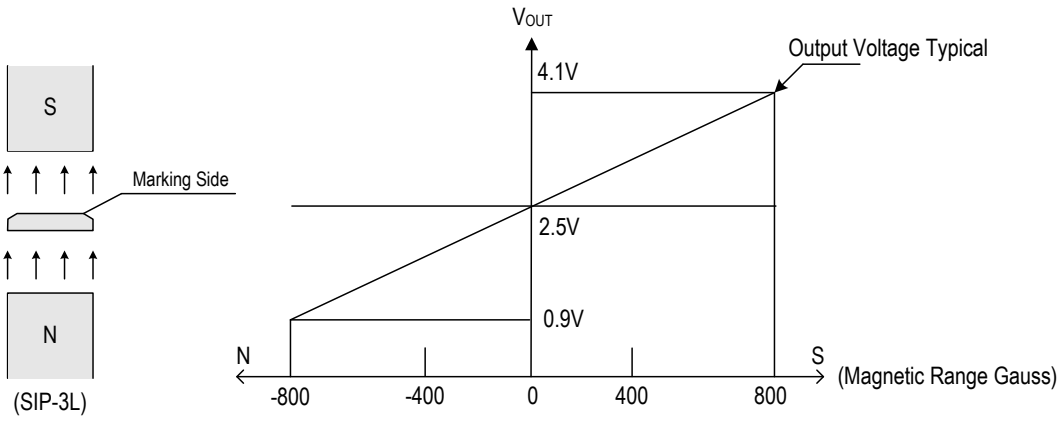
❖ ELECTRICAL CHARACTERISTICS (V_{DD} = 5V, T_A=25°C, unless otherwise specified)

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Input voltage range	V_{CC}	Operating	3.5	-	5.5	V
Supply Current	I_{CC}	B=0 Gauss	-	4	8	mA
Output Current		V_{CC} > 3V	1.0	1.5		mA
Output voltage range		B=0 Gauss	2.3	2.5	2.7	V
Output Bandwidth				20	-	KHz
Output Voltage Span	V_{OS}		2.92	3.2	-	V
Magnetic Range Gauss			±500	±800	-	G
Linearity		% of Span	-	0.7	-	
Response Time			-	3	-	μS
Sensitivity		V_{CC}=5V	1.8	-	2.1	mV/G
Electro-Static Dischage	HBM		3	-	-	KV

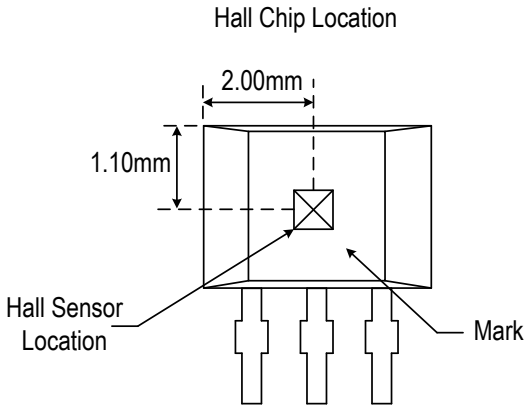
❖ APPLICATION CIRCUIT



❖ OPERATING CHARACTERISTICS



❖ SENSOR LOCATION



❖ APPLICATION INFORMATION

Package Power Dissipation

The power dissipation of the Package is a function of the pad size. This can vary from the minimum pad size for soldering to a pad size given for maximum power dissipation. Power dissipation for a surface mount device is determined by T_J(max), the maximum rated junction temperature of the die, $R_{\theta JA}$, the thermal resistance from the device junction to ambient, and the operating temperature, Ta. Using the values provided on the data sheet for the Package package, PD can be calculated as follows:

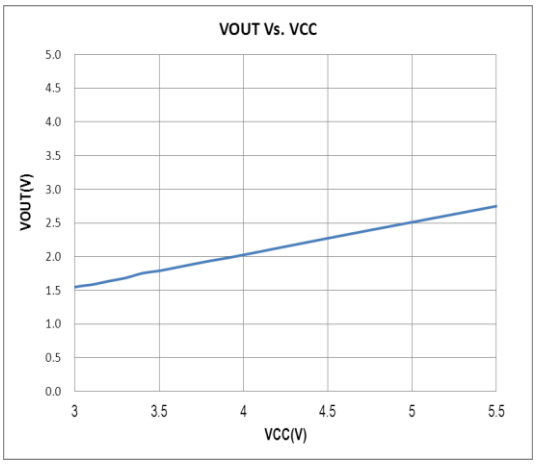
$$P_D = \frac{T_{J(max)} - T_A}{R_{\theta JA}}$$

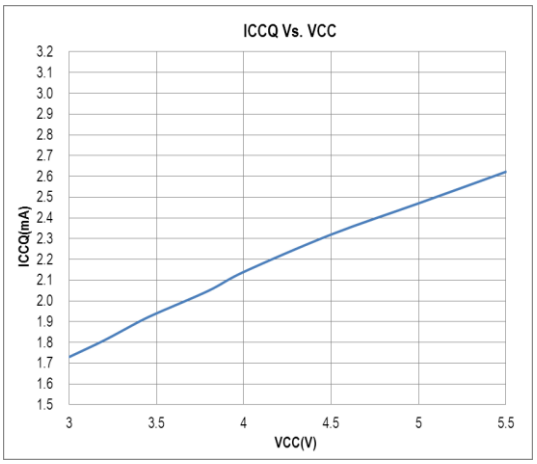
The values for the equation are found in the maximum ratings table on the data sheet. Substituting these values into the equation for an ambient temperature T_A of 25°C, one can calculate the power dissipation of the device which in this case is 606 milliwatts.

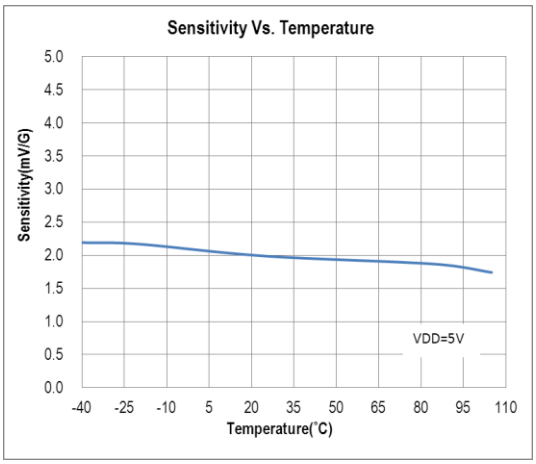
$$P_D(l3) = \frac{150°C - 25°C}{206°C/W} = 606mW$$

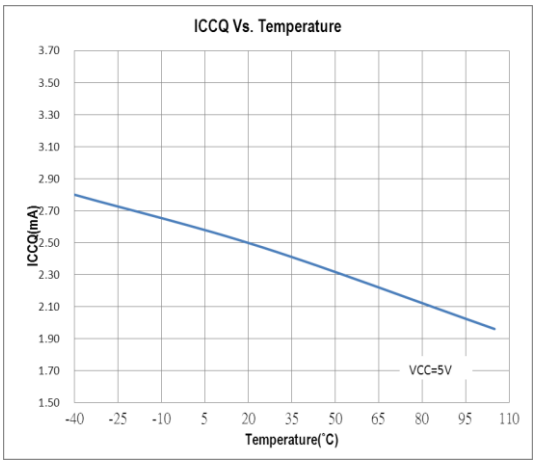
The 206°C/W for the SIP-3L package assumes the use of the recommended footprint on a glass epoxy printed circuit board to achieve a power dissipation of 606 milliwatts. There are other alternatives to achieving higher power dissipation from the Package. Another alternative would be to use a ceramic substrate or an aluminum core board such as Thermal Clad. Using a board material such as Thermal Clad, an aluminum core board, the power dissipation can be doubled using the same footprint.

❖ TYPICAL CHARACTERISTICS

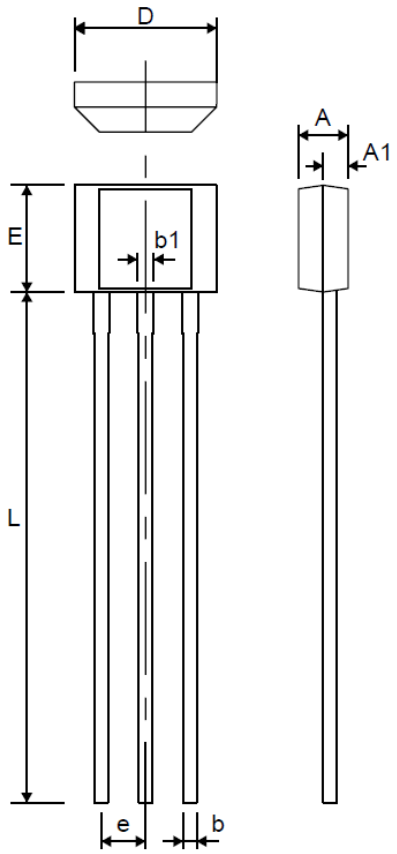








❖ PACKAGE OUTLINES



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.20	1.48	1.76	0.047	0.058	0.069
A1	0.75 REF.			0.030 REF.		
b	0.33	0.38	0.43	0.013	0.015	0.017
b1	0.40	0.45	0.50	0.016	0.018	0.020
D	3.90	4.10	4.30	0.154	0.161	0.169
e1	1.27 BSC			0.050 BSC		
E	2.80	3.00	3.20	0.110	0.118	0.126
L	13.60	14.60	15.60	0.535	0.575	0.614