



## 概述

AH402H 是一款耐高压双极霍尔开关芯片，采用高压 bipolar 工艺制程。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。该芯片具有可耐高电压冲击，具有极强的抗噪能力；适用于各种电子消费类、汽车和工业控制等领域。提供 TO-92S 直插封装，贴片 SOT-23-3L 封装，且封装都符合 RoHS 标准。

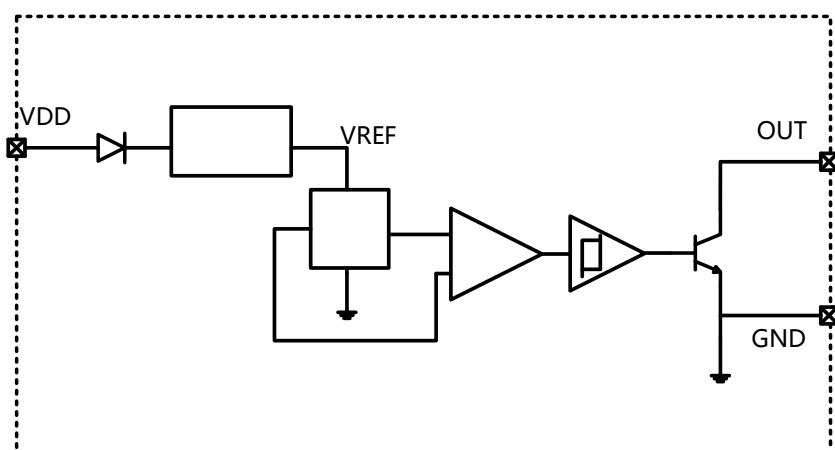
## 特征

- 工作电压：3.0V~60V
- 过压保护能力：80V
- ESD 性能：±4 kV
- 可驱动电流最大 30mA
- 工作温度范围：-40°C~150°C
- 电源引脚反向电压保护

## 典型应用

- 无刷直流电机换向
- 速度测量
- 计数
- 角位置检测
- 接近检测
- 适用于汽车和极端工业环境

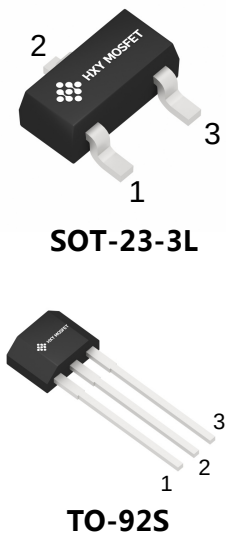
## 功能框图



AH402H 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    |
|----------|-----------|--------|-----------|
| AH402HUA | TO-92S    | 1000/袋 | -40℃~150℃ |
| AH402HSU | SOT-23-3L | 3000/盘 | -40℃~150℃ |

绝对最大额定

| 符号        | 参数   | 最小值  | 最大值 | 单位 |
|-----------|------|------|-----|----|
| $V_{SUP}$ | 电源电压 | -60  | 80  | V  |
| $V_{OUT}$ | 输出电压 | -0.5 | 80  | V  |
| $I_{OUT}$ | 输出电流 | 0    | 40  | mA |
| $T_J$     | 工作温度 | -40  | 150 | ℃  |
| $T_{STG}$ | 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。



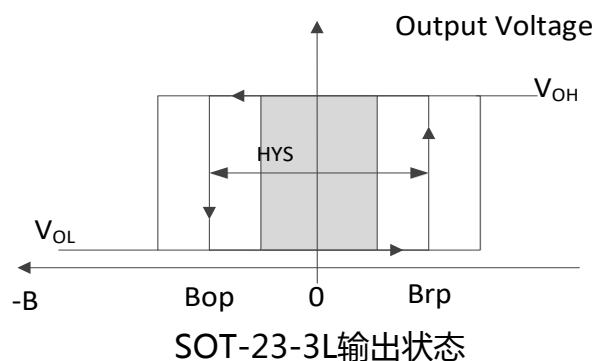
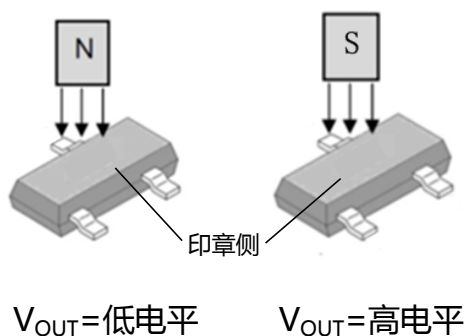
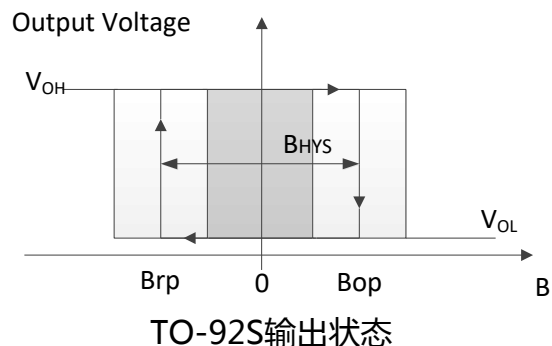
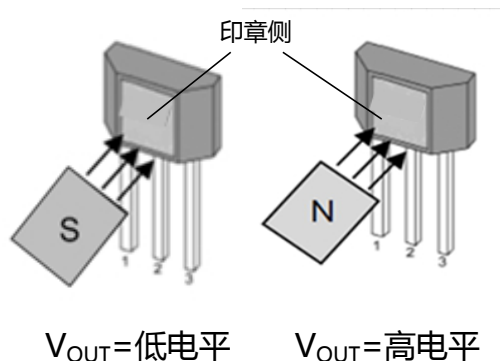
## 电磁特性

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： $T_J = 25^{\circ}\text{C}$ ， $V_{\text{SUP}} = 5\text{V}$ 。

| 符号                | 参数     | 测试条件                           | 最小值 | 典型值 | 最大值 | 单位    |
|-------------------|--------|--------------------------------|-----|-----|-----|-------|
| 电特性               |        |                                |     |     |     |       |
| $V_{\text{SUP}}$  | 电源电压   |                                | 3.8 |     | 60  | V     |
| $I_{\text{SUP}}$  | 电源电流   |                                |     | 4.8 | 8   | mA    |
| $I_{\text{leak}}$ | 输出漏电流  |                                |     |     | 10  | uA    |
| $V_{\text{sat}}$  | 输出电压   | $I_{\text{OUT}} = 20\text{mA}$ |     |     | 0.4 | V     |
| $I_{\text{OUT}}$  | 输出电流   |                                |     |     | 30  | mA    |
| $T_r$             | 输出上升时间 | $C_L = 20\text{pF}$            |     |     | 1.0 | us    |
| $T_f$             | 输出下降时间 | $C_L = 20\text{pF}$            |     |     | 1.5 | us    |
| 磁特性               |        |                                |     |     |     |       |
| Bop               | 工作点    | $C_L = 20\text{pF}$            | 10  | 25  | 40  | Gauss |
| Brp               | 释放点    | $C_L = 20\text{pF}$            | -40 | -25 | -10 | Gauss |
| $B_{\text{HYS}}$  | 回差     |                                |     | 90  |     | Gauss |

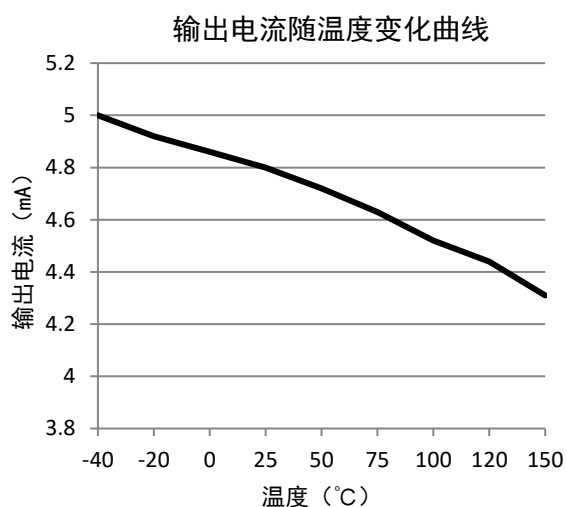
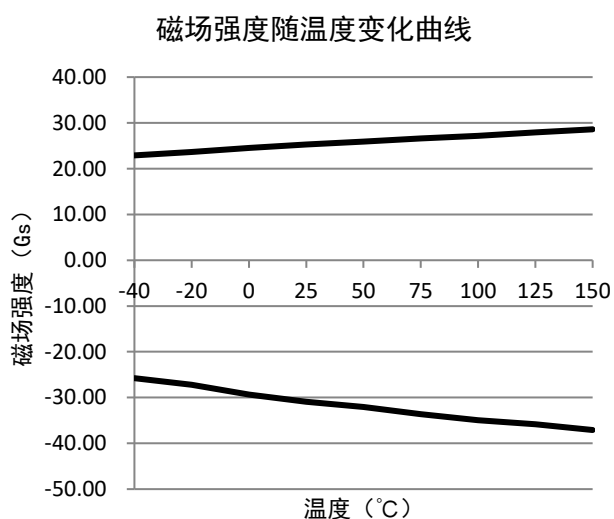


## 磁电转换说明



## 温度特性

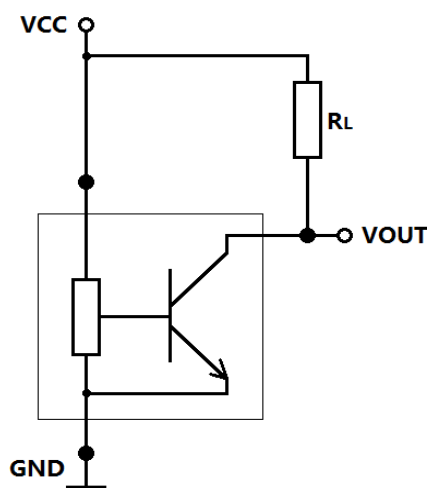
$V_{CC}=5V$  时，芯片工作点和释放点随温度变化曲线。 $V_{CC}=5V$  时，芯片工作电流随温度变化曲线。



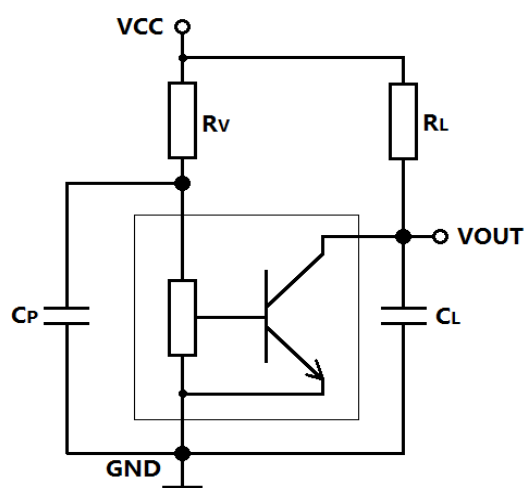


## 应用电路

典型应用电路见下图中: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。



应用电路 1



应用电路 2

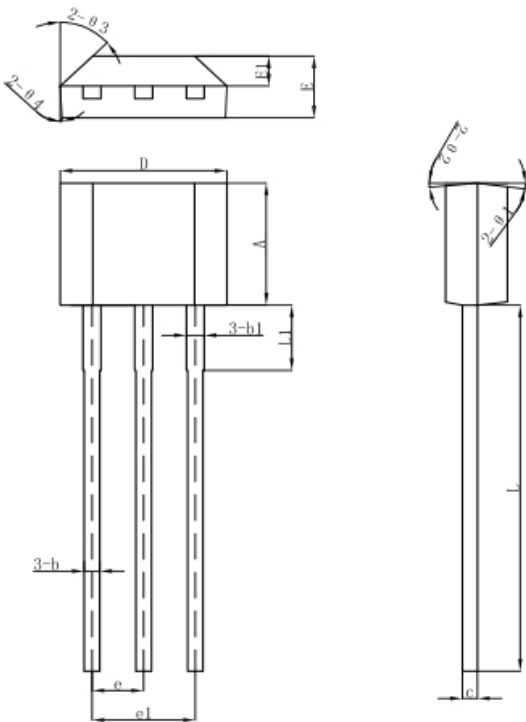
## 注意事项

- 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  $350^{\circ}\text{C}$ , 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

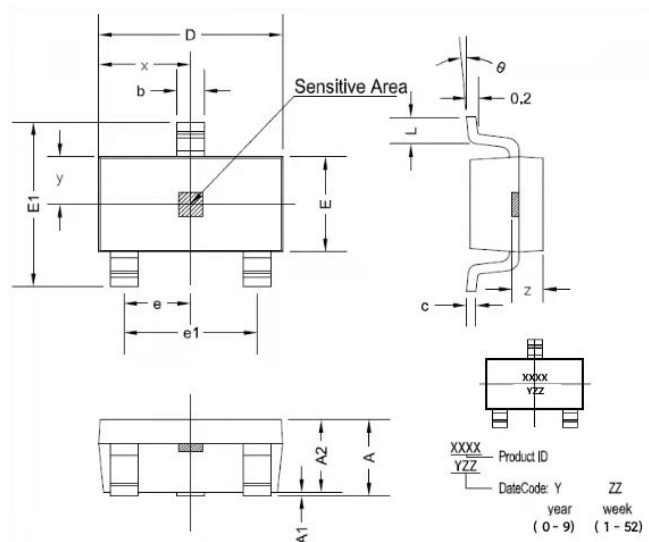
TO-92S 封装尺寸



| 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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