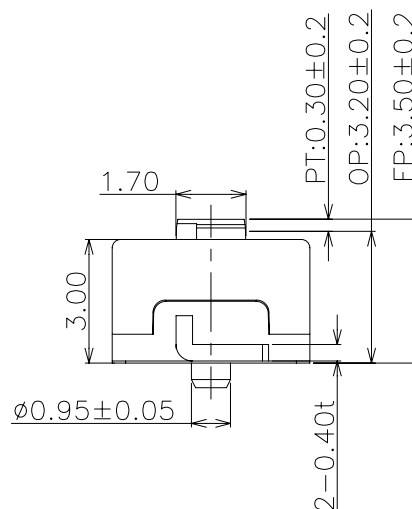
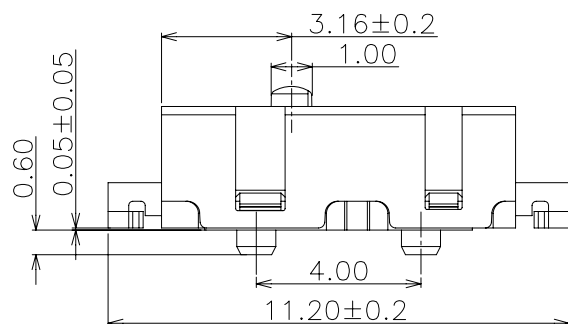
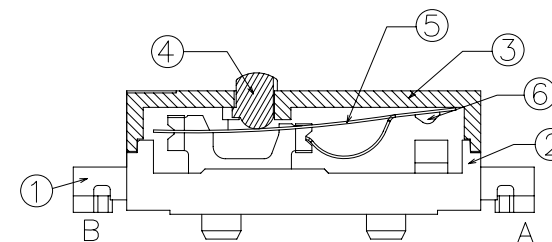
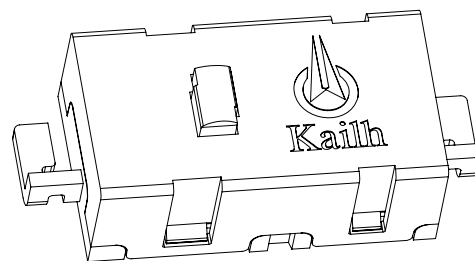
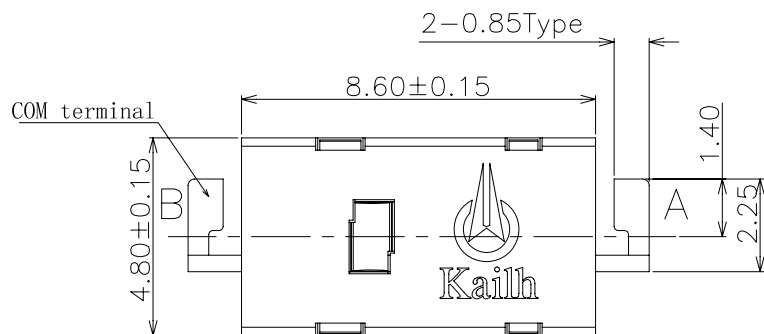
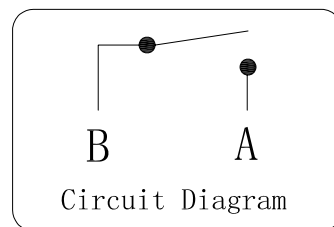
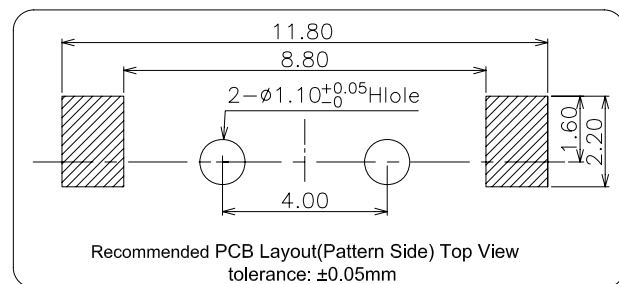


ABIDE BY WEEE & ROHS



■ Specification :

- 1. Rating: DC30V 0.1A
- 2. Contact Resistance: 1000mΩ Max
- 3. Insulation Resistance: 100MΩ Min(DC250V)
- 4. Withstand Voltage: AC500V(50-60Hz) for 1 minute
- 5. Operation Force: 110±20gf
- 6. Releasing Force: 15gf Min.
- 7. Operating Position: 3.20±0.2mm
- 8. Mechanical Life: 5,000,000 Cycles Min.
- 9. Over travel: 0.10mm Min.
- 10. Movement Differential: 0.12mm Max.



⑥	Contact	—	1	Silver Alloy	Natural	—
⑤	Shrapnel	—	1	Stainless Steel	Plating Silver	—
④	Keystoke	—	1	Nylon	Red	—
③	Cover	—	1	Nylon	Black	—
②	Base	—	1	LCP	Grey	—
①	Terminal	A B	1	BRASS	Plating Silver	—
ITEM	PART NAME	TER'NO.	QTY.	MATERIAL	FINISHING	REMARK

APPROVALS		DATE		 东莞市凯华电子有限公司 KAIHUA ELECTRONICS CO., LTD	
DRAWN	Xiao Yijiang	2023.02.07			
CHECKED				TITLE:	MI8731 Micro Switch
APPROVALS				PART NO:	CM1873101S109-1
TOLERANCES ARE	30<L	±0.30	ANGLE UNIT: mm	SCALE: 1:1	PROJ: 
	10<L≤30	±0.20			
	5<L≤10	±0.15			
	L≤5	±0.10			
		±2°	DRAWING NO.	SHEET: 10F	

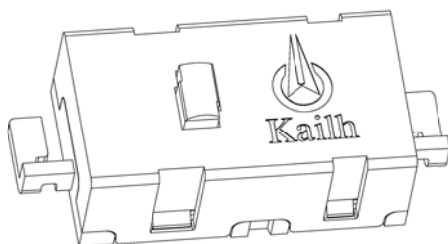
ECN NO.	REV.	DATE.	DESCRIPTION.	CHANGE.	CHECK.	APPRO.
	A	2023.02.07	NEW			



KH-PS2302-06

产品规格书

Product Specification



CM1873101S109-1

Micro Switch

[illegible]



凱華電子
KAIHUA EEELETRONICS

Product Specification

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1. Scope/范围:

This Product Specification covers the requirement of Micro switch on product performance, test methods and quality assurance provisions.

本规格书内容涵盖微动开关产品的要求，包括性能指标、测试方法及质量保证方面等。

2. Product Application/产品应用:

The Switch is applied in all types of computer, mouse, cameras, VCR, stereo and home appliances. Please let us know before using any of the products in the application not described above.

该开关适用于所有类型的电脑/鼠标/照相机/录相机/音响和家用电器,如果用于本文中未提及的领域请在使用前告知。

3. Technology Parameters/技术参数

Ambient Humidity 工作湿度:	45~85% R.H.;
Operating Temperature Range 使用温度范围:	-10℃~+70℃;
Storage Temperature Range 保存温度范围:	-20℃~+80℃;
Normal Condition:	
Ambient temperature 环境温度:	20±5℃
Relative humidity 相对湿度:	65±5%R.H.;
Air pressure 气压:	86~101KPa;
Contact Resistance 接触阻抗:	1000 mΩ Max;
Operation Force 操作力:	110±20gf;
Solder Ability 可焊性:	锡铅焊 245±5℃ 5±0.5s;
	无铅焊 255±5℃ 5±0.5s; ;
Withstand Soldering Temperature 耐焊接热:	回流焊焊接: 260±5℃ 5±0.5s;

4. Ratings/额定性能要求

Rating 额定负荷:	DC30V / 0.1A;
Insulation Resistance 绝缘电阻:	≥100MΩ / DC 250V;
Withstand Voltage 耐电压:	500V AC 1 Minute;
Mechanical Life 机械寿命:	5,000,000 Cycles;

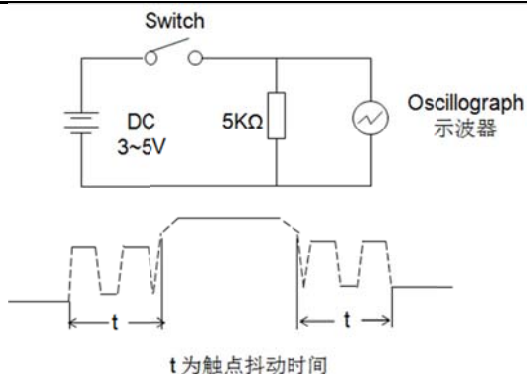
5. Profile Dimensions /外形尺寸

(见产品图纸)



6. Electrical Performance/电气性能

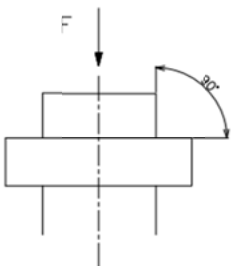
Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求
6.1	Contact Resistance 接触电阻	Static load: (Operation force)x2, which is applied on the center of Switch stem. Be measured when the switch contact stabilization. 静态负载：动作力的 2 倍施加在按钮中心，开关接触稳定时量测。 Measurement tool: Contact resistance Meter. 测量工具：微电流接触电阻计(1KHz, 20mV,5~50mA) 在低电流（≤100mA）条件下测试。 Measured at low current (100mA or less).	1000mΩ Max 1000mΩ 以下
6.2	Insulation Resistance 绝缘电阻	Apply a Voltage of DC250 V for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body. 输入 250V DC 电压 1 分钟，按如下接触方法测试： (1) 端子与端子之间。 (2) 端子与外壳之间。	100MΩ Min 100 兆欧以上
6.3	Dielectric withstanding voltage 耐电压	Apply a Voltage of AC500 V (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body. 输入 500V AC 电压 1 分钟，按如下接触方法测试： (1) 端子与端子之间。 (2) 端子与外壳之间。	No evidence of breakdown 无瞬断、击穿等破坏。
6.4	Bouncing 触点抖动	Operation speed: 3~4 times/s 操作速度：每秒 3~4 次 Slightly push the center of stem by 3~4 times/s, to test the bounce at “ON” and “OFF” 以每秒 3~4 次的速度，轻轻在按钮中心加力，在“导通”与“瞬断”间测试。 Oscillo scope 示波器 Switch Bouncing Test Circuit 抖动测定回路。	Before Life cycle: On: 5ms MAX,5 毫秒以下 Off: 5ms MAX,5 毫秒以下 After Life cycle: On: 5ms MAX,5 毫秒以下 Off: 5ms MAX,5 毫秒以下



7. Mechanical Performance/机械性能

Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求
7.1	Load curve 荷重曲线	Place the vertical direction of switch operation and gradually increase the load applied to the center of the stem until it stop. 开关的动作方向为垂直放置，向按钮中心逐渐施加负荷直到停止.	See page 9 见第 9 页
7.2	Loading parameter 荷重参数	Place the vertical direction of switch operation and gradually increase the load applied to the center of the stem until it stop. 开关的动作方向为垂直放置，向按钮中心逐渐施加负荷直到停止.	See page 9 见第 9 页



7.3	Static Strength 静止强度	A static load of 3 Kgf shall be applied in the direction of button operation for a period of 60 seconds. 在按钮动作方向施加 3kgf 的静负荷 60 秒, 然后测试参数. 	No damage (Electrical and mechanical) 电气和机械性能正常. Contact resistance 接触电阻: 1000mΩ Max
7.4	Life Test 寿命测试	(1) 0.1A 30VDC resistance load 0.1A 30VDC 阻性负载 (2) Operation speed: 2~3cycles/s 操作速度: 2~3 次/秒 (3) Actuation force: 250 gf 动作力: 250gf (4) Cycles: 5,000,000 times Min 操作次数: 500 万次以上	Contact resistance: 10 Ω max 接触电阻: 10 Ω 以下 Bounce: 5ms max 触点抖动: 5 毫秒以下 Actuation force: ± 30% initial force 动作力的变化范围: ± 30%以内 No 6.2 to 6.4 and 7.1 to 7.2 shall be satisfied 满足 6.2 到 6.4 项、7.1 到 7.2 项.

8. Environmental Performance/环境性能

Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求
8.1	Cold test 耐寒性	(1) Temperature : - 20±2℃ 温度: - 20±2℃ (2) Duration of test: 96h 持续时间: 96 小时 (3) Take off a drop water 去掉水珠 (4) Standard conditions after test : 1h 试验后的放置条件: 1 小时	Contact resistance: 1000m Ω Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 1000mΩ 以下满足: No. 6.2 to 6.4 No. 7.1 to 7.2



8.2

Heat test
耐热性

(1) Temperature : $80 \pm 2^{\circ}\text{C}$
温度: $80 \pm 2^{\circ}\text{C}$
(2) Duration of test: 96h
持续时间: 96 小时
(3) Take off a drop water 去掉水珠
(4) Standard conditions after test : 1h
试验后的放置条件: 1 小时

Contact resistance:
 $1000\text{m}\Omega$ Max
Shall meet :
No. 6.2 to 6.4
No. 7.1 to 7.2
接触电阻 $1000\text{m}\Omega$ 以下满足:
No. 6.2 to 6.4
No. 7.1 to 7.2

8.3

Temperature
cycle
温度循环

(1) Test cycles: 5 cycles
试验周期: 5 个周期
(2) Standard condition after test: 1h
试验后的放置条件: 1 小时

	Temperature 温度	Duration of test 持续时间
1 cycle 一次循环	$20 \pm 5^{\circ}\text{C}$	1h
	$-20 \pm 5^{\circ}\text{C}$	1h
	$20 \pm 5^{\circ}\text{C}$	1h
	$80 \pm 5^{\circ}\text{C}$	1h

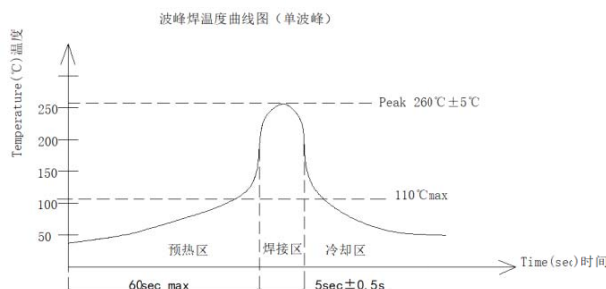
Contact resistance:
 $1000\text{m}\Omega$ Max
Shall meet :
No. 6.2 to 6.4
No. 7.1 to 7.2
接触电阻 $1000\text{m}\Omega$ 以下
满足:
No. 6.2 to 6.4
No. 7.1 to 7.2

8.4

Soldering
heat test
耐焊接热

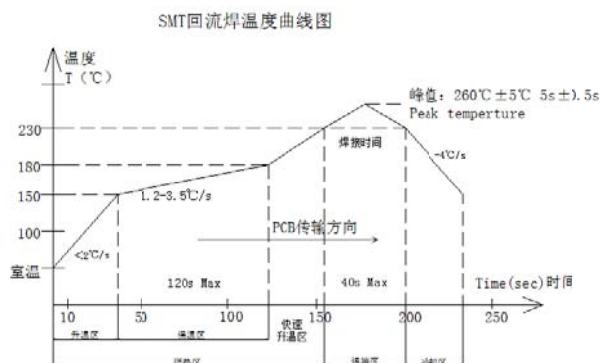
Soldering area: T/2 of PWB thickness.
(PWB: T=1.6mm)
焊接面积: 印刷基板的 1/2 厚度处
Soldering temperature: $260 \pm 5^{\circ}\text{C}$
Soldering time: $5 \pm 0.5\text{s}$
(板下焊接脚处) 波峰焊接温度: $260 \pm 5^{\circ}\text{C}$
焊接时间: 5 ± 0.5 秒

DIP 波峰焊温度曲线图



Automatic Reflow soldering 自动回流焊接:
For the product of SMT, according to below
condition:
oldering temperature: $260 \pm 5^{\circ}\text{C}$
Soldering time: $5 \pm 0.5\text{s}$
(整个产品) 回流焊焊接温度: $260 \pm 5^{\circ}\text{C}$
焊接时间: 5 ± 0.5 秒

Appearance:
No abnormality.
外观无异常



8.5

Solderability
可焊性

Lead-tin soldering 锡铅焊接:
Soldering temperature: $245 \pm 5^{\circ}\text{C}$
Soldering time: $5 \pm 0.5\text{s}$
焊接温度: $245 \pm 5^{\circ}\text{C}$
焊接时间: 5 ± 0.5 秒

Lead free soldering 无铅焊接:
Soldering temperature: $255 \pm 5^{\circ}\text{C}$
Soldering time: $5 \pm 0.5\text{s}$
焊接温度: $255 \pm 5^{\circ}\text{C}$
焊接时间: 5 ± 0.5 秒

At least 90% of surface area of immersed portion shall be covered by solder.
浸焊面积大于 90% 以上.

8.6

Humidity test
耐湿性

- (1) Temperature : $60 \pm 2^{\circ}\text{C}$
温度: $60 \pm 2^{\circ}\text{C}$
- (2) relative humidity: 90~95% R.H.
相对湿度: 90~95% R.H.
- (3) Duration of test: 96h
持续时间: 96 小时
- (4) Take off a drop water
去掉水珠
- (5) Standard conditions after test: 1h
试验后的放置条件: 1 小时

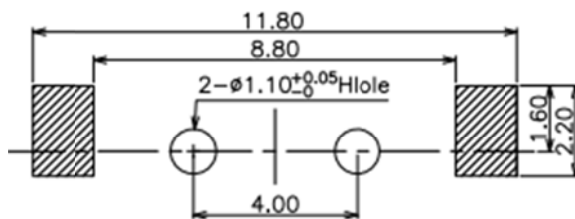
Contact resistance:
 $1000\text{m}\Omega$ Max
Shall meet :
No. 6.2 to 6.4
No. 7.1 to 7.2
接触电阻 $1000\text{m}\Omega$ 以下
满足:
No. 6.2 to 6.4
No. 7.1 to 7.2



8.7	Salt Spray 盐雾测试	Apply the following environment to test: 根据下列条件进行测试: (1) Temperature : $35\pm5^{\circ}\text{C}$ 温度: $35\pm5^{\circ}\text{C}$; (2) Salt water density: $5\pm1\%$ 盐水浓度: $5\pm1\%$; (3) Duration: 24 hours 持续时间: 24 小时; (4) After test, the salt deposit shall be removed by running water. 实验后将盐沉积物用水冲掉	Appearance: No corrosion spot, no crack, no base plate naked. 外观: 无腐蚀点, 无裂纹, 无裸露基材. Contact Resistance: $1000\text{ m}\Omega$ Max 接触电阻: 1000 毫欧以下
8.8	Withstand K_2S 硫化测试	Apply the following environment to test: 根据下列条件进行测试: (1) Temperature: Natural 温度: 常温状态下 (2) K_2S Density: 2%; 硫化钾浓: 2% (3) Duration: 2 minute. 持续时间: 2 分钟	Appearance: No corrosion spot, no crack, no base plate naked. 外观: 无腐蚀点, 无裂纹, 无裸露基材. Contact Resistance: $1000\text{ m}\Omega$ Max 接触电阻: 1000 毫欧以下

9. Recommended PCB Layout 推荐的 PCB 安装焊盘规格

(Top View)
(Single face board T=1.6mm)



PCB Layout (Pattern Side)

10. Loading Parameter (FP/OP/PT/OF/OT/MD/RF) Specification 荷重参数规格：

Parameter	Unit	Specification	Remark
FP	mm	3.50 ± 0.2	
OP	mm	3.20 ± 0.2	
PT	mm	0.30 ± 0.2	
OF	gf	110 ± 20	
OT	mm	0.10	Min
MD	mm	0.12	Max
RF	gf	15	Min



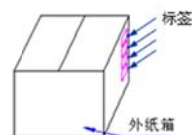
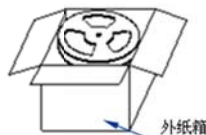
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11. Packaging 包装

Packing Style 包装类型	Quantity 数量	Notes 说明
Reel 卷盘	2000PCS.	
PE Bag 包装袋	2000PCS	Reel: 1 Reel
Carton 纸箱	12000PCS.	Reel: 6 Reels



12. Precaution 注意事项

12.1 Immersion Soldering condition 浸焊条件

ITEM 项目	CONDITION 条 件
Preheat temperature 预热温度	110°C Max (Ambient temperature of soldering surface of P.W.B) 110°C 以下(印刷基板焊锡面周围的温度)
Preheat time 预热时间	60s, Max 60 秒以内
Area of flux 助焊剂面积	1/2 Max of PWB Thickness 印刷基板厚度的 1/2 以内
Temperature of solder 焊锡温度	260±5°C 260±5°C
Time of immersion 浸焊时间	5±0.5s 5±0.5 秒
Number of soldering 焊接次数	2 time Max (But should down heat of the first soldering) 2 次以内
Printed wiring board 印刷基板	Single side copper-clad laminates 单面铜箔

- (1) After switches were soldered, please be careful not to clean switches with solvent
开关浸焊后,注意不要用溶剂清洗.
- (2) Under the condition of using soldering iron, soldering temperature shall be 350°C±5°C with 3±0.5s
在使用烙铁的情况下,焊锡温度应在350°C±5°C,焊接时间3±0.5秒.

12.2 Notes 注意点

- (1) Please be cautious not to give excessive static load or shock to switches.
注意不要施加超负荷的压力或晃动开关.
- (2) Please be careful not to stack up P. W. B. after switches were soldered.
开关焊接以后,印刷基板注意不要叠放.
- (3) Preservation under high temperature and high humidity or corrosive gas should be avoided
Especially. When you need to preserve for a long period, do not open the carton.
保管时尤其应注意避开高湿高温和有腐蚀性气体的环境. 如需长时间保存,请不要打开包装箱.
- (4) The standard storage period is 3 months, with maximum up to 6months, preferably to be used as

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soon as possible. After opening the package, you should put the remaining switches in a plastic bag to prevent from damp and corrosive gas.

保存标准为 3 个月，限度为 6 个月以内，请尽早使用。打开包装后，有剩余品时，应将剩余部分以胶袋包装好以同外界隔离，请进行合适的防湿，防腐蚀气体等处理后进行保管。

- (5) This Product Specification is considered as the technical agreement on product between the receiving customer and Kailh. Any information on Product Catalogue which is in conflict with or different from the corresponding information of this document is considered as invalid.

该规格书为客户与凯华公司产品在技术方面的共识，其他相关数据上与该规格书不一致的内容都是无效的。

- (6) It will be considered that customer already confirmed and accepted this specification if customer issue purchase order to us directly.

无论顾客收到规格书后有没有信息反馈直接向我公司订货，我们将认为顾客对此产品已验证合格。

- (7) If there is no order or no request for new specification after 1 year upon this specification is issued, the specification will be regarded as invalid.

本产品规格书从生效日起 1 年后，如果没有订货或再次申请最新规格书时请做无效处理。

- (8) Products meet the ROHS & REACH environmental management substances control standards
产品满足 ROHS & REACH 环境管理物质管制标准