

SMD Product handling manual

1. Scope

This product handling manual is applied to parts for the surface mounting that KAMAYA ELECTRIC CO., LTD. produce.

2. Storage

Consider the following four points for keeping the environment, the storage method, and the storage period to maintain the qualities of parts below.

2.1 Avoid storing in locations where corrosive gas is present (Sea breezes, Cl₂, H₂S, NH₃, SO₂, NO₂, etc.) or in dusty and moist circumstances. Otherwise, it may result in deterioration of performance and adversely affect the soldering.

2.2 Avoid keeping goods in high temperature and direct sunlight. Otherwise, it may cause deformation of packing materials, and adherence of parts on packing materials.

2.3 Please enforce First-In & First-Out for the use of parts in consideration of the change in the environmental condition.

2.4 Store these products in the following environment.

Temperature: 5 to 35

Humidity : 25 to 75%

Terms of guarantee: 2 years

3. Pattern Design

To solder parts on the printed circuit board properly, it is necessary to take a careful attention in design stage.

It is necessary to consider the land pattern position by mounting equipment, method of soldering (flow or reflow), and material of print circuit board. Moreover, it is necessary to consider the position of adhesive and the array of parts at the flow soldering. Refer to Page 54 for recommended land pattern of Kamaya product

3.1 Strength of parts might decrease under the condition that the width or the shape of land pattern is too large, or the bend of the substrate occurs when gap of soldering position is generated or there are a lot of solder quantities.

3.2 Interval of parts should not narrow too much for the short-circuit prevention.

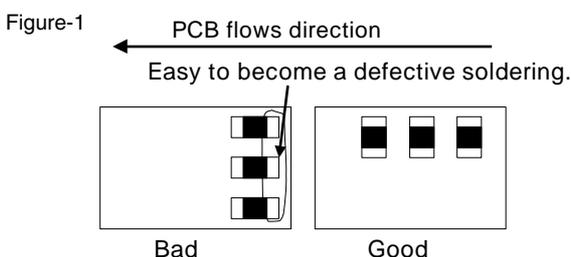
In general, it is safer to open more than 0.5mm from the positioning accuracy of mounting.

3.3 The resistor is a generation of heat source.

The pattern design that opens enough distance is necessary from other generation of heat parts.

Especially, please do enough derating of the rated dissipation for a high voltage circuit after considering the temperature rises of the adjoining generation of heat parts.

3.4 When the flow soldering is executed, soldering differs depending on the direction where the printed circuit board is thrown.

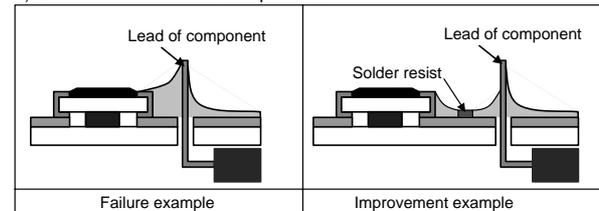


3.5 Examples of division of land pattern (Cross-sectional view)

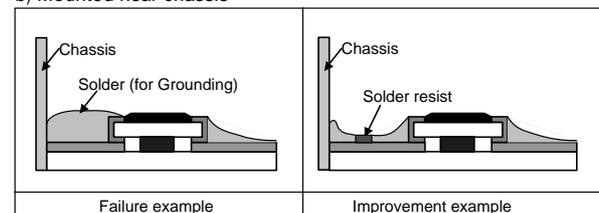
- Land share with lead component.
- Mounted near Chassis.
- Side by side array.

Figure-2

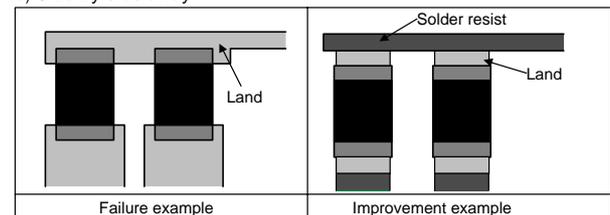
a) Land share with lead component.



b) Mounted near chassis



c) Side by side array



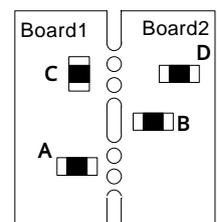
3.6 Avoid the component placement to the following places.

- Near cutting line of print circuit board.
- Place where print circuit board is distorted and mechanical stress is received easily.

Figure-3

Layout of resistors near the cutting line of print circuit board.

Improper A B C&D Proper



4. Print Circuit Board

Please consider following respects.

4.1 Thermal diffusivity (thermal conductivity)

Thermal diffusivity through the print circuit board is necessary for generation of heat from parts.

Especially, use the print circuit board with high thermal conductivity when the calorific value is large.

4.2 Resistance to soldering heat

Select a heatproof, good substrate to soldering parts. Because it often solders two or more times.

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4.3 Pull peel strength of land pattern

Consider that the print circuit board corresponding to the land pattern size and sticking strength with the copper foil.

4.4 Bend strength

The stress in the electrodes and parts body, when the PCB bends by weight and external stress of parts, causes the joining electrode flaking off and the crack. Consider the bend ability of print circuit board.

5. Adhesive

When an adhesive is applied, the spread should be set corresponding to each part so that there are no overflow into the land or no dropout of the parts.

5.1 Strength of adhesive must be strong not to fall and move parts in the mounting process.

5.2 Stiffen at the low temperature as much as possible. Do not heat parts as the cure temperature.

5.3 Keep without stringy, slumping adhesion, and dewetting that solder can not adhere to parts.

5.4 After soldering, there must be no causticity.

6. Mounting

Please consider following to install parts in the printed circuit board.

- 1) Gap of installing position
- 2) Product floating from land pattern
- 3) Mechanical stress to overcoat of parts.

6.1 Do not touch with bare-handed in the electrode and wash it well with an organic solvent when the foreign body such as oils and fats adheres.

6.2 Mounting trouble of static electricity may occur when you touch or rub the part, packaging materials and the cover tape of the taping especially. When you deal with parts on the worktable, please execute the static electricity prevention measures (like the electrification prevention mat).

7. Soldering

7.1 The lead free is recommended in the solder paste.

Select appropriate solder paste after executing the evaluations of soldering and strength of bond, etc.

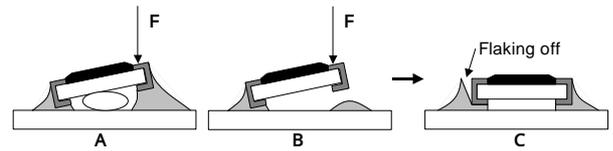
7.2 Select flux without the causticity.

7.3 The conditions of temperature and time should be well considered in the soldering process so that any warp or twist in the printed circuit board may not grow. Moreover, the electrode might flake off when the substrate is bent after it solders or the high impact is given parts or around it.

7.4 In VPS Reflow, preheat well so that the difference of temperature may not big too much between parts and inside of furnace. A big difference of temperature cause drop out of parts.

7.5 Do not rub the electrodes of resistor with soldering iron. The electrode may flake off when the iron is pressed on the electrode. Do not raise the temperature of the soldering iron more than necessary when the side electrode of parts is formed with the Ag resin.

Figure-4



7.6 The overcoat and the main body may be chipped off when you hold the parts strongly with tweezers.

Do not use parts detached from the print circuit board once again.

7.7 Please refer to page 55 for our recommended soldering conditions.

8. Cleaning

The remaining of the flux on print circuit board with part mounted may cause a bad effect on humidity resistance and corrosion resistance. Please use a rosin flux with low chlorine-containing, or alcoholic and hydrocarbon solvent.

9. Other Notes

9.1 The use of the products mentioned in this catalog refers to consumer applications that are available on the open market.

9.2 There are cases which high levels of reliability distinctive from consumer applications sold on the open market are necessary for electrical components which are used in equipment that could effect human life or create huge social loss owing to defect in medical equipment, space equipment, nuclear power-related equipment, vehicle mounted equipment, aircraft and other equipment. When you examine the use in the above-mentioned equipment or for uses not mentioned within this catalog, ensure that you consult with our sales department prior to deployment.

9.3 As the use of resistors and surface-mounted parts used in all electrical components, especially resistors used in high-voltage circuits and in circuits prescribed for safety regulations, will be greatly affected by the circuit used, the method of mounting, the material, and environmental conditions, ensure that you consult with our sales department prior to deployment when examining the viability of use in characteristic circuits, mounting methods, material and under characteristic environmental conditions,

9.4 Thoroughly verify performance and reliability when using under the following characteristic environmental conditions :

- (1) Use within a liquid environment (Water, oil, liquid chemical, organic solution, etc.)
- (2) Use in direct sunshine. Outdoors in heavy dew, in dusty environments, or where corrosive gas is present (Sea breezes, Cl₂, H₂S, NH₃, SO₂, NO₂, etc.)
- (3) Use in environments with strong electrostatic or magnetic waves exists.
- (4) Use nearby flammable substances.
- (5) Use with the resistors coated in resin, etc.
- (6) Use of water or water solution for flux cleaning after unwashed soldering or soldering.
- (7) Use under environment of condensation

9.5 Ensure that the condition of the mounting is evaluated and verified on circuit boards when subjected to overloads in the form of pulses or surges, etc.

9.6 Take cares handling these products as they may be damaged and become defective if subject to impact, such as dropping.