



概述

AH401F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 和 SOT-23-3L 两种封装形式，且封装都符合RoHS标准。

特征

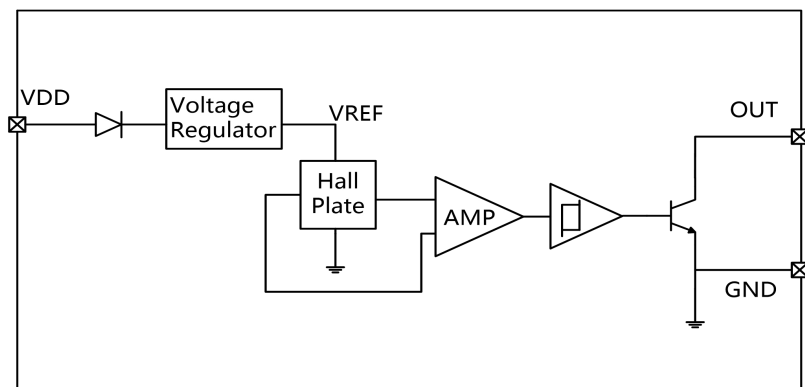
- 工作电压：3.8V~60V
- 过压保护能力：80V
- ESD 性能：±4 kV
- 集电极开路输出
- 电源引脚反向电压保护
- 可驱动电流最大 30mA
- 工作温度范围：-40℃~150℃

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

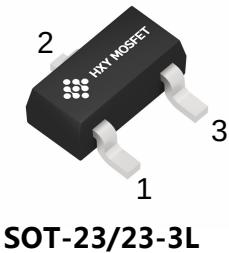
该耐高压双极霍尔开关芯片包括电压调制电路、霍尔片、信号放大电路和施密特触发器电路。其中电压调制电路为霍尔片提供参考电压，该霍尔片感应到垂直于传感器表面的磁场产生霍尔电压，放大后发送给施密特触发器。同时该芯片还集成了反向电源的保护二极管，用于保护芯片免于反向电压的击穿。



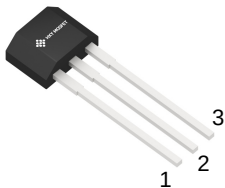
AH401F 功能框图



引脚信息



SOT-23/23-3L



TO-92S

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
AH401FUA	TO-92S	1000/袋	-40℃~150℃
AH401FSU	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： $T_J = 25^{\circ}\text{C}$ ， $V_{\text{SUP}} = 5\text{V}$ 。

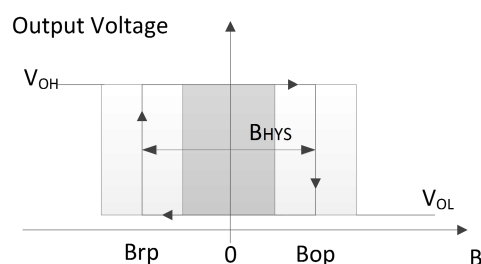
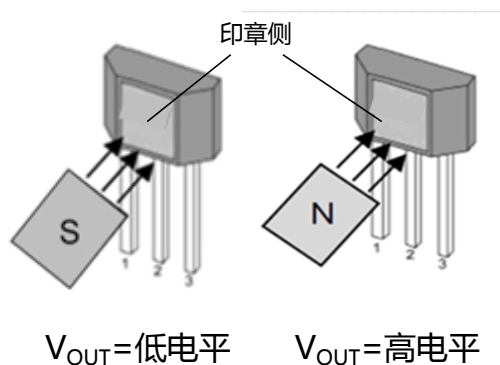
符号	参数	测试条件	最小值	典型值	最大值	单位
电特性						
V_{SUP}	电源电压		3.8		60	V
I_{SUP}	电源电流			4.8	8	mA
I_{leak}	输出漏电流				10	uA
V_{sat}	输出电压	$I_{\text{OUT}} = 20\text{mA}$			0.4	V
I_{OUT}	输出电流				30	mA
T_r	输出上升时间	$R_L = 10\text{K}\Omega$ ， $C_L = 20\text{pF}$			1.0	us
T_f	输出下降时间	$R_L = 10\text{K}\Omega$ ， $C_L = 20\text{pF}$			1.5	us
磁特性						
Bop	工作点	$R_L = 10\text{K}\Omega$ ， $C_L = 20\text{pF}$	10	45	80	Gauss
Brp	释放点	$R_L = 10\text{K}\Omega$ ， $C_L = 20\text{pF}$	-80	-45	-10	Gauss
B_{HYS}	回差			90		Gauss



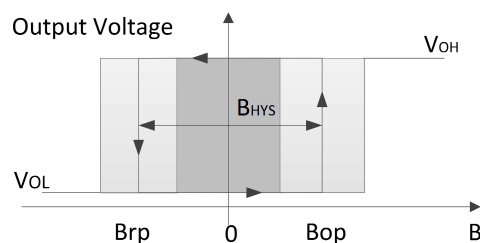
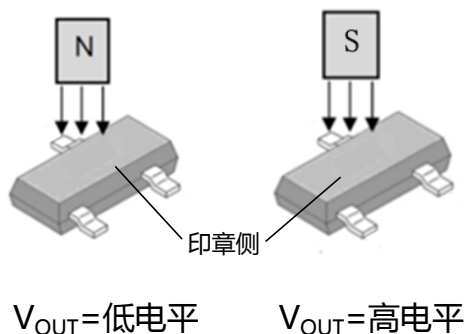
磁电转换说明

在 TO-92S 封装的印章侧施加大于 B_{op} 的磁场（南极靠近），输出变为低电平；施加小于 B_{rp} 的磁场（北极靠近），输出变为高电平。芯片初次上电时，如果磁场处于 B_{op} 和 B_{rp} 之间，输出状态会处于未定义的状态（高电平或低电平）。SOT-23-3L 封装的工作点与释放点的磁场极性与 TO-92S 相反。

见下图。



TO-92S输出状态

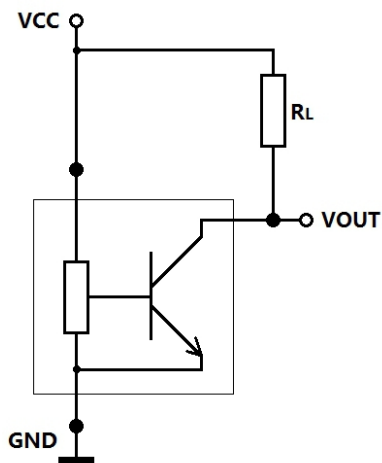


SOT-23-3L输出状态

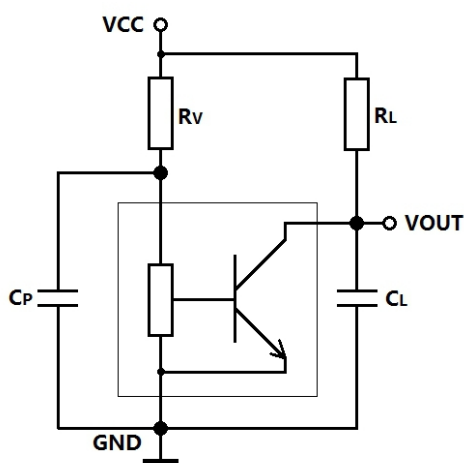


应用电路

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

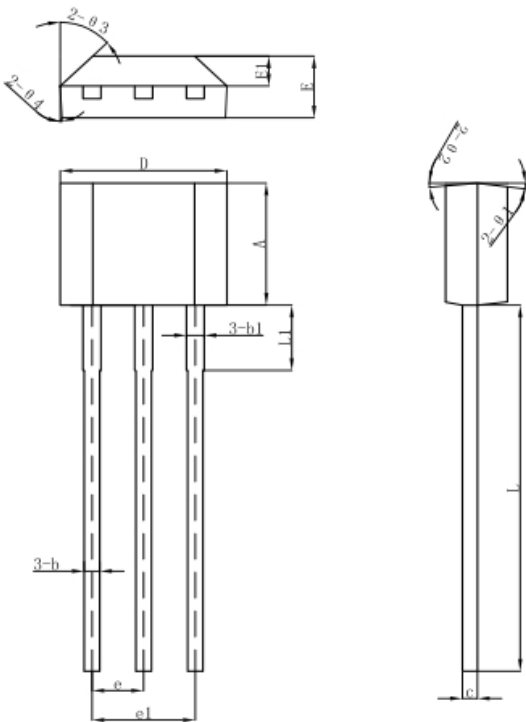
注意事项

- 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°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

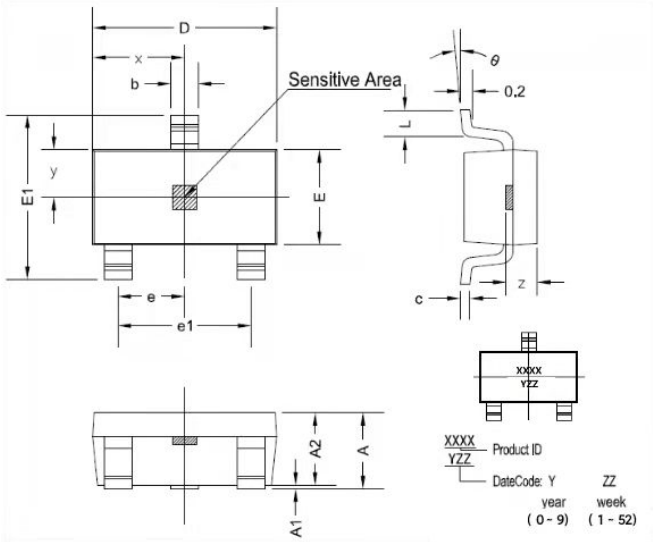
TO-92S 封装尺寸



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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