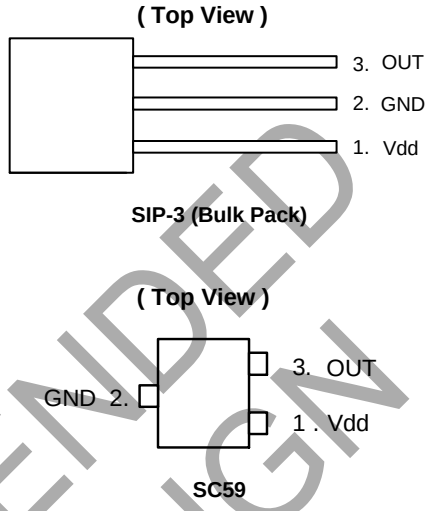
HIGH SENSITIVITY HALL EFFECT LATCH

Description

The AH3761 is an integrated Hall effect latched sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a schmitt trigger to provide switching hysteresis for noise rejection, and open drain output. An internal bandgap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

If a magnetic flux density larger than threshold Bop, DO is turned on (low). The output state is held until a magnetic flux density reversal falls below Brp causing DO to be turned off (high).

Pin Assignments



Features

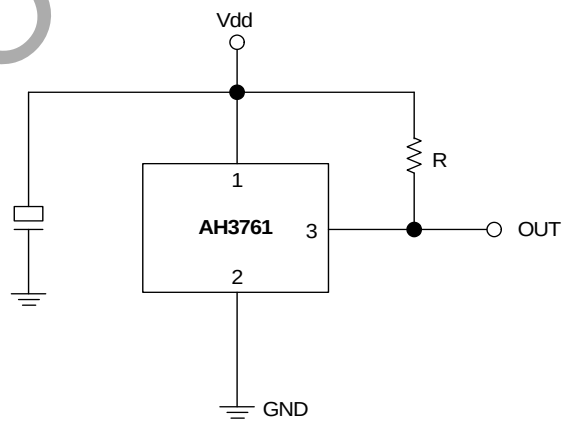
- 3V to 28V DC Operation Voltage
- Chopper Stabilized
- Wide Operating Voltage Range
- Built-in Power Reverse Protection
- Built-in Voltage Overshoot Protection
- Output Short Circuit Protection
- Open Drain Pre-Driver
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 (Commonly known as SOT23 in Asia)
- Available in “Green” Molding Compound (No Br, Sb)
- **Totally Lead-Free & Fully RoHS Compliant (Note 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

Applications

- Brush-less DC Motor Commutation
- RPM Detection
- Consumer and Industrial Position Sensor
- Flow Meters

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated’s definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

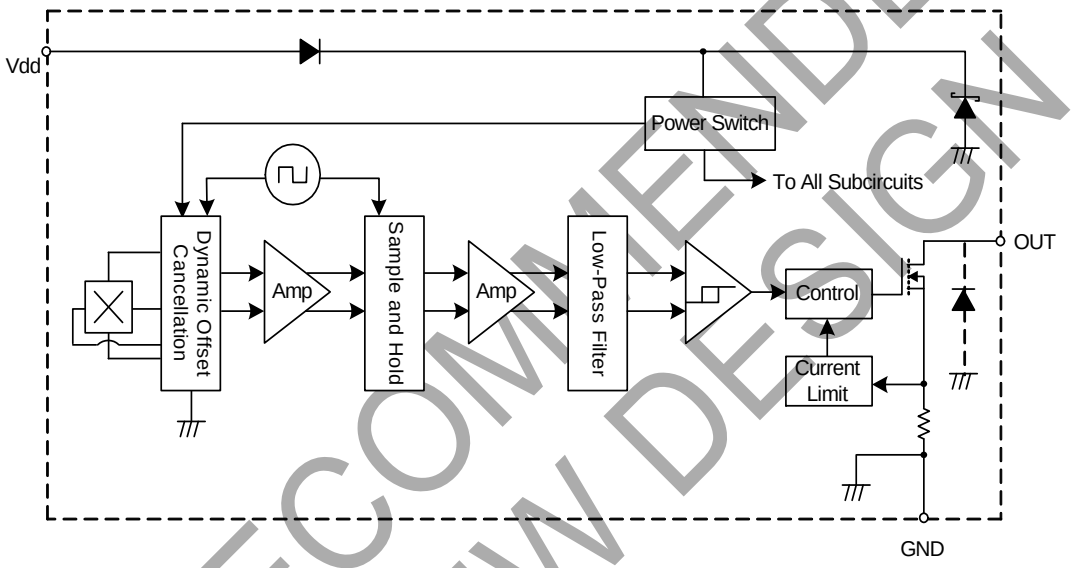
Typical Applications Circuit



Pin Descriptions

Pin Name	P/I/O	Pin #	Description
Vdd	P	1	Positive Power Supply
GND	P	2	Ground
OUT	O	3	Output Pin

Functional Block Diagram



Absolute Maximum Ratings (T_A = +25°C)

Symbol	Characteristics		Values	Unit
V_{DD}	Supply Voltage		30	V
V_{RDD}	Reverse Battery Voltage		-30	V
B	Magnetic Flux Density		Unlimited	
V_{DS}	Output OFF Voltage		30	V
$I_{O(peak)}$	Output "On" Current (Peak)		100	mA
T_{ST}	Storage Temperature Range		-65 to +150	°C
$T_{J(MAX)}$	Maximum Junction Temperature		+150	°C
P_D	Package Power Dissipation	SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)	550	mW
		SC59	230	mW
θ_{JC}	Thermal Resistance Junction to case	SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)	227	°C/W
		SC59	543	°C/W

Recommended Operating Conditions

Symbol	Characteristic	Conditions	Min	Typ.	Max	Unit
V_{DD}	Supply Voltage	Operating	3	24	28	V
T_A	Operating Ambient Temperature	Operating	-40	-	+125	°C

Electrical Characteristics (T_A = +25°C, V_{DD} =24V, Note 4)

Symbol	Characteristic	Test Conditions	Min	Typ.	Max	Unit
$V_{O(SAT)}$	Output Saturation Voltage	Iout =20mA, B>Bop	-	300	500	mV
I_{OFF}	Output Leakage Current	V_O =24V, B<Bop	-	< 0.1	10	μA
I_{DD}	Supply Current	Output Open	-	4	6	mA
t_R	Output Rising Time	R_L =10kΩ, C_L =16pF	-	340	-	ns
t_F	Output Falling Time	R_L =10kΩ, C_L =16pF	-	20	-	ns
f_C	Chopping Frequency	-	-	300	-	kHz
I_{OM}	Output Current Limit	B>Bop (Note 5)	50	70	90	mA
t_{ST}	Start-up time of IC	V_{DD}>3V, B>Bop (Note 6)	-	47	-	μs

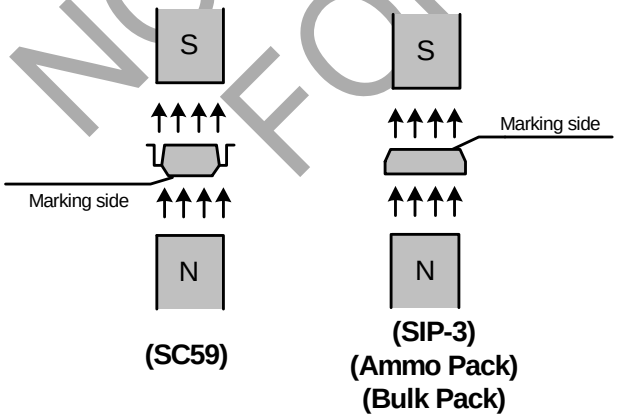
Notes: 4. Typical data is at T_A=+25°C, V_{DD}=24V and is design information only.
5. The device will shut down operating after the output current I_O is over the output current limit I_{OM} for 160μs (typically). The device will re-start up operating after resetting the supply voltage V_{DD}.
6. I_n initial power on time, the output state is kept in "High" in this start-up time of IC.

Magnetic Characteristics (T_A = +25°C, V_{DD} =3V to 28V, Note 7)

(1mT=10Gauss)

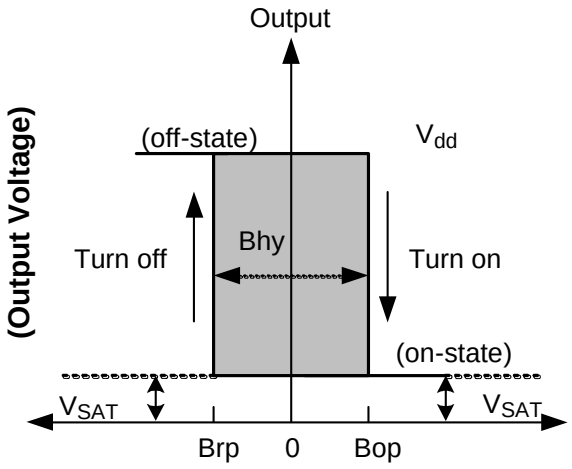
Symbol	Parameter	Min	Typ.	Max	Unit
Bop	Operate Point	5	30	60	Gauss
Brp	Release Point	-60	-30	-5	Gauss
Bhys	Hysteresis	-	60	-	Gauss

Notes: 7. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.



(SC59)

(SIP-3)
(Ammo Pack)
(Bulk Pack)

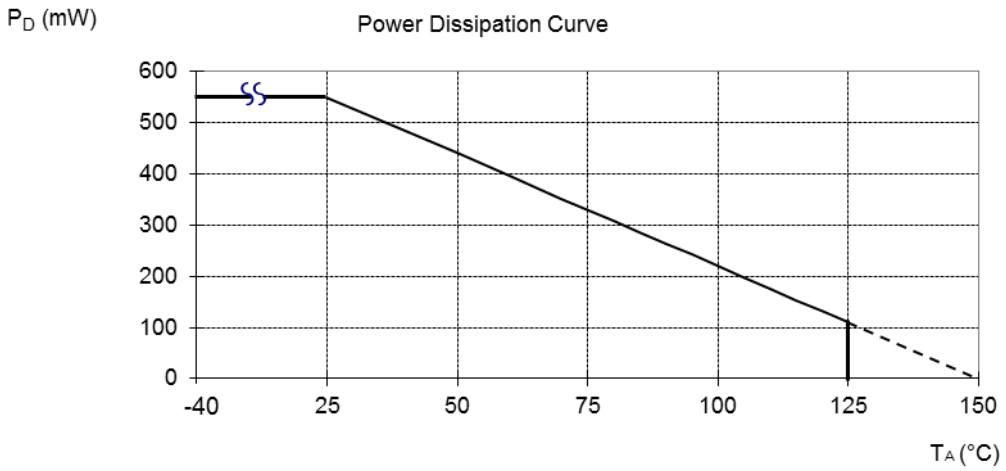


(Magnetic Flux Density B)

Performance Characteristics

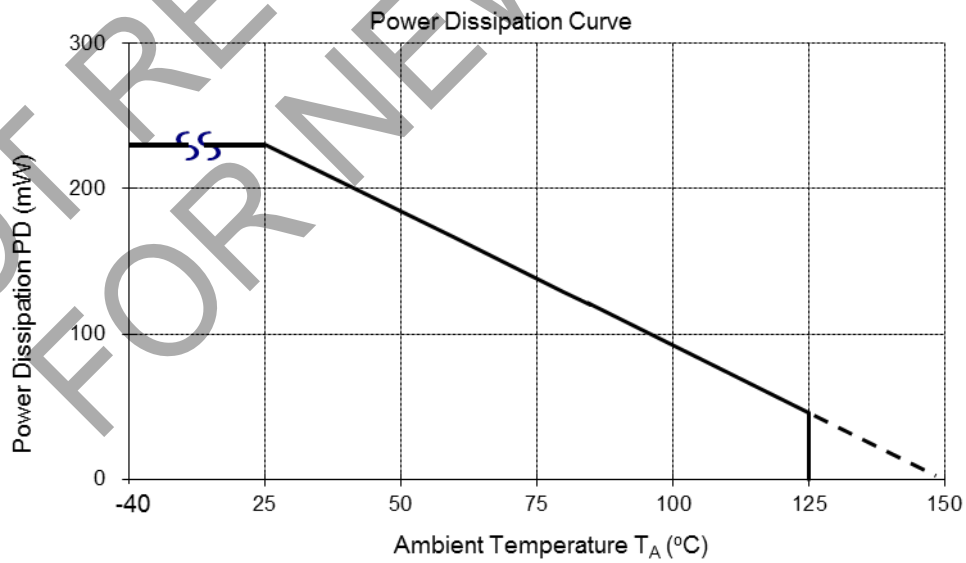
(1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

T_A (°C)	25	50	60	70	80	85	90	95	100
P_D (mW)	550	440	396	352	308	286	264	242	220
T_A (°C)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**150**
P_D (mW)	198	176	154	132	110	88	66	44	0

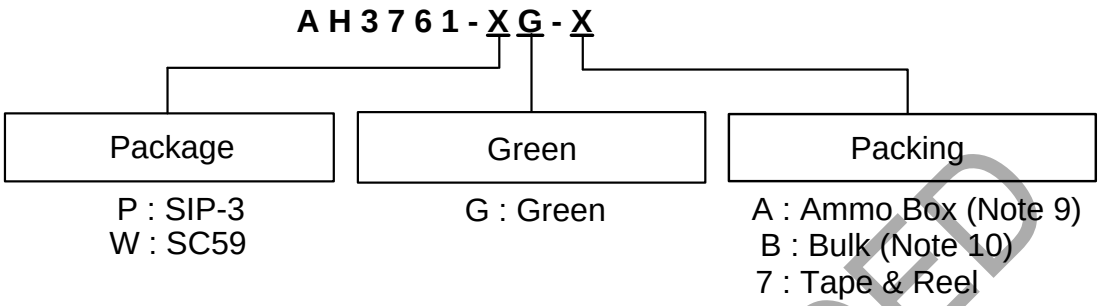


(2) SC59 (Commonly known as SOT23 in Asia)

T_A (°C)	25	50	60	70	80	90	100	110	120	125	130	140	150
P_D (mW)	230	184	166	147	129	110	92	74	55	46	37	18	0



Ordering Information

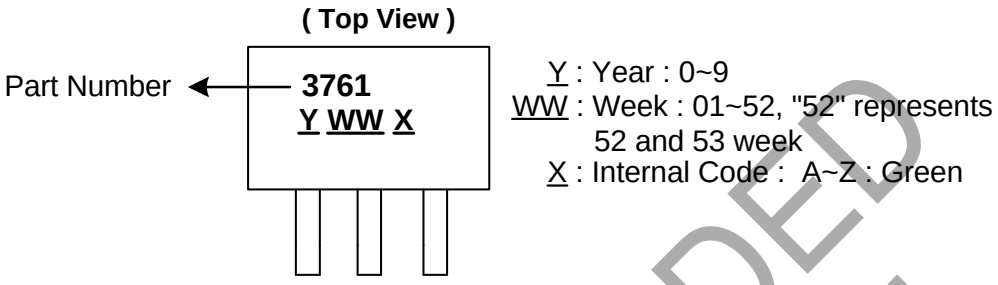


Device	Status (Note 11)	Package Code	Packaging (Note 8)	Bulk		7" Tape and Reel		Ammo Box	
				Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH3761-PG-A	NRND	P	SIP-3(Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH3761-PG-B	NRND	P	SIP-3(Bulk Pack)	1000	-B	NA	NA	NA	NA
AH3761-WG-7	NRND	W	SC59	NA	NA	3000/Tape & Reel	-7	NA	NA

Notes:
8. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at http://www.diodes.com/package-outlines.html.
9. Ammo Box is for SIP-3 Spread Lead.
10. Bulk is for SIP-3 Straight Lead.
11. NRND = Not Recommended for New Design.

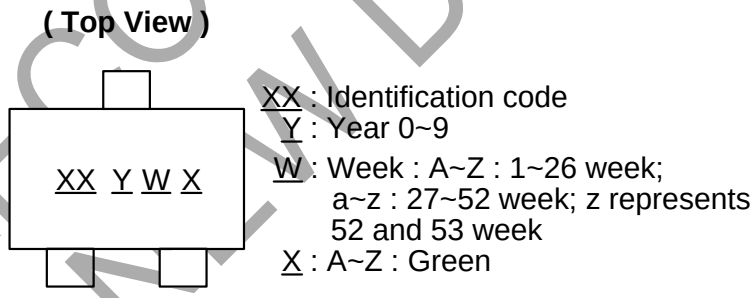
Marking Information

(1) Package Type: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)



Part Number	Package	Identification Code
AH3761	SIP-3 (Ammo Pack)	3761
AH3761	SIP-3 (Bulk Pack)	3761

(2) Package Type: SC59

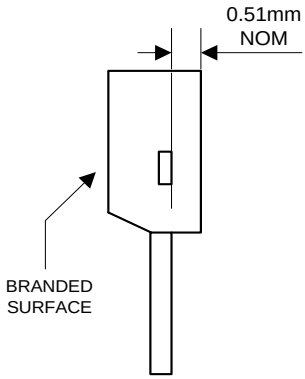


Part Number	Package	Identification Code
AH3761	SC59	P8

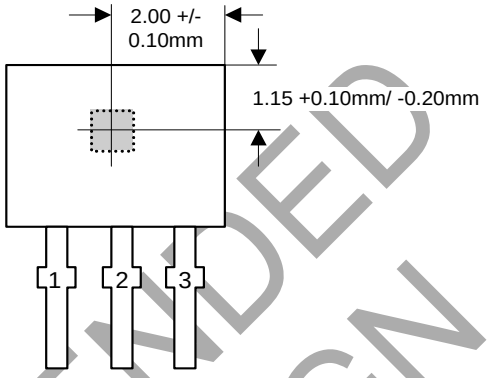
Package Outline Dimensions (All Dimensions in mm)

Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SIP-3 (Bulk Pack)

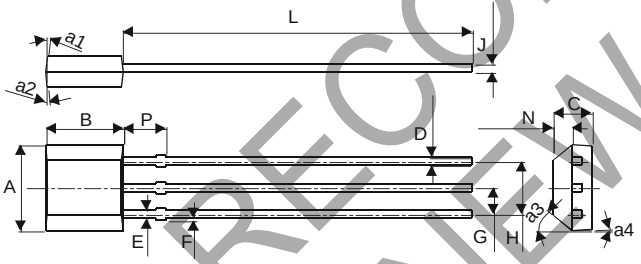


Active Area Depth



Sensor Location

Package Dimension

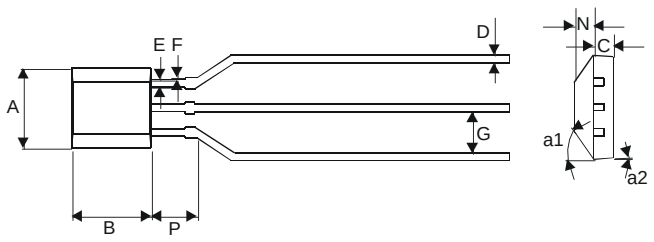


SIP-3 (Bulk Pack)		
Dim	**Min**	**Max**
A	3.9	4.3
a1	5	yp
a2	5	Typ
a3	45	Typ
a4	3	Typ
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

Package Outline Dimensions (Cont.)

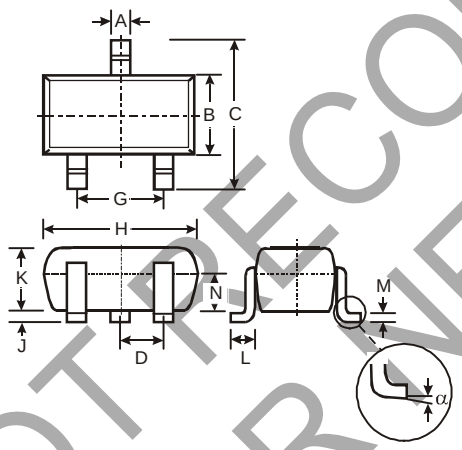
Please see http://www.diodes.com/package-outlines.html for the latest version.

(2) Package Type: SIP-3 (Ammo Pack)

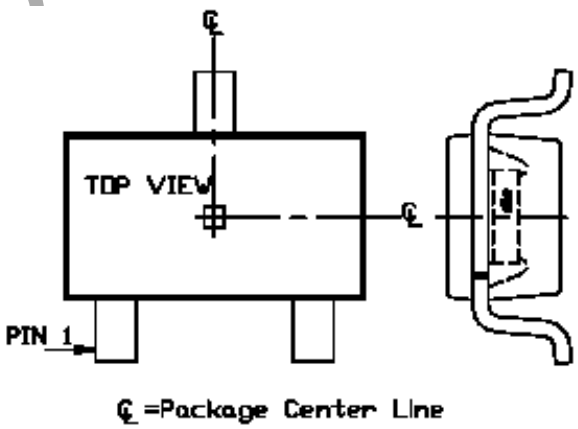


SIP-3 (Ammo Pack)		
Dim	**Min**	**Max**
A	3.9	4.3
a1	45 Typ	
a2	3 Typ	
B	2.8	3.2
C	1.40	1. 0
	0 35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

(3) Package Type: SC59



SC59			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
	0°	8°	-
All Dimensions in mm			

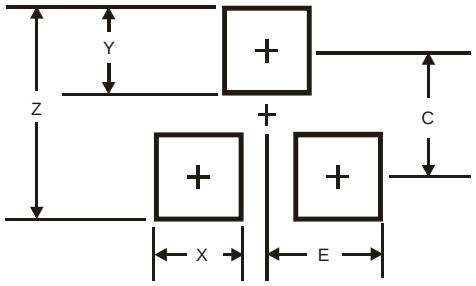


℄ =Package Center Line

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SC59



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35