

1 Features and Benefits

- ▲ Zero speed detection
- ▲ 10 bit A/D converter in the chip
- ▲ Internal short circuit protection
- ▲ No chopping delay
- ▲ Self-adaptive to magnetic field change
- ▲ Operating temperature range -40°C ~ 125°C
- ▲ Developed according to EU RoHs & REACH

2 Application Examples

- ▲ Geartooth Sensor
- ▲ Speed Sensor
- ▲ Camshaft Sensor
- ▲ Direction Detection

3 Selection Guide

Part Number	Packing	Mounting	Operating, To	B _H
AH3194	Anti-static bag, 1000 pieces/bag	3-pin SIP through hole	-40°C ~ 125°C	25.0mT

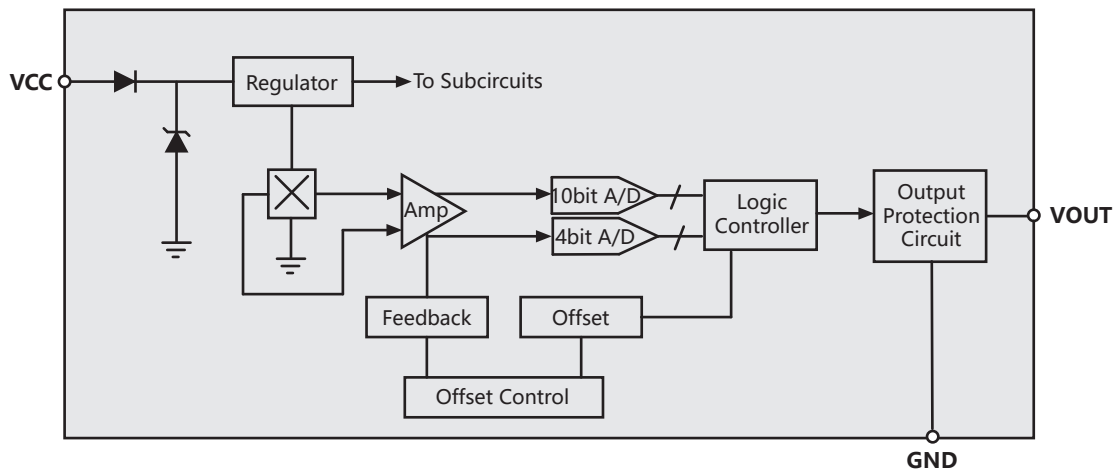
NOTE 1. Hall ICs are soldered tin brazing for assembly.
2. A risk of circuit failure may happen in non-brazing processes such as electric resistance welding, high-frequency welding, etc.
3. E: -40~85°C; K: -40~125°C; L: -40~150°C.



TO-92UA
(UA Type)

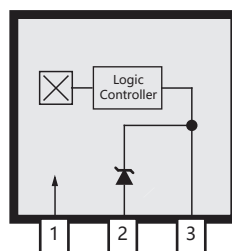
4 General Description

AH3194 is a gear speed sensor with self-adaptive adjustment and digital output function. It's a kind of special automotive gear sensor, but also be suitable for ordinary speed measurement applications. Only one piece Hall element inside the sensor, so no problem of the rotation alignment exists. In addition, it has a 10 bit A/D converter and the logic controller, and another independent 4 bit A/D converter inside it. After two A/D respectively sample and comparison operate to Hall element signals, it can achieve the gear tooth identification. When it works, it needs to put S pole of the magnet to face the back of the product, and magnetic field strength range can from 50mT to 500mT.



5 Terminal List

TO-92UA



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

6 Absolute Maximum Ratings

Characteristic	Symbol	Note	Rating	Unit
Supply Voltage	V_{CC}		28	V
Output Off-state Voltage	V_O (off)		28	V
Output Current	I_O		5	mA
Magnetic Flux Density	B		Unlimited	mT
Operating Temperature	T_O	K	-40 ~ 125	°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 ~ 160	°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, $T_J < 165^\circ\text{C}$	3.5	-	24	V
Low-level Output Voltage	V_{OL}	$V_{CC1} = 4.5\text{V}$, $I_O = 25\text{mA}$	-	0.2	0.6	V
Supply Current	I_{CC}	$V_{CC1} = 4.5\text{V} \sim 24\text{V}$	-	2	6	mA
Output Short Circuit Current	I_{fault}	Output stage short circuit failure occurs	-	50	150	mA
Output Leakage Current	I_{OUTOFF}	$V_{CC2} = 24\text{V}$, V_{CC1} open circuit	-	0.1	10	μA
Clock Frequency	F_{clk}	Normal operation	-	300	800	kHz
Output-Rise Time	t_R	$V_{CC1} = V_{CC2} = 12\text{V}$, $R_L = 1\text{k}\Omega$, $C_L = 10\text{pF}$	-	-	0.4	μs
Output-Fall Time	t_F	$V_{CC1} = V_{CC2} = 12\text{V}$, $R_L = 1\text{k}\Omega$, $C_L = 10\text{pF}$	-	-	0.4	μs
Output Short Circuit Close Time	T_{fault}	Output stage short circuit failure occurs	-	100	200	μs
Bandwidth	BW	Normal operation	-	-	15	kHz

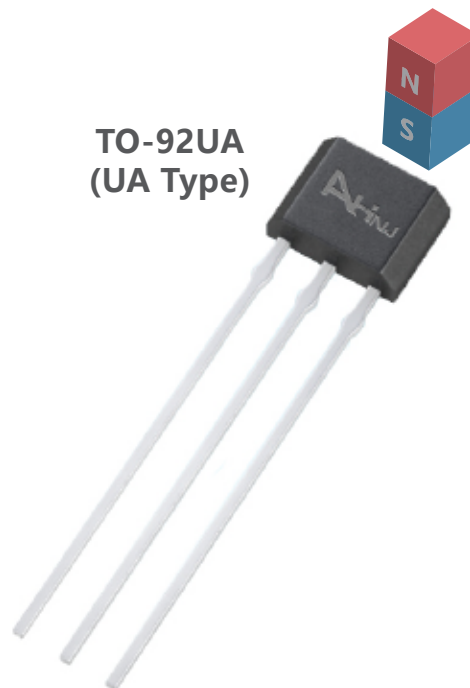
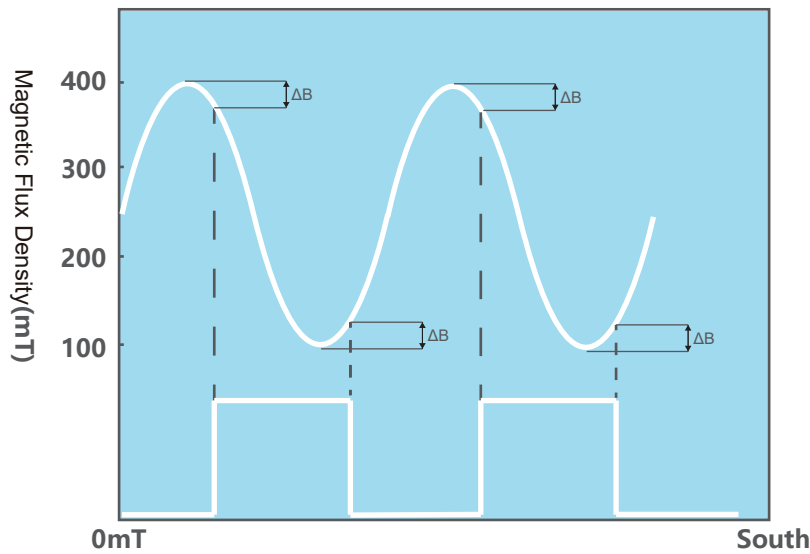
8 Magnetic Operating Characteristics

valid through the full operating temperature range; unless otherwise specified. Test Condition: $V_{CC1} = V_{CC2} = 24\text{V}$, $I_O = 20\text{mA}$

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Reverse Biased Range	B_{bias}	—	-30	-	400	mT
Linear Area	L_{IN}	—	50	500	-	mT
Hysteresis	B_H	$I_{OUT} = 20\text{mA}$, $B > B_{OP}$	1.8	3.5	5.0	mT

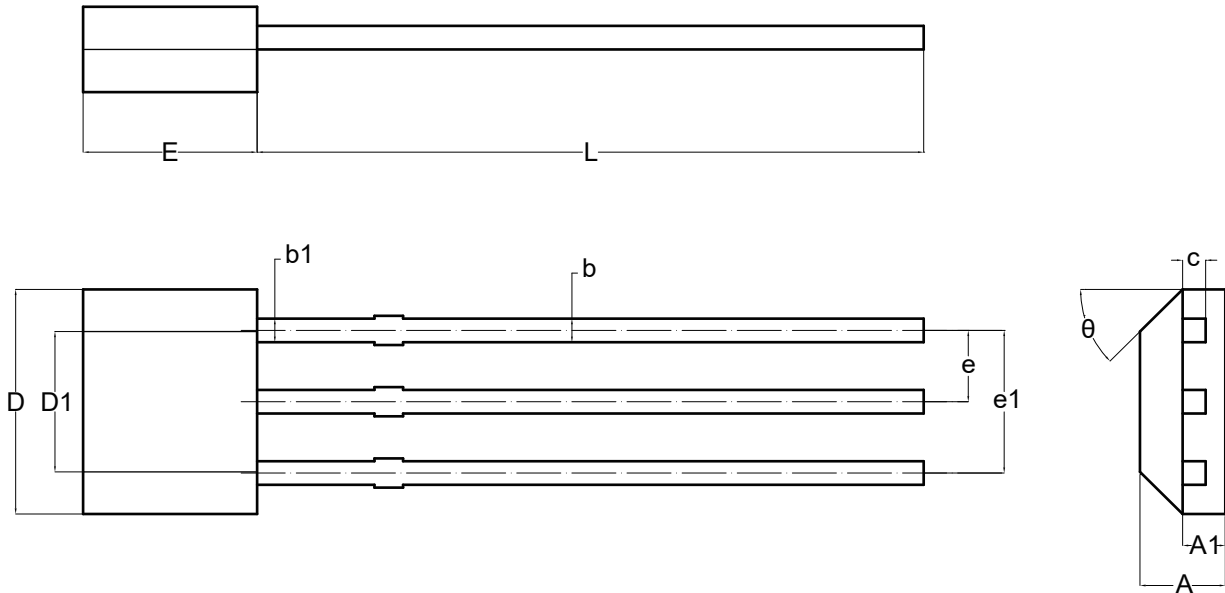
10 Magnetic Behavior

The sensor is designed for sensing the changes of the magnetic field, so after the magnetic strength changes and reaches a certain value, the sensor will change the output state. After the outer magnetic strength reaches maximum value and then begins to decrease, when the increment absolute value ΔB is above 100Gs, the output state changes from low level to high level; when the external magnetic strength reaches minimum value and then begins to increase, when the increment absolute value ΔB is above 100Gs, the output state changes from high level to low level.



11 Package Information

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.	

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