



产品规格书 Product Details Specification

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■ 产品功能 Product Function

水平倒装倾斜检测 Horizontal filp tilt detection

■ 应用产品 Product Applications

智能家电 Intelligent household appliance

倾倒安全保护电器 Tilting safety appliances

小家电类产品，如暖风机、空气净化器、加湿器

Household appliances, such heaters, air purifiers, humidifiers

■ 产品特性 Product Features

1.此产品在水平倒装后可检测360度全周倾倒。

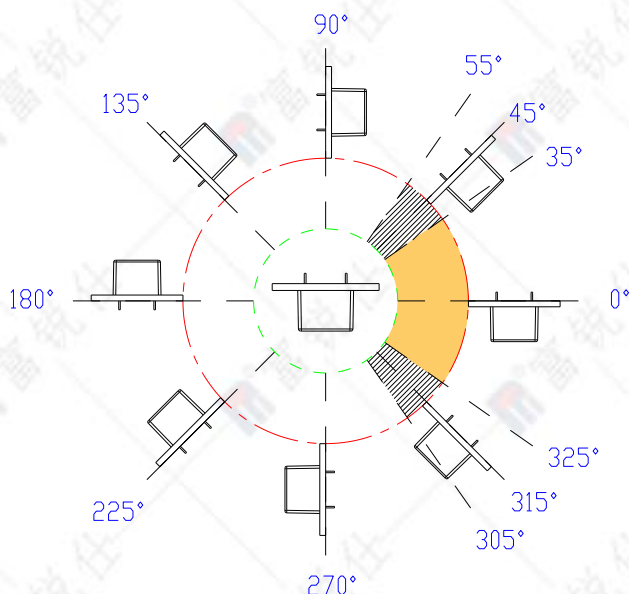
After Horizontal inversion, this products can detect 360 degrees full circle tilt.

2.当产品**水平倒置**或产品向任一方向倾斜少于35度时，输出高电平；当产品向任一方向倾斜超55度，输出低电平。**注：产品测试时旋转角速度应符合正常使用的旋转速度，过慢的角速度可能不触发或触发角增大。**

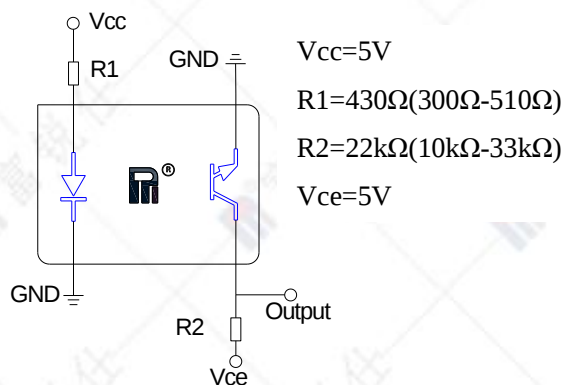
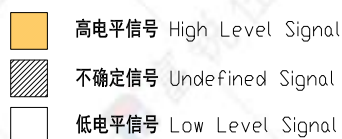
Output is high level when the product is horizontally inverted or tilts less 35 degrees in either direction; Output is low level when the product tilts more than 55 degrees in either direction. **Note: During the product test, the rotating angular speed should be in line with the normal rotation speed, too slow angular speed may not trigger or trigger Angle increase.**

3.此开关的输出量可触发MCU、I/O等控制电路。

This switch output can trigger MCU, I/O control circuit.



水平倒装及倾倒功能参考图



电气原理图



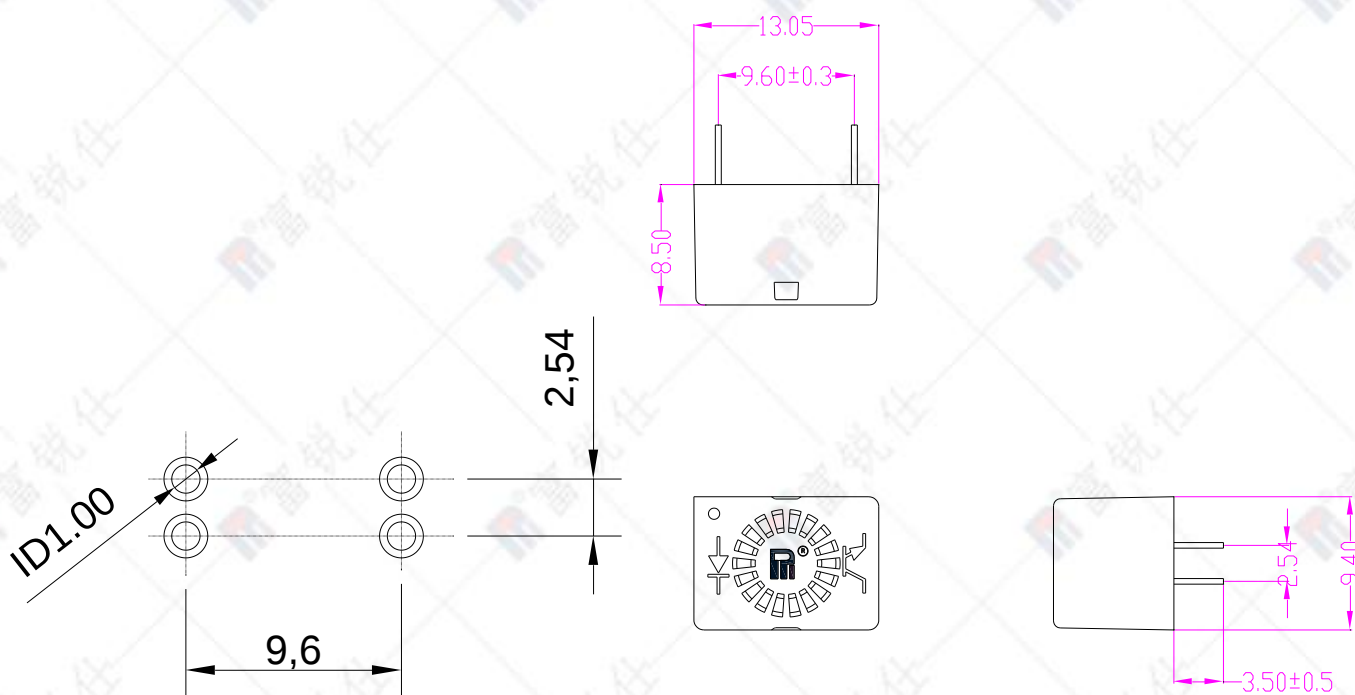
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■ 规格 Size

单位 Unit: mm

公差 Tolerance: ± 0.25



PCB Layout参考图

产品规格参考图

■ 电器特性 Electrical characteristics

1	输入电压	Voltage	4.5-5V
2	电流	Current	6-10mA
3	导通性	Conduction	连续导通
4	对射管特性	LED characteristics	见附件



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■ 可靠测试项目 Reliable test items

1	操作温度	Operating Temperature	-25℃ to 85℃
2	储存温度	Storage Temperature	-10℃ to 40℃
3	端子拉力	Pull Of Housing	500gf for 1 minute
4	盐雾测试	5% Salt Spray Test	95% RH, 40℃for 24 hours
5	操作寿命	Operating Life	200,000 times
6	产品寿命	Appliance Life	30,000 hours IF=10mA,Vce=5V

■ 材料列表 Bill of materials

1	胶壳	Housing	Nylon+ Glass fiber
2	胶座	Base	Nylon+ Glass fiber
3	滚珠	Ball	Stainless steel
4	发射管	Infrared Led	Hybrid
5	接收管	Photo Transistor	Hybrid

■ 焊接特性 Welding characteristics

- 手工焊: 330 ℃ ± 10 ℃, < 3 秒
Manual welding : 330 ℃ ± 10 ℃, < 3 s
- 波峰焊接(DIP): 250 ℃ ± 10 ℃, < 5 秒
Wave welding (DIP): 250 ℃ ± 10 ℃, < 5 s
- 焊锡: 无铅
Solder tin: Lead free
- 不可使用强酸/碱性助焊剂。
Do not use strong acid/ alkali flux.

■ 包装 Pack

- 150PCS / 袋 (PVC塑料袋, 按一般电子料存放要求存放)
150PCS / bag (PVC plastic bags, according to the general electronic material storage requirements)
- 40PCS / 管
40PCS / tube



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■ 注意事项 Notes

1.如果该产品要用于高安全性需求的产品和耐久性极高需求的设备中（如生命安全产品、航空设施、灾难报警装置），请咨询我司了解详情。

If the product, FR-2309B is to be used in products with high safety requirements and equipment with extremely high durability requirements (such as life safety product, aviation facilities, disaster alarm devices), please contact our company for details.

2.本开关触发概率为98%以上（触发概率是指开关每100次动作中，可以良好输出信号的比率）。

The switch trigger probability is above 98%(Trigger probability is the ratio of the switch to have a good output signal every100 actions).

3.焊接温度或时间超过规范时，可能会造成开关解体。

If the welding temperature or time are over-ranging, it may cause switch breakdown.

4.请勿超负荷使用，以免发生火灾。

In case of fire, Please do not overload using.

5.请勿使用水溶性助焊剂，可能会造成开关损坏。

Do not use water solubility flux which may cause damage to the switch.

6.请勿使用溶剂清洗开关。

Do not use solvent to wash switch.

7.东莞富锐仕公司只承担本产品自身不良问题，对不良品进行退换处理，不承担其它费用责任。

Dongguan Forest company only bear the problems of the product itself, and return or exchange the defective products, do not accept other expenses.

8.东莞富锐仕公司的产品验收期为15天。验收期过后视为产品验收合格，东莞富锐仕公司不再接受退货。

The product acceptance period of Dongguan Forest company is 15 days. After the acceptance period, the product shall be deemed to have passed acceptance, and Dongguan Forest Company will not accept the returns.



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■ 附页 Appendix

红外线管25℃下光电特性 Infrared Led Electro-Optical Characteristics at Ta=25℃

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=20 mA	/	1.2	1.5	V
Reverse Current	IR	VR=5V	/	/	10	μA
Radiant Intensity	Icon	IF=20mA Vce=5V	0.4	/	/	mA
View Angle	2θ 1/2	IF=20 mA	/	60	/	deg
Peak Wavelength	λp	IF=20 mA	/	940	/	nm
Spectral Bandwidth	Δλ	IF=20 mA	/	40	/	nm

Rank	Symbol	Condition	Min.	Typ.	Max.	Unit
X3	Icon	IF=20mA Vce=5V	0.9	/	1.32	mA
X4	Icon	IF=20mA Vce=5V	1.08	/	1.54	mA
X5	Icon	IF=20mA Vce=5V	1.26	/	1.76	mA
X6	Icon	IF=20mA Vce=5V	1.44	/	1.98	mA
X7	Icon	IF=20mA Vce=5V	1.62	/	2.2	mA



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光电晶体管25℃下光电特性 Photo Transistor Electro-Optical Characteristics at Ta=25℃

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
On State Collector Current	Icon	Vce=5V IF=10 mA	1.0	/	/	mA
Collector Dark Current	Id	Vce=20V	/	/	100	nA
Collector-Emitter Breakdown Voltage	BVceo	Ic=100uA	30	/	/	V
Emitter-Collector Breakdown Voltage	BVeco	Ie=100uA	5	/	/	V
Collector-Emitter Saturation Voltage	Vce(sat)	Ic=0.5mA IF=20 mA	/	/	0.4	V
Wavelength of Peak Sensitivity	λ_p	IF=20 mA	/	940	/	nm
Rang of Spectral Bandwidth	$\Delta\lambda$	IF=20 mA	400	940	1100	nm

Rank	Symbol	Condition	Min.	Typ.	Max.	Unit
Y1	Icon	IF=10mA Vce=5V	1.0	/	1.87	mA
Y2	Icon	IF=10mA Vce=5V	1.53	/	2.31	mA
Y3	Icon	IF=10mA Vce=5V	1.89	/	2.69	mA
Y4	Icon	IF=10mA Vce=5V	2.21	/	3.52	mA
Y5	Icon	IF=10mA Vce=5V	2.88	/	5.5	mA