



## 概述

AH451 是一款耐高压高灵敏度全极霍尔开关芯片，采用双极半导体 (Bipolar) 工艺设计，该芯片内部由电压稳压单元、霍尔电压发生器、差分放大电路、温度补偿电路、集电极开路输出电路组成。工作形式：输入磁感应强度，输出为数字电压信号。提供 TO-92S 和 SOT-23-3L 两种封装形式，且封装都符合 RoHS 标准。

## 特征

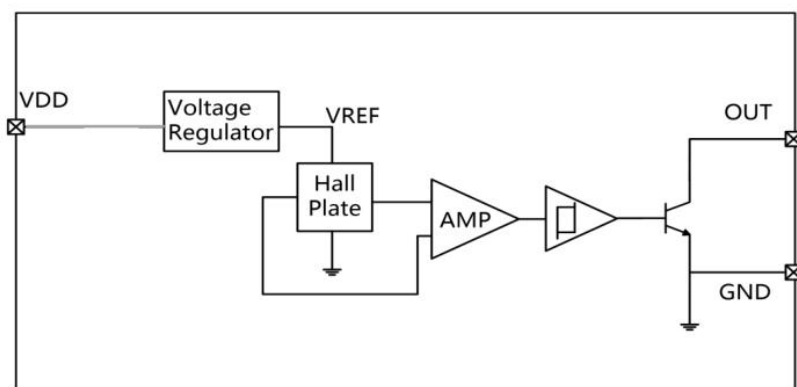
- 工作电压：3.8V~60V
- 数字电流型输出
- ESD性能：±5kV
- 磁特性温度补偿
- 工作温度范围：-40°C~125°C
- 灵敏度：+/- 80/50Gauss（典型值）

## 典型应用

- 对接检测
- 锁开闭检测
- 接近感应
- 阀门定位
- 脉冲计数

## 功能框图

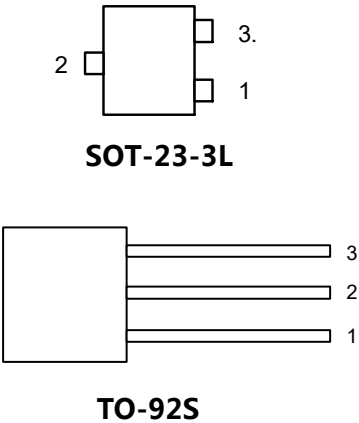
该耐高压高灵敏全极霍尔效应开关芯片包括电压调制电路、霍尔片、信号放大电路和施密特触发器电路。其中电压调制电路为霍尔片提供参考电压。该霍尔片感应到垂直于传感器表面的磁场产生霍尔电压，放大后发送给施密特触发器。



AH451 功能框图



引脚信息



| 芯片引脚号 | 名称   | 说明               |
|-------|------|------------------|
| 1     | VSUP | 电源               |
| 2     | GND  | 地                |
| 3     | VOUT | 集电极开路输出, 需外接上拉电阻 |

订购信息

| 编号      | 封装        | 包装     | 工作温度范围    |
|---------|-----------|--------|-----------|
| AH451UA | TO-92S    | 1000/袋 | -40℃~125℃ |
| AH451SU | SOT-23-3L | 3000/盘 | -40℃~125℃ |

绝对最大额定

| 符号        | 参数   | 最小值  | 最大值 | 单位 |
|-----------|------|------|-----|----|
| $V_{SUP}$ | 电源电压 | -0.3 | 60  | V  |
| $V_{OUT}$ | 输出电压 | -0.5 | 60  | V  |
| $I_{OUT}$ | 输出电流 | 0    | 40  | mA |
| $T_J$     | 工作温度 | -40  | 125 | ℃  |
| $T_{STG}$ | 存储温度 | -50  | 165 | ℃  |

绝对最大额定值是芯片所能承受的极限值，超过该值芯片可能会永久损坏。



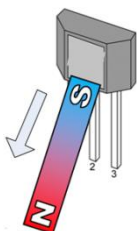
## 电磁特性

测试条件:  $T_J = -40^{\circ}\text{C} \sim 150^{\circ}\text{C}$ ,  $V_{\text{SUP}} = 3.8\text{V} \sim 60\text{V}$ ; 典型值测试条件:  $T_J = 25^{\circ}\text{C}$ ,  $V_{\text{SUP}} = 5\text{V}$ 。

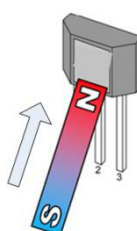
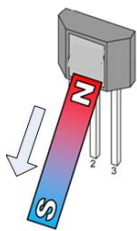
| 参数   | 符号     | 测试条件                        | 最小  | 典型    | 最大  | 单位    |
|------|--------|-----------------------------|-----|-------|-----|-------|
| 电气特性 |        |                             |     |       |     |       |
| VDD  | 工作电压   |                             | 3.8 |       | 60  | V     |
| IDD  | 电源电流   |                             |     | 3.5   | 7   | mA    |
| Ile  | 漏电流    | 关闭状态                        |     |       | 10  | uA    |
| Vsat | 输出饱和电压 | Iout=20mA                   |     |       | 0.4 | V     |
| Tr   | 输出上升时间 | RL= 1k $\Omega$ , CL = 20pF |     |       | 1   | us    |
| Tf   | 输出下降时间 | RL= 1k $\Omega$ , CL = 20pF |     |       | 1.5 | us    |
| 磁特性  |        |                             |     |       |     |       |
| Bop  | 工作点    | RL= 1k $\Omega$ , CL = 20pF |     | +/-80 |     | Gauss |
| Brp  | 释放点    | RL= 1k $\Omega$ , CL = 20pF |     | +/-50 |     | Gauss |
| Bhys | 回差     | RL= 1k $\Omega$ , CL = 20pF |     | 30    |     | Gauss |



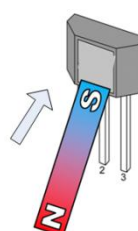
## 磁电转换说明



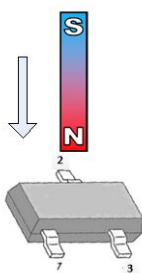
VOUT= 高电平



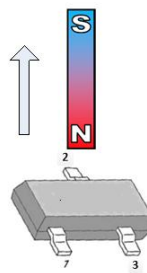
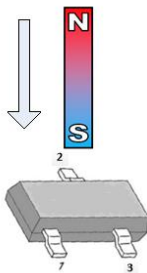
VOUT= 低电平



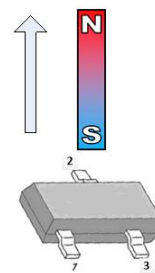
## TO-92S



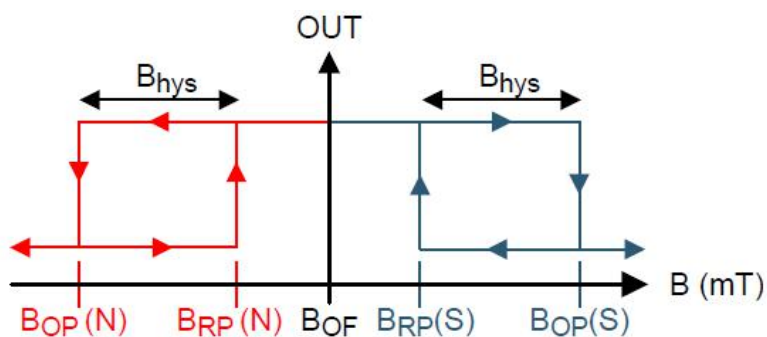
VOUT= 低电平



VOUT= 高电平

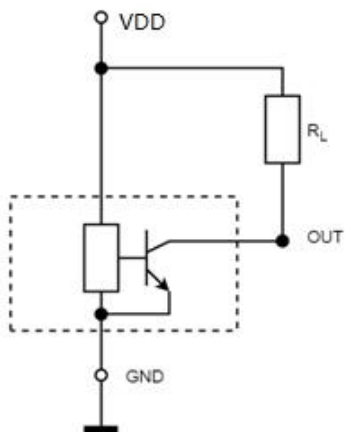


## SOT-23-3L

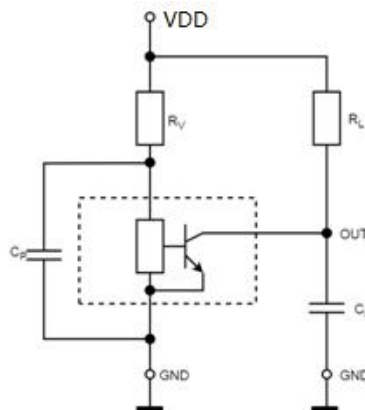




## 应用电路



典型应用电路例1



典型应用电路例2

典型应用电路如图中:应用电路1, 其中 $R_L=4.7K\Omega$ , 可应用与大多数电路。应用电路2, 其中 $R_V=100\Omega$ ,  $C_P=4.7nF$ ,  $R_L=4.7K\Omega$ ,  $C_L=1nF$ , 应用于供电线上具有干扰或辐射干扰的电路, 建议在电路中串联电阻 $R_V$ 和两个电容 $C_P$ 、 $C_L$ , 且将电阻和电容这些元器件尽量放置在接近芯片处。

## 注意事项

- 霍尔芯片是敏感器件, 在使用及存储过程中应注意采取静电防护措施。
- 在安装使用中应尽量减少施加到器件外壳和引线上的机械应力。
- 建议焊接温度不超过  $350^{\circ}C$ , 持续时间不超过 5 秒。
- 为保证霍尔芯片的安全性和稳定性, 不建议长期超出参数范围使用。



外形尺寸

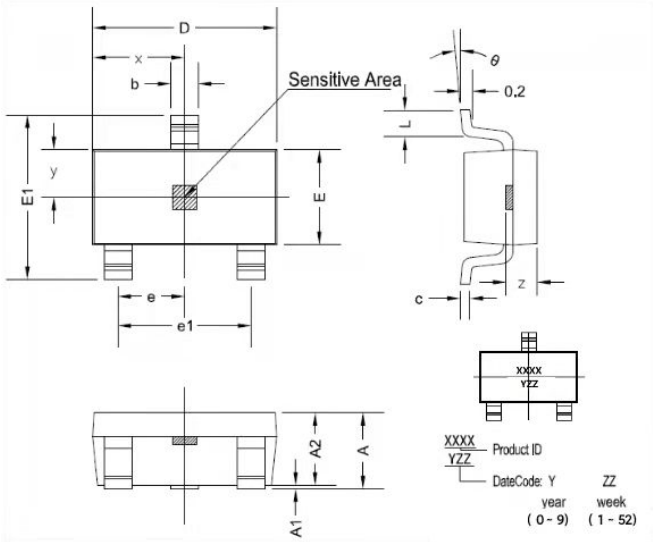
TO-92S 封装尺寸



| 符号 | 机械尺寸/mm |       |       |
|----|---------|-------|-------|
|    | 最小      | 典型    | 最大    |
| A  | 2.90    | 3.00  | 3.10  |
| b  | 0.35    | 0.39  | 0.40  |
| b1 |         | 0.44  |       |
| c  | 0.36    | 0.38  | 0.40  |
| D  | 4.00    | 4.10  | 4.20  |
| E  | 1.42    | 1.52  | 1.62  |
| E1 |         | 0.75  |       |
| e  |         | 1.27  |       |
| e1 |         | 1.27  |       |
| L1 |         | 2.54  |       |
| L  | 13.50   | 14.50 | 15.50 |
| θ1 |         | 6°    |       |
| θ2 |         | 3°    |       |
| θ3 |         | 45°   |       |
| θ4 |         | 3°    |       |
| h  |         | 3.6   |       |



SOT-23-3L 封装尺寸



| 符号 | 尺寸 (毫米)   |      | 尺寸 (英尺)   |       |
|----|-----------|------|-----------|-------|
|    | 最小        | 最大   | 最小        | 最大    |
| A  | 1.05      | 1.25 | 0.041     | 0.049 |
| A1 | 0         | 0.1  | 0         | 0.004 |
| A2 | 1.05      | 1.15 | 0.041     | 0.045 |
| b  | 0.3       | 0.5  | 0.012     | 0.02  |
| c  | 0.100     | 0.2  | 0.004     | 0.008 |
| D  | 2.82      | 3.02 | 0.111     | 0.119 |
| E  | 1.5       | 1.7  | 0.059     | 0.067 |
| E1 | 2.65      | 2.95 | 0.104     | 0.116 |
| e  | 0.950 TYP |      | 0.037 TYP |       |
| e1 | 1.8       | 2    | 0.071     | 0.079 |
| L  | 0.3       | 0.6  | 0.012     | 0.024 |
| x  | 1.460 TYP |      | 0.057 TYP |       |
| y  | 0.800 TYP |      | 0.032 TYP |       |
| z  | 0.600 TYP |      | 0.024 TYP |       |
| θ  | 0°        | 8°   | 0°        | 8°    |



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