

1. General 一般事項

1.1 Scope : This specification covers the requirements for single key switches which have no keytop.
(TACT SWITCHES:MECHANICAL CONTACT).

適用範圍: 本規格書適用於不含鍵帽之單鍵開關(觸壓式開關:機械式接點)

1.2 Operating Temperature Range -20~+70°C (normal humidity *normal press.) 使用溫度範圍: -20~+70°C (常濕常壓條件下)

1.3 Storage Temperature Range -30~+80°C (normal humidity *normal press.) 存放溫度範圍: -30~+80°C (常濕常壓條件下)

1.4 Test conditions : The standard test conditions shall be 5~35°C in temperature , 45~85% RH and 860~1060mbar in atmospheric pressure. Should any doubt arise in judgement, tests shall be conducted at 20±2°C , 65±5% RH. and 860~1060mbar.

試驗狀態: 若無特別規定限制, 則以溫度 5~35°C, 相對濕度 45~85%, 氣壓 860~1060mbar 之標準狀態測之。但對此標準狀態之測定值發生判定疑問或有特別要求則以基準狀態(溫度 20±2°C 相對濕度 65±5% .氣壓 860~1060mbar)為準測定

2. Appearance, construction and dimensions. 外觀.構造.尺寸

2.1 Appearance : There shall be no defects that affect the serviceability of the product. 不得有影響製品機能之缺陷。

2.2 Construction dimensions : Shall conform to the assembly drawings. 構造及尺寸: 必須與組立圖符合。

3. Type of actuation : Tactile feedback

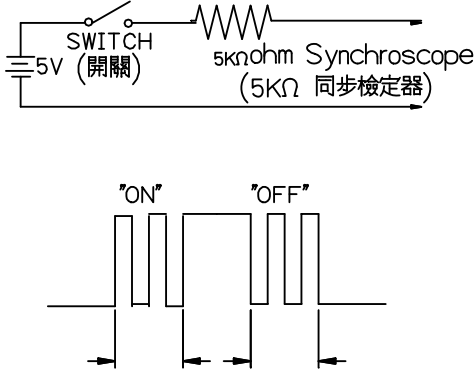
動作型式: 有觸感之反饋

4. Contact arrangement: 1 poles 1 throws (Details of contact arrangement are given in the assembly drawings.)

接點構成: 單極單投式(詳細如組立圖所示)

5. Maximum ratings : 最大額定: DC 12 V 50 mA

6. Electrical performance 電氣性能

	Property 項目	Test conditions 試驗條件	Performance 判定基準		
6.1	Contact resistance 接觸阻抗	Applying a static load twice the actuating force to the center of the stem measurements shall be made with a 1 kHz small-current or DC5V 100mV contact resistance meter. 將兩倍於動作力之靜負荷加於柄之中央以 1 kHz 小電流或 DC5V 100mV 接觸阻抗計測定之。	100 m ohm max. 100 mΩ 以下		
6.2	Insulation resistance 絕緣阻抗	Measurements shall be made following application of DC 100V potential across terminals and across terminals and frame for one minute . 以 DC 100V 之電壓加於端子相互間及端子與外框間 1 分鐘測定之	100 M ohm min. 100 MΩ 以上		
6.3	Dielectric with standing voltage 耐電壓	AC 250V (50~60Hz) shall be applied across terminals and across terminals and frame for one minute. 以 AC 250V (50~60Hz) 之電壓加於端子相互間及端子與外框間 1 分鐘測定之	There shall be no breakdown. 不可有絕緣破壞之現象		
6.4	Bounce 接點之瞬間接觸跳動時間	Lightly striking the center of the stem at a rate encountered in normal use (3 to 4 operations per sec) bounce shall be tested at "ON" and "OFF". 以 3~4 次/秒之正常使用速度輕輕地敲打柄之中央, 開關在 "開" 及 "關" 之位置均需測定之 	10 m sec max. 10 m sec 以下.		
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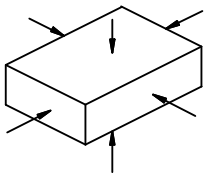
SFKHUM-001		SFKHUM/SFNHUM SWITCHES SPECIFICATIONS SFKHUM/SFNHUM 觸壓式製品規格書			98.09.18	
7.Mechanical performance 機械性能						
	Property 項目	Test conditions 試驗條件			Performance 判定基準	
7.1	Actuating force 動作力	Placing the switch such that the direction of switch operation is vertical and then gradually increasing the load applied to the center of the stem the maximum load required for the switch to come to a make shall be measured. 將開關之操作部置於垂直方向,並在把柄的中央逐漸增加荷重,直到柄不動為止,量取施力期間之最大荷重值。			As showing in assembly drawing. 依組立圖上規定。	
7.2	Travel 移動量	Placing the switch such that the direction of switch operation is vertical and then applying a static load twice the actuating force to the center of the stem the travel distance for the switch to come to a make shall be measured. 將開關之操作部置於垂直方向,並在把柄的中央加兩倍於動作力之靜負荷測量柄被壓到不動時之移動距離。			0.25 ^{+0.2} _{-0.1} mm	
7.3	Return force 復歸力	The sample switch is installed such that the direction of switch operation is vertical and upon depression of the stem in its center the whole travel distance the force of the stem to return to its free position shall be measured. 將開關之操作部置於垂直方向,並在把柄的中央施力,使之移動全行程距離再測量其復歸至原來位置之力量。			As showing in assembly drawing. 依組立圖上規定。	
7.4	Stop strength 止動強度	Placing the switch such that the direction of switch operation is vertical a static load of 3 kgf shall be applied in the direction of stem operation for a period of 3 seconds. 將開關之操作部置於垂直方向,並沿操作方向加 3kgf 之靜負荷 3 秒。			There shall be no sign of damage mechanically and electrically. 不得有電氣及機構上之破壞現象	
7.5	Stem strength 操作部(柄)之強度	Placing the switch such that the direction of switch operation is vertical the maximum force to withstand a pull applied opposite to the direction of stem operation shall be measured. 將開關之操作部置於垂直方向,並在與柄之操作相反方向,施加拉力,測量其最大抗拉力量。			500 gf.	
8.Weather-proof 耐候性能						
	Property 項目	Test conditions 試驗條件			Performance 判定基準	
8.1	Resistance to low temperatures 耐寒性能	Switch for testing being kept in the conditions at -30±2°C in temperature for 96 hours, and in a normal ambient condition for one hour, then to be measured within one hour. Drops of water being taken away. -30±2°C 放置 96 小時試驗後,置於常溫常溼中 1 小時,除去水滴後,在 1 小時內測定之。			Item 6 Item 7.1,7.2 同 6 項 同 7.1, 7.2 項	
8.2	Heat resistance 耐熱性能	Switch for testing being kept in the conditions at 80±2°C in temperature for 96 hours, and in a normal ambient condition for one hour, then to be measured within one hour. 80±2°C 放置 96 小時試驗後,置於常溫常溼中 1 小時,在 1 小時內測定之。			Item 6 Item 7.1,7.2 同 6 項 同 7.1, 7.2 項	
8.3	Moisture resistance 耐溼性能	Switch for testing being kept in the conditions at 60±2°C in temperature and 90~95% RH for 96 hours, and in a normal ambient condition for one hour then to be measured within one hour. 在溫度 60±2°C,相對溼度 90~95% 放置 96 小時試驗後,置於常溫常溼中 1 小時,除去水滴後在 1 小時內測定之。			Contact resistance: 500 m ohm max. Insulation resistance: 10 M ohm min. Item 6.3, 6.4 Item 7.1, 7.2 接觸阻抗在 500 mΩ 以下 絕緣阻抗在 10 MΩ 以上 同 6.3, 6.4 項 同 7.1, 7.2 項	
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Property 項目					Test conditions 試驗條件			Performance 判定基準		
8.4					Temperature cycling 耐溫度循環試驗			After 5 cycles of following conditions, the switch shall be allowed to stand under room temperature and humidity conditions for 1 hour and measurement shall be made within 1 hour after that. Water drops shall be removed. 以下記條件做 5 個週期的試驗後放置 1 小時以內測試之但是水珠必須去除 		
9.Endurance 耐久性能										
Property 項目					Test conditions 試驗條件			Performance 判定基準		
9.1					Operating life 有負載壽命試驗			Measurements shall be made following the test set forth below: (1)DC 5V 5mA resistive load (2)Rate of operation 2 to 3 operations per second (3)Depression : Upper limit of the actuating force (4)Cycles of operation: 10×10^4 cycles (1)DC 5V 5mA (阻抗負載) (2)動作速度:2~3 次/秒 (3)壓下力量:動作力之上限 (4)動作次數: 10×10^4 次		
9.2					Vibration resistance 耐振動性			Measurements shall be made following the set forth below: ㄟ.Range of oscillation : 10 to 55 Hz ㄟ.Amplitude pk-to-pk : 1.5 mm ㄟ.Cycle of sweep : 10-55-10 Hz in one minute approx. ㄟ.Mode of sweep : Logarithmic sweep or uniform sweep. ㄟ.Direction of oscillation : Three mutually perpendicular directions including the direction of stem travel . ㄟ.Duration of testing : 2 hours each for a total of 6 hours ㄟ.振動數範圍: 10~55 Hz ㄟ.全振幅:1.5 mm ㄟ.掃瞄週期:10-55-10 Hz 約 1 分鐘 ㄟ.掃瞄振動之變化方式:近似對數或直線 ㄟ.振幅方向:相互垂直之三個方向(含柄移動之方向) ㄟ.試驗時間:各 2 小時(計 6 小時)		
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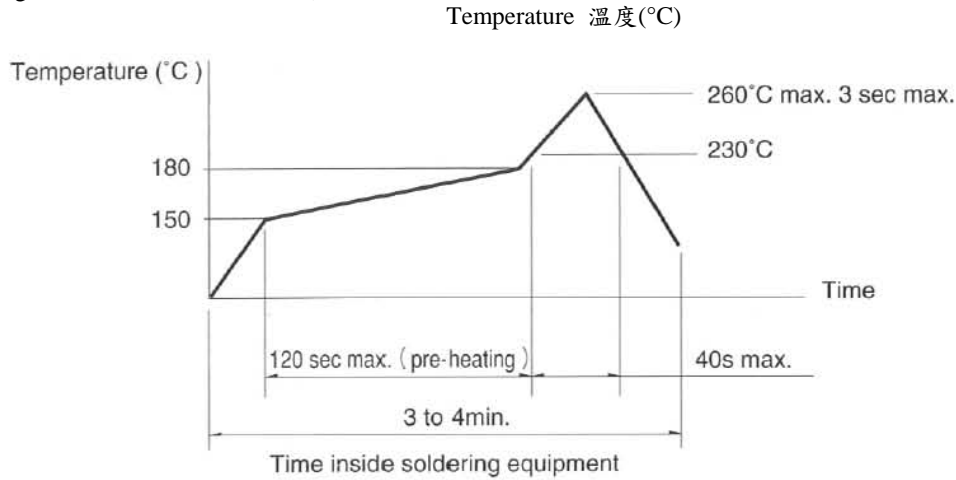
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Property 項目	Test conditions 試驗條件	Performance 判定基準
9.3 Impact shock resistance 耐衝擊性	Measurements shall be made following the test set forth below: (1) Acceleration : 80g (2) Cycle of test : 3 cycles a total of 18 cycle. (1) 用 80g 加速度 (2) 沿圖示 6 個方向, 每方向 3 次共 18 次. <div style="text-align: center;">  </div>	Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項

Switch Handling Precaution 使用上應注意事項

1. Reflow Soldering condition.

Reflow 焊錫條件



Time(時間) ----- Temperature profile (溫度圖)

Caution 注意事項

(1). The condition mentioned above is the temperature on the P.C board surface on which parts are mounted. There are cases where board's temperature greatly differs from switch's surface temperature. depending on the board's material, size, thickness, etc. Care, therefore, should be taken to prevent the switch's surface temperature from exceeding 260°C.
上述條件為 P.C.B 組裝表面溫度, 部份基板因材質, 大小及厚度等引起基板溫度與 SW 表面溫度很大差異, SW 表面溫度勿超過 260°C 請確認

(2). As the conditions vary some how depending on the kind of reflow soldering equipment, please make sure you have the right one before use.
因 REFLOW 爐的種類不同, 條件設定上亦有所差異, 使用前詳加確認。

2. Other precautions 其它注意事項

(1). Following the soldering process do not try to clean the switch with a solvent or the like.
在焊錫過程中, 不可用溶劑或類似品清洗開關。

(2). Safeguard the switch assembly against flux penetration from its top side.
焊錫時請注意防止助焊劑從開關頂部滲入。

(3). Please have the products keep in close status and the storage time is 90 days guaranty agter delivering the goods at most.
為了避免保管場所的環境引起端子變色, 未到使用之前, 請勿拆封. TACT SW 的保存期限出貨後 3 個月內

(4). Please understand that the specifications other then electric and mechanical characteristics and outside dimensions may be changed at our own discretion.

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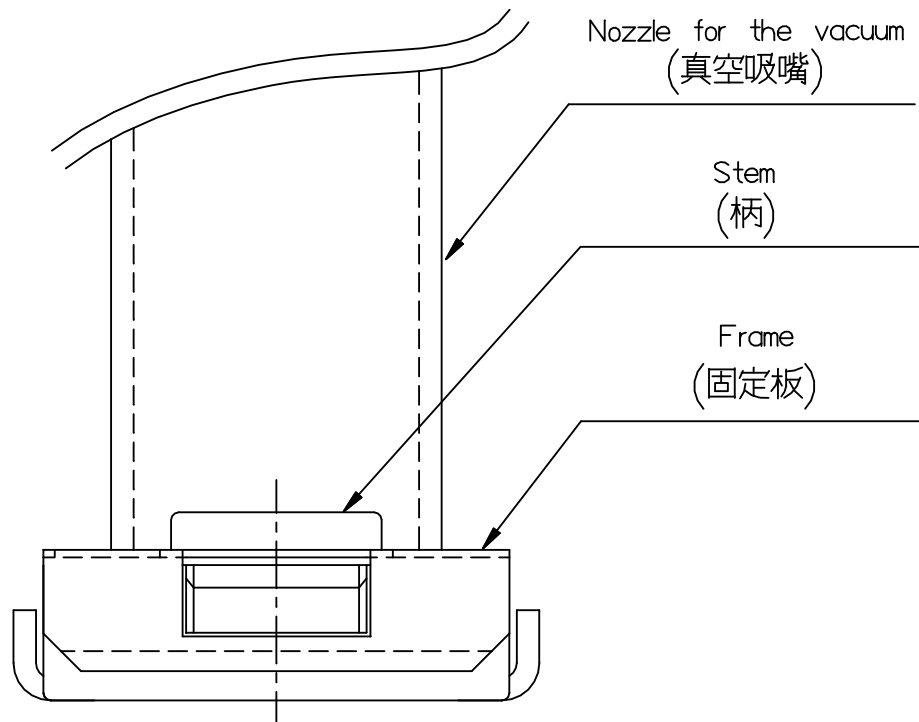
10.其它 Others

ㄟ.When chip components is soldered on the back side of P.C.B by DIP soldering,after switch soldered by reflow soldering,flux will possibly creep up at the exterior wall of the housing and penetrate into the housing due to flux ejection
Therefore, When the P.C.B is designed, please do not locate through holes adjacent to the switch mounted area.
P.C.B 設計時貫穿孔位置請勿鄰近於此開關固定位置，以避免助焊劑噴流滲入開關造成不良。

ㄞ.When this switch is mounted by the chip, it can be dispositioned because the body turns on the way to the P.C.B if you Vacuum the top side of the stem.
Therefore we recommend that the stem should be vacuumed by the called " escape part the frame ".
本開關如以 CHIP MOUNT 機器自動裝著時,如由把柄先端直接吸取至基板裝著過程中,可能由 SW 本體旋轉而發生黏著偏移,建議吸嘴部逃孔大於把柄外徑後真空吸取確保黏著精度。

Example which dose a switch in the vacuum.

真空吸取範例



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1.Scope 適用範圍

This specification covers the requirements of the taping packaging for SFKHMM standard type of TACT switches.
本規範適用於 TACT switches SFKHMM 之承載帶包裝方式。

2.Packaging Materials 包裝材料

Item 項目	Material 材料
Package 包裝箱	Cartons.
Reel 捲盤	Antistatic Polystyrene.
Carrier Tape 承載帶	Conductive Polystyrene.
Cover Tape 封口帶	Polyster heat active.

3.Aging Quantity 包裝數量

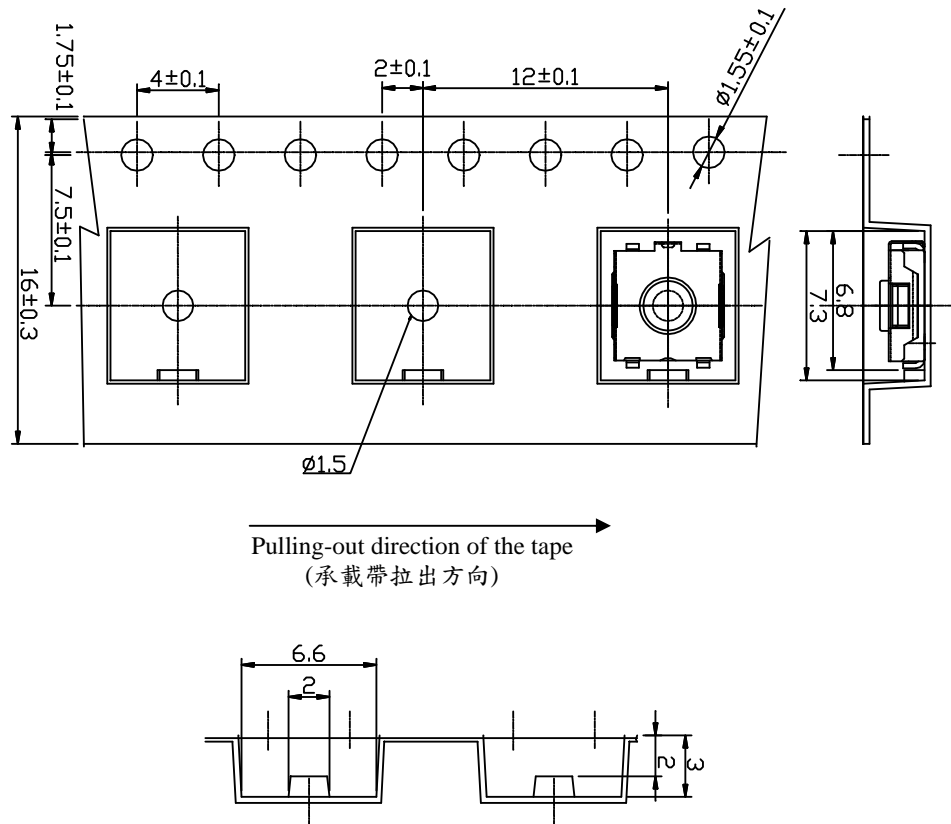
3.1.The number of the reels. 捲盤數量

Fourteen(14)reels at maximum, which contain 21,000 switches, shall be packed in a package.
每個包裝箱可裝 14 捲, 計 21,000 個開關。

3.2.The number of the switches. 開關數量

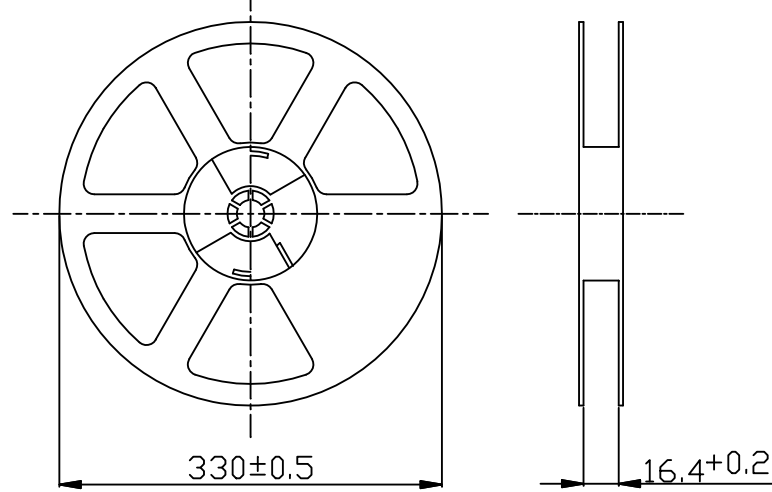
1,500 switches shall be packed in a reel.每捲包裝數量 1,500 個。

4.Carrier Tape Form and Dimensions 承載帶形狀及尺寸



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5.Reel Form and Dimensions 捲盤形狀及尺寸



(mm)

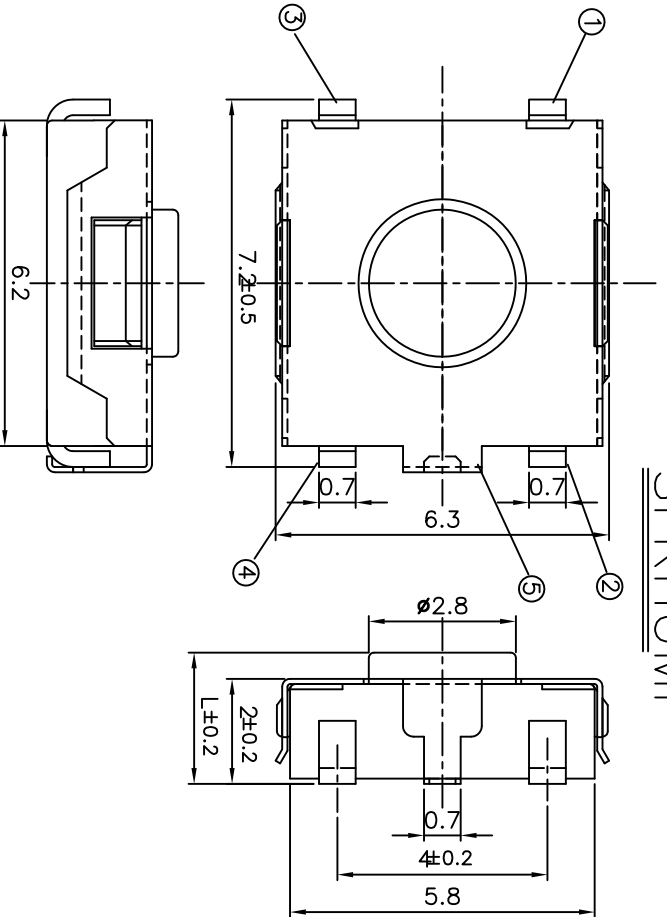
6.Packaging Procedure 包裝方式

- 6.1.At the beginning of reeling, the end of the tape,200mm or more, shall be empty and fit into the groove in the reel core.
料捲起點約 200 mm (或更多) 承載帶須空出並固定於蕊心.
- 6.2.After reeling , the end of the tape 130 ± 4 mm, shall be empty and the tape edge shall be cut in 45° .
料捲終點承載帶須空出約 130 ± 4 mm 尾端並裁成 45° 角.
The cover tape shall be extended 250 ± 10 mm from the tape edge and fixed with tape.
封口帶須從承載帶終點延伸約 250 ± 10 mm 並與承載帶固定.
- 6.3.Total number of missing switches shall be less than 3 in one reel.
每捲漏裝數不可超過 3PCS.

7.Storage Condition 保存狀態

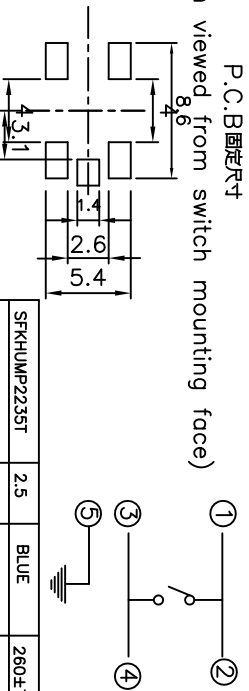
- 7.1.Storage Environment 儲存環境
 -20 to 50°C , 20 to 85%RH.
溫度 $-20 \sim 50^\circ\text{C}$, 溼度 20~85%RH.
(Storage in high temperature and high humidity shall be avoided).
(儲存時避免放置於高濕高溫下).

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Printed circuit board land dimensions 回路圖：(CIRCUIT DIAGRAM)

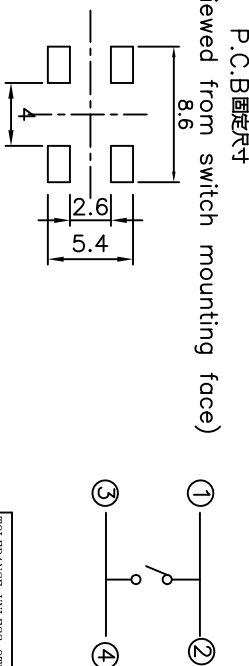
P.C.B面定尺寸
(When viewed from switch mounting face)



SFKHUMP2331T	3.1	BLUE	260±70	50Min
SFKHUMP2321T	3.1	GREEN	160±50	50Min
SFKHUMP2311T	3.1	YELLOW	100±50	10Min
SFKHUMA2331T	3.1	BLUE	260±70	50Min
SFKHUMA2321T	3.1	GREEN	160±50	50Min
SFKHUMA2311T	3.1	YELLOW	100±50	10Min
TYPE OF MODEL	DIM L	STEM COLOR	ACTUATING FORCE (gf)	RETURN FORCE (gf)

Printed circuit board land dimensions 回路圖：(CIRCUIT DIAGRAM)

P.C.B面定尺寸
(When viewed from switch mounting face)



SFKHUMP2235T	2.5	BLUE	260±70	50Min
SFKHUMP2225T	2.5	GREEN	160±50	50Min
SFKHUMP2215T	2.5	YELLOW	100±50	10Min
SFKHUMP22A5T	2.5	BLACK	50±15	5Min
SFKHUMP2230T	2	BLUE	260±70	50Min
SFKHUMP2220T	2	GREEN	160±50	50Min
SFKHUMP2210T	2	YELLOW	100±50	10Min
SFKHUMA2235T	2.5	BLUE	260±70	50Min
SFKHUMA2225T	2.5	GREEN	160±50	50Min
SFKHUMA2215T	2.5	YELLOW	100±50	10Min
SFKHUMA2230T	2	BLUE	260±70	50Min
SFKHUMA2220T	2	GREEN	160±50	50Min
SFKHUMA2210T	2	YELLOW	100±50	10Min
TYPE OF MODEL	DIM L	STEM COLOR	ACTUATING FORCE (gf)	RETURN FORCE (gf)

TOLERANCE UNLESS OTHERWISE SPEC. (未指定容許差尺寸之公差)	
BASIC DIMENSIONS	TOLERANCE
UP TO 10	±0.3
ABOVE 10 TO 100	±0.5
ABOVE 100	±0.8
ANGULAR DIMENSIONS	±3°

零件號碼	名稱	材料	規格	處理	數量
三角法				SFKHUM	組立圖
承認	校對	設計	圖名		
99.01.23	99.01.23	99.01.23	圖號		