COMPLEMENTARY OUTPUT HALL EFFECT LATCH

❖ GENERAL DESCRIPTION

AX8160 is a single-digital-output Hall-Effect latch sensor. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, a comparator to provide switching hysteresis for noise rejection, and an output driver. An internal bandgap regulator provides a temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

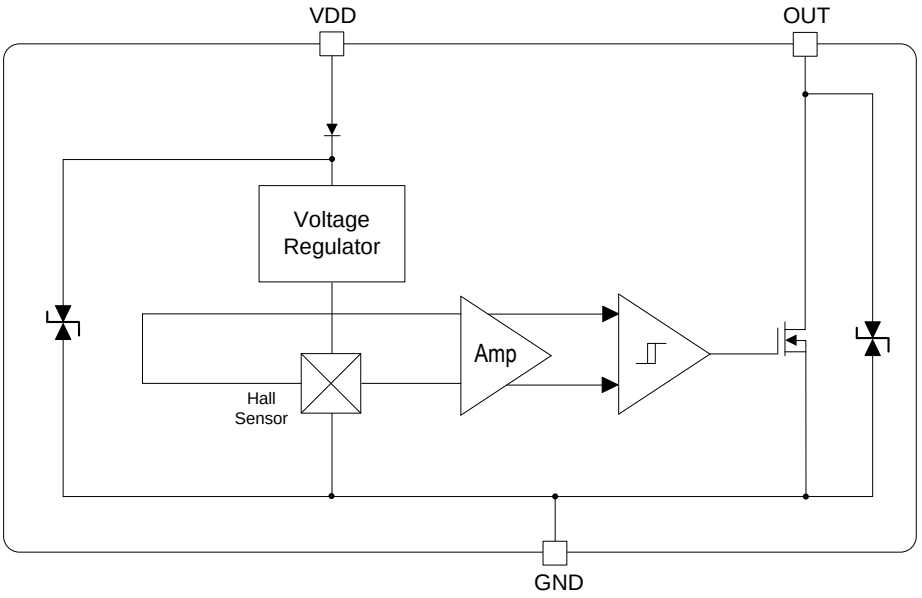
When the magnetic flux density (B) is larger than operate point (Bop), output is switched on (OUT pin is pulled low). The output state is held on until a magnetic flux density reversal falls below Brp. When B is less than Brp, the output is switched off.

The AX8160 is available in package SOT-23-3L and SIP-3L.

❖ FEATURES

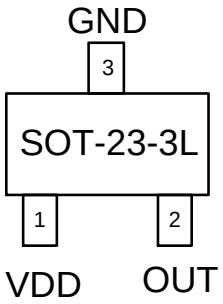
- Chopper stabilized amplifier stage
- Optimized for BLDC motor applications
- AX8160 Open Drain
- New miniature package / thin, high reliability package
- Operation down to 2.5V
- Custom sensitivity / Temperature selection are available.
- SIP-3L and SOT-23-3L Pb-Free packages.

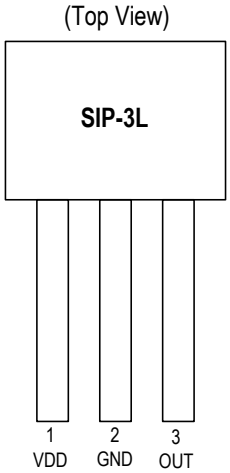
❖ BLOCK DIAGRAM



❖ PIN ASSIGNMET

The packages of AX8160 are SOT-23-3L and SIP-3L; the pin assignment is given by:





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

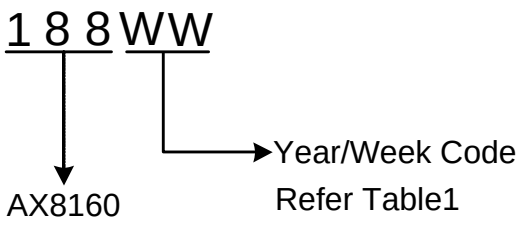
❖ ORDER/MARKING INFORMATION

Order Information

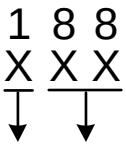
AX8160 XX X

Package Type	Packing
R: SOT-23-3L	Blank : Bag
I3: SIP-3L	A : Taping

Top Marking (SOT-23-3L)



Top Marking (SIP-3L)



EX：2014 Year_8 Week → 408

Table1:

week	1	2	3	4	5	6	7	8	9	10	11	12	13
code	SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM
week	14	15	16	17	18	19	20	21	22	23	24	25	26
code	SN	SO	SP	SQ	SR	SS	ST	SU	SV	SW	SX	SY	SZ
week	27	28	29	30	31	32	33	34	35	36	37	38	39
code	TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM
week	40	41	42	43	44	45	46	47	48	49	50	51	52
code	TN	TO	TP	TQ	TR	TS	TT	TU	TV	TW	TX	TY	TZ

EX：2014 Year_8 Week → SH

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

Characteristics		Symbol	Rating	Unit
Supply Voltage		V_{DD}	26	V
AX8160 Output Current		I_{SINK}	50	mA
Operating Temperature Range ("Normal" version)		T_A	-40 to +85	°C
Operating Temperature Range ("Specially" version)			-40 to +125	°C
Storage Temperature Range		T_S	-55 to +150	°C
Magnetic Flux Density			Unlimited	Gauss
Thermal Resistance from Junction to case	SOT-23-3L	θ_{JC}	410	°C/W
	SIP-3L		148	
Thermal Resistance from Junction to ambient	SOT-23-3L	θ_{JA}	230	°C/W
	SIP-3L		606	

Note1: θ_{JA} is measured with the PCB copper area of approximately 1 in^2(Multi-layer).
Note2: Specially application spec is using in industrial and automotive application. Please contact Axelite.

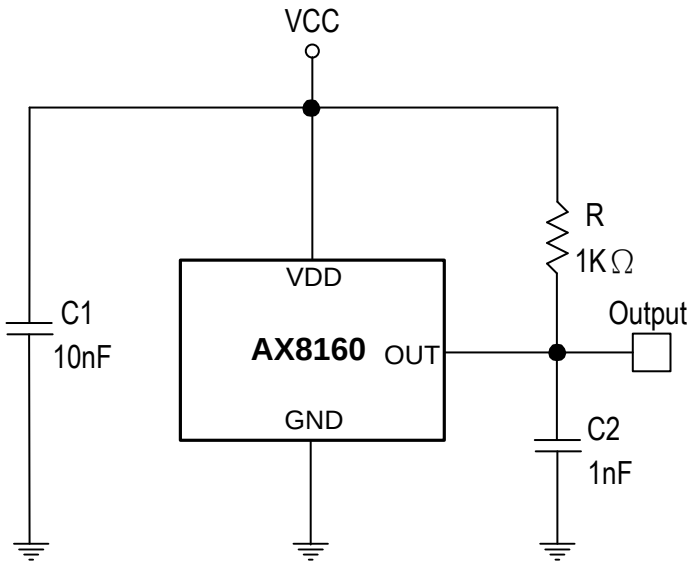
❖ ELECTRICAL CHARACTERISTICS (V_{DD} =12V, T_A=25°C, unless otherwise specified)

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage	V_{DD}	Operating	2.5	-	24.0	V
Supply Current	I_{DD}	B<Bop	-	-	5.0	mA
Output Saturation Voltage	V_{SAT}	I_{OUT} = 20 mA, B>BOP	-	-	400	mV
Output Leakage Current	I_{OFF}	I_{OFF} B<BRP, V_{OUT} = 24V	-	-	10.0	μA
Output Rise Time	T_R	V_{DD} = 12V, RL = 1.1KΩ, CL =20pF	-	0.04	0.45	μS
Output Fall Time	T_F	V_{DD} = 12V , RL=1.1KΩ; CL=20pF	-	0.18	0.45	μS
Electro-Static Discharge		HMB	4	-	-	KV

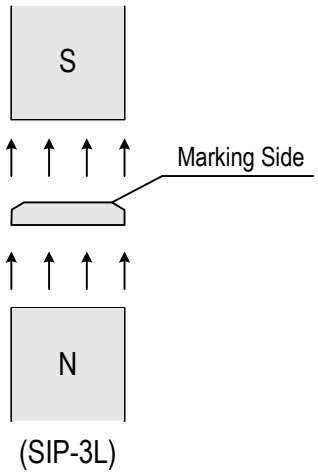
❖ MAGNETIC CHARACTERISTICS (V_{DD} =12V, T_A=25°C, unless otherwise specified)

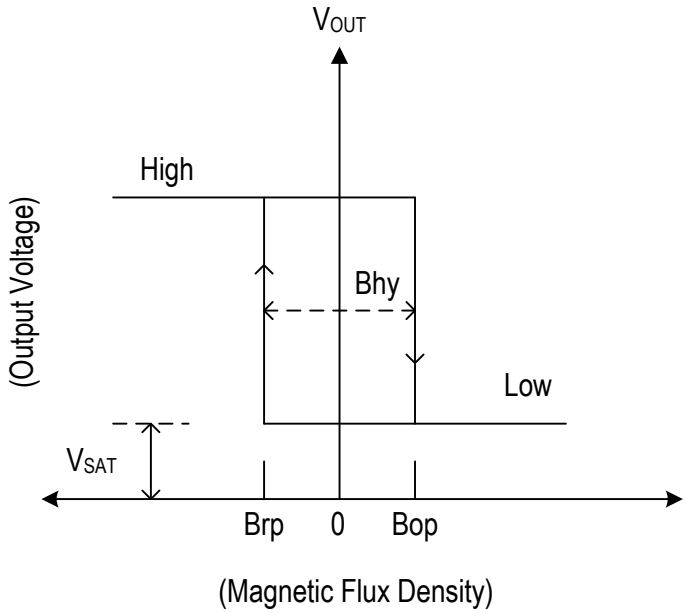
Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Operating Points	B_{OP}		5	15	25	Gauss
Release Points	B_{RP}		-25	-15	-5	
Hysteresis	B_{Hys}		20	30	40	

❖ APPLICATION CIRCUIT

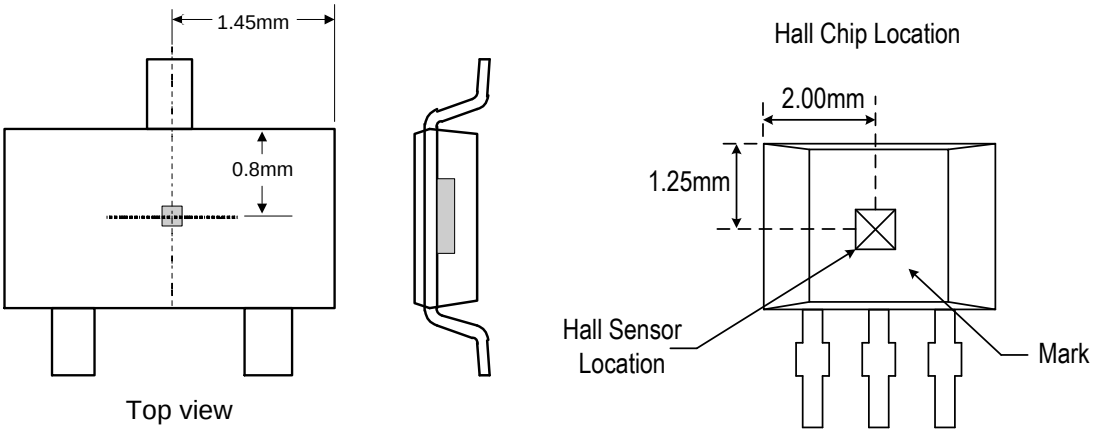


❖ OPERATING CHARACTERISTICS





❖ 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:

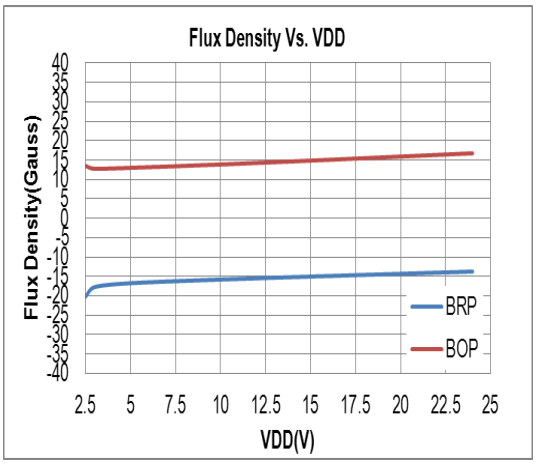
$$P_D = \frac{T_{J(max)} - T_A}{R_{\theta JA}}$$

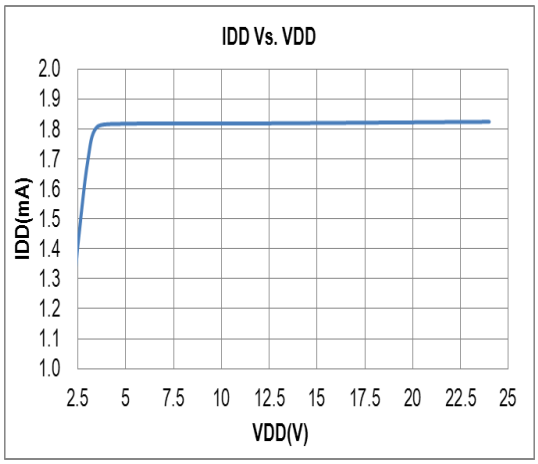
The values for the equation are found in the maximum ratings table on the data sheet. Substituting these values into the equation for an ambient temperature T_A of 25°C, one can calculate the power dissipation of the device which in this case is 606 milliwatts.

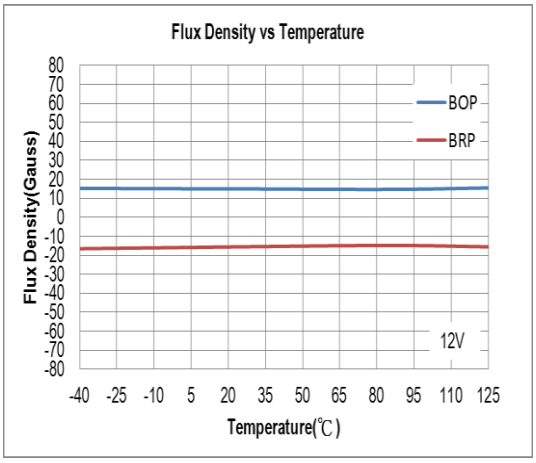
$$P_D(SIP-3L) = \frac{150°C - 25°C}{206°C/W} = 606mW$$

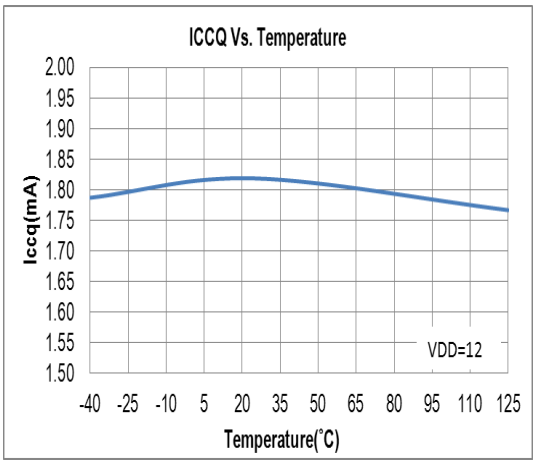
The 206°C/W for the SIP-3L package assumes the use of the recommended footprint on a glass epoxy printed circuit board to achieve a power dissipation of 606 milliwatts. There are other alternatives to achieving higher power dissipation from the Package. Another alternative would be to use a ceramic substrate 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



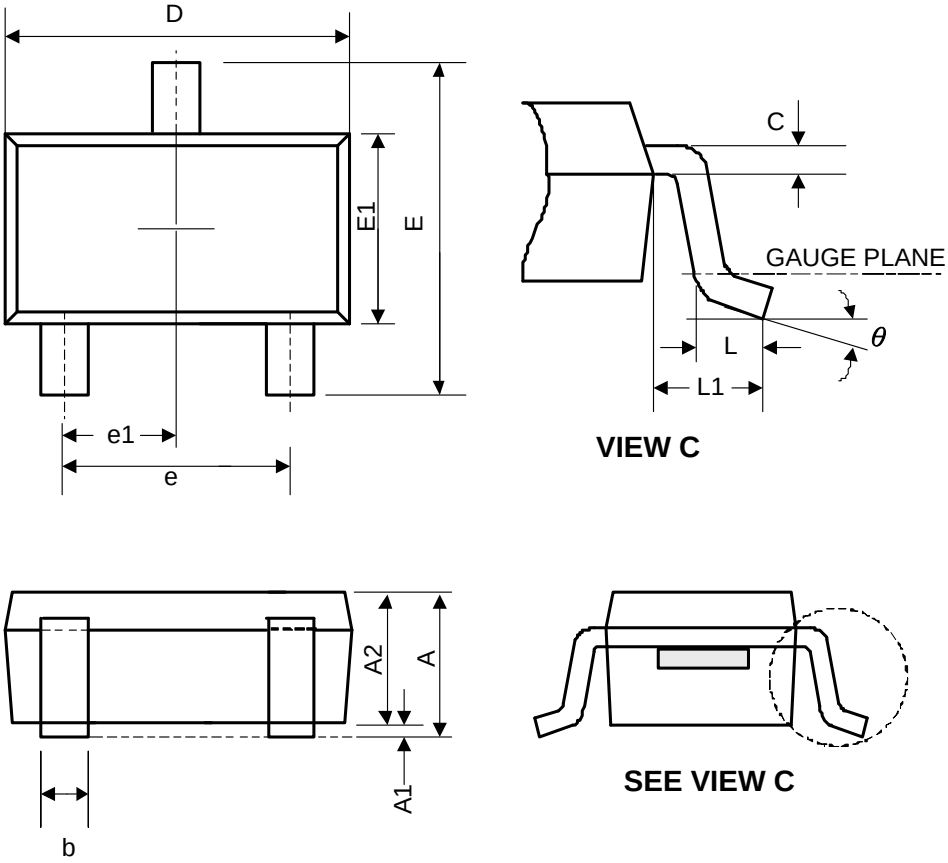






❖ PACKAGE OUTLINES

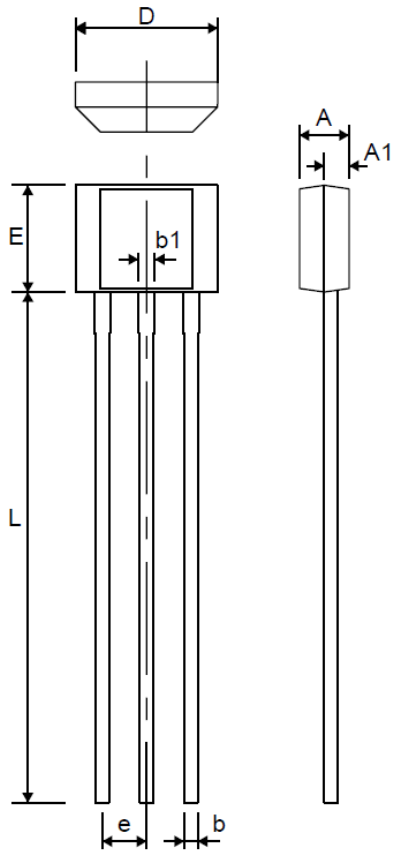
(1) SOT-23-3L



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.45	-	-	0.057
A1	0	0.08	0.15	-	-	0.006
A2	0.9	1.1	1.3	0.035	0.043	0.051
b	0.3	0.4	0.5	0.012	0.016	0.02
C	0.08	0.15	0.22	0.003	0.006	0.009
D	2.7	2.9	3.1	0.106	0.114	0.122
E	2.6	2.8	3	0.102	0.11	0.118
E1	1.4	1.6	1.8	0.055	0.063	0.071
L	0.3	0.45	0.6	0.012	0.018	0.024
L1	0.5	0.6	0.7	0.02	0.024	0.028
e	1.9 BSC			0.075 BSC		
e1	0.95 BSC			0.037 BSC		
θ	0°	4°	8°	0°	4°	8°

JEDEC outline: NA

(2) SIP-3L



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