

Customer; G \_\_\_\_\_

No : \_\_\_\_\_

Attention; G \_\_\_\_\_

Date : \_\_\_\_\_

Your ref No; G \_\_\_\_\_

Your Part No; G \_\_\_\_\_

## SPECIFICATION

MODEL; GACTING SWITCH Q TYPE \_\_\_\_\_

Spec No; G \_\_\_\_\_

Sample No.; G \_\_\_\_\_

RECEIPT STATUS

RECEIVED

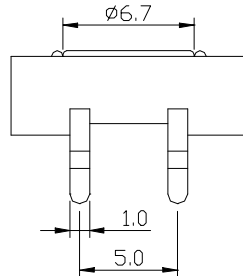
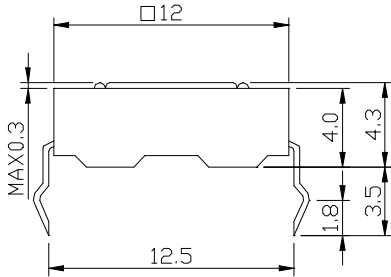
By Date \_\_\_\_\_

Signature \_\_\_\_\_

Name

Title

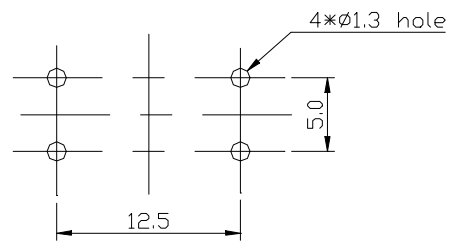
# TACTING SWITCH SPECIFICATION



- 1.CONTACT: Mechanical contact
- 2.RATING: DC 12V 50mA
- 3.TRAVEL: 0.3;  $\varnothing$ .15mm
- 4.OPERATING FORCE: 160;  $\varnothing$ 90gf
- 5.CONTACT RESISTANCE: 100m $\Omega$  max
- 6.LIFE: 100,000 cycles min

Printed circuit board mounting hole dimensions  
(When viewed from switch mounting face)

The length	Tolerance range
L≤10	±0.3
10<L≤100	±0.5
100<L	±0.6

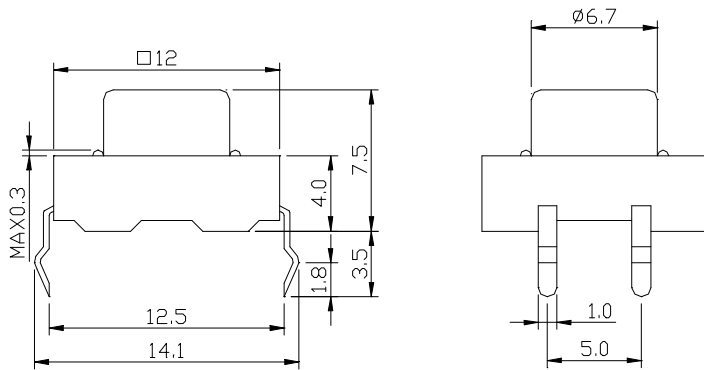


It is suggested to use a P.C. board of 1.6 mm thick

MODEL	DIM-A	STEM COLOR	ACTUATING FORCE(gf)	RETURN FORCE(gf)	STEM
TSQA-1	4.3	BLACK	100 <sub>i</sub> $\varnothing$	10 Min	
TSQA-2	4.3	GRAY	160 <sub>i</sub> $\varnothing$	50 Min	
TSQA-3	4.3	RED	260 <sub>i</sub> $\varnothing$	50 Min	

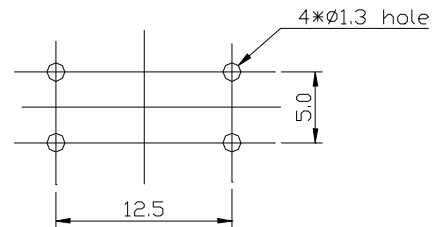
					APPD	CHKD	DSGD	PART NO: TSQA; $\varnothing$ _____	
					David	Liao	Tsai		
					Lee	Kau	Chia		
ZONE	SYMB	DATE	APPD	CHKD	DSGD	Tao	Hui	DOCUMENT NO: SPECTSQ.DOC	1/8

# TACTING SWITCH SPECIFICATION



- 1.CONTACT:Mechanical contact
- 2.RATING:DC 12V 50mA
- 3.TRAVEL:0.3;  $\phi$ 0.15mm
- 4.OPERATING FORCE:160;  $\phi$ 30gf
- 5.CONTACT RESISTANCE:100m $\Omega$  max
- 6.LIFE:100,000 cycles min

Printed circuit board mounting hole dimensions  
(When viewed from switch mounting face)

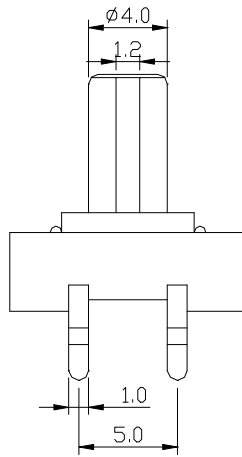
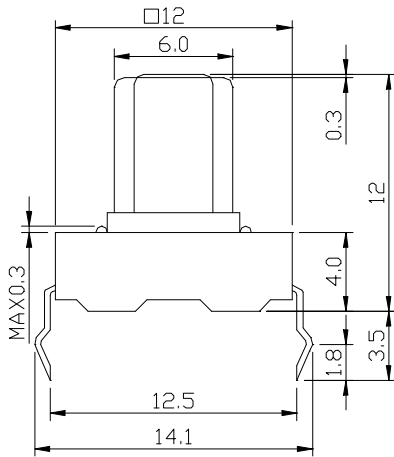


It is suggested to use a P.C. board of 1.6 mm thick

The length	Tolerance range
$L \leq 10$	$\pm 0.3$
$10 < L \leq 100$	$\pm 0.5$
$100 < L$	$\pm 0.6$

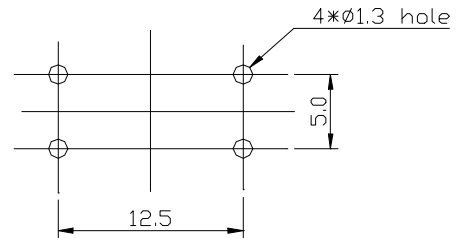
MODEL	DIM-A	STEM COLOR	ACTUATING FORCE(gf)	RETURN FORCE(gf)	STEM		
TSQB-1	7.5	BLACK	100; $\phi$ 30	10 Min			
TSQB-2	7.5	GRAY	160; $\phi$ 30	50 Min			
TSQB-3	7.5	RED	260; $\phi$ 30	50 Min			
			APPD David Lee	CHKD Liao Kau Tao	DSGD Tsai Chia Hui	PART NO: TSQB; $\phi$ _____	
ZONE	SYMB	DATE	APPD	CHKD	DSGD	DOCUMENT NO:SPECTSQ.DOC	1/8

# TACTING SWITCH SPECIFICATION



- 1.CONTACT:Mechanical contact
- 2.RATING:DC 12V 50mA
- 3.TRAVEL:0.3±0.15mm
- 4.OPERATING FORCE:160±30gf
- 5.CONTACT RESISTANCE:100mΩmax
- 6.LIFE:100,000 cycles min

Printed circuit board mounting hole dimensions  
(When viewed from switch mounting face)



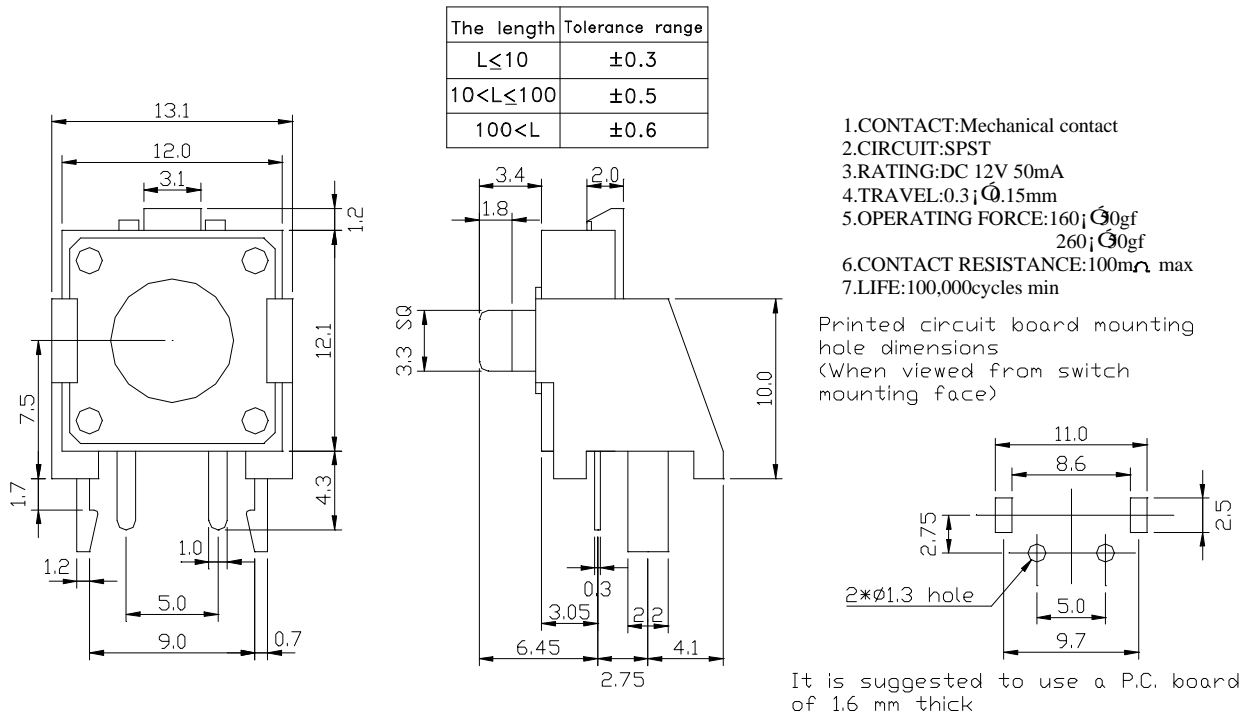
It is suggested to use a P.C. board of 1.6 mm thick

The length	Tolerance range
L≤10	±0.3
10<L≤100	±0.5
100<L	±0.6

MODEL	DIM-A	STEM COLOR	ACTUATING FORCE(gf)	RETURN FORCE(gf)	STEM
TSQC-1	12	BLACK	100 <sub>i</sub> $\phi$	10 Min	
TSQC-2	12	GRAY	160 <sub>i</sub> $\phi$	50 Min	
TSQC-3	12	RED	260 <sub>i</sub> $\phi$	50 Min	

						APPD	CHKD	DSGD	PART NO: TSQC <sub>i</sub> $\phi$ _____	
						David Lee	Liao Kau Tao	Tsai Chia Hui		
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# TACTING SWITCH SPECIFICATION

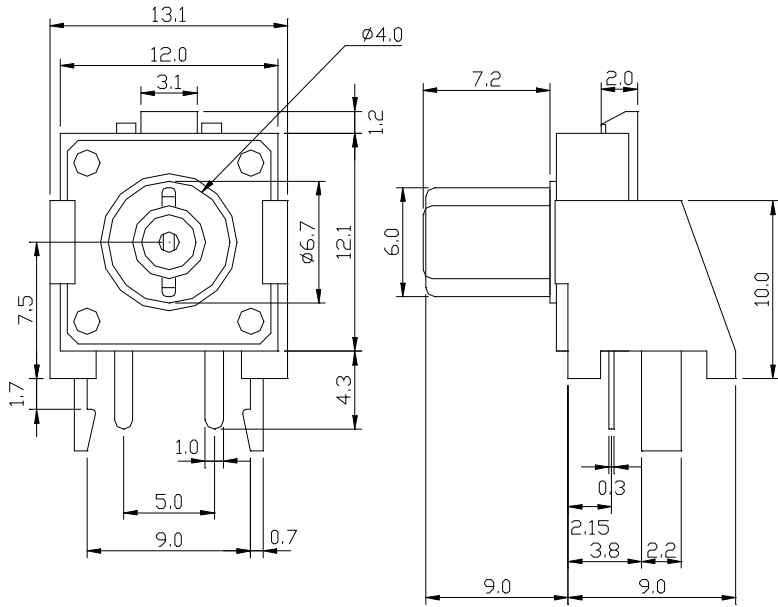


MODEL	DIM-A	STEM COLOR	ACTUATING FORCE(gf)	RETURN FORCE(gf)	STEM
TSQE-1	6.45	BLACK	100 <sub>i</sub> 30	10 Min	
TSQE-2	6.45	GRAY	160 <sub>i</sub> 30	50 Min	
TSQE-3	6.45	RED	260 <sub>i</sub> 30	50 Min	

						APPD David Lee	CHKD Liao Kau Tao	DSGD Tsai Chia Hui	PART NO: TSQE <sub>i</sub> <u>  </u>
ZONE	SYMB	DATE	APPD	CHKD	DSGD				DOCUMENT NO:SPECTSQ.DOC 1/8

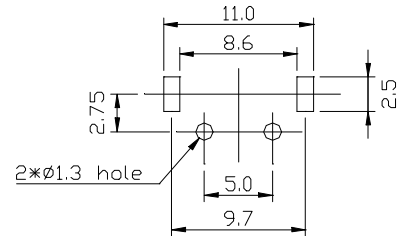
# TACTING SWITCH SPECIFICATION

The length	Tolerance range
L≤10	±0.3
10<L≤100	±0.5
100<L	±0.6



- 1.CONTACT:Mechanical contact
- 2.RATING:DC 12V 50mA
- 3.TRAVEL:0.3<sub>i</sub> 0.15mm
- 4.OPERATING FORCE:160<sub>i</sub> 30gf
- 5.CONTACT RESISTANCE:100mΩ max
- 6.LIFE:100,000cycles min

Printed circuit board mounting hole dimensions  
(When viewed from switch mounting face)

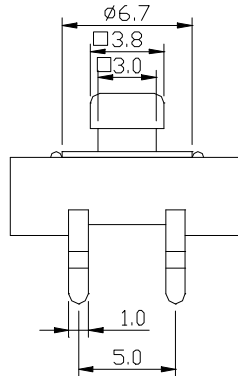
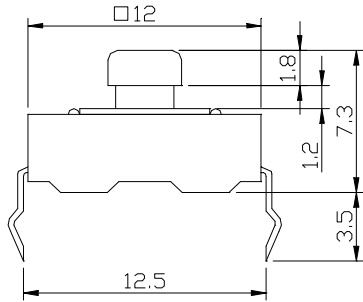


It is suggested to use a P.C. board of 1.6 mm thick

MODEL	DIM-A	STEM COLOR	ACTUATING FORCE(gf)	RETURN FORCE(gf)	STEM
TSQF-1	11.2	BLACK	100 <sub>i</sub> 30	10 Min	
TSQF-2	11.2	GRAY	160 <sub>i</sub> 30	50 Min	
TSQF-3	11.2	RED	260 <sub>i</sub> 30	50 Min	

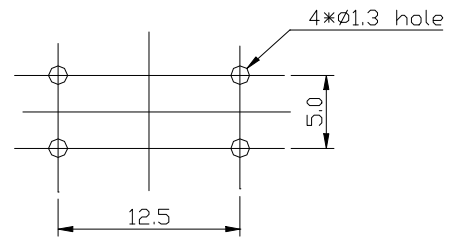
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						David Lee	Liao Kau Tao	Tsai Chia Hui	
ZONE	SYMB	DATE	APPD	CHKD	DSGD				DOCUMENT NO:SPECTSQ.DOC 1/8

# TACTING SWITCH SPECIFICATION



- 1.CONTACT:Mechanical contact
- 2.RATING:DC 12V 50mA
- 3.TRAVEL:0.3±0.15mm
- 4.OPERATING FORCE:160±30gf
- 5.CONTACT RESISTANCE:100mΩmax
- 6.LIFE:100,000 cycles min

Printed circuit board mounting hole dimensions  
(When viewed from switch mounting face)



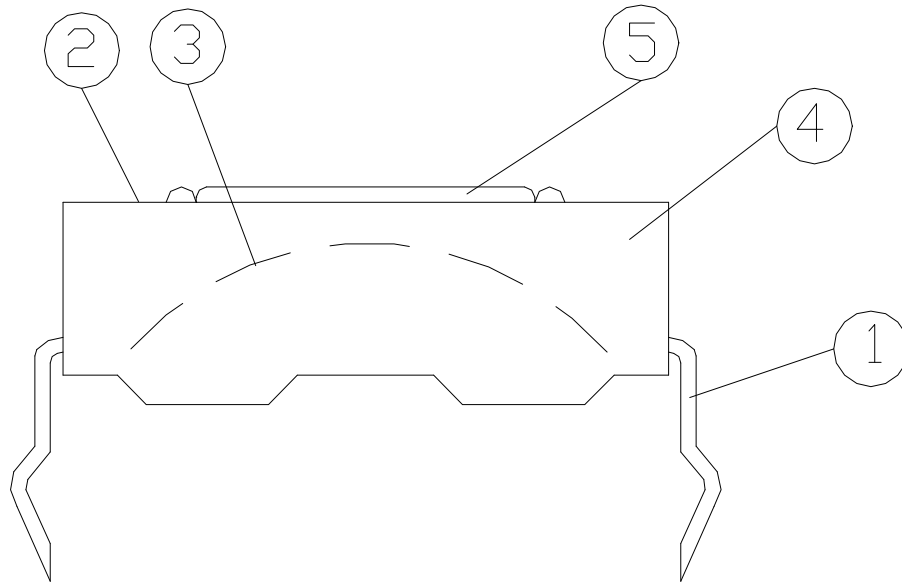
It is suggested to use a P.C. board of 1.6 mm thick

The length	Tolerance range
L≤10	±0.3
10<L≤100	±0.5
100<L	±0.6

MODEL	DIM-A	STEM COLOR	ACTUATING FORCE(gf)	RETURN FORCE(gf)	STEM
TSQG-1	7.3	BLACK	100 <sub>i</sub> $\bar{\Phi}$	10 Min	
TSQG-2	7.3	GRAY	160 <sub>i</sub> $\bar{\Phi}$	50 Min	
TSQG-3	7.3	RED	260 <sub>i</sub> $\bar{\Phi}$	50 Min	

						APPD David Lee	CHKD Liao Kau Tao	DSGD Tsai Chia Hui	PART NO: TSQG <sub>i</sub> $\bar{\Phi}$ _____
ZONE	SYMB	DATE	APPD	CHKD	DSGD				DOCUMENT NO:SPECTSQ.DOC 1/8

# TACTING SWITCH SPECIFICATION



ITEM	COMPONENTS	MATERIAL ARTICLE	SPECIFICATION	VENDOR
1	TERMINAL	BRASS STRIP SILVER CLOTHED	JIS C2680R-H Ag 1% g & Ag 0.5% g	FUJISAWA JAPAN
2	FRAME	STAINLESS STEEL OR TIN SHEET	JIS G3303 SPTE	N. K. K. TAIWAN AGENT
3	CONTACT	SILVER PHOSPHOR BRONZE STRIP	JIS C5210R-EH Ag 0.5% g	FUJISAWA JAPAN
4	HOUSING	P.B.T VALOX	G.F 15% E45587	G. E. AGENT
5	STEM	P.P.O NORYL	E45587	G. E. AGENT

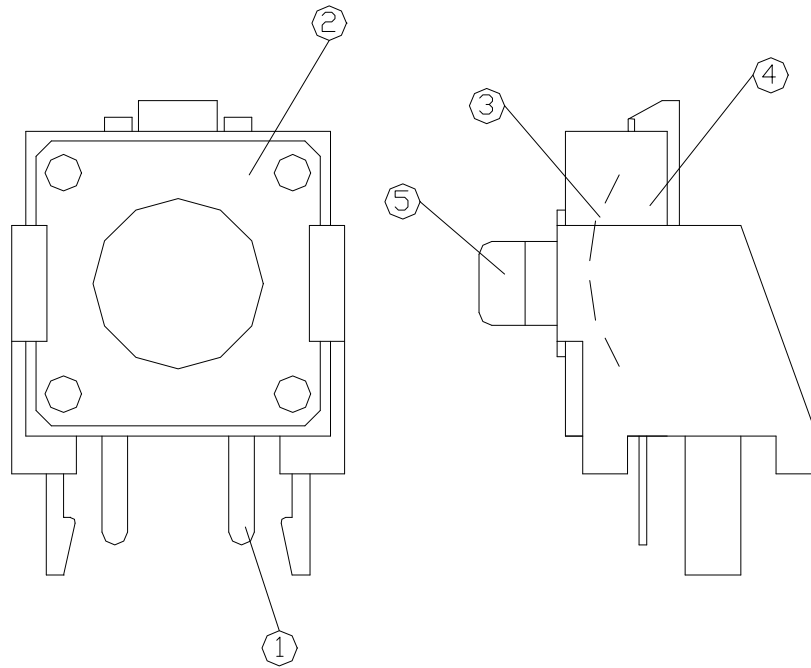
						APPD David Lee	CHKD Liao Kau Tao	DSGD Tsai Chia Hui	PART NO: TSQA; D _____	
ZONE	SYMB	DATE	APPD	CHKD	DSGD				DOCUMENT NO: SPECTSQ.DOC	2/8







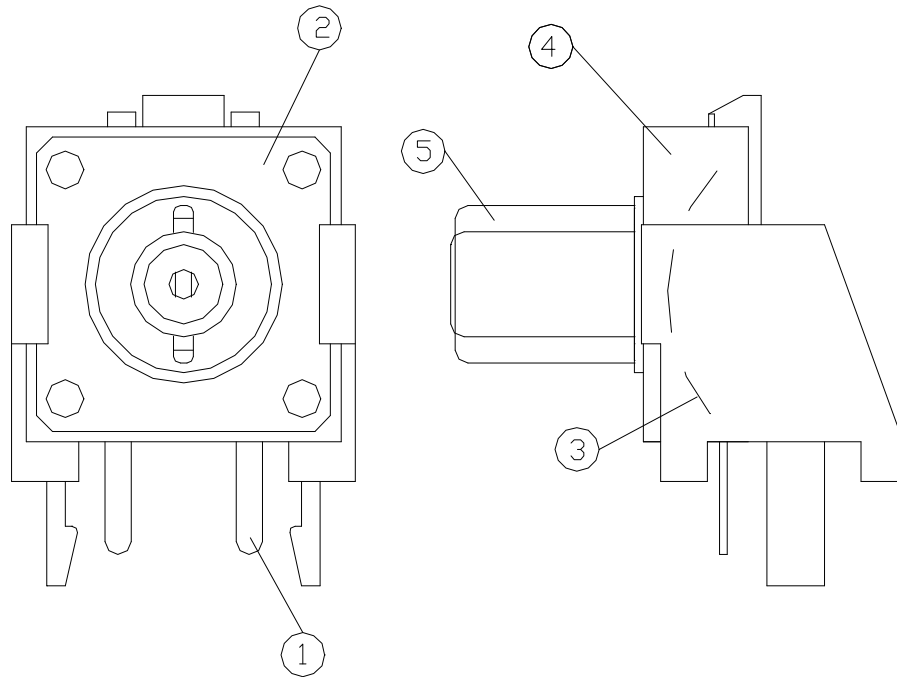
# TACTING SWITCH SPECIFICATION



ITEM	COMPONENTS	MATERIAL ARTICLE	SPECIFICATION	VENDOR
1	TERMINAL	BRASS STRIP SILVER CLOTHED	JIS C2680R-H Ag 1% g & Ag 0.5% g	FUJISAWA JAPAN
2	FRAME	STAINLESS STEEL OR TIN SHEET	JIS G3303 SPTE	N. K. K. TAIWAN AGENT
3	CONTACT	SILVER PHOSPHOR BRONZE STRIP	JIS C5210R-EH Ag 0.5% g	FUJISAWA JAPAN
4	HOUSING	P.B.T VALOX	G.F 15% E45587	G. E. AGENT
5	STEM	P.P.O NORYL	E45587	G. E. AGENT

						APPD David Lee	CHKD Liao Kau Tao	DSGD Tsai Chia Hui	PART NO: TSQE <sub>i</sub> D_____
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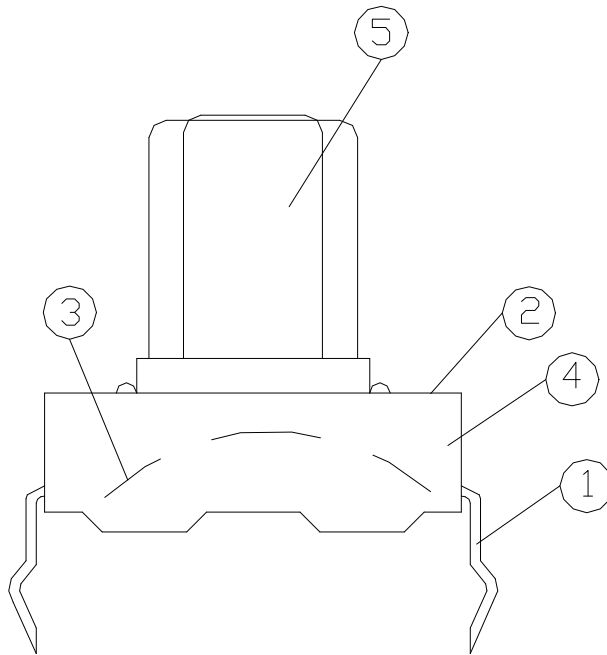
# TACTING SWITCH SPECIFICATION



ITEM	COMPONENTS	MATERIAL ARTICLE	SPECIFICATION	VENDOR
1	TERMINAL	BRASS STRIP SILVER CLOTHED	JIS C2680R-H Ag 1£ g & Ag 0.5£ g	FUJISAWA JAPAN
2	FRAME	STAINLESS STEEL OR TIN SHEET	JIS G3303 SPTE	N. K. K. TAIWAN AGENT
3	CONTACT	SILVER PHOSPHOR BRONZE STRIP	JIS C5210R-EH Ag 0.5£ g	FUJISAWA JAPAN
4	HOUSING	P.B.T VALOX	G.F 15% E45587	G. E. AGENT
5	STEM	P.P.O NORYL	E45587	G. E. AGENT

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ZONE	SYMB	DATE	APPD	CHKD	DSGD				DOCUMENT NO: SPECTSQ.DOC

# TACTING SWITCH SPECIFICATION



ITEM	COMPONENTS	MATERIAL ARTICLE	SPECIFICATION	VENDOR
1	TERMINAL	BRASS STRIP SILVER CLOTHED	JIS C2680R-H Ag 1% & Ag 0.5% g	FUJISAWA JAPAN
2	FRAME	STAINLESS STEEL OR TIN SHEET	JIS G3303 SPTE	N. K. K. TAIWAN AGENT
3	CONTACT	SILVER PHOSPHOR BRONZE STRIP	JIS C5210R-EH Ag 0.5% g	FUJISAWA JAPAN
4	HOUSING	P.B.T VALOX	G.F 15% E45587	G. E. AGENT
5	STEM	P.P.O NORYL	E45587	G. E. AGENT

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# TACTING SWITCH SPECIFICATION

## 1. GENERAL

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

**1.2 Operating Temperature Range**  
-20 to 70°C (normal humidity, normal press.)

**1.3 Storage Temperature Range**  
-30 to 80°C (normal humidity, normal press.)

### 1.4 Test Conditions

Tests and measurements shall be made in the following standard conditions unless otherwise specified:

Normal temperature (temperature 5 to 35°C)

Normal humidity (relative humidity 45 to 85%)

Normal pressure (pressure 860 to 1060 m bars)

In case any question arises from the judgement made, tests shall be conducted in the following conditions:

Temperature (20±2°C)

Relative humidity (65±5%)

Pressure (860 to 1060 m bars)

## 2. APPEARANCE, STYLE, AND DIMENSIONS

### 2.1 Appearance

There shall be no defects that affect the serviceability of the product.

### 2.2 Style and Dimensions

Shall conform to the assembly drawings.

## 3. TYPE OF ACTUATION

Tactile feedback

**4. CONTACT ARRANGEMENT** 1 poles 1 throws

(Details of contact arrangement are given in the assembly drawings.)

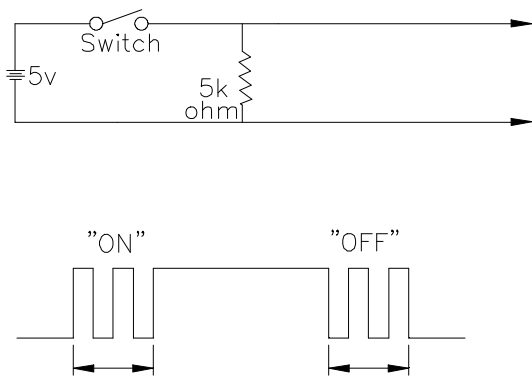
**5. MAXIMUM RATINGS** DC 12 V 50 mA

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# TACTING SWITCH SPECIFICATION

## 6. PERFORMANCE

### 6.1 Electrical

Item	Test Conditions	Requirements
6.1.1. Contact Resistance	Applying a static load twice the actuating force to the center of the stem, measurements shall be made with a 1 kHz small-current contact resistance meter.	<u>100</u> m ohm max.
6.1.2. Insulation Resistance	Measurements shall be made following application of DC <u>250</u> V potential across terminals and across terminals and frame for one minute.	<u>100</u> M ohm min.
6.1.3. Dielectric with-standing voltage	AC <u>500</u> V (50Hz or 60Hz) shall be applied across terminals and across terminals and frame for one minute.	There shall be no breakdown.
6.1.4. Bounce	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".  <div style="text-align: center;">  </div>	<u>5</u> m sec max.

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# TACTING SWITCH SPECIFICATION

## 6.2 Mechanical

Item	Test Conditions	Requirements
6.2.1. Actuating Force	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 stem to come to a stop shall be measured.	_____ ± _____ g f
6.2.2. Travel	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 stem to come to a stop shall be measured.	<u>0.3</u> ± <u>0.15</u> m m
6.2.3. Return Force	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.	_____ g f min.
6.2.4. Stop Strength	Placing the switch such that the direction of switch operation is vertical, a static load of <u>3</u> kgf shall be applied in the direction of stem operation for a period of <u>60</u> seconds.	There shall be no sign of damage mechanically and electrically.
6.2.5 Stem Strength	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.	<u>3</u> k g f

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# TACTING SWITCH SPECIFICATION

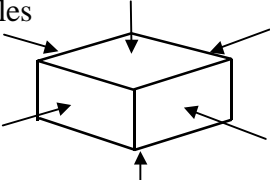
## 6.3 Environmental

Item	Test Conditions	Requirements
<b>6.3.1.</b> Resistance to Low Temperatures	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made: (1)Temperature: $-30\pm 2^{\circ}\text{C}$ (2) Time: 96 hours (3)Water drops shall be removed.	Item 6.1 Item 6.2.1 Item 6.2.2
<b>6.3.2.</b> Heat Resistance	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made: (1)Temperature: $80\pm 2^{\circ}\text{C}$ (2) Time: 96 hours	Item 6.1 Item 6.2.1 Item 6.2.2
<b>6.3.3.</b> Moisture Resistance	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made: (1) Temperature: $60\pm 2^{\circ}\text{C}$ (2)Relative humidity: 90 to 95% (3) Time: 96 hours (4)Water drops shall be removed.	Contact resistance: <u>200</u> m ohm max. Insulation resistance: <u>10</u> M ohm min. Item 6.1.3 Item 6.1.4 Item 6.2.1 Item 6.2.2
<b>6.3.4.</b> Temperature Cycling	Following five cycles of the temperature cycling test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made. During this test, water drops shall be removed. <p style="text-align: center;">1 cycle</p>	Item 6.1 Item 6.2.1 Item 6.2.2

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# TACTING SWITCH SPECIFICATION

## 6.4 Endurance

Item	Test Conditions	Requirements
<b>6.4.1.</b> Operating Life	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: _____ g f (4)Cycles of operation: $10 \times 10^4$ cycles	Contact resistance: <u>200</u> m ohm max. Insulation resistance: <u>10</u> M ohm min. Bounce: <u>10</u> m sec max. Actuating force: i <u>30</u> % or i <u>30</u> % of initial force Item 6.1.3 Item 6.2.2
<b>6.4.2.</b> Vibration Resistance	Measurements shall be made following the test set forth below: (1)Range of oscillation: 10 to 55 Hz (2)Amplitude, pk-to-pk:1.5 mm (3)Cycle of sweep: 10 -55 -10 Hz in one minute, approx. (4)Mode of sweep: Logarithmically sweep or uniform sweep (5)Direction of oscillation: Three mutually perpendicular directions, including the direction of stem travel (6)Duration of testing: 2 hours each, for a total of 6 hours	Item 6.1 Item 6.2.1 Item 6.2.2
<b>6.4.3.</b> Impact Shock Resistance	Measurements shall be made following the test set forth below: (1)Acceleration:80g (2)Cycles of test:3 cycles each in 6 directions, for a total of 18 cycles <div style="text-align: center;">  </div>	Item 6.1 Item 6.2.1 Item 6.2.2

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# TACTING SWITCH SPECIFICATION

## 7. Switch Handling Precautions

7.1. In case an automatic flow soldering apparatus is used for soldering, adhere to the following conditions:

Item	Soldering condition
7.1.1 Preheat Temperature	100°C Jmax (Ambient temperature of printed circuit board on its soldering side)
7.1.2 Preheat Time	45 sec max.
7.1.3 Flux Foaming	To such an extent that fluxes 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 located.
7.1.4 Soldering Temperature	255°C Jmax.
7.1.5 Duration of Solder Immersion	5 sec. max.
7.1.6 Allowable Frequency of Soldering process	2 times max.

### 7.2 Other precautions

(1) Following the soldering process, do not try to clean the switch with a solvent or the like.

(2) Safeguard the switch assembly against flux penetration from its topside.

(3) Please have the products keep in close status and the storage time is 90 days guaranty after delivering the goods at most.

						APPD David	CHKD Liao	DSGD Tsai	PART NO: TSQ____; Đ____	
						Lee	Kau	Chia		
							Tao	Hui		
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