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 : Malaysia	Panasonic Industrial Devices Malaysia Sdn. Bhd.
The country of manufacture : Japan	Input Devices Business Unit, Electromechanical Control Business Division Panasonic Corporation

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.

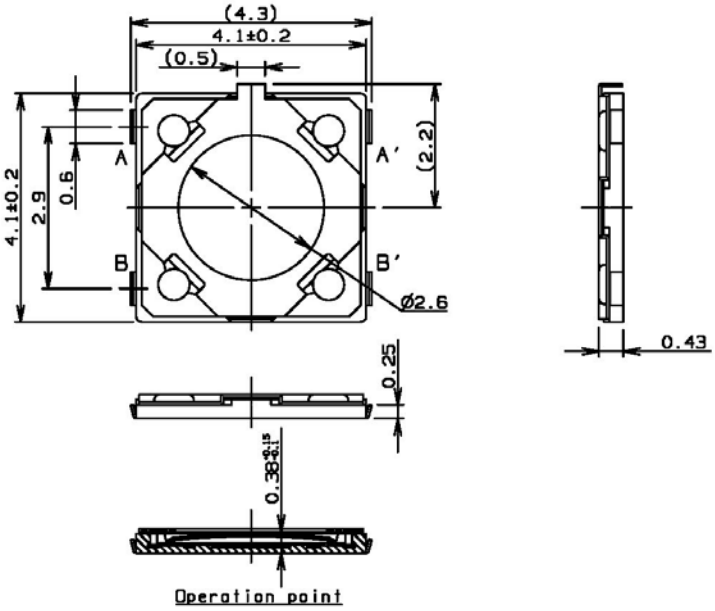
2.3 Items not particularly specified in this specifications shall be in conformance with JIS Standards.

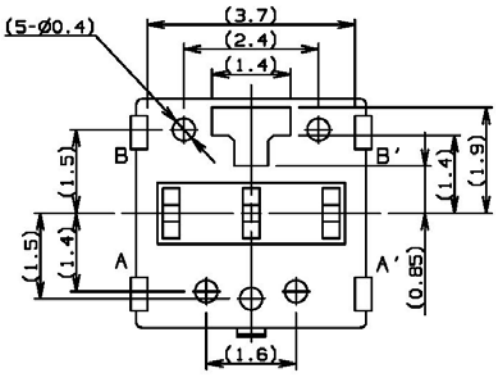
3. Dimension・Marking・Circuit diagram

REFERENCE ONLY

Date code are indicated in the product.

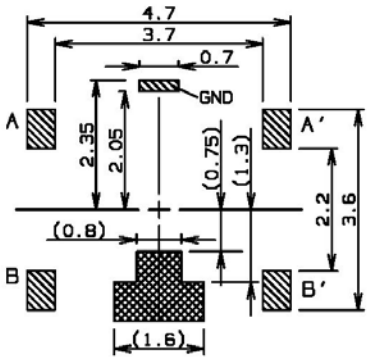
( )dimensions are reference dimensions.





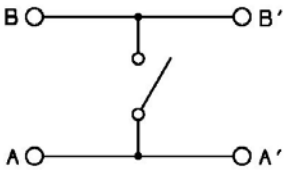
Piece weight :about 0.015g

Solder thickness t=0.15±0.03



Land pattern plan

Part of B-B' terminal is exposed at ▩ area.
Any land pattern or vias shall not be provided at ▩ area.
We recommend to connect the GND land shown in the switch spec.with the GND of your P.C.B for withstanding electric-static discharge.



Circuit Diagram

4. General specification

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

4.2 Operation temperature range -20 ～ + 70 ℃

4.3 Preservative temperature range Single condition : - 40 ～ + 85 ℃
Taping conditior : - 20 ～ + 60 ℃

4.4 Standard conditions

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

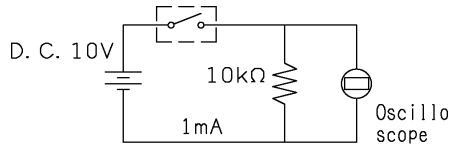
Ambient temperature : 5 ～ 35 ℃
Relative humidity : 45 ～ 85 %
Atmospheric pressure : 86 ～ 106 kPa

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

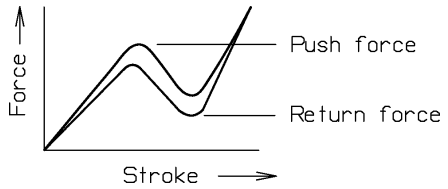
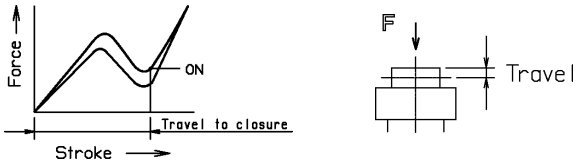
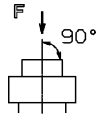
Ambient temperature : 20 ± 2 ℃
Relative humidity : 65 ± 5 %
Atmospheric pressure : 86 ～ 106 kPa

5. Performance

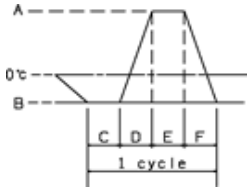
5.1 Electrical characteristics

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)	500 mΩ max.
5.1.2	Insulation resistance	DC 100 V (Between terminals)	50 MΩ min.
5.1.3	Withstand voltage	AC 100 V for 1 minute. (Between terminals)	No insulation destruction
5.1.4	Bouncing	Operation speed : 3～4 times/s  Switch Bouncing Test Circuit	ON 3 ms max. OFF 10 ms max.

5.2 Mechanical characteristics

No.	ITEM	TEST CONDITION	PERFORMANCE
5.2.1	Operation force		Push force $1.0^{+0.5}_{-0.5}$ N Return force 0.1 N min
5.2.2	Travel to closure		$0.15^{+0.1}_{-0.1}$ mm
5.2.3	Push strength	50 N for 15 sec. 	No damage (Electrical and mechanical)
5.2.4	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.
5.2.5	Soldering heat test	Mount the switch on P.W.B by solder paste. 1) Reflow process 3 times. (Refer to section 6.1) 2) Standard conditions after test : 1 hours	Contact resistance 500 mΩ max. No.5.1.2 to 5.1.4 and No.5.2.1 to 5.2.2 shall be satisfied.
5.2.6	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 : 500h 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 : 85±2 ℃ 2) Duration of test : 500h 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 : 20 cycles 2) Standard conditions after test : 1 h  A:+85±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 : 500 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 : 1,000,000 times	Contact resistance 20 Ω 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_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

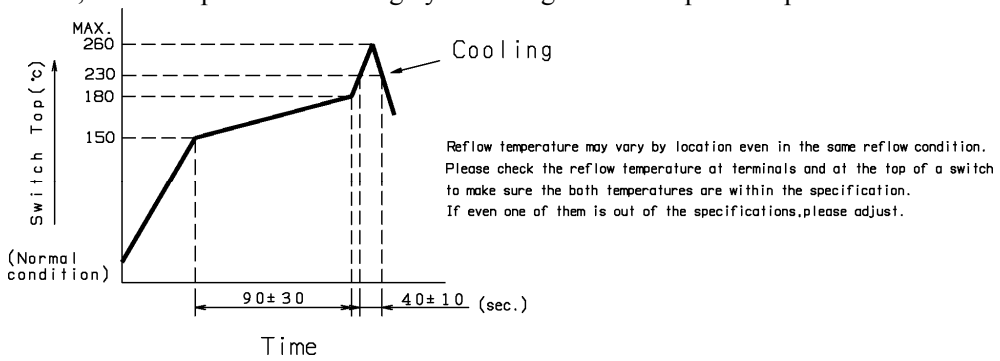
In order to prevent accidents or performance deteriorations in use of the product, observe the following restrictions and pay attentions to the following items.

<Restrictions>

1) Wave soldering(by solder bath dwelling)is prohibited because this switch does not have a capability. Therefore, be sure to perform soldering by reflow method.
2) Do not put this switch into the washing process after soldering because this switch does not have a capability of washing even water.

6.1 Reflow soldering condition

1) Therefore,be sure to perform soldering by following reflow temperature profile.



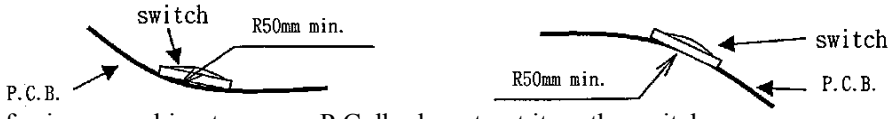
2) Three times max.It is possible to conduct reflow soldering with switch side down after at least one time soldering with switch up, but the drop of switch from the PCB and/or flux ingress might happen depend on your manufacturing/soldering condition. So please check if these phenomena do not happen with your manufacturing/soldering process.
3) Please do not load extra heat and pressure during re-work process by iron soldering. In the process of re-work the power of iron solder should be less than 60 W and soldering condition should be as follows, Temperature : 350 ℃ max., Period : 3 seconds max. Time : 1 time only.
4) Do not put any object such as a weight etc. on the operating knob during soldering.
5) In case that this switch is mounted on FPC board like film,we expect the board shall be tough by putting additional board for reinforcement on the reverse side. We are concerned that the switch may be damaged due to an extra stress with multiple undulations from FPC board after soldering.

6.2 Mounting condition

1) As this product is thin and small type,when the mechanical chuck is to be used at automatic mounting, it is subject to be deformed, Please mount after sufficiently ajustment.

6.3 Handing after soldering

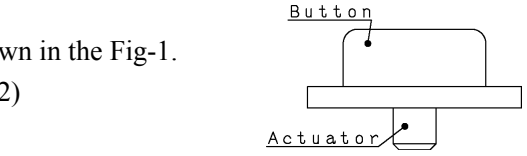
1) Do not load extra pressure on the switch after soldering. Example,under the condition like stack of the P.C.bd on the switch.
2) Do not make a extra bending condition of P.C.bd like below figure.



3) In case of using a masking tape on a P.C.db, do not put it on the switch.

6.4 Attentions Required for Unit Design at customer side.

1) Design the operating section on the setting side as shown in the Fig-1.
Inclination shall be within 4 degree. (Refer to the Fig-2)
The switch and the decentering shall be 0.3 mm max.
For use of this switch, press the center portion as much as possible, however, the life when the switch is pressed deviated from the center is shown below.



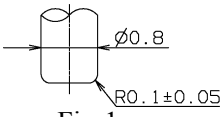


Fig-1

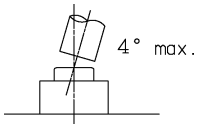


Fig-2

6.5 Attentions Required for Other Items

1) Do not apply excessive load on this product.The stopper that shall be put on a button due to protection of this product against excessive load.
Pay special attention to the terminal section.It may be a cause of terminal deformation,bad contact, or malfunction.
2) To prevent a bad contact caused by foreign particles (dust particles of P.W.B.,dust,Particles of flux) into the inside of the switch, pay attention to handle the P.W.B. after mounting.
And do not pile up the P.W.B..
3) For storage of this product, avoid the place at high temperature and humidity,and where corrosive gas may be generated. Especially for a long-term storage, do not take out from the package and avoid storing with a loosed condition.
4) Avoid pressing the film portion of the product with sharp-edged object.
5) Please put your attention not to locate big amount of solder paste around the switch, like adding extra land patterns besides the switch, because flux ingress to inside of the switch may occur.
6) This switch is for making a momentary signal. It is prohibited using the switch at a function that expects long time signal (long time contact close).
7) 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.

6.6 Attentions Required for Circuit Condition

6.6.1 Rating

(1) In order to assure the reliability, use this product within the rating range specified in the Specifications.
(2) Rated power is a maximum value of the power which can be continuous load at rated ambient temperature.
(3) If the product is used over the rated power, the correct characteristics may not be gained or the product may be burnt.
(4) The circuit shall be designed to avoid the inrush current to the switch, also avoid the surge voltage to be applied.
(5) When the switches is used under a few μA (dry circuit),contact resistance may affect circuit property, so please use the switch under specified switch rating.
(6) Do not apply the voltage of rated puncture value min. between the insulation and the electrode.

6.6.2 Attentions Required for Bouncing and Chattering

In order to prevent the malfunction by chattering caused by bounching at switch-operation of ON/OFF and external vibration etc., please pay attention to the design shown below.

1) Read several times.
2) Set the delay time.
3) Set the CR integration circuit.

6.7 Attentions Required for Mounting and Operating Condition

6.7.1 Operating temperature

In order to assure the reliability, use this product within the operating temperature range specified in the Specifications.

6.7.2 Operating relative humidity

Do not use this product under relative humidity of 85% min. for a long time.
(Excluding the case that measure is taken in a set.)
Avoid using this product in a place where it is directly exposed to the wheather, or where humidity is high caused by steam and dew condensation, etc.

6.7.3 The product is not a sealed type.

Avoid the use under following circumstance and conditions as it may affect a bad influence to characteristics.

(1) In the corrosive gas atmospere, such as Cl_2, H_2S, NH_3, NOx, SO_2 gas.
(2) Waterdrop remained, dew condensation, Waterdrop adhered.
(3) In the solution of water, sale water, oil, chemicals, and organic solvents.
(4) A place where it is exposed to direct sunlight.
(5) A place with large amounts of dust or dirt particles.

6.7.4 The structure of this product is not waterproof, chemicals resistance and solvent resistance. Do not wet with water, chemicals and/or solvents.

6.7.5 Do not apply the vibration, the shock (drop, etc.) or the pressure to this product more than specified.

6.7.6 Push strength

In order to avoid damages of the switch, do not apply the load to the operating section more than specified.(If the load is applied more than specified, it may affect on the characteristics of the push stroke, etc.)

6.7.7 Avoid the use of the switch under pushed ON condition is continued for a long time.

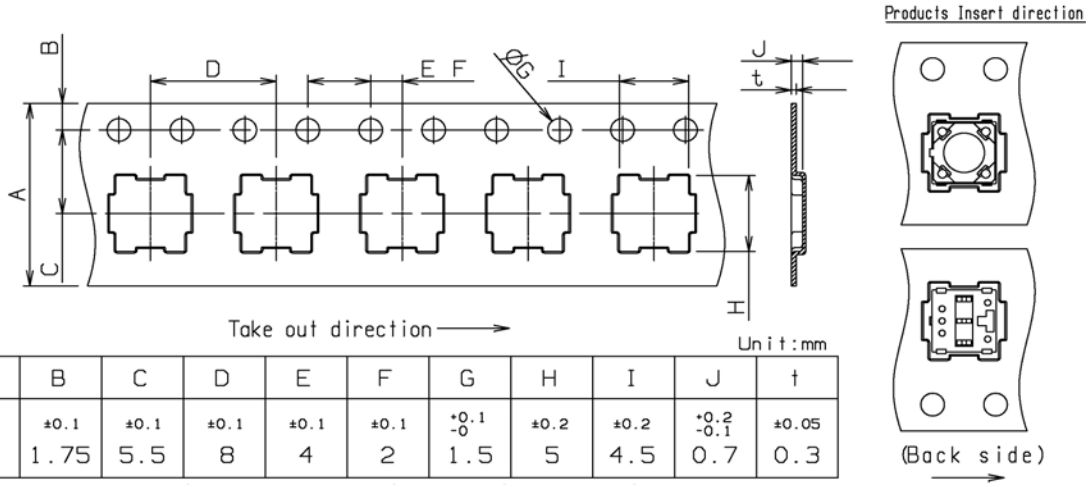
6.8 Repair･Service

6.8.1 When additional solder to the mounting soldering section of this product is to be performed or soldering section is to be removed, pay attention not to apply excessive stress and the temperature.

6.8.2 Pay attention not to melt the insulation material or the resin section, and avoid deformation.

7. Packing specification

Carrier tape

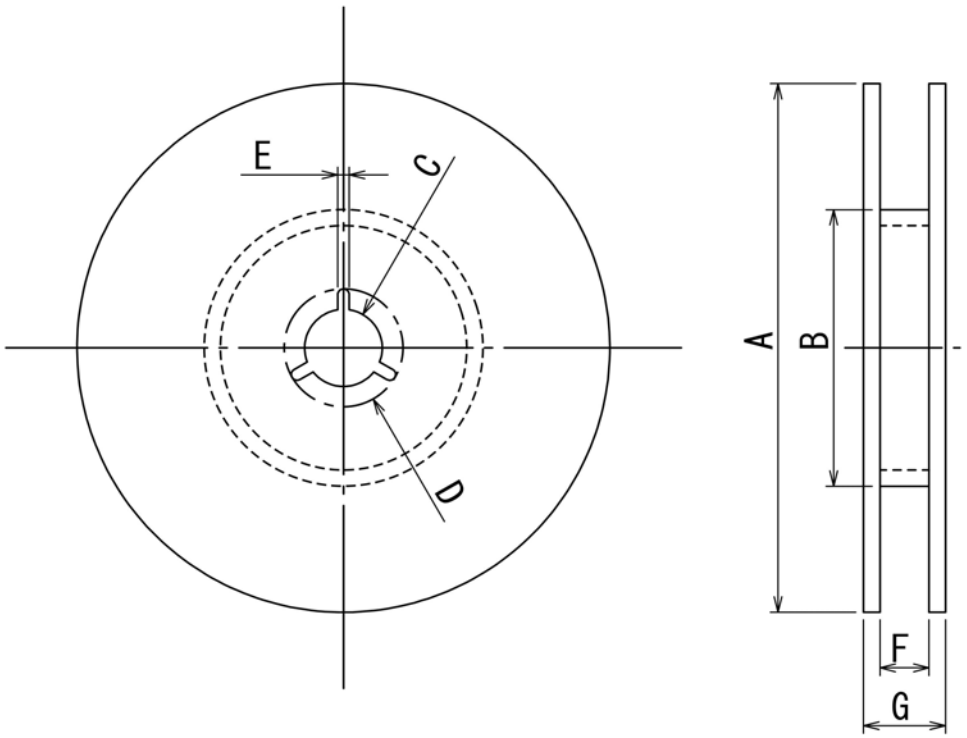


Unit:mm

A	B	C	D	E	F	G	H	I	J	t
+0.3 -0.1	±0.1	±0.1	±0.1	±0.1	±0.1	+0.1 -0	±0.2	±0.2	+0.2 -0.1	±0.05
12	1.75	5.5	8	4	2	1.5	5	4.5	0.7	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(10000 pcs./reel)



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