

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.

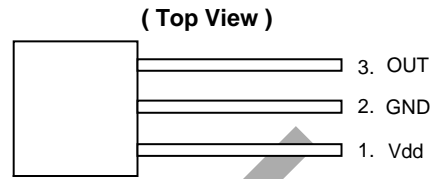
If a magnetic flux density larger than threshold Bop, DO is turned on (low). The output state is held until a magnetic flux density reversal falls below Brp causing DO to be turned off (high).

Features

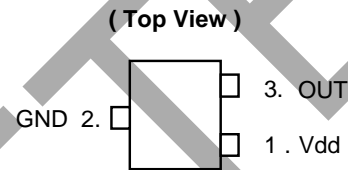
- 3V to 28V DC Operation Voltage
- Chopper Stabilized
- Wide Operating Voltage Range
- Built-in Power Reverse Protection
- Built-in Voltage Overshoot Protection
- Output Short Circuit Protection
- Open Drain Pre-Driver
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 (Commonly known as SOT23 in Asia)
- 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)**

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> 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.

Pin Assignments



SIP-3 (Bulk Pack)

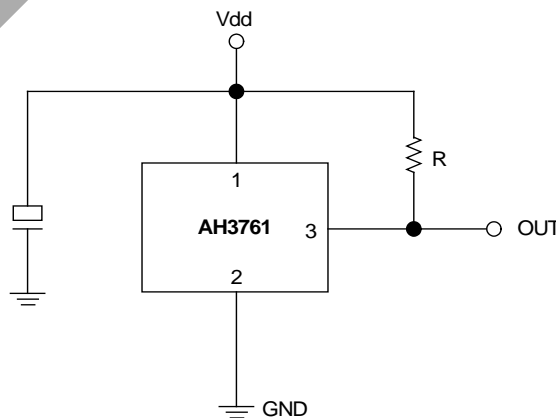


SC59

Applications

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

Typical Applications Circuit

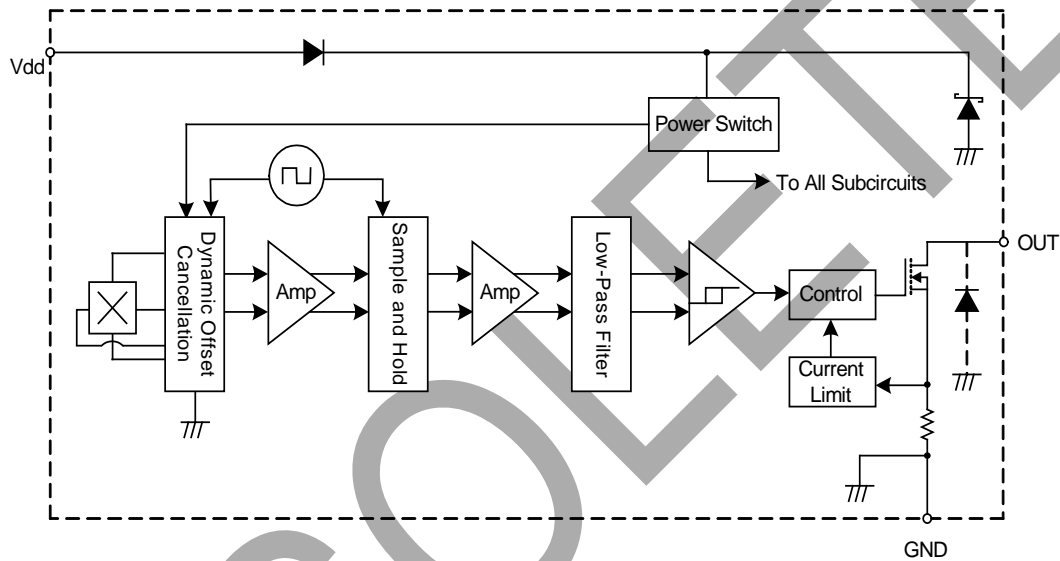


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Pin Descriptions

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 ($T_A = +25^\circ\text{C}$)

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	$^\circ\text{C}$	
$T_{J(MAX)}$	Maximum Junction Temperature	+150	$^\circ\text{C}$	
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	$^\circ\text{C/W}$
		SC59	543	$^\circ\text{C/W}$

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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	I _{out} =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

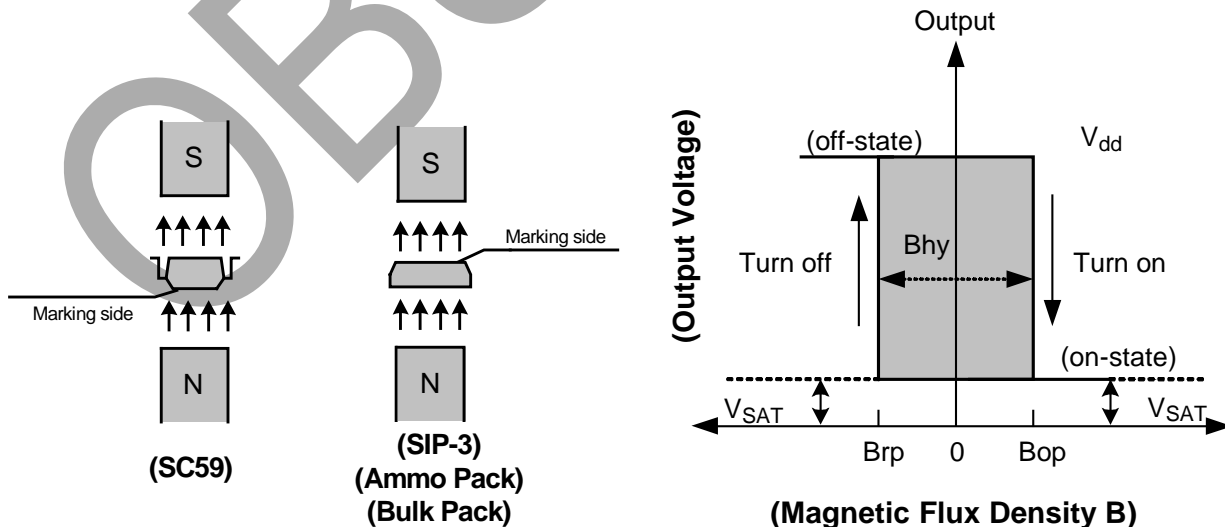
- Notes:
- Typical data is at T_A=+25°C, V_{DD}=24V and is design information only.
 - The device will shut down operating after the output current I_O is over the output current limit I_{OM} for 160μs (typically). The device will re-start up operating after resetting the supply voltage V_{DD}.
 - I_n 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
B _{hys}	Hysteresis	-	60	-	Gauss

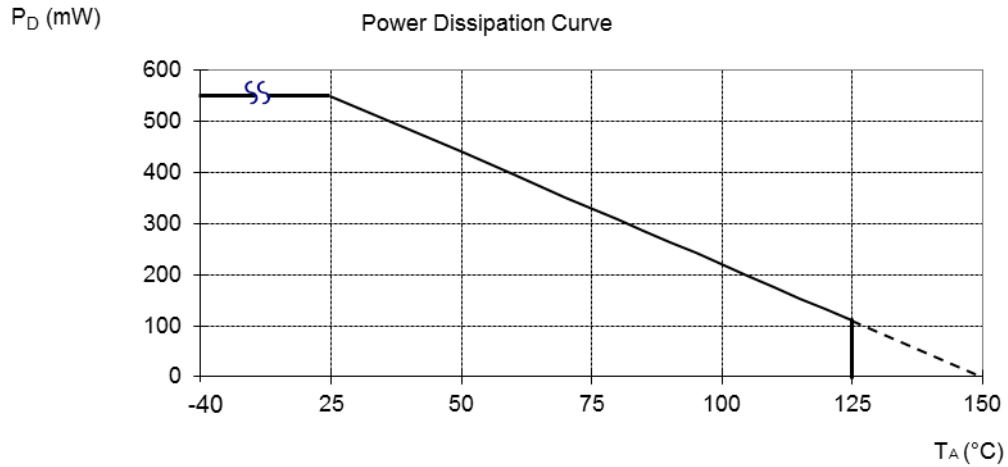
- Notes: 7. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.



Performance Characteristics

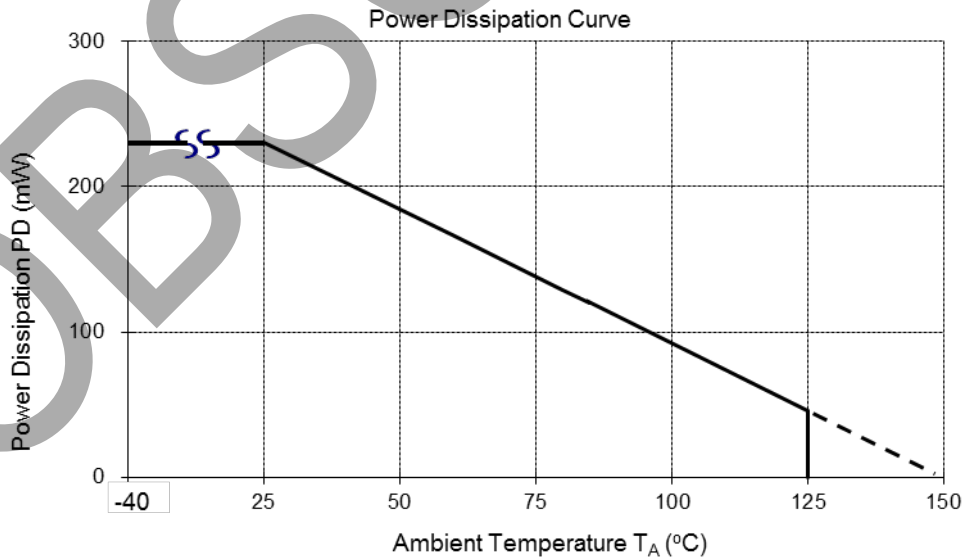
(1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

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)

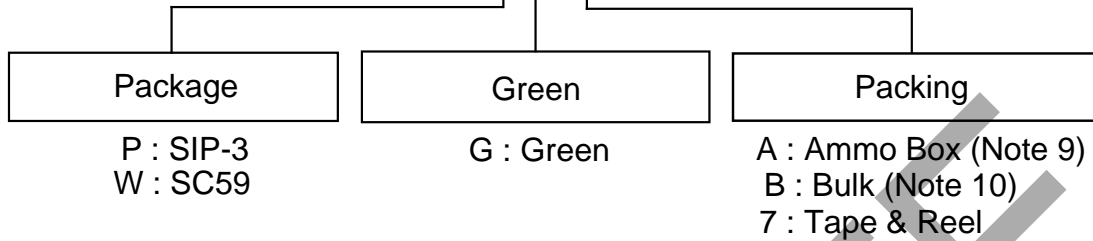
T _A (°C)	25	50	60	70	80	90	100	110	120	125	130	140	150
P _D (mW)	230	184	166	147	129	110	92	74	55	46	37	18	0



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Ordering Information

AH3761-XG-X



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	EOL	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

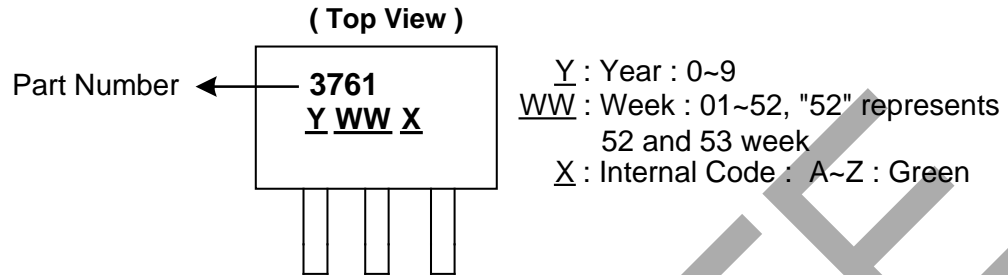
- Notes:
- 8. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
 - 9. Ammo Box is for SIP-3 Spread Lead.
 - 10. Bulk is for SIP-3 Straight Lead.
 - 11. NRND = Not Recommended for New Design.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

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Marking Information

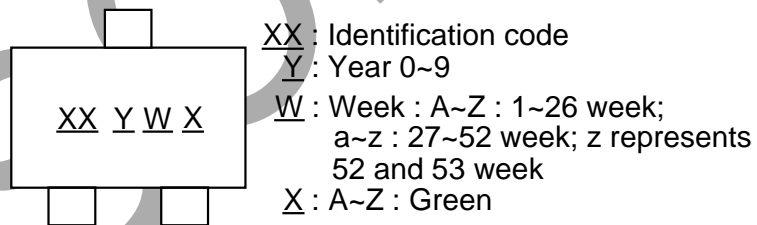
(1) Package Type: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)



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

(2) Package Type: SC59

(Top View)

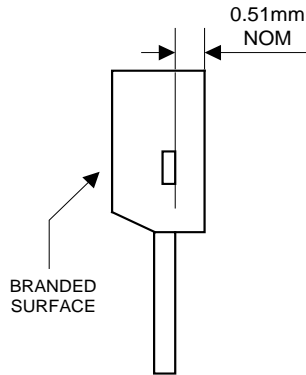


Part Number	Package	Identification Code
AH3761	SC59	P8

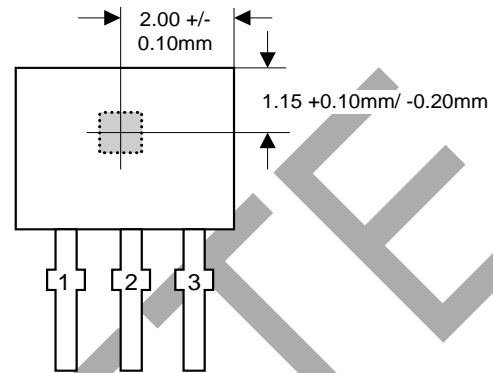
Package Outline Dimensions (All Dimensions in mm)

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

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

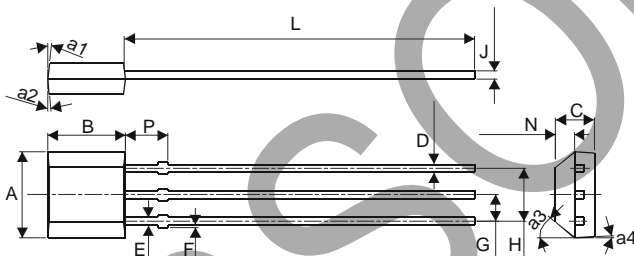


Active Area Depth



Sensor Location

Package Dimension



SIP-3 (Bulk Pack)		
Dim	Min	Max
A	3.9	4.3
a1	5	typ
a2	5	□ Ty
a3	45	□ Ty
a4	3	□ Ty
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		

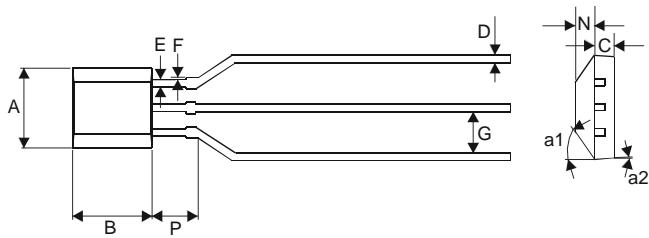
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Package Outline Dimensions (Cont.)

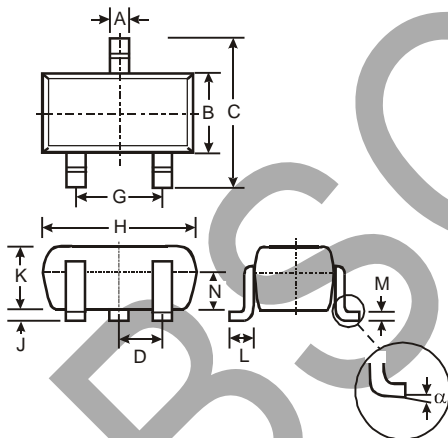
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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

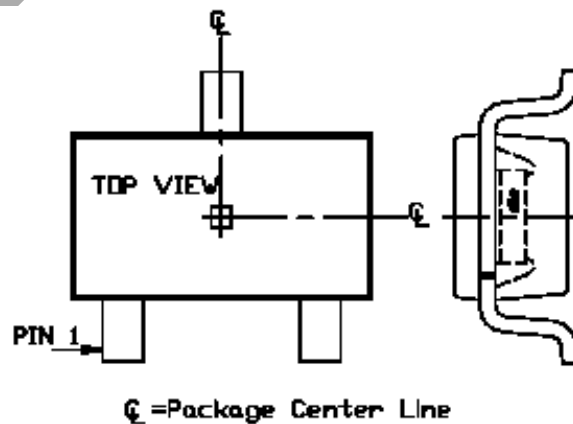


SIP-3 (Ammo Pack)		
Dim	Min	Max
A	3.9	4.3
a1	45	<input type="checkbox"/> Typ
a2	3	<input type="checkbox"/> Typ
B	2.8	3.2
C	1.40	1.00
<input type="checkbox"/>	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

(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
<input type="checkbox"/>	0°	8°	-
All Dimensions in mm			

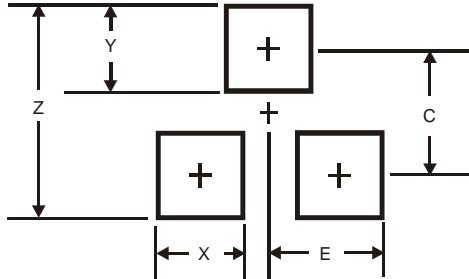


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Suggested Pad Layout

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

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