

1 Features and Benefits

- ▲ Digital output, omnipolar switch
- ▲ Stable over the entire temperature range
- ▲ Low operating voltage range: 1.65V ~ 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

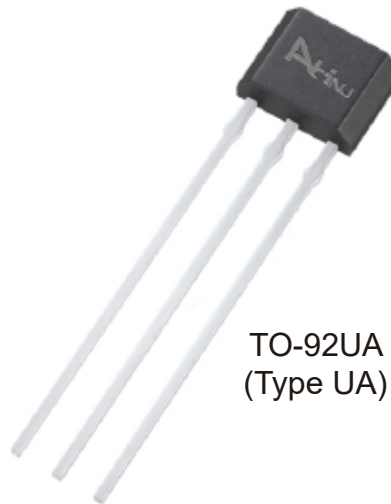
3 Selection Guide

| Part Number | Packing | Mounting | Operating, T | B _{RP} (Min) | B _{OP} (Max) |
|-------------|----------------------------------|------------------------------|---------------|-----------------------|-----------------------|
| AH3663/E-M | 7-in. reel, 3000 pieces/reel | 3-pin SOT23-3L surface mount | -40°C to 85°C | ±20GS | ±30GS |
| AH3663/E-UA | Anti-static bag, 1000 pieces/bag | 3-pin SIP through hole | -40°C to 85°C | ±20GS | ±30GS |

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)



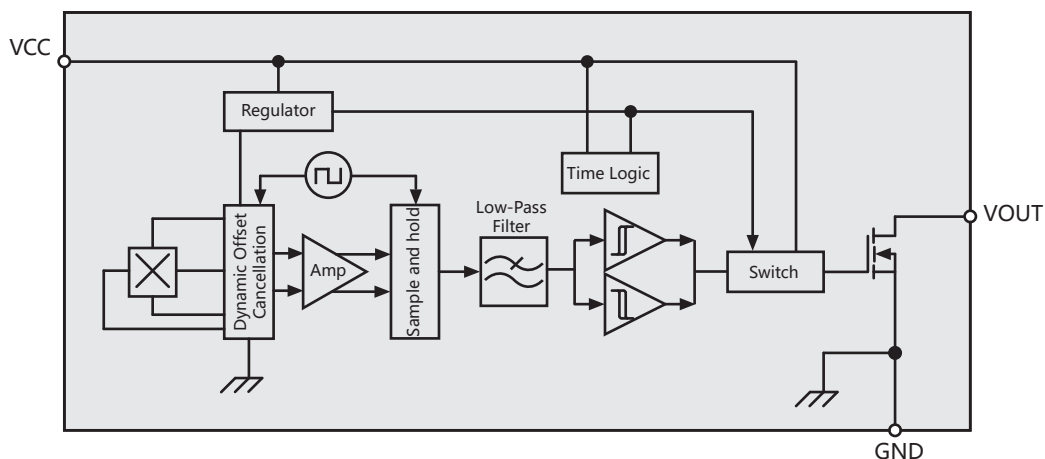
TO-92UA
(Type UA)

4 General Description

The AH3663 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.

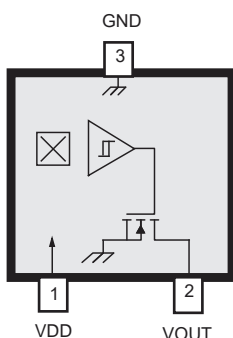
The AH3663 Hall-effect sensor includes the following on a single silicon chip: reverse voltage protector, voltage regulator, temperature compensation circuit, Hall-voltage generator, signal amplifier, Schmitt trigger and open-drain output driver, etc.

The AH3663, 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.

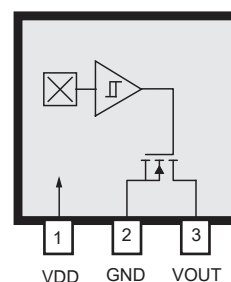


5 Terminal List

SOT-23-3L
(Type M)



TO-92UA
(Type UA)



| Name | Description | Number | |
|------|--------------|--------|---------|
| | | Type M | Type UA |
| VDD | Power Supply | 1 | 1 |
| GND | Ground | 3 | 2 |
| VOUT | Output | 2 | 3 |

6 Absolute Maximum Ratings

| Characteristic | Symbol | Note | Rating | Unit |
|------------------------------|----------------------|---|------------|------|
| Supply Voltage | V _{DD} | | 1.65 ~ 5.5 | V |
| Output Current | I _{OUTSINK} | | 5 | 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 | 125 | °C |
| Storage Temperature | T _{stg} | | -65 to 125 | °C |
| ESD sensitivity – HBM | - | | 6 | 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°C | 1.65 | 3.3 | 5.5 | V |
| High-level Output Voltage | V _{OH} | V _{CC} =3.3V, R _L =10kΩ, B < B _{RP} | 0.35 | 0.1 | - | V |
| Low-level Output Voltage | V _{OL} | I _{OUTMAX} =1mA, B > B _{OP} | - | 0.1 | 0.3 | V |
| Average Supply Current | I _{CC} | V _{CC} =3V | - | 1.2 | 1.9 | μA |
| Awake Supply Current | I _{CC_Awk} | V _{CC} =1.65V to 5.5V | 1.1 | 1.4 | 1.8 | mA |
| Sleepy Supply Current | I _{CC_Slp} | V _{CC} =1.65V to 5.5V | - | - | 1.2 | μA |
| Awake Time | t | V _{CC} =1.65V to 5.5V | 20 | 40 | 55 | μs |
| Period | T | V _{CC} =1.65V to 5.5V | 33 | 50 | 100 | ms |
| Duty Cycle | f | | - | 0.1 | - | % |

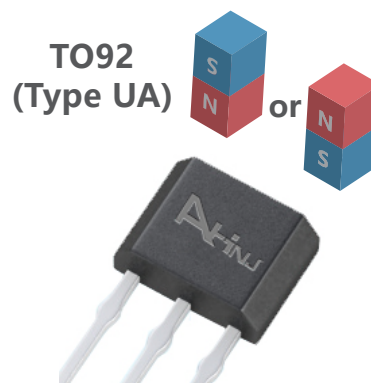
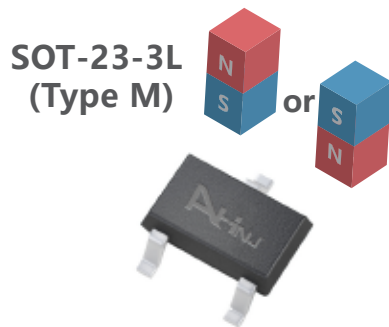
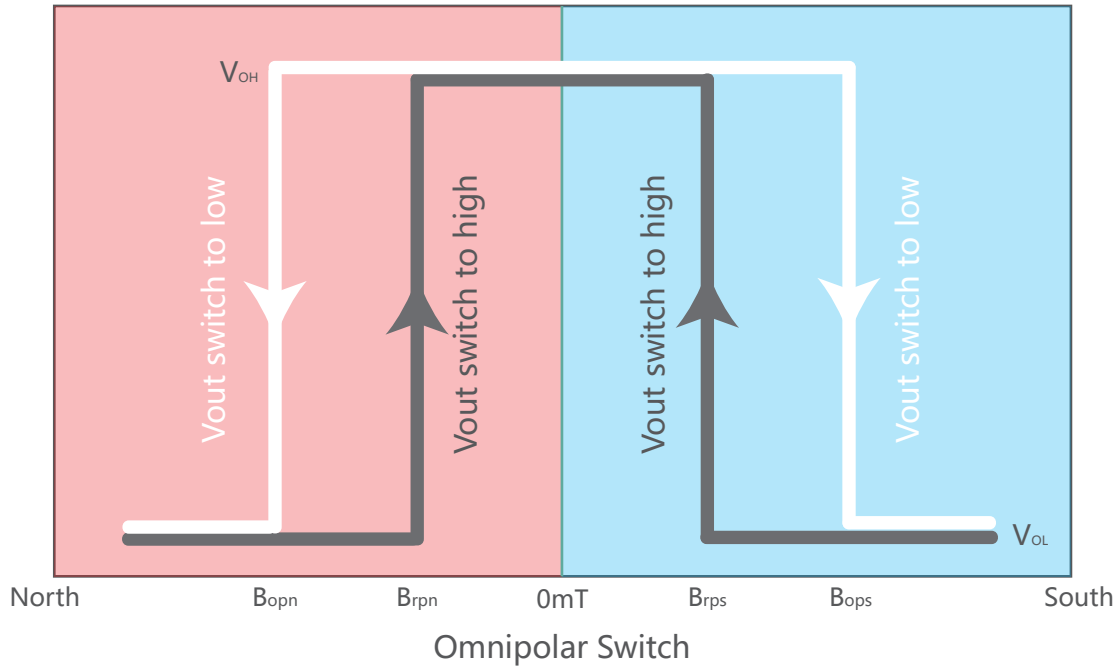
8 Magnetic Operating Characteristics

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°C | - | 3.0 | - | mT |
| South Release Point | B _{RPS} | V _{CC} =1.75V, I _{OUT} =1mA | - | 2.0 | - | mT |
| Nouth Operating Point | B _{OPN} | Operating, T _J <165°C | - | -3.0 | - | mT |
| Nouth Release Point | B _{RPN} | V _{CC} =1.75V, I _{OUT} =1mA | - | -2.0 | - | mT |
| Hysteresis | B _H | I _{OUT} =1mA | ±0.1 | - | ±1.3 | mT |

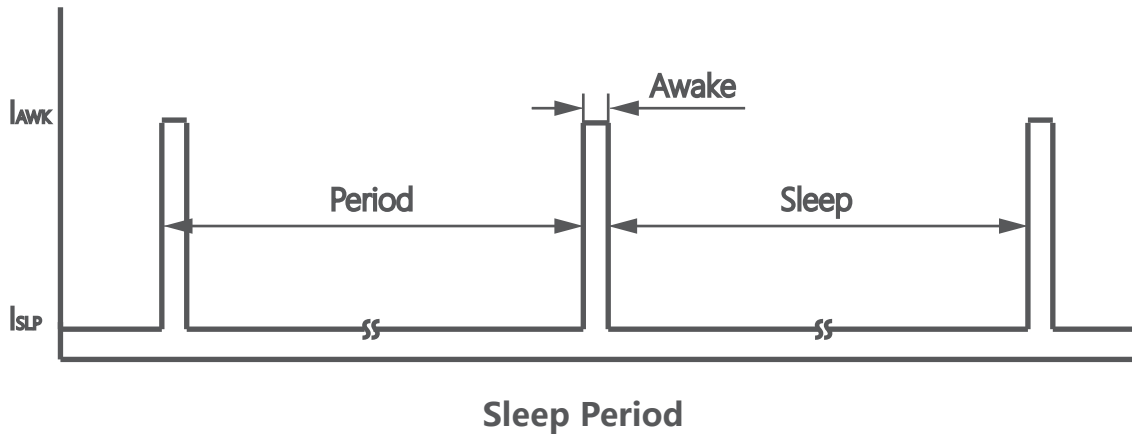
9 Magnetic Behavior

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 AH3663 are shown in the figure:



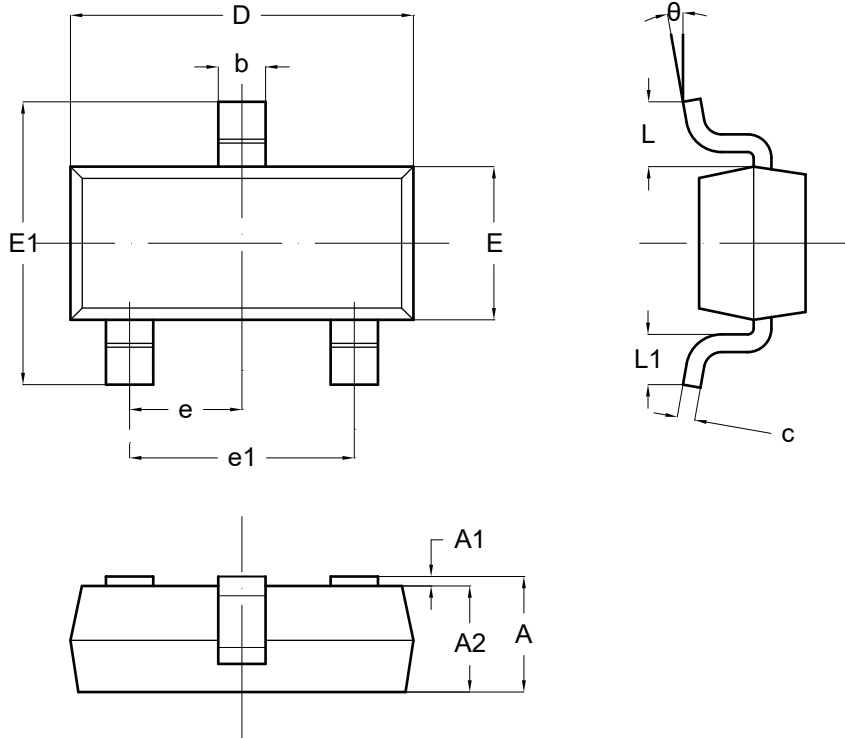
Low Average Power

Internal timing circuit activates the IC for 75 μ s and deactivates it for the remainder of the period (90 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.



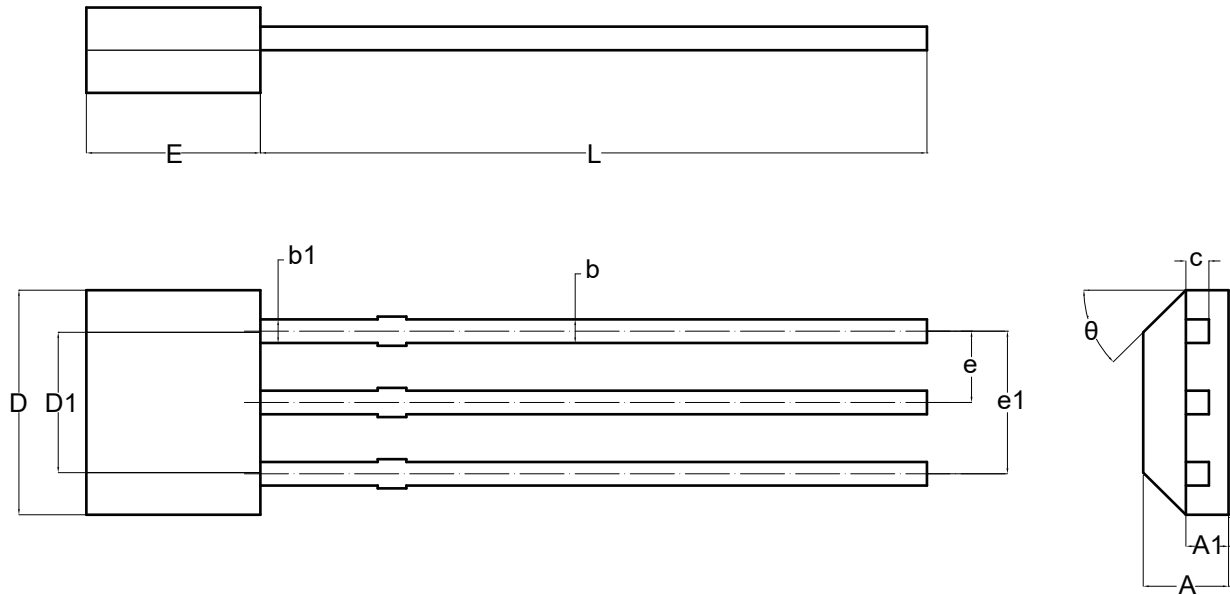
10 Package Information

SOT-23-3L



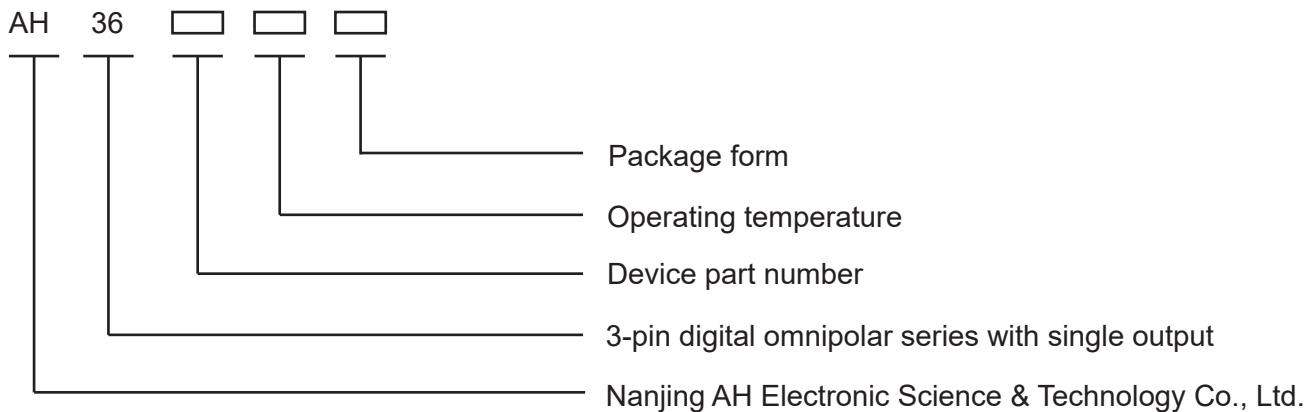
| Symbol | Dimension (Unit: mm) | |
|----------|----------------------|-------|
| | Min | Max |
| A | 1.050 | 1.250 |
| A1 | 0.000 | 0.100 |
| A2 | 1.050 | 1.150 |
| b | 0.300 | 0.500 |
| c | 0.100 | 0.200 |
| D | 2.820 | 3.020 |
| E | 1.500 | 1.700 |
| E1 | 2.650 | 2.950 |
| e | 0.950BSC. | |
| e1 | 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 — $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- L — $-40^{\circ}\text{C} \sim +150^{\circ}\text{C}$

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