

## 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

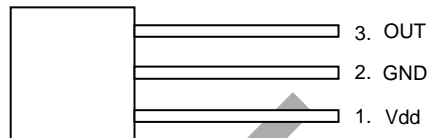
- 3V to 28V DC Operation Voltage
- Chopper Stabilized
- Wide Operating Voltage Range
- Built-in Power Reverse Protection
- Built-in Voltage Overshoot Protection
- Output Short Circuit Protection
- Open Drain Pre-Driver
- SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) and SC59 (Commonly known as SOT23 in Asia)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

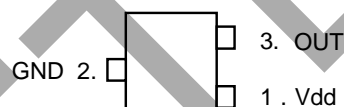
### Pin Assignments

( Top View )



SIP-3 (Bulk Pack)

( Top View )

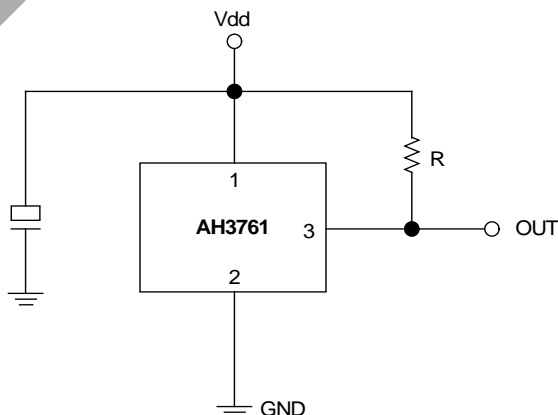


SC59

### Applications

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

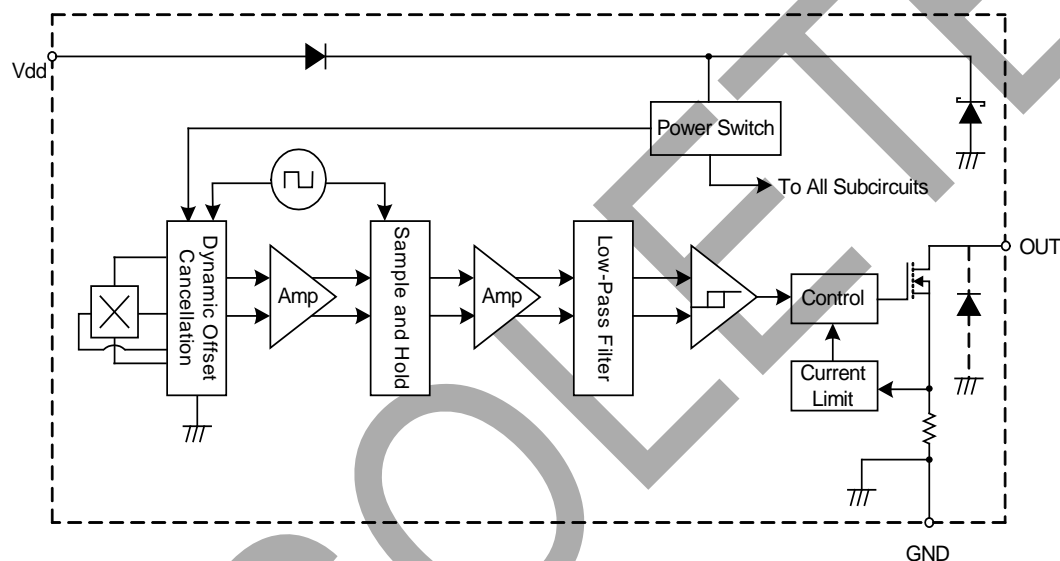
### Typical Applications Circuit



## 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<sub>A</sub> = +25°C)

Symbol	Characteristics		Values	Unit
V <sub>DD</sub>	Supply Voltage		30	V
V <sub>RDD</sub>	Reverse Battery Voltage		-30	V
B	Magnetic Flux Density		Unlimited	
V <sub>DS</sub>	Output OFF Voltage		30	V
I <sub>O(peak)</sub>	Output "On" Current (Peak)		100	mA
T <sub>ST</sub>	Storage Temperature Range		-65 to +150	°C
T <sub>J(MAX)</sub>	Maximum Junction Temperature		+150	°C
P <sub>D</sub>	Package Power Dissipation	SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)	550	mW
		SC59	230	mW
θ <sub>JC</sub>	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 ( $T_A = +25^\circ\text{C}$ , $V_{DD} = 24\text{V}$ , Note 4)

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

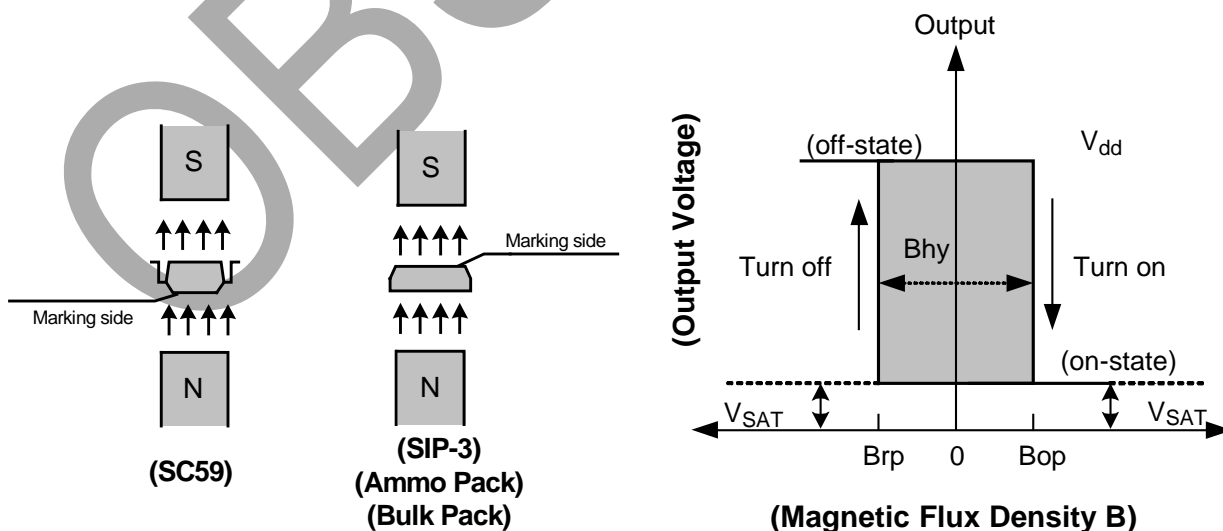
- Notes:
- Typical data is at  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 24\text{V}$  and is design information only.
  - The device will shut down operating after the output current  $I_O$  is over the output current limit  $I_{OM}$  for 160 $\mu\text{s}$  (typically). The device will re-start up operating 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 ( $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$ to $28\text{V}$ , Note 7)

(1mT=10Gauss)

Symbol	Parameter	Min	Typ.	Max	Unit
$B_{op}$	Operate Point	5	30	60	Gauss
$B_{rp}$	Release Point	-60	-30	-5	Gauss
$B_{hys}$	Hysteresis	-	60	-	Gauss

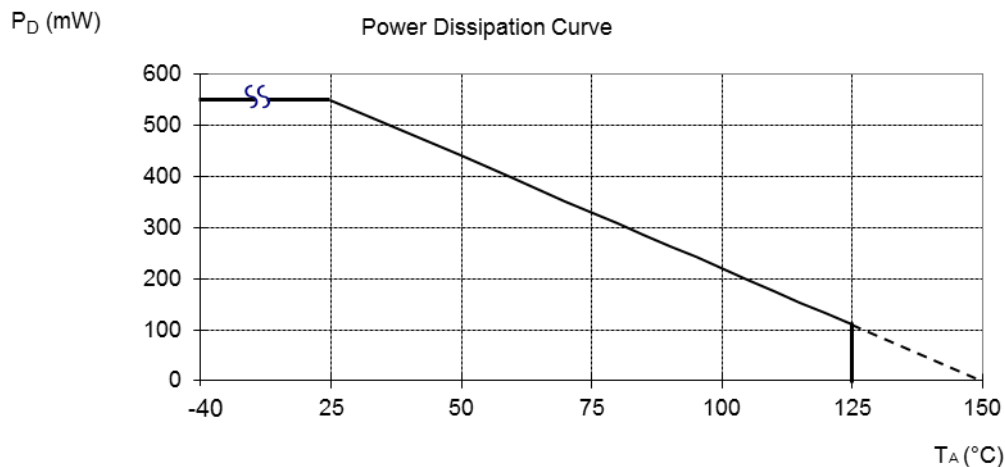
- Notes: 7. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.



## Performance Characteristics

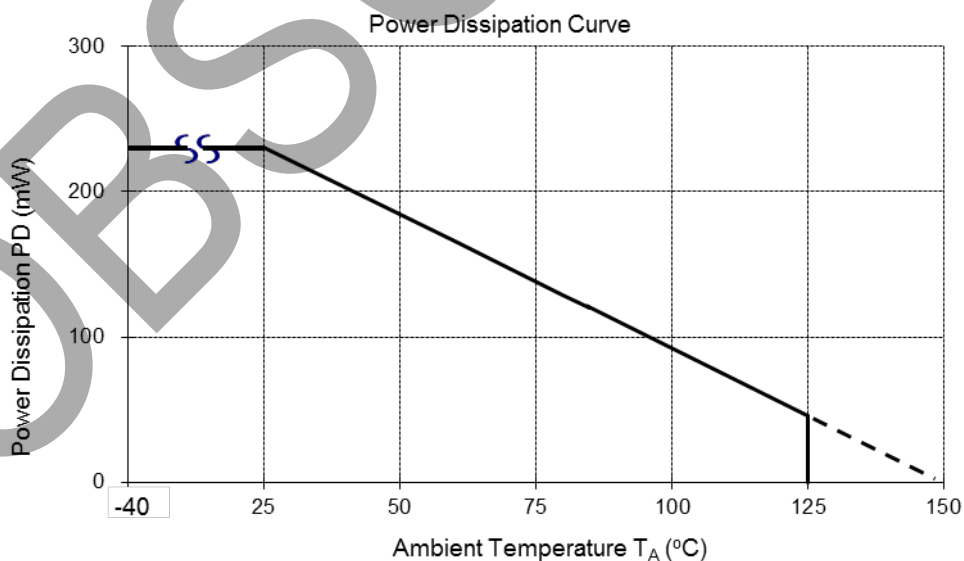
### (1) SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

$T_A$ (°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



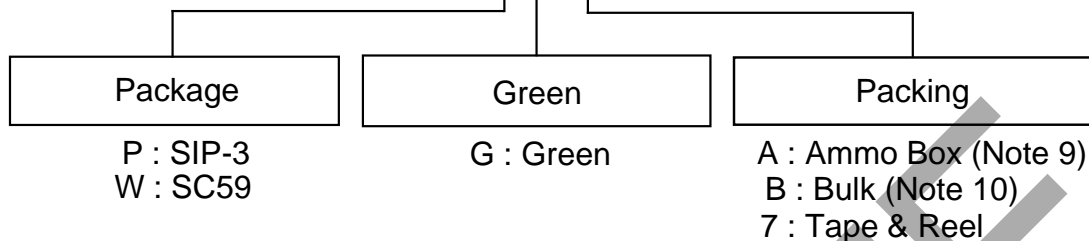
### (2) SC59 (Commonly known as SOT23 in Asia)

$T_A$ (°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



## Ordering Information

**A H 3 7 6 1 - X G - X**

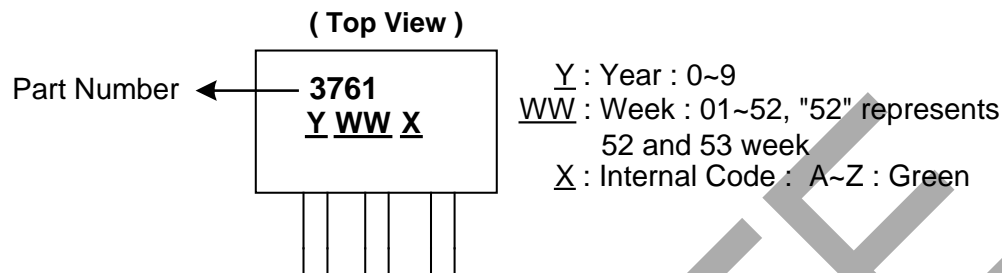


Device	Status (Note 11)	Package Code	Packaging (Note 8)	Bulk		7" Tape and Reel		Ammo Box	
				Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH3761-PG-A	EOL	P	SIP-3(Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH3761-PG-B	NRND	P	SIP-3(Bulk Pack)	1000	-B	NA	NA	NA	NA
AH3761-WG-7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

## Marking Information

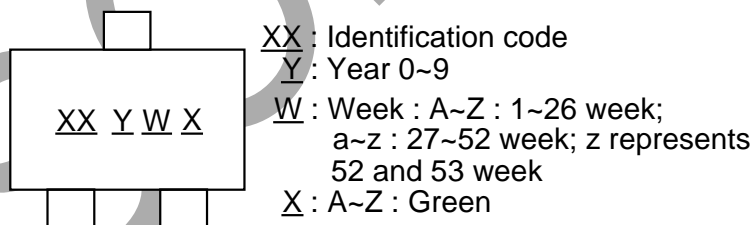
(1) Package Type: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)



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

(2) Package Type: SC59

( Top View )

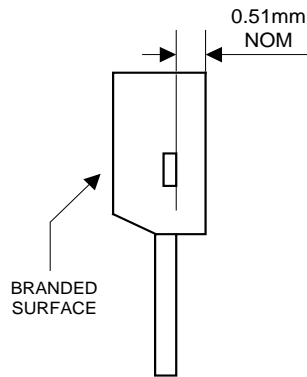


Part Number	Package	Identification Code
AH3761	SC59	P8

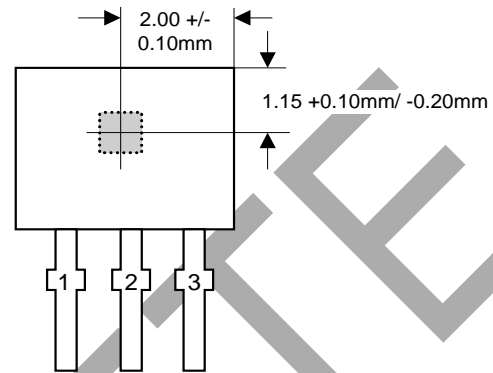
# Package Outline Dimensions (All Dimensions in mm)

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

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

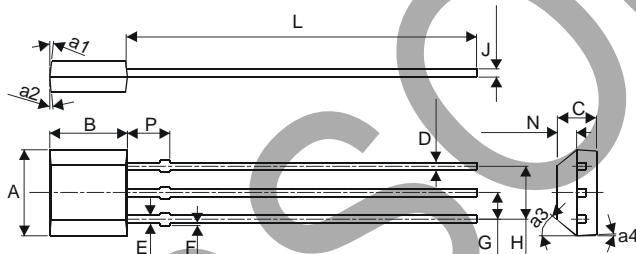


Active Area Depth



Sensor Location

## Package Dimension

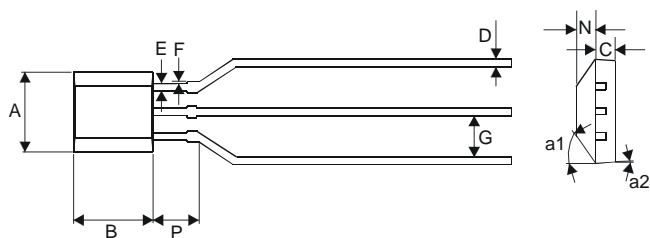


SIP-3 (Bulk Pack)		
Dim	Min	Max
A	3.9	4.3
a1	5	Typ
a2	5	Typ
a3	45	Typ
a4	3	Typ
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

## Package Outline Dimensions (Cont.)

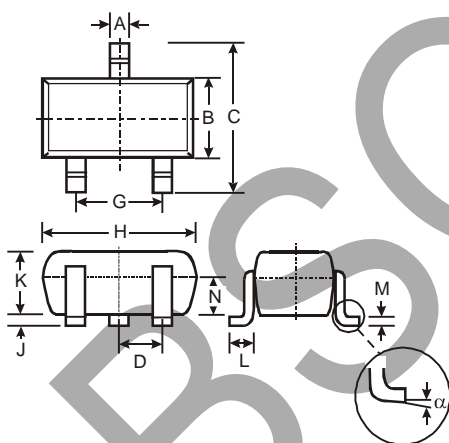
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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

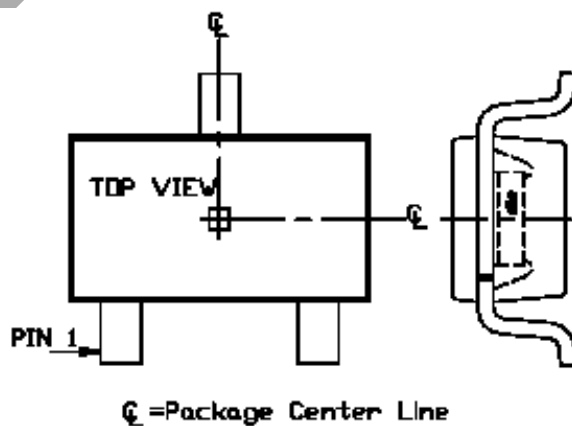


SIP-3 (Ammo Pack)		
Dim	Min	Max
A	3.9	4.3
a1	45	□ Ty
a2	3	□ Ty
B	2.8	3.2
C	1.40	1.□0
□	0□35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

### (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			



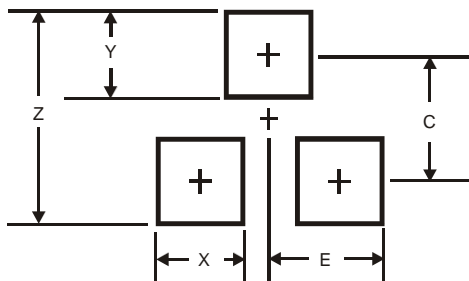
☒ = Package Center Line



## 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

OBSOLETE - PART DISCONTINUED

OBSOLETE

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