

SPECIFICATION

ALPS' ;

MODEL : SK5AA15340

Spec. No. : SK5AA15340

Sample No. :

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Sales _____

1MSE106 #02

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1. General 一般事項

1.1 Application 适用范围
This specification is applied to CONTACT SHEET which have no KEYTOP.
此份规格书适用于不包含键帽的薄膜开关产品

1.2 Application note 使用形态
This product is supposed to apply to PCB with contacts to comprise a switch.
本产品跟印刷电路板贴合构成开关功能

1.3 Operating temperature range 使用温度范围
-20 ~ +70 °C (normal humidity, normal air pressure 常湿·常压)
*To be specified in the condition with attaching on PCB. *限定于贴合在印刷电路板上之后的状态

1.4 Storage temperature range 保存温度范围
-40 ~ +85 °C (normal humidity, normal air pressure 常湿·常压)
*To be specified in the condition with attaching on PCB. *限定于贴合在印刷电路板上之后的状态

1.5 Test conditions 试验状态
Unless otherwise specified, the atmospheric conditions for making measurements and tests are as follows.
试验及测定时在没有特别规定场合适用以下条件
Normal temperature 常 温 : (Temperature 温度 5~35 °C)
Normal humidity 常 湿 : (Relative humidity 湿度 25~85 %)
Normal air pressure 常 压 : (Air pressure 气压 86~106 kPa)
If any doubt arise from judgement, tests shall be conducted at the following conditions.
判定有分歧的场合, 适用以下条件
Ambient temperature 温 度 : 20±2 °C
Relative humidity 相对湿度 : 60~70 %
Air pressure 气 压 : 86~106 kPa

2. Appearance, style and dimensions 外观、形状、尺寸

2.1 Appearance 外观
There shall be no defects that affect the performance of the product.
不允许有将对产品性能产生影响的瑕疵

2.2 Style and dimensions 形状、尺寸
Refer to the assembly drawings.
参照产品图。

3. Type of actuating 动作形式
Tactile feedback 触压反馈式

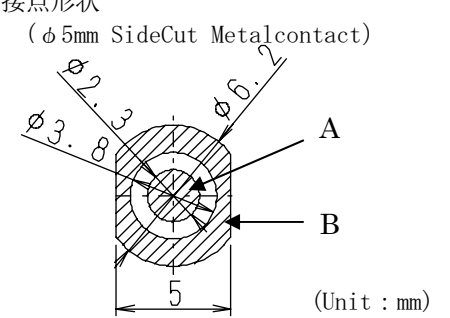
4. Ratings 额定值

4.1 Maximum ratings 最大额定
12 V DC 10 mA

4.2 Minimum ratings 最小额定
5 V DC 1 mA

5. Measuring condition 测量条件
Specifications shall be applied in the case of attached on PCB with our recommended PCB contact.
性能规格须在贴合在推荐的印刷电路板上的状态下进行测量

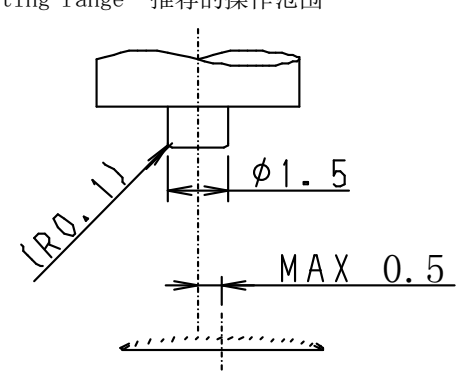
6. Recommended PCB contact 推荐的线路板接点形状
(φ5mm SideCut Metalcontact)



(Unit : mm)

- ※ The hatching part is Au plated and the use of insulating resist shall be prohibited.
(Ni plating 3 μm and Au plating 0.05 μm)
阴影部分表示镀金面, 并禁止有绝缘物质在此区域 (镍衬底 3 μm、镀金 0.05 μm 以上)
- ※ Fill in the through-hole, otherwise it may cause contact failure with the flux rising etc.
通孔必须被填没。否则, 有助焊剂等的流动将会导致开关接触不良
- ※ The outer surface of pattern A must be in the same level as outer surface of pattern B in the above fig.
接点的中间部分 (上图A) 与外周 (上图B) 要设计成在同一水平高度

7. Recommended operating range 推荐的操作范围



(Unit : mm)

- ※ Operate within 0.5 mm from the dome center with the shape of the left figure.
Operating force and click ratio will vary according to the amount of offset.
So we recommend you to minimize the amount of offset.
(This is not to guarantee operation feeling in the range.)
- ※ 操作的时候, 按左图所示, 在偏离中心最多0.5mm的范围内操作
按压力和操作手感等由于偏离中心的数值将会产生很大的变化
因此推荐尽可能缩小偏离范围。(此建议不能被当作是保证操作手感数据)

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8. Condition of use 使用条件

8.1 General 一般项目

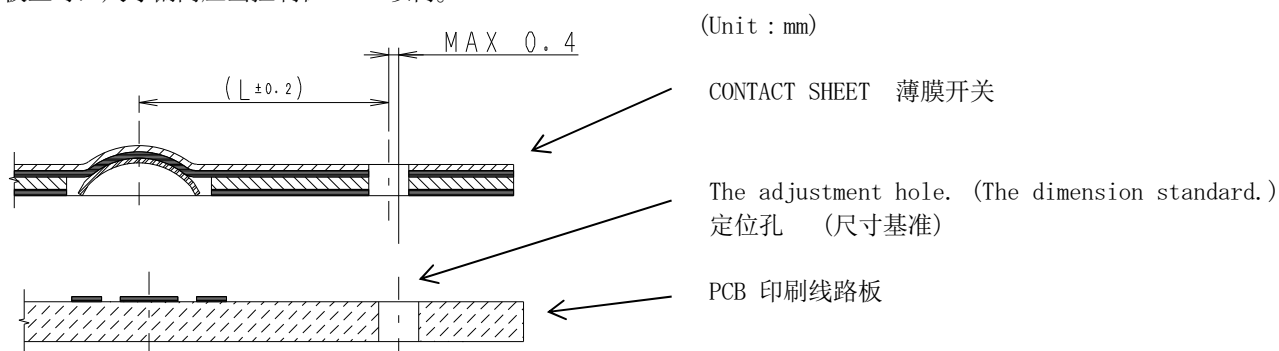
- 8.1.1 For the export of products which are controlled items subject to foreign and domestic export laws and regulations, you must obtain approval and/or follow the formalities of such laws and regulations.
涉及到本产品的限制进口/出口国家或地区的法律法规时，应当遵守该法律法规或做好相应的申请/手续工作。
- 8.1.2 Products must not be used for military and/or antisocial purposes such as terrorism, and shall not be supplied to any party intending to use the products for such purposes.
本产品不得使用在军事和/或反社会活动(例如恐怖活动)等意图的场合。并且，不得将本产品提供给最终用于此类目的团体或个人。
- 8.1.3 Unless provided otherwise, the products have been designed and manufactured for application to equipment and devices which are sold to end-users in the market, such as AV (audio visual) equipment, home electric equipment, office and commercial electronic equipment, information and communication equipment or amusement equipment. The products are not intended for use in, and must not be used for, any application of nuclear equipment, driving control equipment for aerospace or any other unauthorized use.
With the exception of the above mentioned banned applications, for applications involving high levels of safety and liability such as medical equipment, burglar alarm equipment, disaster prevention equipment and undersea equipment, please contact an Alps sales representative and/or evaluate the total system on the applicability. Also, implement a fail-safe design, protection circuit, redundant circuit, malfunction protection and/or fire protection into the complete system for safety and reliability of the total system.
本产品在指定最终用途时，原意是用于 影音设备，家电，办公设备，信息通讯设备，娱乐设备 的产品
本产品并非为以下使用目的设计也不得用于此类场合 核能设备，航空航天的控制设备及其他未经认可的使用目的。
上述禁用场合以外，需用于高度安全性/可靠性的场合时，例如医疗设备，防盗报警设备，防灾设备和海底设备，请联系ALPS销售代表，并且/或者对整个系统可行性进行充分验证。并需设计保险装置，保护电路、备用电路、防误、防火装置等进入最终系统，保证整个系统的安全及可靠性。
- 8.1.4 Before using products which were not specifically designed for use in automotive applications, please contact an Alps sales representative.
在使用未被设计用于车载应用的产品之前，请联系ALPS销售代表。
- 8.1.5 This product is designed and manufactured assuming that it is to be used with the resistance for direct current. Do not use other kinds of resistance {inductive (L) or capacitive (C)}.
本产品被设计/制造使用于直流负载。不要用于其它负载 包括电容式/电感式。
- 8.1.6 When peeling a sheet from the separator, take care not to let refuse adhere to the contact.
(Becoming failure in the contact when the refuse etc., adhere to the contact)
将薄膜从离型材上剥离时请注意不要有异物黏附到接点上。(接点部分附着有异物时将会无法导通)
- 8.1.7 Please make sure that contact sheet is fully attached on PCB in order to avoid unintended peeling of sheet.
(If sheet has insufficient adherence with PCB, foreign materials such as dust may penetrate into the inside of sheet.)
Please make sure that the surface of PWB for pasting the dome sheet is absolutely plane in order to ensure leak tightness. If the water infiltrates into the contact, the performance will be deteriorated.
请确认此薄膜开关充分贴合到印刷线路板上以避免意外剥离。(如果薄膜没有被充分贴合到印刷线路板上。)
为保证密封性，请确保被贴装的PWB表面平整，无高度差。一旦水分渗入后，制品性能会受到影响。
- 8.1.8 This sheet used for this product can not endure the heat given by soldering.
本产品所使用的薄膜材料不能承受焊接温度。
- 8.1.9 When dome on PCB is pressed or activated, PCB may have flexure or deformation.
Please use PCB support in application unit in order to prevent such flexure.
(Especially when flexible PWB is used, it may have more flexure. Please design PCB support at the backside of PCB pattern.)
当金属弹片被按压或操作时，由于受力原因印刷线路板有可能会弯曲或变形，在实际应用中请使用补强板以避免此类弯曲。
(特别是使用柔性线路板时，将会产生更大程度的弯曲/内陷，需要在线路板背面设计支撑物。)
- 8.1.10 Basically, our quality guarantee for this product applies to only a recommended situation in the specification.
Especially, use without a recommended PCB contact does not apply.
基本上，本产品的品质保证仅限于使用在推荐的条件下。
特别是，在使用非推荐线路板时不受保证。

8.2 Washing process 清洗方法

- 8.2.1 Do not try to clean this product with a solvent or the like.
不得用溶剂等清洗本产品。

8.3 Mechanism design(contact layout) 机构设计

- 8.3.1 The dimensions of the PCB contact shall refer to the recommended dimensions in this product specifications.
(Refer to the 6. Recommendable PCB contact)
线路板接点形状尺寸、请参考本规格书的推荐尺寸。(6. 推荐的线路板接点形状)
- 8.3.2 When setting to the PCB, deviation from the standard shall be within 0.4mm.
贴合到线路板上时，尺寸偏离应当控制在0.4mm以内。

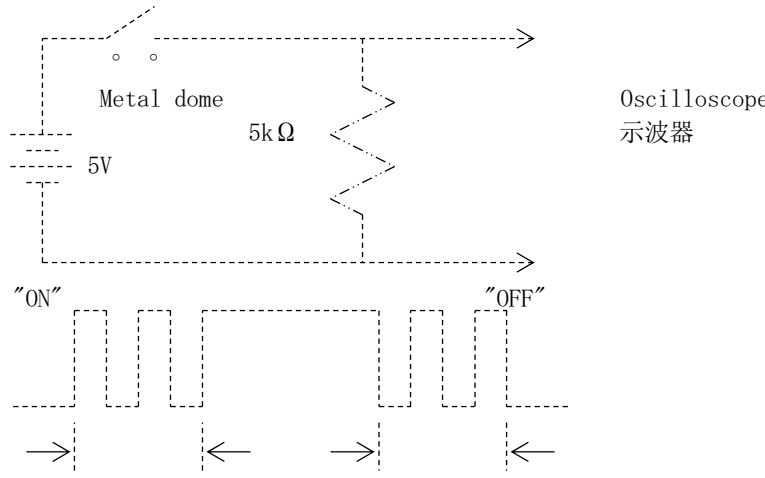


- 8.3.3 Do not place something pointy on the scaling film of the product.
避免使用尖锐的物体按压薄膜表面
- 8.3.4 This CONTACT SHEET is designed for unit construction that it is pressed by human operation.
Please avoid using this CONTACT SHEET as mechanical detecting function.
In case such detecting function is required, please consult with our detector switch section.
此薄膜开关是被设计成人工按压的装置。
请避免用于机械的定位功能
需要用到检测开关的场合，请咨询我们的检测开关部门。

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<p>8.4 Using environment 使用环境</p> <p>8.4.1 Do not use this product in the atmosphere with bedewing , because such atmosphere may cause leak among terminals. 不要在结露环境下使用本产品，因为这样一种环境会导致接点之间漏电。</p> <p>8.5 Storage method 保管方法</p> <p>8.5.1 If you don't use the product immediately, store it as delivered in the following environment: with neither direct sunshine nor corrosive gas and in normal temperatures. However, it is recommended that you should use it as soon as possible before six months pass. 不马上使用本产品时，按照原始包装形态保存：避免光照直射及腐蚀性气体，常温。但是，还是建议在6个月之内尽快使用。</p> <p>8.5.2 After you break the seal, you should put the remaining in a plastic bag to separate it from the outside and store it in the same environment Mentioned above. You should use it up as soon as possible. 开封后，需要将剩余暂时不用的产品装入塑料袋内以隔绝外界空气，并保存在上述同样条件下。并建议尽快使用。</p> <p>8.6 Others 其他</p> <p>8.6.1 This specification will be invalid one year after it is issued, if you don't return it or don't place an order. 本规格书发行1年之后如果没有得到签回或没有得到一件订单，将作失效处理。</p> <p>8.6.2 Never use the product beyond the rating. It may catch fire. If you think that the product may be used beyond the rating due to some abnormal conditions, you must take certain protective measures, such as a protective circuit to shut down the current. 超过额定值使用时会有诱发火灾的危险，请避免。如果认为使用中会有不可避免的超出额定值的情况，必须保证有保护措施，例如设计一个保护电路隔断电流。</p> <p>8.6.3 It is recommended to install a protective or redundant circuit, or to perform safety tests when you use the products for the equipment Requiring expensive safety, whatever purposes the equipment is applied for. 不管最终用途如何，使用在需要高安全性的设备上时，强烈推荐在设计保护电路或备用电路的同时，进行安全性的测试。</p> <p>8.6.4 C o n t a c t s h e e t is trademark or registered trademark of ALPS ELECTRIC CO.,LTD. 薄膜开关为阿尔卑斯电子有限公司注册商标。</p>		

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9. Electrical specification 电器性能

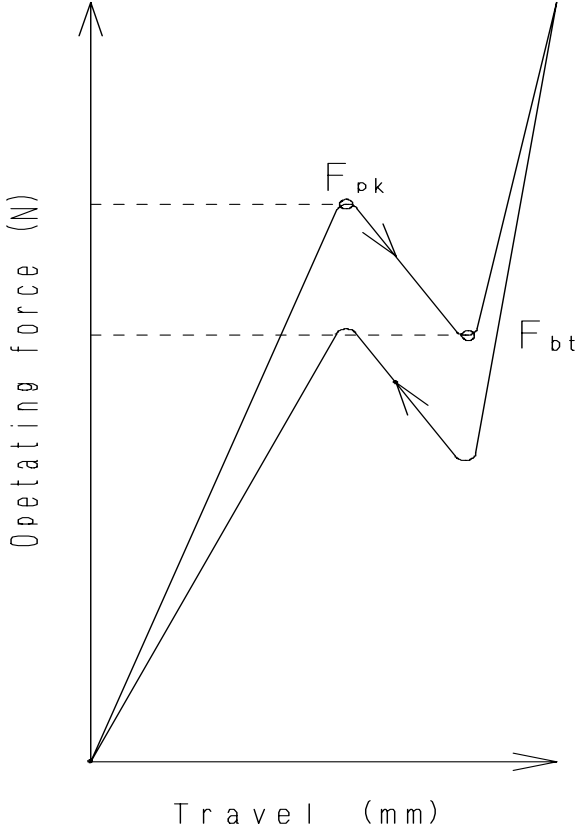
Items 項目	Test conditions 試験条件	Criteria 判定基准
9.1 Contact resistance 接触电阻	Applying the below static load to the center of the metal dome, measurements shall be made. 加载如下的静止力到金属片中央进行测量 (1) Depression 按压力: <u>3.2</u> N (2) Measuring method 测定方法: 1 kHz small-current metal dome resistance meter or voltage drop method at 5VDC 10mA. 1kHz微电流电阻计, 或者DC5V 10mA电压下降法	<u>1</u> Ω MAX. (For reference) *1 (参考值)
9.2 Bounce 跳跃	Lightly striking the center of the metal dome at a rate encountered in normal use (3 to 4 operations per sec.), bounce shall be tested at "ON". 按照通常的使用状态 (3~4回/秒) 轻轻按下金属片中心位置, 测量回路导通时的跳跃时间。 	ON bounce: <u>10</u> ms MAX. (For reference) *1 (参考值)

*1 Specifications shall be applied in the case of attached on PCB with our recommended PCB contact.
Electrical specification shall be specified with our recommended PWB. It will change with the different practical PWB.
In case the practical PWB is different, the electrical performance's reconfirm is recommended.
与推荐的线路板贴合后进行测量。
以上电气性能测试是使用弊社推荐规格的基板进行评价的。由于实际的使用环境对特性值会有一些影响, 故使用前, 请务必实机状态确认特性值。

10. Mechanical specification 机械性能

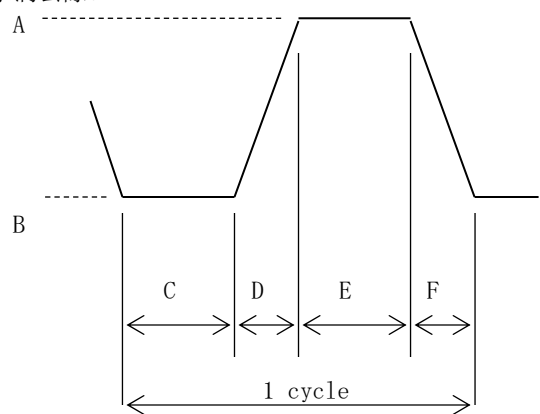
Items 項目	Test conditions 試験条件	Criteria 判定基准
10.1 Operating force 动作力	Placing the metal dome such that the manipulation direction of metal dome operation is vertical and then gradually increasing the load applied to the center of the metal dome by the flat tip measuring pole shaped φ1.5(SUS), the maximum load required for the metal dome to come to a make "ON" shall be measured. 与按压方向垂直放置金属弹片, 用直径1.5mm的平坦按压头慢慢加载力到金属片正中央 记录下到回路导通为止过程中所需要的最大的按压力	<u>1.6 ± 0.5</u> N
10.2 Travel 行程	Placing the metal dome such that the manipulation direction of metal dome operation is vertical and then applying the below static load to the center of the metal dome by the flat tip measuring pole shaped φ1.5(SUS), the travel distance for the metal dome to come to a make "ON" shall be measured. 与按压方向垂直放置金属弹片, 用直径1.5mm的平坦按压头加载以下的力到金属片正中央 记录下从接触金属片开始到回路导通为止的移动距离 (1) Depression 按压力: <u>3.2</u> N	<u>0.21 ± 0.05</u> mm
10.3 Return force 回复力	The sample metal dome shall be placed such that the manipulation direction of metal dome operation is vertical. Upon the above-specified depression to the center of metal dome by the flat tip measuring pole shaped φ1.5(SUS), the force of the metal dome to return to its free position shall be measured. 与按压方向垂直放置金属弹片, 用直径1.5mm的平坦按压头加载如前所述力到金属片正中央 记录下金属片恢复到自然状态过程中的力	<u>0.20</u> N MIN.
10.4 Stop strength 静止强度	Placing the metal dome such that the manipulation direction of metal dome operation is vertical and then the below static load shall be applied by the flat tip measuring pole shaped φ1.5(SUS) in the direction of metal dome operation. 与按压方向垂直放置金属弹片, 用直径1.5mm的平坦按压头加载如下静止力到金属片正中央 (1) Depression 按压力: <u>50</u> N (2) Time 时间: <u>60</u> s	There shall be no sign of damage mechanically. 机械性能无异常。

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Items 項目	Test conditions 試験条件	Criteria 判定基準
10.5 Click ratio 回弾率	<p>Placing the metal dome such that the manipulation direction of metal dome operation is vertical and then gradually increasing the load applied to the center of the metal dome by the flat tip measuring pole shaped $\phi 1.5$(SUS), the load required for the metal dome to come to a make "ON" shall be measured. 将金属片垂直放置于金属片的操作方向,用$\phi 1.5$平头治具(SUS)按压操作部的中心位置,测量从开始施加压力到金属片导通为止的按压力。</p> <p>Click (Tactile Feedback) It refers to the feeling indicated on the inversion portion in the operating force vs. travel diagram shown below. 手感(感触反作用) 按压力与行程的线性关系图如下图所示。</p> <p style="text-align: center;">Click ratio = $(F_{pk} - F_{bt}) / (F_{pk})$</p> 	<u>55 ± 20</u> %

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11. Environmental specification 环境性能

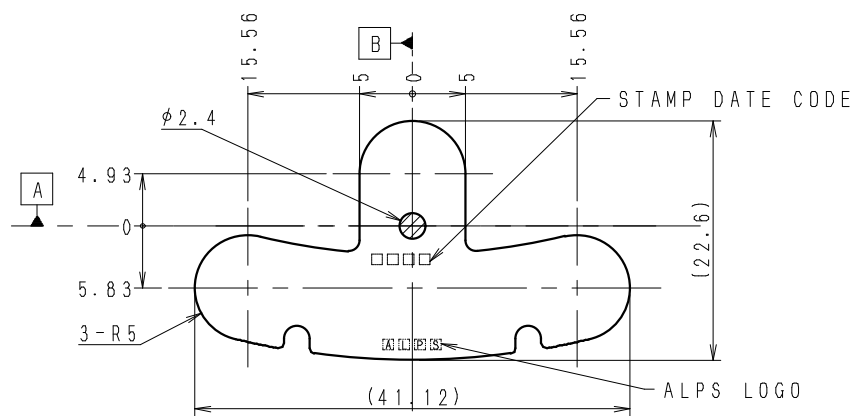
Items 項目	Test conditions 試験条件	Criteria 判定基準
11.1 Resistance to low temperatures 耐寒性	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1 hour before measurements are made: 以下试验后, 常温常湿环境中放置1小时后测试。 (1) Temperature 温度: -40 ± 2 °C (2) Time 时间: <u>240</u> h (3) Waterdrops shall be removed. 去除水滴。	Item 9. Item 10.1 Item 10.2
11.2 Heat resistance 耐热性	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1 hour before measurements are made: 以下试验后, 常温常湿环境中放置1小时后测试。 (1) Temperature 温度: $+85 \pm 2$ °C (2) Time 时间: <u>240</u> h	Item 9. Item 10.1 Item 10.2
11.3 Moisture resistance 耐湿性	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1 hour before measurements are made: 以下试验后, 常温常湿环境中放置1小时后测试。 (1) Temperature 温度: $+60 \pm 2$ °C (2) Time 时间: <u>240</u> h (3) Relative humidity 相对湿度: <u>90</u> ~ <u>95</u> % (4) Waterdrops shall be removed. 去除水滴。	Item 9.1 Contact resistance 接触阻抗 <u>2</u> Ω MAX. (For reference) *1 (参考值) Item 9.2 Item 10.1 Item 10.2
11.4 Change of temperature 温度循环	After below cycles of following conditions, the metal dome shall be allowed to stand under normal room temperature and humidity conditions for 1 hour, and measurement shall be made. Water drops shall be removed. 按照以下条件进行循环试验后, 常温常湿环境中放置1小时后测试。 水滴去除。  <p style="margin-left: 200px;"> A = $+85$ °C B = -40 °C C = <u>2</u> h D = <u>1</u> h E = <u>2</u> h F = <u>1</u> h (1) Number of cycles サイクル数: <u>5</u> cycles </p>	Item 9. Item 10.1 Item 10.2

*1 Specifications shall be applied in the case of attached on PCB with our recommended PCB contact.
与推荐的线路板贴合后进行测量。

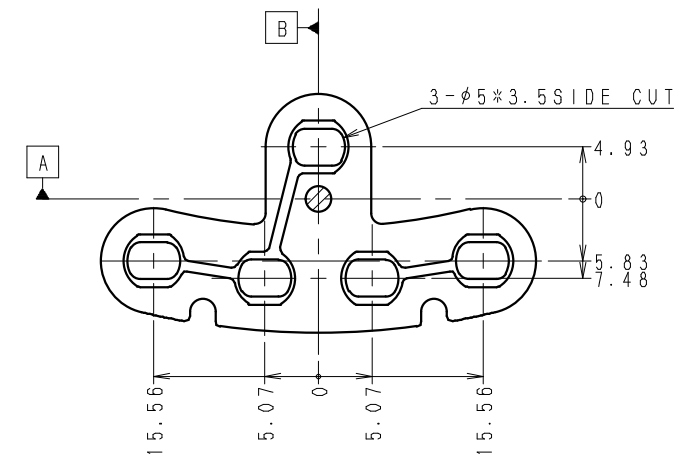
12. Endurance specification 耐久性能

Items 項目	Test conditions 試験条件	Criteria 判定基準
12.1 Operating life 打键寿命	Measurements shall be made following the test set forth below: 按照以下条件进行试验后, 测定 (1) Operating JIG 加压机具: The flat tip Pole shaped $\phi 1.5$ (POM) $\phi 1.5$ で先端が平らな器具 (POM) (2) Rate of operation 打键速度: <u>3</u> operations per sec. 回/秒 (3) Depression 施加压力: <u>3.2</u> N MAX. (4) Cycles of operation 打键次数: <u>1000,000</u> cycles 回 (5) Hardness of Silicone rubber of operating post 打键部橡胶硬度: <u>65</u> ° (shore A)	Item 9.1 Item 9.2 ON bounce ON跳跃 <u>20</u> ms MAX. (For reference) *1 (参考值) Item 10.1 Operating force 作動力 <u>-40</u> ~ <u>+40</u> % of initial force 相对于初期值的变化量 Item 10.2

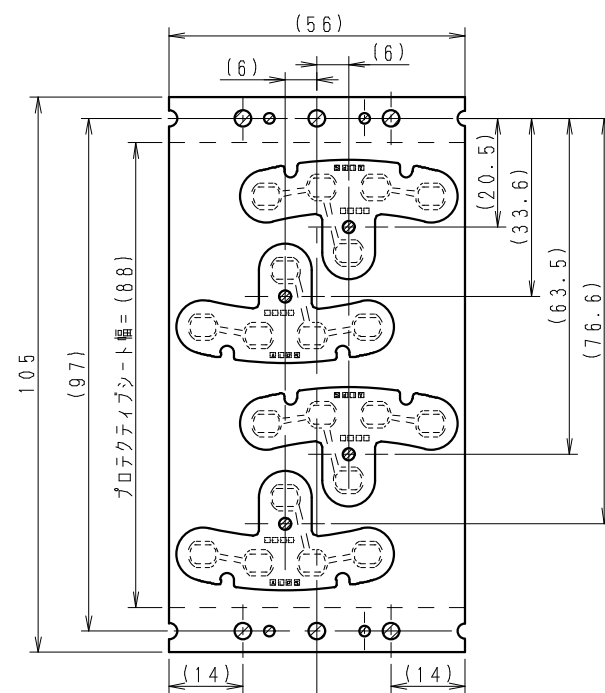
FRONT SIDE VIEW (2:1)



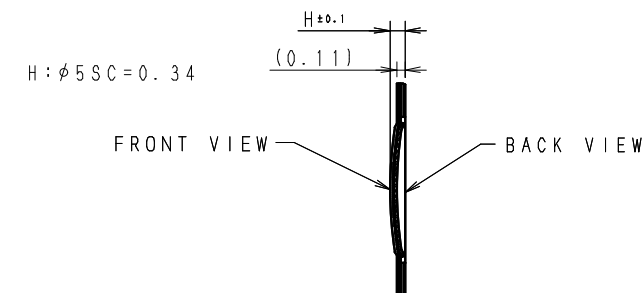
BACK SIDE VIEW (2:1)



LAYOUT (1:1)



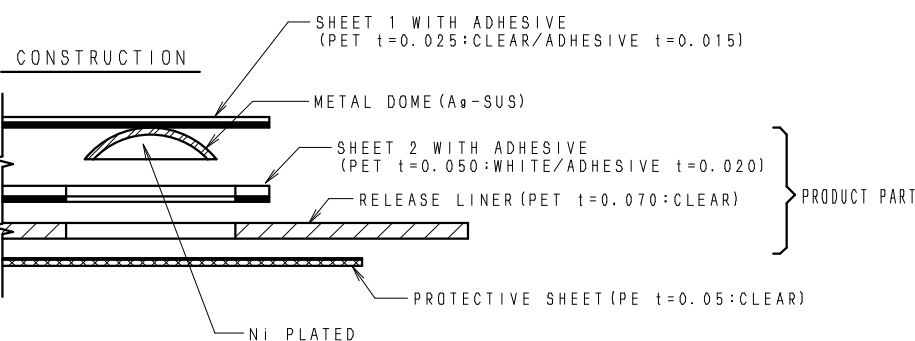
SECTION OF METAL DOME PART



TYPE	OPERATING FORCE	CLICK RATIO	TRAVEL
φ5SC	1.6 ± 0.5N	55 ± 20%	0.21 ± 0.05

NOTE

1. TOLERANCE SHOULD BE ±0.25 UNLESS OTHERWISE SPECIFIED.
2. TOLERANCE OF ANGLE SHOULD BE ±1° UNLESS OTHERWISE SPECIFIED.
3. UNDEFINED DIMENSION: BASED ON CAD DATA.
4. CROSS-HATCHED PART: THROUGH HOLE.
5. ANGLE OF SIDE CUT METAL DOME: ±5°
6. THE DRAWING IS ONLY USED TO LASER SAMPLES MAKE.



PART NO.	MATERIAL	SPEC/NAME	FINISH	REMARK
		ALPS ELECTRIC CO., LTD.		
	DSGD2016.09.29 ALCH-WUR	FANGFANG CAI	SCALE 1:1	NO. SK5AA15340 (1/1)
	CHKD2016.09.29 ALCH-WUR	JIUHUA ZUO	TITLE	PRODUCT DRAWING
	APPD2016.09.29 ALCH-WUR	SHIN YOSHIDA	UNIT mm	DOCUMENT NO. SK5AA15340 .1100 .23
SYMB	DATE	APPD	CHKD	DSGD