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| Classification | REFERENCE SPECIFICATION | Issue No. 20090869 |
| Part Name LIGHT TOUCH SWITCH | Part No. EVQ21504M | 1/10 |

1. Notification Items

1.1 Law and the regulation which are applied

- ① This product has not been manufactured with ozone depleting chemical controlled under the Montreal Protocol.
- ② This product complies with the RoHS Directive (Restriction of the use of certain Hazardous Substance) in electrical and electronic equipment (DIRECTIVE 2002/95/EC).
- ③ All the materials used in this part are registered material under the Law Concerning the Examination and Regulation of Manufacture etc. or Chemical Substances.
- ④ Permission must be obtained from the Japanese government if the product that is subject to the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.

1.2 Application Limits

This product was designed and manufactured for general electronics devices household appliances, office equipment, data and communication equipment.

For the following applications in which high reliability and safety are required, or for the applications in which the failure or malfunction of the products may directly jeopardize life or cause threat of personal asset, please contact us beforehand.

- Aircraft and aerospace equipment, anti-disaster or anti-crime equipment, medical equipment, transport equipment (automotives, trains, boat etc), high public information processing devices or the other equipments or devices that are equivalent to the above mentioned.

1.3 Handling of reference specification.

- Since the contents of this reference specification are subjected to change without prior notifications, please request us a formal specification again for your investigations before using.

1.4 Manufacturing Sites

- ① The country of manufacture : Japan
Panasonic Electronic Devices Japan Co., Ltd.

2. Summary

2.1 This specifications applies to the following types of switch.

Push-ON type S.P.S.T

2.2 This specifications is a constituent document of contract for business concluded between your company and Panasonic Corporation.

2.3 Items not particularly specified in this specifications shall be in conformance with JIS Standards.

REFERENCE ONLY

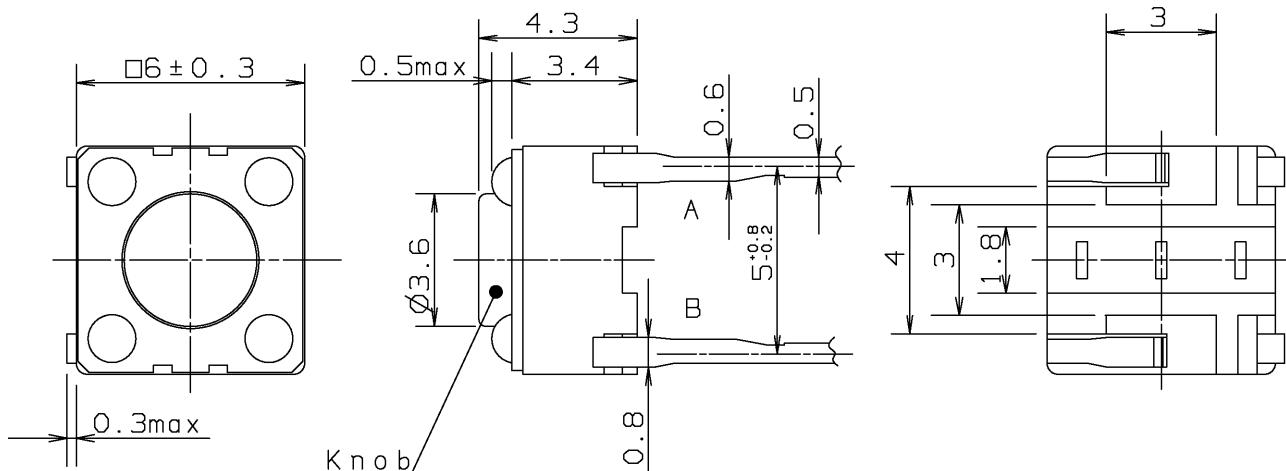
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3. Dimension • Marking • Circuit diagram

Date code are indicated in the product.

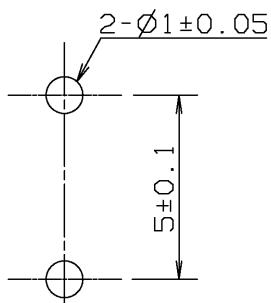
General dimension tolerance : ± 0.2

() dimensions are reference dimensions.

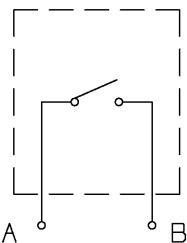


Knob color : WHITE

Piece weight : 0.24g



P.C.B.piercing plan



Circuit Diagram

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Part No.

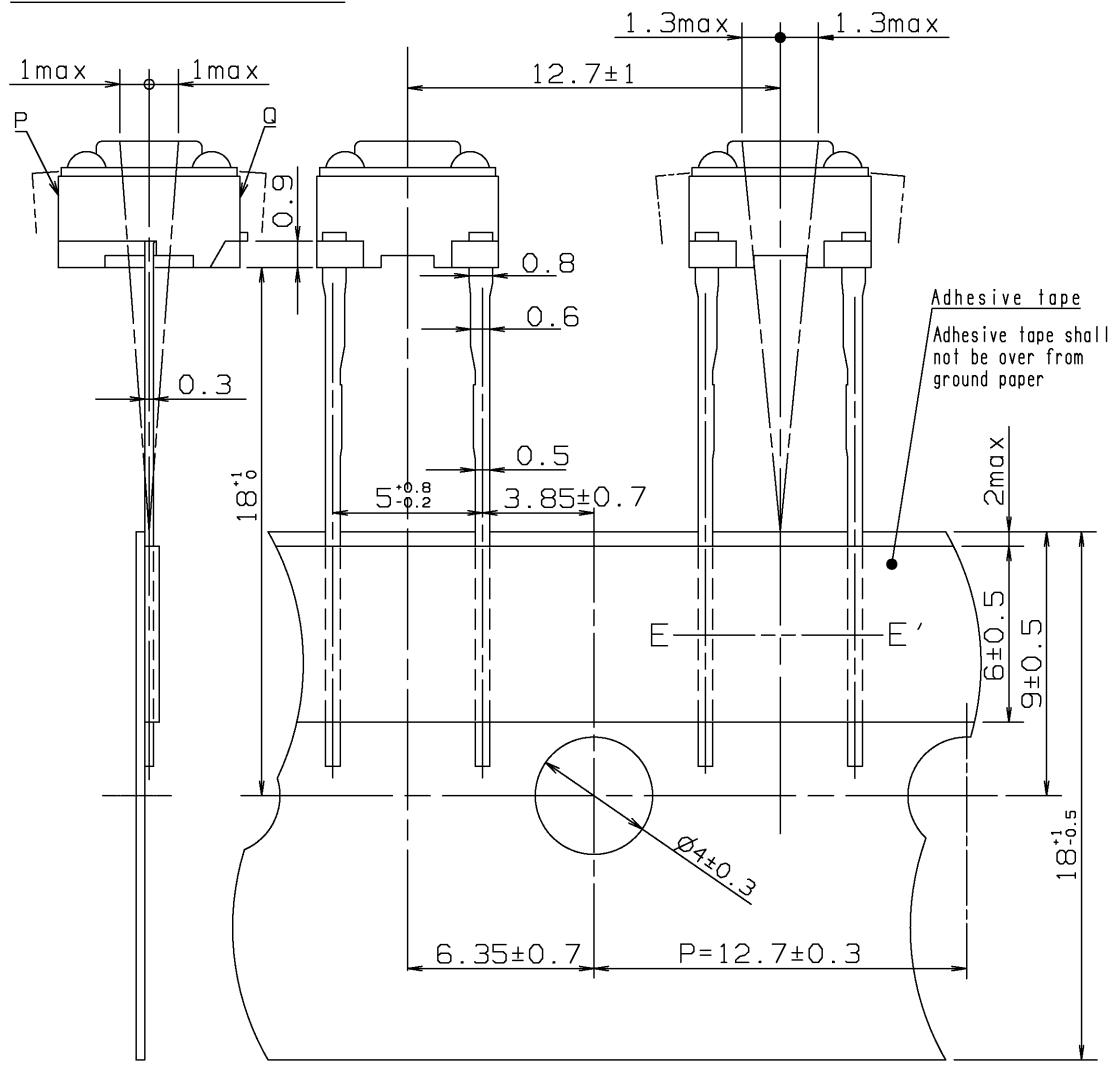
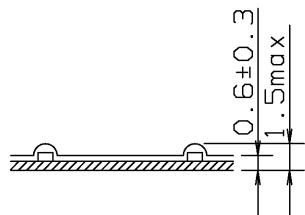
EVQ21504M

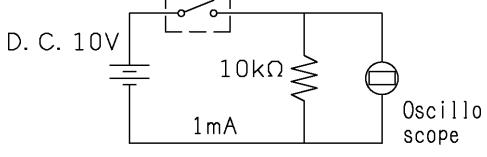
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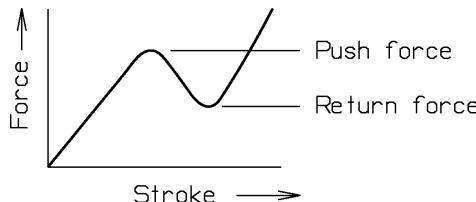
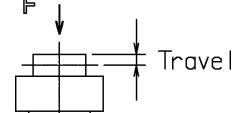
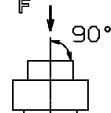
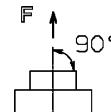
General dimension tolerance : ± 0.2

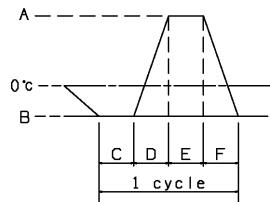
()dimensions are reference dimensions.

Knob color : WHITE

The direction of P or Q side
is randomly settled.Correspond to JIS C0806-2 requirements.Section of E - E'

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| Part Name LIGHT TOUCH SWITCH | Part No. EVQ21504M | 4/10 | |
| 4. General specification | | | |
| 4.1 Switch rating | DC 15 V 20 mA(max.) DC 2V 10 μ A(min.) | | |
| 4.2 Operation temperature range | -20 °C ~ +70 °C | | |
| 4.3 Preservative temperature range | Single condition : -40~+85 °C Taping condition : -20~+40 °C | | |
| 4.4 Standard conditions | Unless otherwise specified, the test and measurements shall be carried out as follows. Ambient temperature : 5~35 °C Relative humidity : 45~85 % Air pressure : 86~106 kPa | | |
| | However, if doubt arises on the decision based on the measured values under the above-mentioned conditions, the following conditions shall be employed. Ambient temperature : 20 ± 2°C Relative humidity : 65 ± 5 % Air pressure : 86~106 kPa | | |
| 5. Performance | | | |
| 5.1 Electrical characteristics | | | |
| No. | ITEM | TEST CONDITION | PERFORMANCE |
| 5.1.1 | Contact resistance | Push force : {Operation force} × 2 Measurement tool : Contact resistance meter (Capable of 10 μ A ~ 10 mA) | 50 mΩ max. |
| 5.1.2 | Insulation resistance | DC 100 V (Between terminals) | 50 MΩ min. |
| 5.1.3 | Withstand voltage | AC 250 V for 1 minute. (Between terminals) | No insulation destruction |
| 5.1.4 | Bouncing | Operation speed : 3~4 times/s D. C. 10V  <u>Switch Bouncing Test Circuit</u> | ON 3 ms max. OFF 8 ms max. |

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| 5.2 Mechanical characteristics | | | |
| No. | ITEM | TEST CONDITION | PERFORMANCE |
| 5.2.1 | Operation force |  <p>Force ↑ Push force Return force Stroke →</p> | Push force $1.6^{+0.5}_{-0.5}$ N Return force 0.4 N min. |
| 5.2.2 | Travel to closure | Push by recommended operating condition. (4.2) $F = \{\text{Operation force}\} \times 2$  | 0.25 $^{+0.10}_{-0.10}$ mm |
| 5.2.3 | Push strength | 50 N for 60 sec.  | No damage (Electrical and mechanical) |
| 5.2.4 | Pull strength |  | 20 N min. |
| 5.2.5 | Vibration test | 1) Amplitude : 1.5 mm 2) Sweep rate : 10-55-10Hz for 1 minute 3) Sweep method : Logarithmic frequency sweep rate 4) Vibration direction : X, Y, Z(3 directions) 5) Time : Each direction 2 hours (Total 6 hours) | No. 5.1 and 5.2.1 to 5.2.2 shall be satisfied. |
| 5.2.6 | Soldering heat test | Soldering area : 1/2 of P.W.B. thickness Soldering temperature : $260 \pm 5^\circ\text{C}$ Soldering time : 5 ± 1 sec. | No damage (Electrical and mechanical) |
| 5.2.7 | Solderability | After spreading flux, the terminal is immersed in solder with following condition. Solder ber : M705/Sn-3.0Ag-0.5Cu (Senju Metal Indusry Co., Ltd.) Flux : CF-110VH-2A (tamura kaken) Soldering temperture : $260 \pm 5^\circ\text{C}$ Soldering time : 2 ± 0.5 sec. | 95% or more of surface area(Excluding ruptured surface)where is immersed in solder shall be covered by new solder. |

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| 5.3 Climatic characteristics | | | |
| | | | |
| No. | ITEM | TEST CONDITION | PERFORMANCE |
| 5.3.1 | Cold test | 1) Temperature : -40 ± 2 °C 2) Duration of test : 500 h 3) Take off a drop water. 4) Standard conditions after test : 1 h | Contact resistance 200 mΩ max. No. 5.1.2 to 5.1.4 and No. 5.2.1 to 5.2.2 shall be satisfied. |
| 5.3.2 | Heat test | 1) Temperature : 85 ± 2 °C 2) Duration of test : 500 h 3) Standard conditions after test : 1 h | Contact resistance 200 mΩ max. No. 5.1.2 to 5.1.4 and No. 5.2.1 to 5.2.2 shall be satisfied. |
| 5.3.3 | Heat shock test | 1) Test cycles : 20 cycles 2) Standard conditions after test : 1 h  A: $+85 \pm 2$ °C B: -40 ± 2 °C C:1 hour D:5 minutes max. E:1 hour F:5 minutes max. | Contact resistance 200 mΩ max. No. 5.1.2 to 5.1.4 and No. 5.2.1 to 5.2.2 shall be satisfied. |
| 5.3.4 | Humidity test | 1) Temperature : 60 ± 2 °C 2) Relative humidity : 90~95 % 3) Duration of test : 500 h 4) Take off a drop water. 5) Standard conditions after test : 1 h | Contact resistance 200 mΩ max. No. 5.1.2 to 5.1.4 and No. 5.2.1 to 5.2.2 shall be satisfied. |
| 5.3.5 | Endurance (Switching action) | 1) DC 15 V 20 mA Resistance load 2) Operation speed : 2~3 times/s 3) Push force : Maximum value of operation force 4) Operation number : 100,000 times | Contact resistance 200 mΩ max. Bouncing : 10 ms max. Variation rate of operation force shall be within ± 30 % to the value before testing No. 5.1.2 and 5.2.2 shall be satisfied. |
| 5.3.6 | Withstand H ₂ S | 1) Density : 3 ± 1 ppm 2) Temperature : 40 ± 2 °C 3) Relative humidity : 80~85 % 4) Duration of test : 24 h 5) Standard conditions after test : 1 h | Contact resistance 200 mΩ max. No. 5.1.2 to 5.1.4 and No. 5.2.1 to 5.2.2 shall be satisfied. |

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6. Prohibitions and precaution for handling

6.1 Soldering condition

| ITEM | CONDITION |
|-----------------------|---|
| Preheat temperature | 110°C max. (Environmental temperature of soldering surface of P.W.B.) |
| Preheat time | 60 sec. max. |
| Area of flux | 1/2 max. of P.W.B. thickness |
| Temperature of solder | 260±5 °C |
| Time of immersion | Within 5 sec. |
| Soldering number | Within 2 times (But should bring down heat of the first soldering.) |
| Printed wiring board | Single sided copper-clad laminates |

- 1) After switches were soldered, please be careful not to clean switches with solvent.
- 2) Please flux don't into over the switch.
- 3) In the case of using soldering iron, soldering conditions shall be 350 °C max. 3 sec. max. 1 time only and the tip of iron must not touch to terminals.
Soldering iron for re-soldering have to be 60W max.
- 4) Right after switches were soldered, please be carefull not to load on the knobs of switches.

6.2 Design instructions

- 1) Please refer to the land pattern plan Panasonic recommends on the 2nd page.
- 2) Design key top as fig-1. Design inclination of key top 4 deg. max. as fig-2.
(Recommended operation condition)



6.3 Notes

- 1) Please be cautions not to give excessive static load or shock to switches.
- 2) Please be careful not to pile up P.W.B. after switches were soldered.
- 3) A product shall be mounted properly by insert machine.
- 4) 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.
- 5) Avoid the use of the switch under pushed ON condition is continued for a long time.

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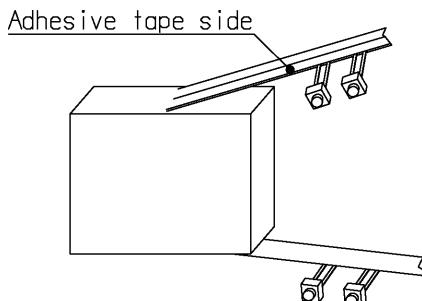
7. Packing and taping Specifications

7.1 Packing method

Packing method : Taped products should be put into the inner packing case like zigzag.

Packing quantity : Inner carton 1,000 pcs.
Outer carton 10,000 pcs.

7.2 Method of draw out

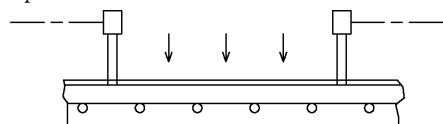


7.3 Taping condition

1) Lack of products

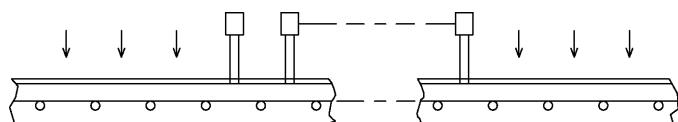
(1) Middle portion

Should not continue 4 pcs.



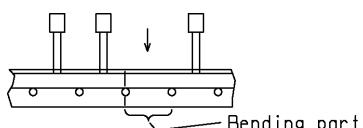
(2) The end of taping

Should have more than 5 pitch leader space.

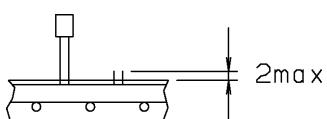


(3) Bending part

At bending part, one product can be skipped.



2) In case of cutting the lead wire off, the length of lead wire protruded from the tape is maximum 2 mm.



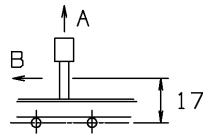
3) Pull strength

Pull strength products should not be separated from the tape at the pull strength of 5N.

(Direction A)

Pull strength products should not be separated from the tape at the pull strength of 1N.

(Direction B, 3 sec)



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4) Connecting portion

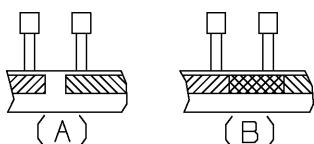
The connecting portion and number is free.

The connection between the mount tape shall be done with adhesive tapes.

Connecting portion should be less than 4 time thick, compared with the other portion.

(1) Adhesive tape

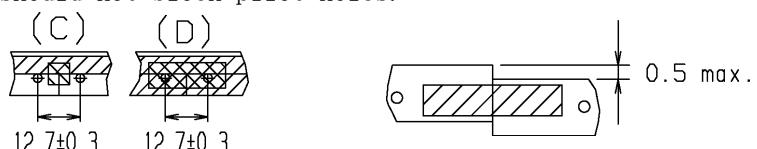
The strength of connection should satisfy the specification of 7.3 3) and adhesive tape should not block pilot holes.



(2) Ground tape

The connection between the mount tape shall be done with the adhesive tape and the gap between tapes is maximum 0.5 mm.

Adhesive tape should not block pilot holes.



7.4 Bending portion

The tape should be bent every 25 pitch.

The portion of bending is free.

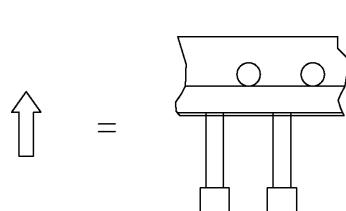
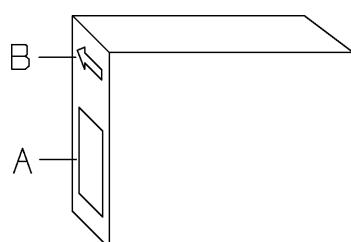
7.5 Marking of packing (Inner carton)

A: Customer part No.

Panasonic part No.

Quantity

B: Direction of products



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<Prohibitions and precaution for handling>

【Prohibited items on fire and smoking】

- Absolutely avoid use of a product beyond its rated range because doing so may cause a fire. If misuse or abnormal use may result under conditions in which the product is used out of its rated range, take proper measures such as current interruption using a protective circuit.
- The grade of nonflammability for resin used in product is "94HB," which is based on UL94 Standards (flammability test for plastic materials). Prohibit use in a location where a spreading fire may be generated or prepare against a spreading fire.

【For use in equipment for which safety is requested】

- Although care is taken to ensure product quality, inferior characteristics, short circuits, and open circuits are some problems that might be generated. To design an equipment which places maximum emphasis on safety, review the effect of any single fault of a product in advance and perform virtually fail-safe design to ensure maximum safety by:
 - Preparing a protective circuit or a protective device to improve system safety, and equipment.
 - Preparing a redundant circuit to improve system safety so that the single fault of a product does not cause a dangerous situation.

【Attentions required for storage condition】

- When this product is to be stored in the following circumstances and conditions, it may affect on the performance deteriorations and solderability etc., avoid storing in the following conditions.
 - (1)A place where the temperature is -10°C max., +40°C min. and the humidity is 85% min.
 - (2)In the corrosive gas atmosphere.
 - (3)Long-term storage for 6 months min.
 - (4)A place where the product is exposed to direct sunlight.
- Store in packed condition so that the load stress is not applied.
- Please use this product as soon as possible, our recommendation is within 3 months and the limitation is 6 months.
- If any remainder left after packing is opened, store it with proper moistureproofing and gasproofing, etc.,
- The switch shall be packed by Nylon sheet in the box like original packaging style when it will be an inventory after using on the assembly machine at your production line.