

1 Features and Benefits

- ▲ Digital output, omnipolar switch
- ▲ Stable over the entire temperature range
- ▲ Low operating voltage range: 2.5V ~ 5.5V
- ▲ Strong resistance to mechanical stress
- ▲ Non-contact output, safety and reliable
- ▲ Operating temperature range: -40°C ~ 85°C
- ▲ TO-92UA and SOT-23-3L package options
- ▲ Developed according to the EU RoHS and REACH

2 Application Examples

- ▲ Automotive electronics, Consumer electronics and Industrial electronics
- ▲ Water flow sensing
- ▲ Liquid level detection
- ▲ Position sensing
- ▲ Hand-held equipment
(Cellphone, Pan-Tilt, Notebook, etc.)
- ▲ Contactless key/button
- ▲ Bluetooth headset
- ▲ Door latch system

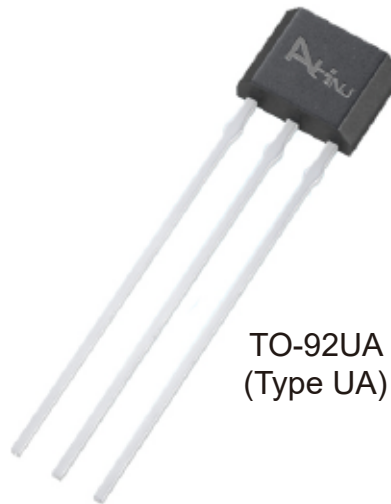
3 Selection Guide

Part Number	Packing	Mounting	Operating, T	B _{RP} (Min)	B _{OP} (Max)
AH3661/E-M	7-in. reel, 3000 pieces/reel	3-pin SOT23-3L surface mount	-40°C to 85°C	±1.0mT	±6.0mT
AH3661/E-UA	Anti-static bag, 1000 pieces/bag	3-pin SIP through hole	-40°C to 85°C	±1.0mT	±6.0mT

NOTE 1. Hall ICs are soldered tin brazing for assembly, and wave soldering of SOT-23-3L surface-mounted components poses a risk of failure.
 2. A risk of circuit failure may happen in non-brazing processes such as electric resistance welding, high-frequency welding, etc.
 3. E: -40~85°C; K: -40~125°C; L: -40~150°C.



SOT-23-3L
(Type M)



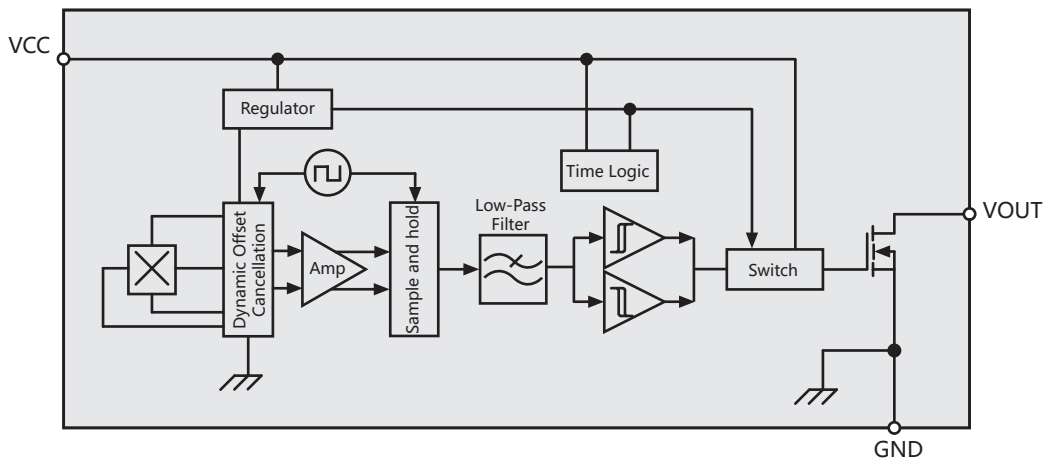
TO-92UA
(Type UA)

4 General Description

The AH3661 is a digital omnipolar-switch Hall IC with single output. It has good temperature stability and operates over a temperature range of -40°C to 85°C with switch function.

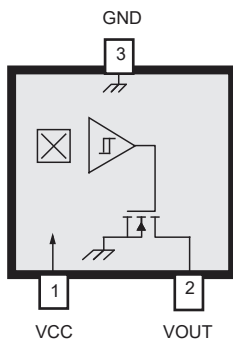
The AH3661 Hall-effect sensor includes the following on a single silicon chip: reverse voltage protector, voltage regulator, temperature compensation circuit, Hall-voltage generator, signal amplifier, Schmitt trigger and open-drain output driver, etc.

The AH3661, produced with CMOS technology, is asked for lower supply voltage and less power supply. It is available in two package types: SOT-23-3L (Type M) and TO-92UA (Type UA). Each package is lead (Pb) free, with 100% matte tin plated leadframes.

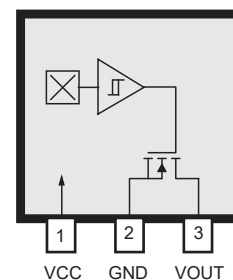


5 Terminal List

SOT-23-3L
(Type M)



TO-92UA
(Type UA)



Name	Description	Number	
		Type M	Type UA
VCC	Power Supply	1	1
GND	Ground	3	2
VOUT	Output	2	3

6 Absolute Maximum Ratings

Characteristic	Symbol	Note	Rating	Unit
Supply Voltage	V_{CC}		5	V
Output Current	$I_{OUTSINK}$		1	mA
Magnetic Flux Density	B		Unlimited	G
Operating Temperature	T_A	E	-40 to 85	°C
Maximum Junction Temperature	$T_{J(max)}$	Too high a T_j could lead to electrical or thermal breakdown	165	°C
Storage Temperature	T_{stg}		-50 to 160	°C
ESD sensitivity – HBM	-		2	kV

NOTE 1. Human Body Model according to AEC-Q100-002 standard.

7 Electrical Operating Characteristics

valid through the full operating temperature range; unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	Operating, $T_J < 165^\circ\text{C}$	2.5	3.3	5.5	V
High-level Output Voltage	V_{OH}	$V_{CC}=3.3\text{V}$, $R_L=10\text{k}\Omega$, $B < B_{RP}$	3.0	-	3.3	V
Low-level Output Voltage	V_{OL}	$I_{OUTMAX}=1\text{mA}$, $B > B_{OP}$	0	-	0.3	V
Average Supply Current	I_{CC}	$V_{CC}=3.3\text{V}$	-	2.8	3.5	μA
Awake Supply Current	I_{CC_Awk}	$V_{CC}=3.3\text{V}$	-	-	2	mA
Sleepy Supply Current	I_{CC_Slp}	$V_{CC}=3.3\text{V}$	-	-	2	μA
Awake Time	t		-	75	100	μs
Period	T		-	90	130	ms
Duty Cycle	f		-	0.1	-	%

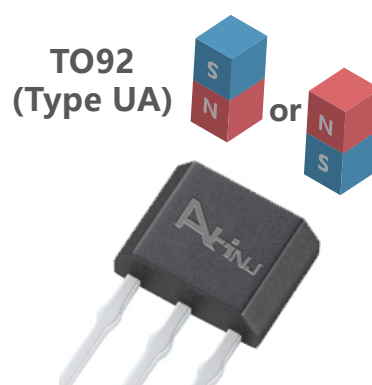
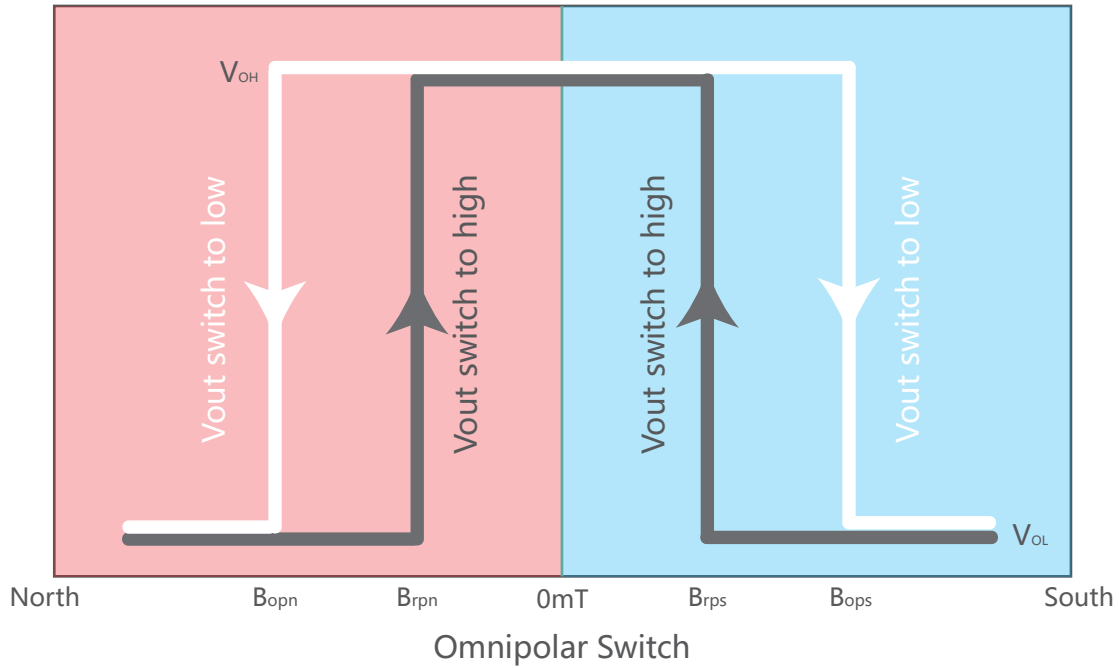
8 Magnetic Operating Characteristics

valid through the full operating temperature range; unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
South Operating Point	B_{OPS}	Operating, $T_J < 165^\circ\text{C}$	-	4.0	6.0	mT
South Release Point	B_{RPS}	$V_{CC}=3.3\text{V}$, $I_{OUT}=1\text{mA}$	1.0	2.7	-	mT
North Operating Point	B_{OPN}	Operating, $T_J < 165^\circ\text{C}$	-6.0	-4.0	-	mT
North Release Point	B_{RPN}	$V_{CC}=3.3\text{V}$, $I_{OUT}=1\text{mA}$	-	-2.7	-1.0	mT
Hysteresis	B_H	$I_{OUT}=1\text{mA}$	-	1.3	-	mT

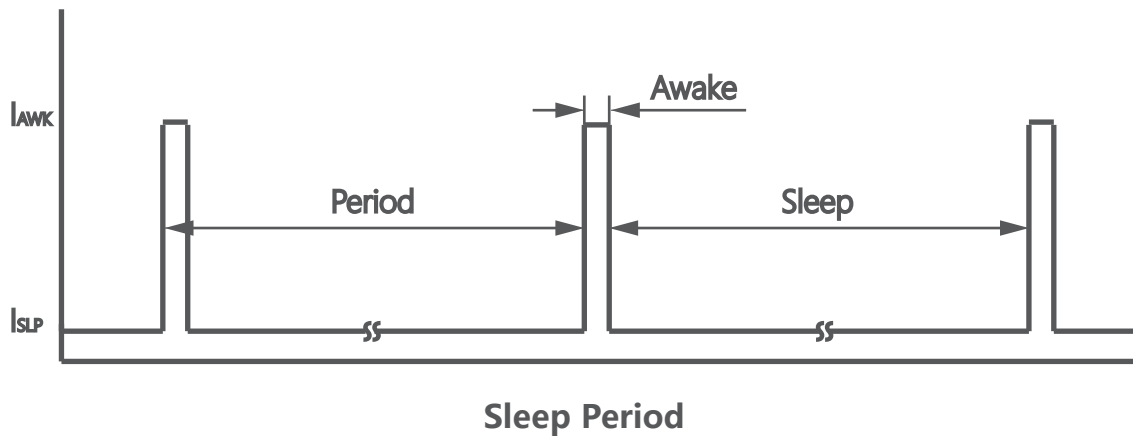
9 Magnetic Behavior

When the magnet (S or N pole) is close to the sensor ($|B| \geq |B_{OP}|$), the sensor outputs a low level; when the magnet is far away from sensor ($|B| \leq |B_{RP}|$), the sensor outputs a high level. Steady Hysteresis ($B_{HX} = |B_{OPX} - B_{RPX}|$) ensures its stable switch status. The magnetoelectric conversion characteristics of AH3661 are shown in the figure:



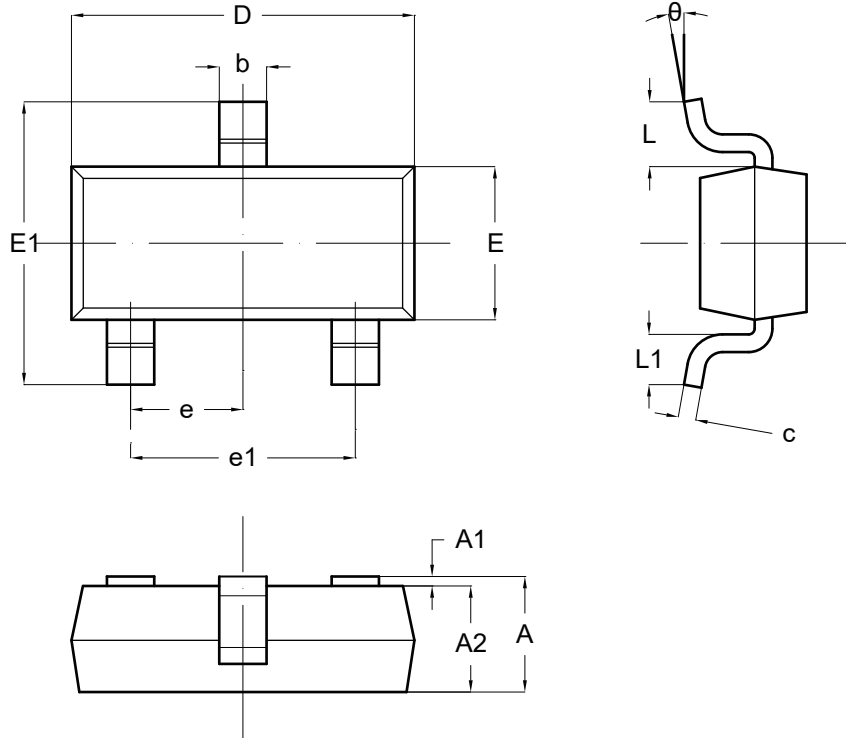
Low Average Power

Internal timing circuit activates the IC for 45 μ s and deactivates it for the remainder of the period (45 ms). A short "awake" time allows for stabilization prior to the sampling and data latching on the falling edge of the timing pulse. The output during the "sleep" time is latched in the last sampled state. The supply current is not affected by the output state.



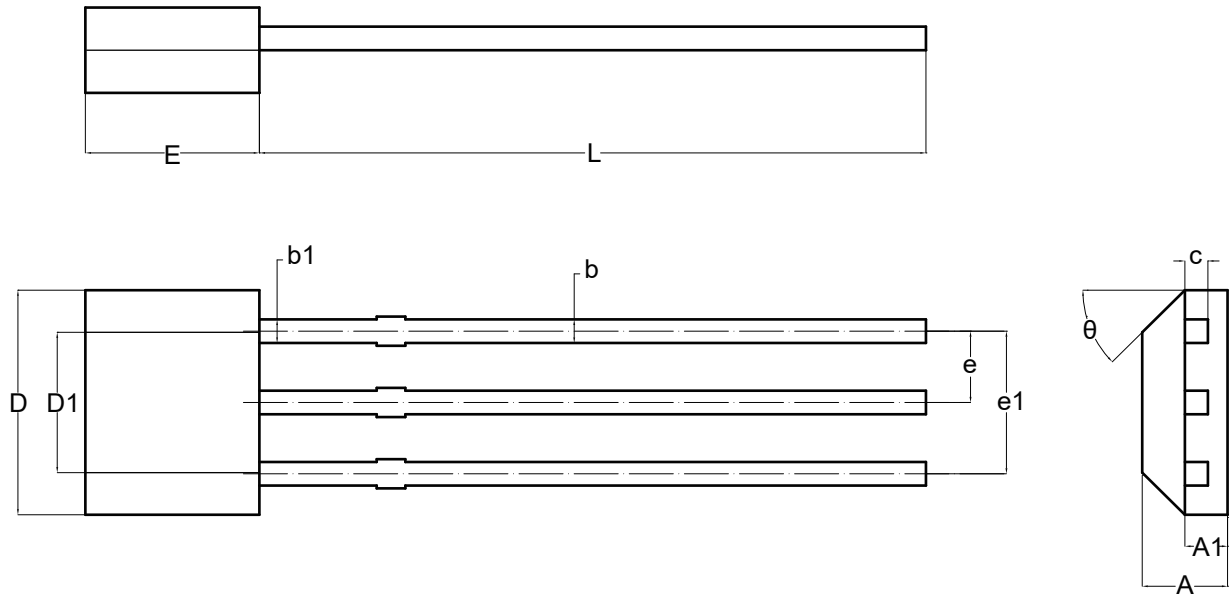
10 Package Information

SOT-23-3L



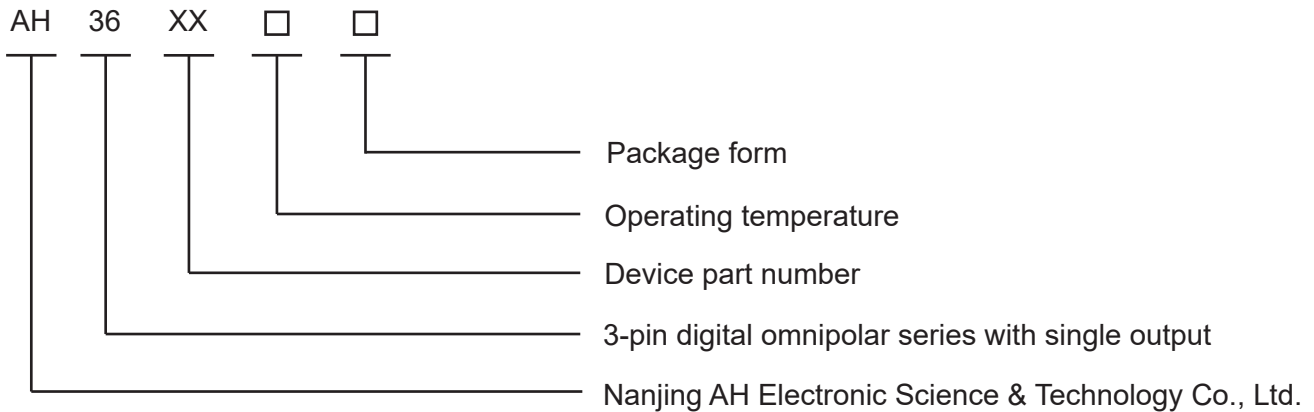
Symbol	Dimension (Unit: mm)	
	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950BSC.	
e1	1.800	2.000
L	0.550REF.	
L1	0.300	0.600
θ	0°	8°

TO-92UA



Symbol	Dimension (Unit: mm)	
	Min	Max
A	1.420	1.620
A1	0.660	0.860
b	0.330	0.480
b1	0.400	0.510
c	0.330	0.510
D	3.900	4.100
D1	2.280	2.680
E	3.050	3.250
e	1.270TYP.	
e1	2.440	2.640
L	14.350	14.750
θ	45°TYP.	

12 Marking Information



- Package Form:

- M — SOT-23-3L (SMD)
- S — SOT-89 (SMD)
- UA — TO-92UA/TO-92S (SIP)

Note: M and S type are packed in reels, M 3k/reel, S 1k/reel;

UA type is packed in bags of 1k/bag or 0.5k/bag.

- Operating Temperature:

- E — -40°C ~ +85°C
- L — -40°C ~ +150°C

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