HYUNDAI MOBIS

Issue №	:	20180496
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Product Description : LIGHT TOUCH SWITCH

Product Part Number : EVPAL8G1A000

Applications :

Reference specification

Prepared by : Panasonic Industrial Devices (Qingdao) Co., Ltd.

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All the materials used in this part are registered material under the Law
Concerning the Examination and Regulation of Manufacture etc. or Chemical Substances.

Panasonic

1. Notification Items

1.1 Law and the regulation which are applied

① Ozone depleting substances specified by Montreal Protocol have not been used in the manufacturing process of the material used in this product.

② This product complies with RoHS Directive (on the restriction of the use of certain hazardous substances in electrical and electronic equipment) (2011/65/EU).

③ The materials used in this product contain only the substances listed in the List of Existing Chemical Substances specified in 'Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc'.

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

The following shall be described for safety precaution:

[Limitation of Application]

(a) This product has been designed and manufactured for general electronic devices, such as home electronics, office equipment, information devices and communication devices.

(1) This product is not intended for use in more sophisticated applications which require a higher safety standard and more reliability, including if a failure or malfunction may cause bodily injury or property damage.

(2) If the product is intended for more sophisticated applications prior approval must be obtained. Such applications shall include, but are not limited to, the following: aircraft equipment, aerospace equipment, disaster prevention equipment, crime prevention equipment, medical equipment, transportation equipment (such as vehicles, trains, ships, etc.), and information processing equipment that are highly publicized, and other equivalent equipment.

(b) Regardless of its applications, in an event that this product is used for equipment with high safety standards, protective circuits or back up circuits must be used and safety tests must be performed.

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

The country of manufacture : China Panasonic Industrial Devices (Qingdao) 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.

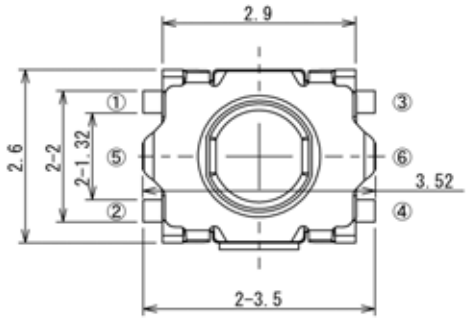
2.3 Items not particularly specified in this specifications shall be in conformance with JIS Standards.

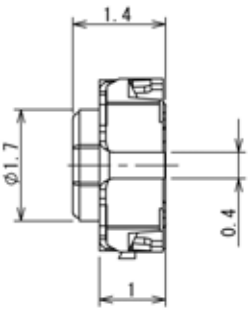
3. Dimension･Marking･Circuit diagram

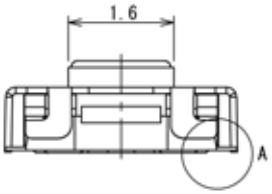
Date code are indicated in the product.

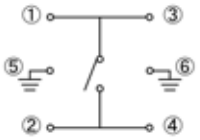
REFERENCE ONLY

General dimension tolerance : ±0.1
( )dimensions are reference dimensions.

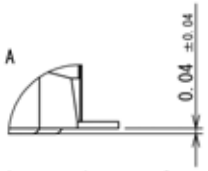




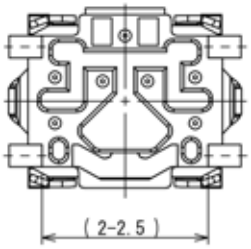




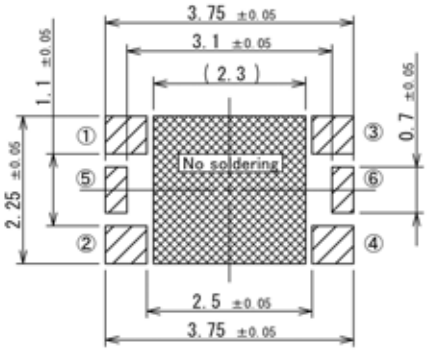
Circuit diagram



Distance between bottom of mounting base and terminals



Solder thickness t=0.1 ±0.02 mm



Land pattern plan

(Note)
This product is designed to be smaller than the conventional type, which lowered the peel off strength. Therefore please avoid to apply force to a push plate from side, or/and avoid set-knob to touch push plate during insertion to a set-case.
This product is not sealed structure, so there is a possibility of dust intrusion and then it may cause contact failure depending on usage environment. Therefore, please consider the application design, especially for the application requiring dust-proof, to prevent the dust from intruding to inside of the switches.

▨ :Recommended land pattern area.
▩ :No soldering area

- Any land pattern or via holes shall not be provided at ▩ area.
- If it's necessary to design land pattern or via holes at ▩ area, please apply resist to them to protect their metal part completely.
- If their metal parts are not protected completely, short circuit failure may occur.
- Besides, there should be convexoconcave by designing additional pattern, it may cause swith tilt, influence on solder-ability or flux intrusion after reflow soldering.
- Therefore, please study any influence of additioan land pattern or via holes at ▩ area in advance.

4. General specification

4.1 Switch rating DC 15 V 20 mA(max.) DC 2 V 10 μA(min.)

4.2 Operation temperature range -40 ～ + 90 ℃

4.3 Preservative temperature range Single condition : - 40 ～ + 90 ℃
Taping conditior : - 20 ～ + 60 ℃

4.4 Standard conditions

Unless otherwise specified, the test and measurements shall be carried out as follows.

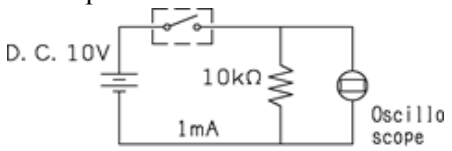
Ambient temperature : 5 ～ 35 ℃
Relative humidity : 45 ～ 85 %
Atmospheric pressure : 86 ～ 106 kPa

However, if doubt arises on the decision based on the measured values under the above-mentioned conditions, the following conditions shall be employed.

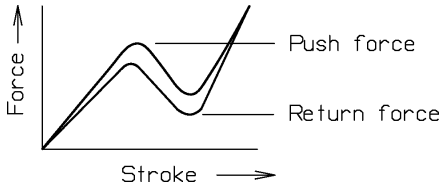
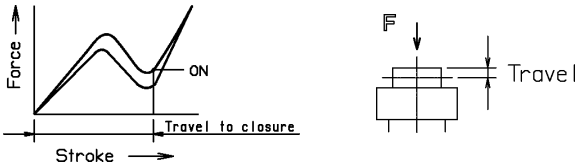
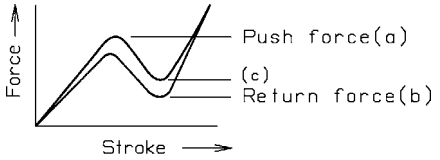
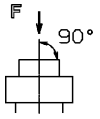
Ambient temperature : 20 ± 2 ℃
Relative humidity : 65 ± 5 %
Atmospheric pressure : 86 ～ 106 kPa

5. Performance

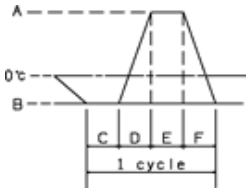
5.1 Electrical characteristics

No.	ITEM	TEST CONDITION	PERFORMANCE
5.1.1	Contact resistance	Push force : {Operation force} × 2 Measurement tool : Contact resistance meter (Capable of 10 μA ～ 10 mA)	100 mΩ max.
5.1.2	Insulation resistance	DC 100 V (Between terminals)	100 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  Switch Bouncing Test Circuit	ON 10 ms max. OFF 10 ms max.

5.2 Mechanical characteristics

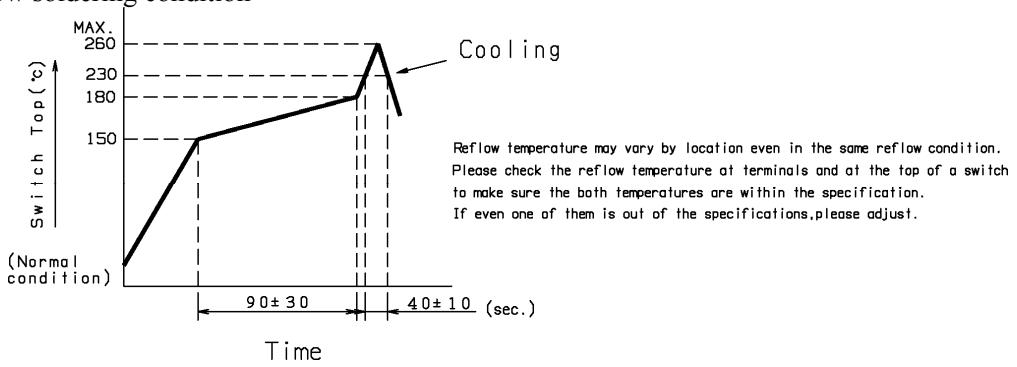
No.	ITEM	TEST CONDITION	PERFORMANCE
5.2.1	Operation force		Push force $5.0\ ^{+1.0}_{-1.0}$ N Return force 0.3 N min
5.2.2	Travel to closure		$0.14\ ^{+0.1}_{-0.1}$ mm
5.2.3	Click ratio	Measurement condition:No.5.2.1  Click ratio = (a-c)/a×100%	Click ratio 35 % min. (before reflow soldering)
5.2.4	Push strength	50 N for 60 sec. 	No damage (Electrical and mechanical)
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	Mount the switch on P.W.B by solder paste. 1) Reflow process 2 times. (Refer to section 6.1) 2) Standard conditions after test : 1 hours	Contact resistance 100 mΩ max. No.5.1.2 to 5.1.4 and No.5.2.1 to 5.2.2 shall be satisfied.
5.2.7	Solderbility	After spreading flux, the terminal is immersed in solder with following condition. Solder bar : M705/Sn-3.0Ag-0.5Cu (Senju Metal Industry Co.,Ltd.) Flux : CF-110VH-2A (tamura kaken) Soldering temperture : 260±5℃ 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.

5.3 Climatic characteristics

No.	ITEM	TEST CONDITION	PERFORMANCE
5.3.1	Cold test	1) Temperature : -40±2 ℃ 2) Duration of test : 1000h 3) Take off a drop water. 4) Standard conditions after test : 1 h	Contact resistance 1000 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 : 90±2 ℃ 2) Duration of test : 1000h 3) Standard conditions after test : 1 h	Contact resistance 1000 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 : 100 cycles 2) Standard conditions after test : 1 h  A:+90±2 ℃ B:-40±2 ℃ C:1 hour D:5 minutes max. E:1 hour F:5 minutes max.	Contact resistance 1000 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 ℃ 2) Relative humidity : 90～95 % 3) Duration of test : 1000 h 4) Take off a drop water. 5) Standard conditions after test : 1 h	Contact resistance 1000 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 20 Ω max. Bouncing : 20 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_2S	1) Density : 3±1ppm 2) Temperature : 40±2 ℃ 3) Relative humidity : 80～85 % 4) Duration of test : 24 h 5) Standard conditions after test : 1 h	Contact resistance 1000 mΩ max. No.5.1.2 to 5.1.4 and No.5.2.1 to 5.2.2 shall be satisfied.

6. Prohibitions and precaution for handling

6.1 Reflow soldering condition



1) Two times max. with directing the switch mounting side of P.W.B up.
2) Re-soldering by soldering iron shall be allowed under 350 ℃ 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 60 W max.

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.
   Deviation between center of key top and switch should be within 0.3 mm.
   (Recommended operation condition)

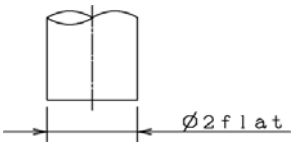


fig-1

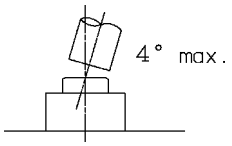


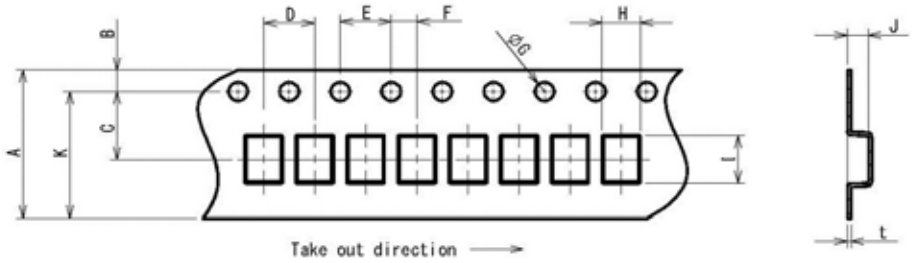
fig-2

6.3 Note

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) 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.
4) Cleaning
   - If flux or solder is scattered on the surface of P.W.B when soldering, characteristics of this product may be damaged.
   - Cleaning after soldering is not allowed.When cleaning is required this switch should be soldered after the cleaning.
5) Avoid the use of the switch under pushed ON condition is continued for a long time.
6) There is a possibility the flux from solder paste infiltrates into the body if plenty of solder paste was applied by switch on the P.W.B.
   So we recommend to use our proposed land design in order to prevent above problem.
   Also please avoid putting additional land by the switch on the P.W.B.
7) This product is not sealed structure, so there is a possibility of dust intrusion and then it may cause contact failue depending on usage environment.
   Therefore, please consider the application design, especially for the application requiring dust-proof, to prevent the dust from intruding to inside of the switches.

7. Packing specification

Carrier tape

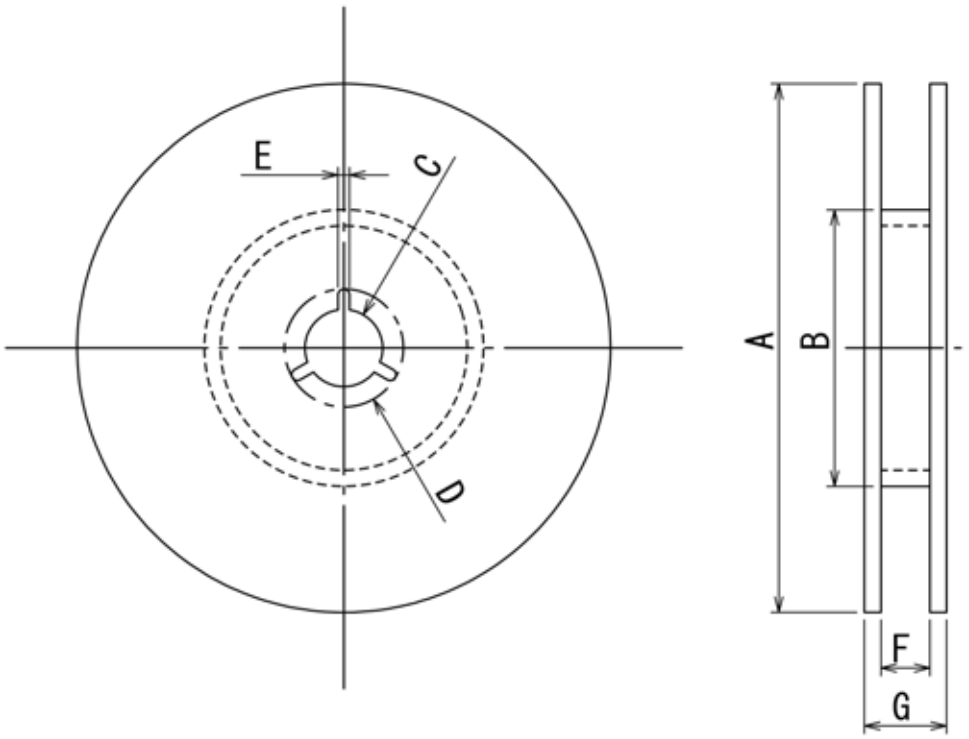


Unit:mm

A	B	C	D	E	F	G	H	I	J	K	t
±0.3 12	±0.1 1.75	±0.1 5.5	±0.1 4	±0.1 4	±0.1 2	+0.1 −0 1.5	±0.2 3.0	±0.2 3.9	±0.2 1.65	(10.25)	±0.1 0.3

* Taping condition : Lack of products in the middle of taping should be one MAX.
but total quantity specified in the specifications should be secured.
* Peeling off strength of top tape : It should be within 0.2N to 1.0N at 165 degree in peeling off angle.
* Joint of carrier tape : One joint per one reel may exist.

Reel (12000 pcs./reel)



A	B	C	D	E	F	G
±2 Φ380	±1 Φ80	±0.2 Φ13	±0.8 Φ21	±0.5 2	±1 13.4	±1 17.4

Unit:mm

<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℃ max., +40℃ 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.,