



东莞市神久电子科技有限公司

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承認書

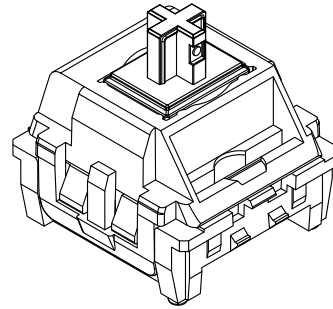
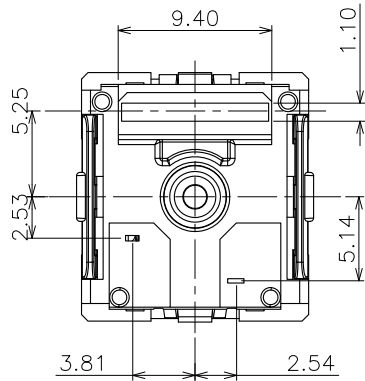
APPROVAL SHEET

机械黑轴

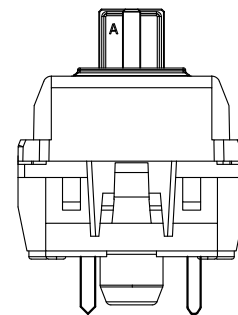
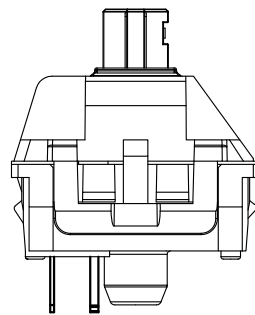
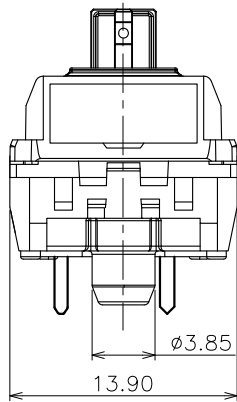
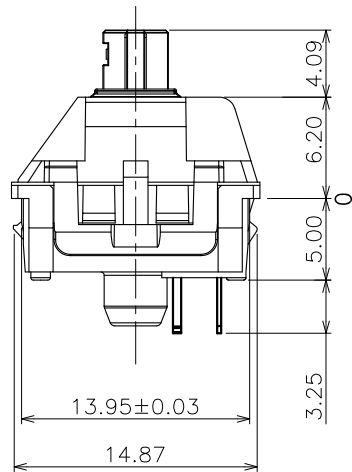
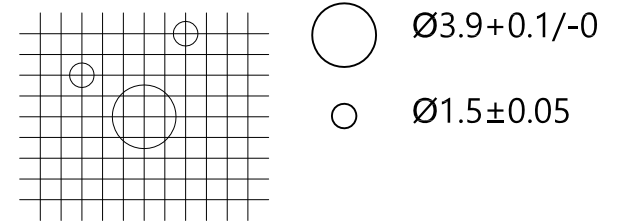
| | | |
|---|---------------|----------------|
| Description (品名): 键盘开关/黑轴 10 | | |
| PART NO. (料號): SJ-LC-P10 | | |
| Customer PART NO. (客戶料號): | | |
| Customer Name (客戶名稱): | | |
| Manufacturers Approved 制造商批准: | | |
| 批准 APPROVED BY | 检查 CHECKED BY | 制作 PREPARED BY |
| | | |
| Customer Approved 客户批准: | | |
| 批准 APPROVED BY | 检查 CHECKED BY | |
| | | |



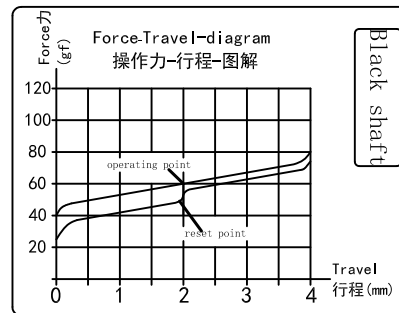
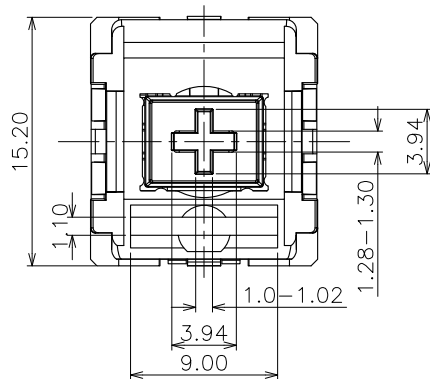
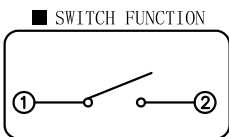
产品图



安装位置:
Keyswitch without fixation pins
按键开关不带定位柱



- 产品规格:
- 1. 额定值: 12 VAC/DC max. 2 VDC min. 10mA AC/DC max. 10µA DC min.
 - 2. 接触阻抗: 200毫欧 最大
 - 3. 绝缘阻抗: 100兆欧 最小 (DC100V)
 - 4. 耐高压: 交流500伏 (50-60赫兹) 持续 1 分钟
 - 5. 抖动时间: ≤5msec (3-4次/秒. 按压速度)
 - 6. 触感点力: 60±10gf
 - 7. 操作力: 50±10gf
 - 8. 导通行程: 2.0mm±0.4mm (PT)
 - 9. 全行程: 4.0+0/-0.3 mm
 - 10. 操作寿命: 5000万次以上
 - 11. 防护等级: IP40



| 序号 | 零件名称 | 端子编号 | 用量 | 材料 | 镀层/颜色 | 备注 |
|----|--------|-------|----|------------|-------|----|
| ⑥ | 基座 | LC007 | 1 | PA66+GF15% | 黑色 | |
| ⑤ | 黑轴弹簧 | LC011 | 2 | SUS304-EH | 进口料光面 | |
| ④ | 黑轴端子 | LC010 | 2 | 黄铜 | 镀金5U" | |
| ③ | 黑/红轴簧片 | LC009 | 2 | 铜合金 | 镀金5U" | |
| ② | 透明基盖 | LC008 | 1 | PC 110 | 透明 | |
| ① | 黑色按柄 | LC005 | 1 | POM | 黑色 | |

| 承认 | | 日期 | 东莞市神久电子科技有限公司 | | | |
|--------|-----|----------|---------------|----------|------------|-----------|
| 设计 | 皮华程 | 20200606 | 名称 | 机械键盘开关黑轴 | | |
| 审核 | | | 料号 | LC-P10 | | |
| 核准 | | | 单位: mm | 比例: 1:1 | 视角 | |
| 未注尺寸公差 | | 30<L | ±0.30 | 角度 | | |
| | | 10<L | ±0.20 | ±2' | 单位: mm | 比例: 1:1 |
| | | 5<L | ±0.15 | 视角 | | |
| | | L | ±0.10 | 图纸编码 | LC-P10-001 | 页次 1 OF 1 |

| 工程变更单号 | 版次 | 日期 | NEW | 说明 | 修改 | 审核 | 核准 |
|--------|----|----|-----|----|----|----|----|
| | A | | | | | | |

1. General specification 基本事项

- 1.1 Switch action 开关种类 Push-on type S. P. S. T: 按键开关
- 1.2 Switch rating 额定值 : 12V AC/DC max. 2V DC min. 10mA AC/DC max. 10mA DC min.
- 1.3 Operation temperature range 使用温度试验范围 : - 40 ~ + 70°C
- 1.4 Storage temperature range 保存温度范围 : - 40 ~ + 70°C
- 1.5 Suggested storage period 贮存期限 : about 6 months 最多六个月
Require the tin part on the switch terminals should keep good after storage guarantee date
要求贮存期后开关端子部分上锡仍然良好
- 1.6 Appearance and dimensions 外形及尺寸: See outside drawing page 见外形尺寸图
- 1.7 Dust-proof waterproof level switch 开关防尘防水等级为: IP 40
- 1.8 Standard condition Unless otherwise specified, the test and measurements shall be carried out as follows:
标准状态 除非另有说明, 试验和测量应如下进行



Ambient temperature 温度 : 20±2°C

Relative humidity 相对湿度 : 45 ~ 85

Air pressure 气压 : 86 ~ 106kPa (860~1060mbar)

However, if doubt arises on the decision based on the measured

Values under the above-mentioned conditions, the following conditions shall be employed:

但是在对判定产生疑义时, 按下述状态实施:

Ambient temperature 温度: 20±2°C Relative humidity 相对湿度: 90±5%

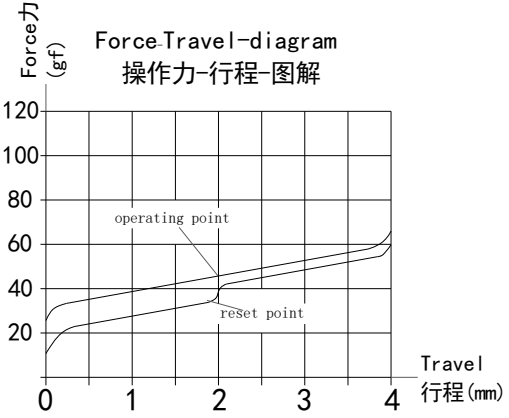
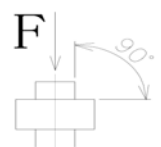
Air pressure 气压: 86 ~ 106kPa (860~1060mbar)

2. Performance 性能

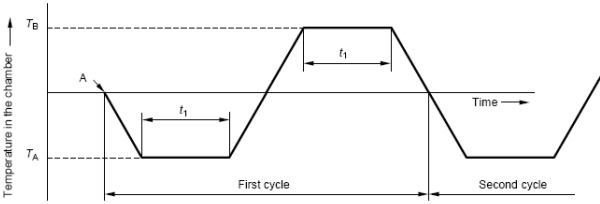
2.1 Electrical characteristics 电气性能

| No. | Item 项目 | Test condition 试验条件 | Performance 规格 |
|-------|-------------------------------|--|---|
| 2.1.1 | Contact resistance 接触电阻 | Push force: (Operation force) x 2. 测定时的负荷: 操作方向动作力基准值的2倍。 Measurement tool : Contact resistance meter 测定器: 微电流接触电阻计(1kHz, 20mV, 5~50mA) | Initial contact resistance(初始值) 100mΩ Max After Environmental Test (环境测试后) 200mΩ Max After Life Test(寿命测试后) : 500mΩ Max |
| 2.1.2 | Insulation resistance 绝缘电阻 | DC. 100V(Between terminals) (端子间) | 100MΩ min 100MΩ 以上 |
| 2.1.3 | Withstand voltage 耐电压 | AC 500V for 1 min (Between terminals) (端子间) | No insulation destruction. 无绝缘破坏. |
| 2.1.4 | Bouncing 触点抖动 | Operation speed : 3~4 times/s 操作速度: 每秒3~4次 Oscilloscope 示波器 Switch Bouncing Test Circuit 抖动测定回路 Switch Bouncing Test Circuit 抖动测定回路 "ON" "OFF" | ON:5ms max 以下 OFF:5ms max以下 |

2.2 Mechanical Characteristics 机械性能

| No. | Item 项目 | Test condition 试验条件 | Performance 规格 |
|-------|---|---|--|
| 2.2.1 | Operation force 启动力 Travel to closure 动作行程 (见图表) |  <p>Force-Travel-diagram 操作力-行程-图解</p> | Operating force 启动力 : 45±15gf End force 终点力: 65-75gf Pretravel 预行程: 2.0±0.4mm Total Travel 总行程: 4.0 +0/-0.3mm |
| 2.2.2 | Push strength 按压强度 | 5Kgf for 15 sec  5Kgf 15秒 | No damage (Electrical and mechanical) 无异常 (电气、机械性能) |
| 2.2.3 | Pull strength 推压强度 | Break by drawing push plate in the direction of right diagram 抽拔推杆使其破坏的强度. | 4kgf |
| 2.2.4 | Vibration test 耐振性 | 1) Amplitude 全振幅: 1.5 mm 2) Sweep rate: 10-55-10Hz for 1 minute 扫描速度: 10-55-10Hz 1 分钟 3) Sweep method: Logarithmic frequency sweep rate 扫描方式: 对数频率扫描速度 4) Vibration direction : X, Y, Z (3 directions) 振动方向: X, Y, Z (3 方向) 5) Time : Each direction 2 hours (Total 6 hours) 时间: 每个方向2 个小时(共6 个小时) | No. 2.1 and 2.2.1 to 2.2.2 shall be satisfied 满足2.1 项和2.2.1 至 2.2.2 项. |
| 2.2.5 | Soldering heat test 耐焊接热 | 端子焊接部分浸入焊炉, 焊炉温度 260±5°C, 焊接时间 5±1 秒。(焊接时不可于端子施加外力)。 Terminals shall be dipped in the solder bath at 260±5°C for 5±1 seconds without additional force for terminals. | No damage (electrical and mechanical) 无异常。 (电气、机械特性) |
| 2.2.6 | Solderability 可焊性 | After sprated flux / 涂上助焊剂后 temperature :260± 5°C / 温度: 260± 5°C soldering time :2±0.5 sec/ 焊接时间:2±0.5 秒 | 70% or more of surface area of the portion immersed in solder shall be covered by new solder / 70% 或更多的浸焊面能被焊锡覆盖. |

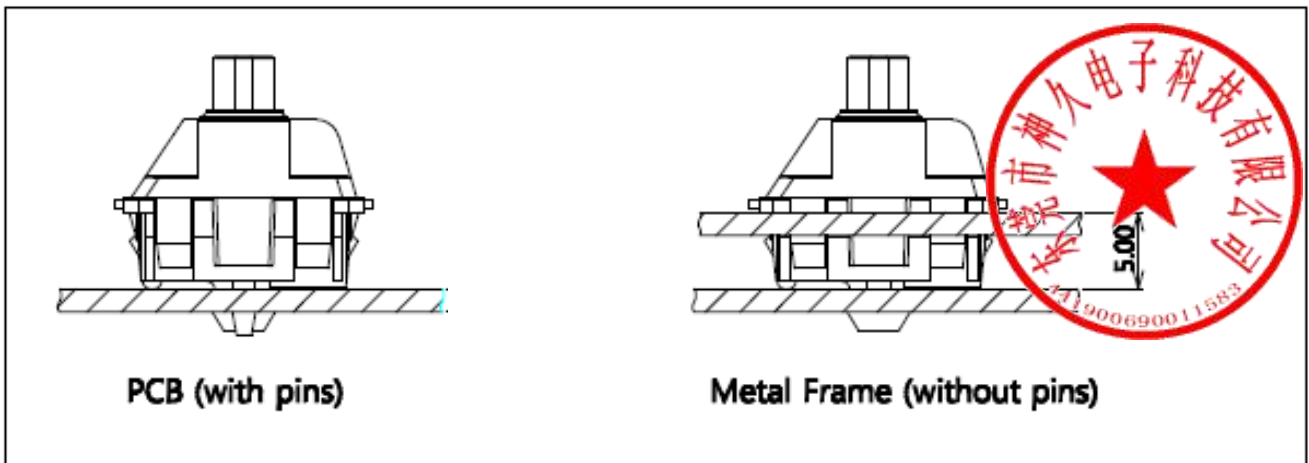
2.3 Climatic characteristics 耐候性能

| No. | Item 项目 | Test condition 试验条件 | Performance 规格 |
|-------|---------------------------|--|---|
| 2.3.1 | Cold test 耐寒性 | 1) Temperature : $-40\pm 2^{\circ}\text{C}$ 温度: $-40\pm 2^{\circ}\text{C}$ 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 200m Ω max No. 2.1.2 to 2.1.4 and No. 2.2.1 to 2.2.2 shall Be satisfied 接触电阻 200m Ω 以下 满足2.1.2 到2.1.4 项、2.2.1 到2.2.2 项. |
| 2.3.2 | 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) Standard conditions after test : 1h 试验后的放置条件: 1 小时 | Contact resistance 200m Ω max No. 2.1.2 to 2.1.4 and No. 2.2.1 to 2.2.2 shall Be satisfied 接触电阻 200m Ω 以下 满足2.1.2 到2.1.4 项、2.2.1 到 2.2.2 项. |
| 2.3.3 | Temperature cycle 温度循环 | 1) Test cycles :2 cycles 试验周期: 2 个周期 2) Cycle time: 8H 循环总时间: 8小时 3) Parameter: TA: -40°C TB: 70°C t1=3H 参数: TA: -40°C TB: 70°C t1=3H 4) Standard conditions after test : 1h 试验后的放置条件: 1 小时  | Contact resistance 200m Ω max No. 2.1.2 to 2.1.4 and No. 2.2.1 to 2.2.2 shall be satisfied 接触电阻 200m Ω 以下 满足2.1.2 到2.1.4 项、2.2.1 到2.2.2 项. |
| 2.3.4 | Humidity test 耐湿性 | 1) Temperature : $70\pm 2^{\circ}\text{C}$ 温度: $70\pm 2^{\circ}\text{C}$ 2) relative humidity: 90~95% 相对湿度:90~95% 3) Duration of test: 96h 持续时间: 96 小时 3) 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 200m Ω max No. 2.1.2 to 2.1.4 and No. 2.2.1 to 2.2.2 shall Be satisfied 接触电阻 200m Ω 以下 满足2.1.2 到2.1.4 项、2.2.1 到2.2.2 项. |

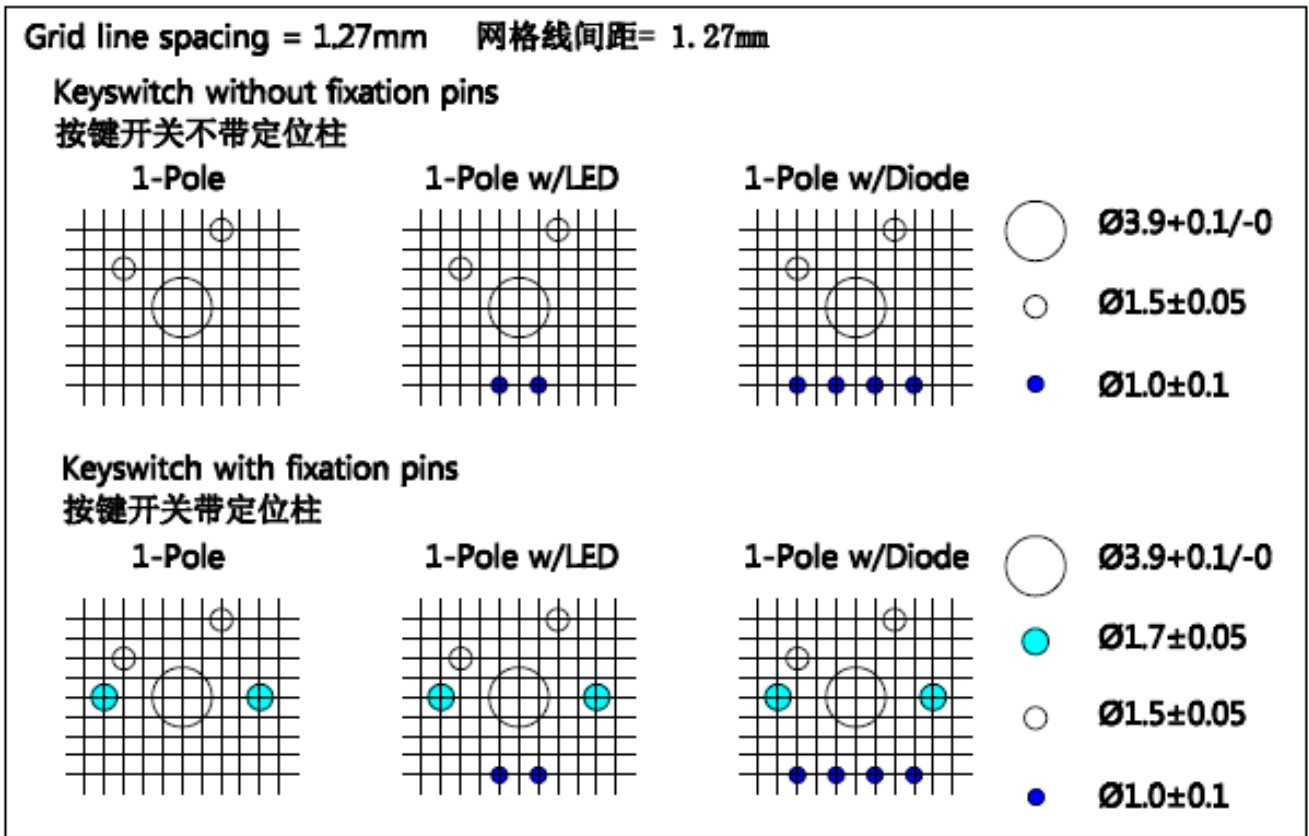


| No. | Item 项目 | Test condition 试验条件 | Performance 规格 |
|-------|---|--|---|
| 2.3.5 | Endurance (switching action) 耐久特性 (开关寿命) | 1) D.C.12V 10mA resistance load D.C 12V 10mA 电阻负荷 2) Operation speed : 2-3 times / s 动作速度: 2-3 次/ 秒 3) Push force : 150gf 按力:150gf 3) Push travel : 4.0mm(Max) 按压行程: 4.0mm(最大) 4) Operation number:50,000,000cycles 动作次数:50,000,000次 | Contact resistance 500mΩ max 接触电阻 500mΩ 以下 Bouncing: 10 ms max 触点抖动: 10 毫秒以下 Variation rate of operation force shall be within ±30% to the value before testing 动作力的变化范围在初始值的±30%以内 No.2.1.2 and 2.2.2 shall Be satisfied 满足2.1.2 和2.2.2 项 |
| 2.3.6 | 盐雾实验 Salt Mist Test | 试件在下述实验后测量: 1. 温度: 35±5°C 2. 盐溶液浓度: 5±1% (质量百分比), 3. 试验时间: 48 小时, 4. 试验后, 将盐沉积物用水冲掉。 The switch shall be checked after following test: 1. Temperature: 35±5°C 2. Salt solution: 5±1%(Solids by mass) 3. Duration: 48 hours, 4. After immersing, salt deposit shall be removed by running water. | Contact resistance 200mΩ max No. 2.1.2 to 2.1.4 and No. 2.2.1 to 2.2.2 shall Be satisfied 接触电阻 200mΩ 以下 满足2.1.2 到2.1.4 项、2.2.1 到2.2.2 项. |
| 2.3.7 | Shock 耐冲击性 | Measure after test at a condition below 在下列条件下进行测试后的量度 Peak acceleration:80G 冲击加速度:80G Test time-6direction ,each 3 times total 18 times 测试次数-6 个方向, 各3次共计18 次。 | No.2.1 and 2.2.1 to 2.2.2 shall be satisfied 第2.1 及2.2.1—2.2.2 都应符合要求  |

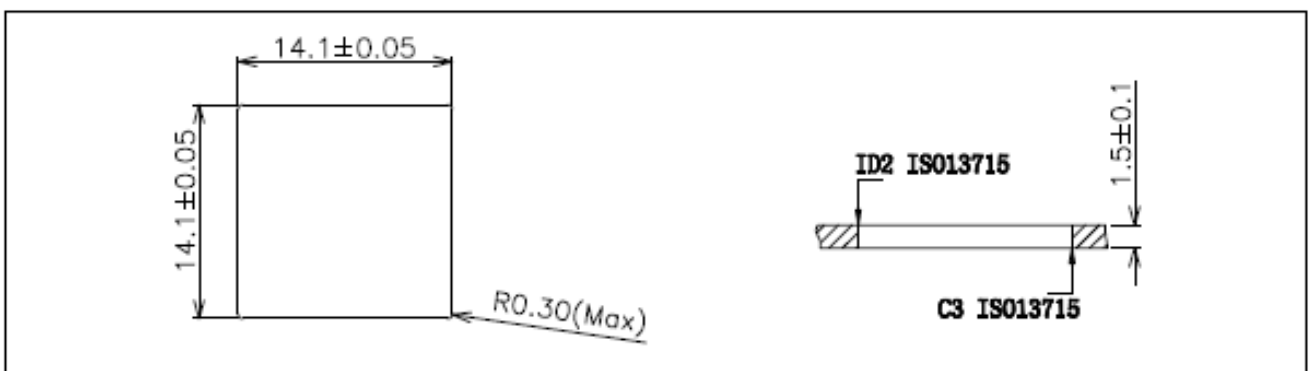
Mounting Options 安装选项



Circuit Board Layouts 电路板布局



Metal Frame Cutout Dimensions 卡板尺寸



3. Precaution 注意事项

3.1 Soldering condition 浸焊条件

| ITEM 项目 | CONDITION 条件 |
|-------------------------------|---|
| Preheat temperature 预热温度 | 110°C max (Embilomental 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 | 60 sec, max 60 秒以内 |
| Area of flux 助焊剂的面积 | 1/2 max of P. W. B. 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 | Within 5 sec 5 秒以内 |
| Soldering number 浸焊次数 | Within 2 times (But should bring down heat of the first soldering) 2 次以内 (但应把第一次焊锡的温度降下来) |
| Printed wiring board 印刷基板 | Single sided 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) In the case of using soldering iron, soldering conditions shall be 280oC max and 3 sec. max

在使用烙铁的情况下, 焊锡温度应在350±10°C 以下, 3 秒以内.

3.2 Note(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 pile 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) Products meet the ROHS environmental management substances control standards

产品满足 ROHS环境管理物质管制标准