

## 1. General 一般事項

1.1 Scope : This specification covers the requirements for single key switches which have no key top.  
(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 judgment, 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)

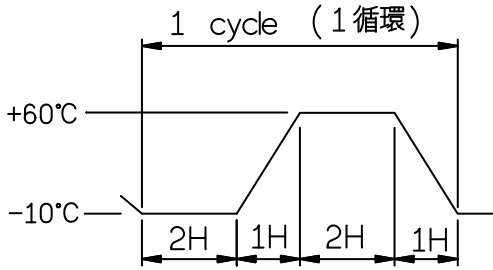
## 5. Maximum ratings : 最大額定: DC 12 V 50 mA

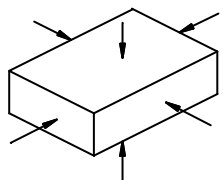
## 6. Electrical performance 電氣性能

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 100mA 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		
		APPD	CHKD	DSGD	TITLE:
		K C Chen Sep,30'2009	Fu Sep,29'2009	Chang Sep,29'2009	DOCUMENT NO. SFKQGMA-001 (1/7)
SYMB	DATE	APPD	CHKD	DSGD	

SFKQGMA-001		SFKQGMA/SFNQGMA SWITCHES SPECIFICATIONS SFKQGMA/SFNQGMA 觸壓式製品規格書			98.09.29	
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 <sup>+0.2</sup> / <sub>-0.1</sub> 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	
			APPD	CHKD	DSGD	TITLE:
			K C Chen Sep,30'2009	Fu Sep,29'2009	Chang Sep,29'2009	DOCUMENT NO. SFKQGMA-001 (2/7)
SYMB	DATE	APPD	CHKD	DSGD		

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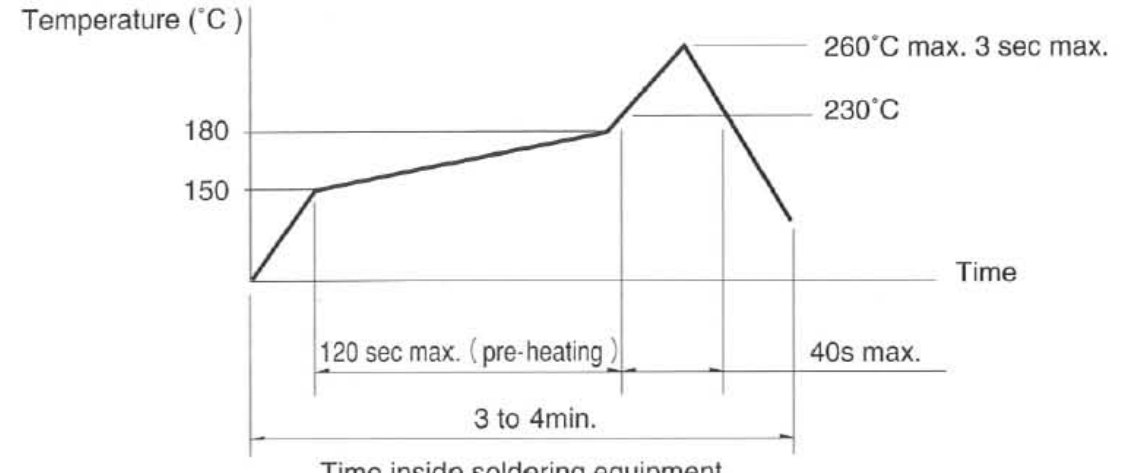
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Property 項目		Test conditions 試驗條件			Performance 判定基準	
8.4	Temperature cycling 耐溫度循環試驗	After 5 cycles of following conditions, the switch shall be allowed to stand under room temperature and humidity conditions for 1 hour and measurement shall be made 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 			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項	
8.5	Soldering 焊錫性能	After sprayed flux. 浸泡助焊劑後. Temperatures of solder : 230±5°C. 焊錫溫度:230±5°C. Duration of dipping : 3±0.5 seconds. 浸入時間: 3±0.5 秒.			More than 75% of the dipped part shall recovered by solder. 浸泡部份須付著 75% 以上	
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 : 1×10 <sup>5</sup> 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: 1×10 <sup>5</sup> cycles			Contact resistance: <u>1000</u> m ohm max. Insulation resistance: <u>10</u> M ohm min. Bounce: <u>20</u> m sec max. Actuating force:±30% of initial force. Item 6.3 Item 7.2 接觸阻抗 <u>1000mΩ</u> 以下 絕緣阻抗 <u>10 MΩ</u> 以上 接點之瞬間跳動時間 <u>20msec</u> 以下 動作力在初期值之±30%以內 同 6.3, 7.2 項	
9.2	Vibration resistance 耐振動性	Measurements shall be made following the set forth below: .Range of oscillation : 10 to 55 Hz .Amplitude pk-to-pk : 1.5 mm .Cycle of sweep : 10-55-10 Hz in one minute approx. .Mode of sweep : Logarithmic sweep or uniform sweep. .Direction of oscillation : Three mutually perpendicular directions including the direction of stem travel . .Duration of testing : 2 hours each for a total of 6 hours .振動數範圍: 10~55 Hz .全振幅:1.5 mm .掃瞄週期:10-55-10 Hz 約 1 分鐘 .掃瞄振動之變化方式:近似對數或直線 .振幅方向:相互垂直之三個方向(含柄移動之方向) .試驗時間:各 2 小時(計 6 小時)			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項	
			APPD	CHKD	DSGD	TITLE:
			K C Chen Sep,30'2009	Fu Sep,29'2009	Chang Sep,29'2009	DOCUMENT NO. SFKQGMA-001 (3/7)
SYMB	DATE	APPD	CHKD	DSGD		

	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; margin-top: 10px;">  </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

Temperature 溫度(°C)



Temperature (°C)

Time

Time inside soldering equipment

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 265°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 265°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 gaps.  
焊錫時請注意防止助焊劑從開關零件間隙滲入.
  - (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.

					APPD	CHKD	DSGD	TITLE:
					K C Chen	Fu	Chang	
					Sep,30'2009	Sep,29'2009	Sep,29'2009	DOCUMENT NO.
SYMB	DATE	APPD	CHKD	DSGD				SFKQGMA-001 (4/7)

SFKQGMA-001		SFKQGMA/SFNQGMA SWITCHES SPECIFICATIONS SFKQGMA/SFNQGMA 觸壓式製品規格書			98.09.29			
◇◇◇◇Switch Handling Precaution ◇◇◇◇使用上應注意事項 1. In case an automatic flow soldering apparatus is used for soldering adhere to the following conditions: 若以自動焊錫機實施焊錫時,必須附帶下列條件:								
Item 項目		Soldering condition 焊錫條件						
(1)Preheat temperature 預熱溫度		100°C max. (Ambient temperature of printed circuit board on its soldering on its soldering side) 100°C 以下(P.C.B 焊錫面周圍之溫度).						
(2)Preheat time 預熱時間		45 sec max. 45 秒以下.						
(3)Flux foaming 助焊劑泡沫		To such an extent that flux will be kept flush with the printed circuit board s top surface on which components are mounted. Preparatory flux must not be applied to that side of printed circuit board on which components are mounted and to the area where terminals are located. 焊錫時助焊劑應防止上升至 PCB 之零件面,且不可塗預備助焊劑於 PCB 零件面及端子部 必要時可於過錫爐前,先塗一層助焊劑滲透防止劑於 PCB 零件面端子部						
(4)Soldering temperature 焊錫溫度		255°C max. 255°C 以下						
(5)Duration of solder immersion 焊錫浸漬時間		5 sec max. 5 秒以下						
(6)Allowable frequency of soldering process 容許焊錫次數		2 times max. 2 次以下(恢復常溫時,才可進行第二次焊錫)						
2. In case an manual soldering apparatus is used for soldering adhere to the following conditions: 若以手動焊錫機實施焊錫時,必須附帶下列條件:								
Item 項目		Soldering condition 焊錫條件						
(1)Soldering temperature 焊錫溫度		350°C max. 350°C 以下						
(2)Continuous soldering time 連續焊錫時間		3 sec max. 3 秒以下						
3. 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 use flux of specific gravity 0.81MIN.(Temperature conditions:20°C). 請使用比重 0.81 以上 FLUX(溫度條件 20°C).								
					APPD	CHKD	DSGD	TITLE:
					K C Chen Sep,30'2009	Fu Sep,29'2009	Chang Sep,29'2009	DOCUMENT NO. SFKQGMA-001 (5/7)
SYMB	DATE	APPD	CHKD	DSGO				

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1.Scope 適用範圍

This specification covers the requirements of the taping packaging for SFKHM standard type of TACT switches.  
本規範適用於 TACT switches SFKHM 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.Packaging Quantity 包裝數量

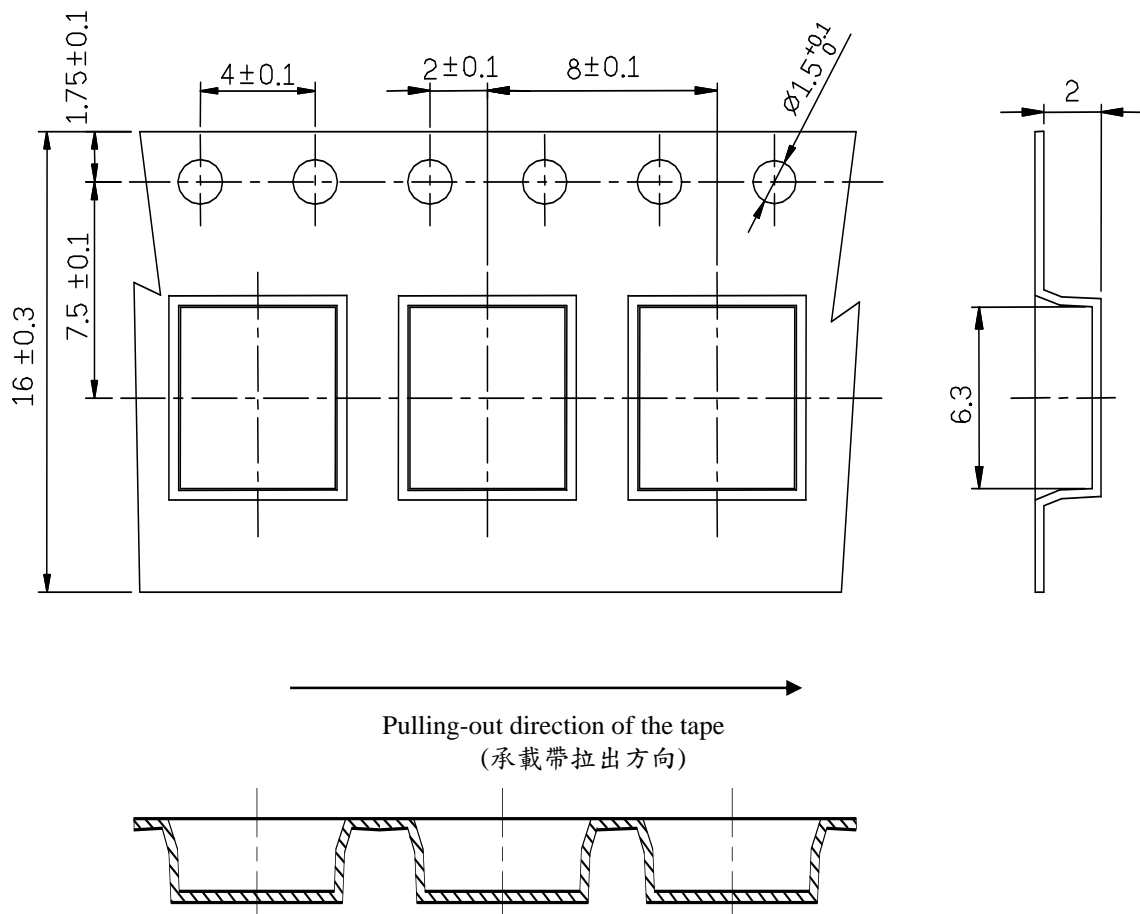
3.1.The number of the reels. 捲盤數量

Fifteen(14)reels at maximum, which contain 56,000 switches, shall be packed in a package.  
每個包裝箱可裝 14 捲, 計 56,000 個開關。

3.2.The number of the switches. 開關數量

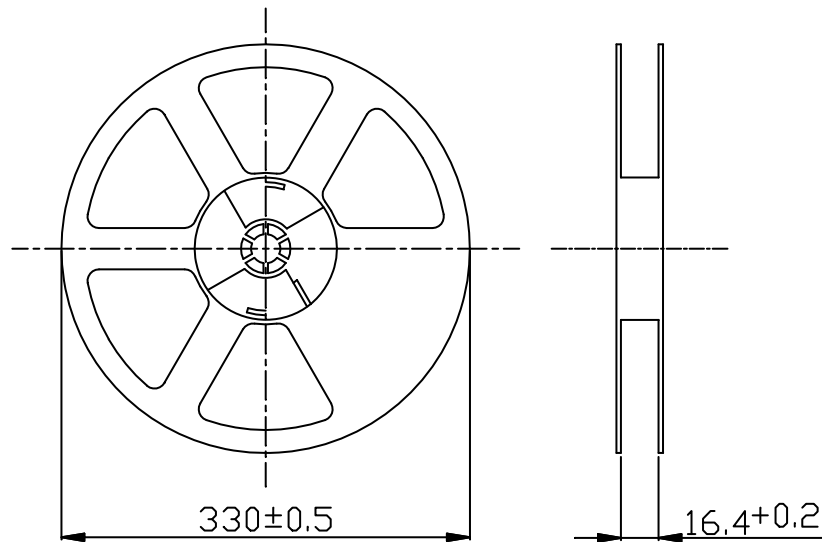
4,000 switches shall be packed in a reel.每捲包裝數量 4,000 個。

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



				APPD	CHKD	DSGD	TITLE:
				K C Chen	Fu	Chang	DOCUMENT NO.
				Sep,30'2009	Sep,29'2009	Sep,29'2009	SFKQGMA-001 (6/7)
SYMB	DATE	APPD	CHKD				

## 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,160mm or more, shall be empty and fit into the groove in the reel core.  
料捲起點約 160 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 180mm, shall be empty and the tape edge shall be cut in 45°.  
料捲終點承載帶須空出約 180mm 尾端並裁成 45°角。

The cover tape shall be extended  $180 \pm 10$  mm from the tape edge and fixed with tape.  
封口帶須從承載帶終點延伸約  $180 \pm 10$  mm 並與承載帶固定。

6.3.Total number of missing switches shall be less than 2 in one reel.  
每捲漏裝數不可超過 2PCS.

## 7.Storage Condition 保存狀態

## 7.1.Storage Environment 儲存環境

-20 to 50°C, 20 to 85%RH.

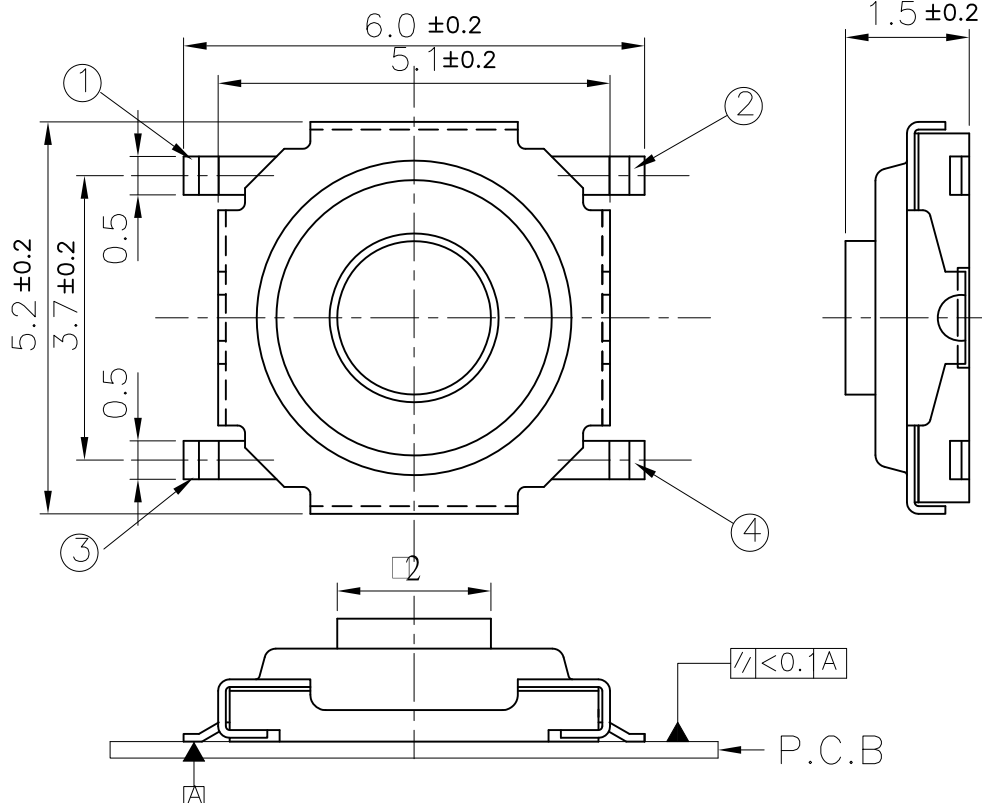
溫度-20~50°C, 溼度 20~85%RH.

(Storage in high temperature and high humidity shall be avoided).

(儲存時避免放置於高濕高溫下).

					APPD	CHKD	DSGD	TITLE:
					K C Chen	Fu	Chang	DOCUMENT NO.
					Sep,30'2009	Sep,29'2009	Sep,29'2009	SFKQGMA-001 (7/7)
SYMB	DATE	APPD	CHKD					

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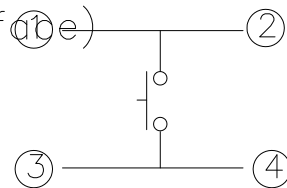
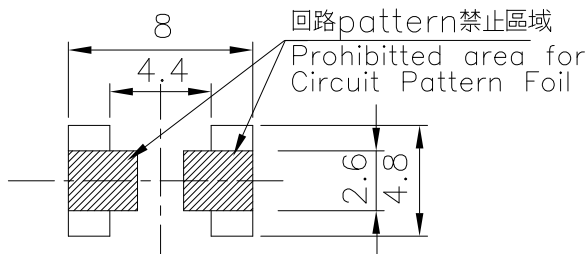


Printed circuit board land dimensions

P.C.B固定尺寸

回路圖：(CIRCUIT DIAGRAM)

(When viewed from switch mounting face)



SFKQGMA2135	1.5	260±70	50Min	COPPER
SFKQGMA2125	1.5	160±50	50Min	SILVER
SFKQGMA2115	1.5	100±50	10Min	BLACK
TYPE OF MODEL	DIM L	ACTUATING FORCE (gf)	RETURN FORCE (gf)	STEM COLOR

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°

註記: 1. 如上表為單體零件型名, 若以承載帶包裝則型名追加 "T",

例如 SFKQGMA2135 → SFKQGMA2135T.

2. 零件組裝在P.C.B之共面性(平行度)之公差需小於0.1mm.

零件號碼		名稱		材料		規格		處理		顏色	
○				三角法	單位 mm	比例 10/1	SFKQGMA				
○				承認	校對	設計	圖名				
○				KE 設計課 98.08.10 張乃文	KE 設計課 98.08.10 張乃文	KE 設計課 98.08.10 傅義文	圖號				
記號	年.月.日	承認	校對	設計							