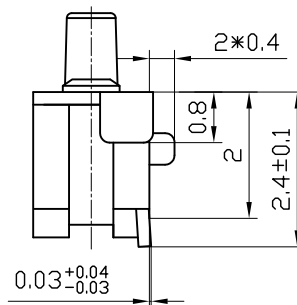
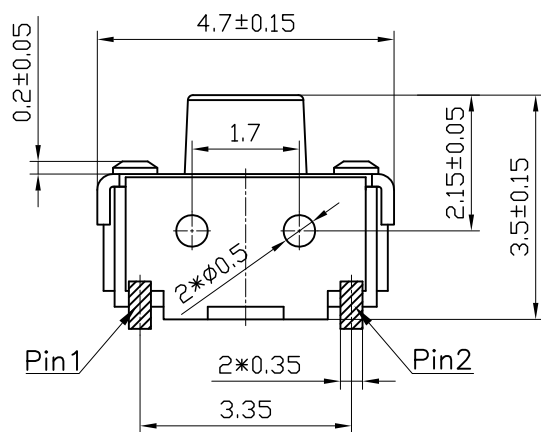
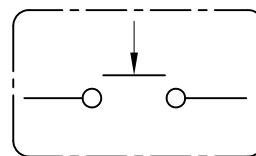
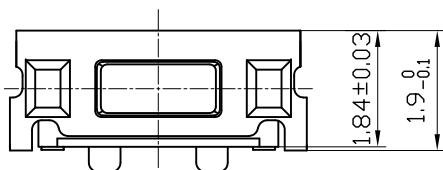
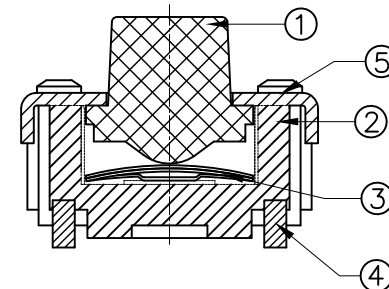
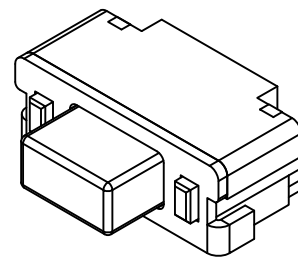


ABIDE BY ROHS



两脚落差不能超过0.03mm

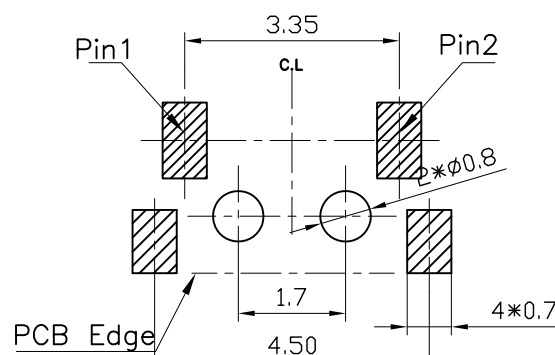


Circuit Diagram

■ Specification :

- 1. Rated voltage: D.C.12V 50mA
- 2. Contact Resistance: 100mΩ(Max)
- 3. Insulation resistance: 100MΩ(Min) DC250V
- 4. Dielectric strength: AC250V(50-60Hz) for 1 minute
- 5. Operation force: 200±50gf
- 6. Travel closure: 0.20±0.10mm
- 7. Life Test : 30,000 Cycles(min)

KAIHUA P/NO	Keystoke Color
CTA451701S02	White
CTA451701S01	Black



Recommended PCB Layout
(Pattern Side) Tolerance: ±0.05mm

⑤	Shell	1PCS	PBS	Plating Silver		
④	Terminal	1PCS	PBS	Plating Silver		
③	Contact	2PCS	Stainless steel	Plating Silver		
②	Base	1PCS	LCP	White		
①	Keystoke	1PCS	LCP	Black		
ITEM	PART NAME	TER'NO.	QTY.	MATERIAL	FINISHING	REMARK

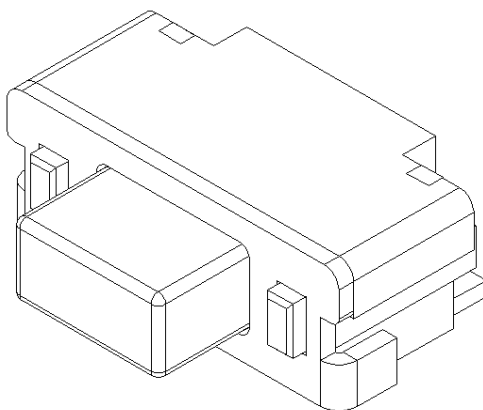
APPROVALS		DATE	东莞市凯华电子有限公司 DONGGUAN CITY KAIHUA ELECTRONICS CO.,LTD			
DRAWN	Nick Lai	2018/08/08	TITLE:	MINI型轻触开关		
CHECKED			PART NO.	CTA451701S01		
APPROVALS			UNIT: mm	SCALE: 1:1	PROJ:	
TOLERANCES ARE		30<L ±0.30 10<L≤30 ±0.20 5<L≤10 ±0.15 L≤5 ±0.10	ANGLE	±2°	DRAWING NO.	051129-02
						SHEET 1 OF 1

ECN-1808-11	B	18/08/08	Structural Changes	Nick Lai		
	A	01/23/18	NEW			
ECN NO.	REV.	DATE.	DESCRIPTION.	CHANGE.	CHECK.	APPRO.



KH-PS1611-17

Product Specification

[illegible]



凱華電子
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1.Scope/范围:

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

本规格书内容涵盖轻触开关产品的要求，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 car radio equipment and home appliances. Please let us know before using any of the products in the application not described above.

该轻触开关产品适用于所有类型的电脑、鼠标、照相机、录像机、音响、汽车无线电设备和家用电器，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℃~+70℃;
Suggested storage period 贮存期限:	6 months Max 最多 6 个月;
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:	100 mΩ Max;
Operation Force 操作力:	200±50gf;
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

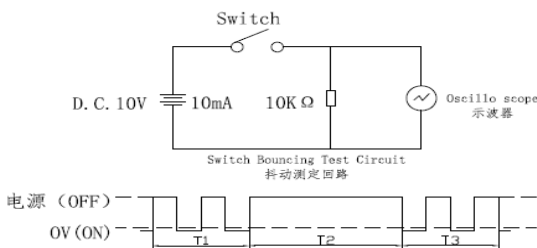
Rating 额定负荷:	DC12V / 50mA;
Insulation Resistance 绝缘电阻:	≥100MΩ/ DC 250V;
Withstand Voltage 耐电压:	250V AC 1 Minute;
Mechanical Life 机械寿命:	30,000 Cycles (Without load).

5.Profile Dimensions /外形尺寸

(见产品图纸)

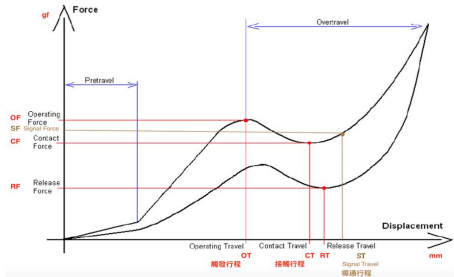
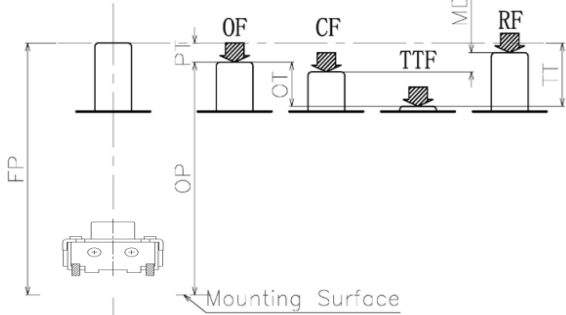
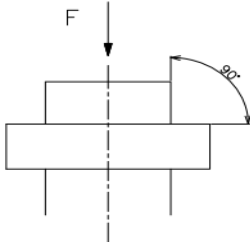


6. Electrical Performance/电气性能

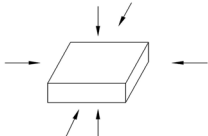
Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求
6.1	Contact Resistance 接触电阻	Measured at low current (100mA or less). 在低电流 ($\leq 100\text{mA}$) 条件下测试. Static load: (Operation force) x2, which is applied on the center of Switch stem. Be measured when the switch contact stabilization . 静态负载: 动作力的 2 倍, 施加在手柄中心. 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)	100m Ω Max 100m Ω 以下
6.2	Insulation Resistance 绝缘电阻	Apply a Voltage of DC 250 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.	100M Ω Min 100 兆欧以上
6.3	Dielectric withstanding voltage 耐电压	Apply a Voltage of AC 250 V (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body. 输入 250V 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 Oscillo scope 示波器 Switch Bouncing Test Circuit 抖动测定回路. 	T1 and T3: 5ms MAX before life 10ms MAX after life T2: 0ms T1 和 T3: 寿命测试前 5 毫秒以下, 寿命测试后 10 毫秒以下 T2: 0ms (不能有杂波)



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	Loading Curve 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，向手柄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，向手柄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. 在手柄动作方向施加 3kgf 的静负荷 60 秒，然后测试参数。 	No damage (Electrical and mechanical) Shall meet : No.6, 7.1、7.2. 电气和机械性能正常。 满足： 6, 7.1、7.2 项要求。



7.4	Shock 机械冲击	Measured by according to the below condition: (1) Acceleration: 80g 加速度: 80g (2) Cycles of test: 3 cycles each in 6 directions, for a total of 18 cycles. 试验次数: 每个方向 3 次, 6 个方向共 18 次. 	Shall meet No.6, 7.1, 7.2. 满足 6, 7.1, 7.2 要求.
7.5	Life Test 寿命测试	(1) Applying Force: $250 \pm 50\text{gf}$ 施加力: $250 \pm 50\text{gf}$ (2) Operation speed: 2~3cycles/s 操作速度: 2~3 次/秒 (3) Cycles: 30,000 times Min 操作次数: 3 万次以上	Contact resistance: $10\ \Omega$ Max Operation force: Variation rate within $\pm 30\%$ Shall meet : No.6.2 to 6.4, 7.1、7.2. 接触电阻: 10 欧以下 操作力的变化范围在初始值的 $\pm 30\%$ 以内. 满足: 6.2 到 6.4, 7.1、7.2 项要求.

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 : $-20 \pm 2^\circ\text{C}$ 温度: $-20 \pm 2^\circ\text{C}$ (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: $200\text{m}\ \Omega$ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 $200\text{m}\ \Omega$ 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 : $70 \pm 2^\circ\text{C}$ 温度: $70 \pm 2^\circ\text{C}$ (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: $200\text{m}\ \Omega$ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 $200\text{m}\ \Omega$ 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

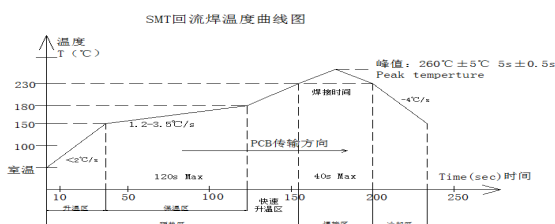
	Temperature 温度	Duration of test 持续时间
1 cycle 一次循环	$20 \pm 5^{\circ}\text{C}$	1h
	$-20 \pm 5^{\circ}\text{C}$	1h
	$20 \pm 5^{\circ}\text{C}$	1h
	$70 \pm 5^{\circ}\text{C}$	1h

Contact resistance:
 $200\text{m}\Omega$ Max
Shall meet :
No. 6.2 to 6.4
No. 7.1 to 7.2
接触电阻 $200\text{m}\Omega$ 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

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:
 $200\text{m}\Omega$ Max
Shall meet :No. 6.2 to
6.4
No. 7.1 、 7.2.
接触电阻 $200\text{m}\Omega$ 以下
满足:No. 6.2 to 6.4
No. 7.1 、 7.2.

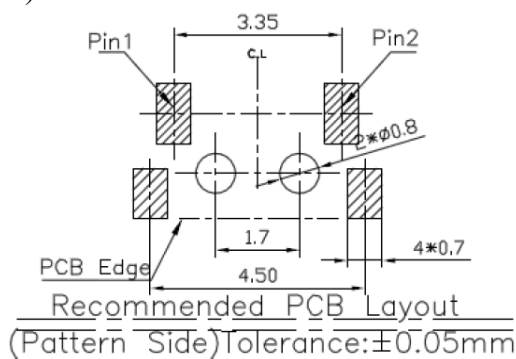


8.7	Salt Spray 盐雾测试	(1) Temperature : $35 \pm 5^{\circ}\text{C}$ 温度: $35 \pm 5^{\circ}\text{C}$; (2) Salt water density: $5 \pm 1\%$ 盐水浓度: $5 \pm 1\%$; (3) Duration: 24 hours 持续时间: 24 小时; (4) Test data after flushing with water after test. 用水冲洗后测试数据	Appearance: No corrosion spot, no crack, no base plate naked. Shall meet :No. 6.4 Contact Resistance: $200\text{ m}\Omega$ Max 外观: 无腐蚀点, 无裂纹, 无裸露基材. 满足: No. 6.4 接触电阻: $200\text{m}\Omega$ 以下
8.8	Withstand K_2S 硫化测试	(1) Temperature: Natural 温度: 常温状态下 (2) K_2S Density: 2%; 硫化钾浓度: 2% (3) Duration: 2 minute. 持续时间: 2 分钟 (4) Test data after flushing with water after tes 用水冲洗后测试数据	Appearance: No corrosion spot, no crack, no base plate naked. Shall meet :No. 6.4 Contact Resistance: $200\text{ m}\Omega$ Max 外观: 无腐蚀点, 无裂纹, 无裸露基材. 满足: No. 6.4 接触电阻: $200\text{m}\Omega$ 以下

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

(Top View)

(Single face board T=1.6mm)



10.Loading Parameter (FP/PT/OF/CR) Specification 荷重参数规格：

Parameter	Unit	Specification	Remark
FP	mm	3.50 ± 0.15	
PT	mm	0.20 ± 0.10	
OF	gf	200 ± 50	



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11.Packaging 包装

Packing Style 包装类型	Quantity 数量	Notes 说明
Tape & Reel 卷	3000PCS.	3000Pcs/Reel,
外纸箱 Inner Carton	30000PCS.	Reel:10 PCS



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℃ Max (Ambient temperature of soldering surface of P.W.B) 110℃ 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℃ 260±5℃
Time of immersion 浸焊时间	5±0.5s 5±0.5 秒
Number of soldering 焊接次数	2time 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±5℃ with 3±0.5s
在使用烙铁的情况下,焊锡温度应在350±5℃,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.

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- (4) The standard storage period is 3 months, with maximum up to 6months, preferably to be used as 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.
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- (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.
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