

DESCRIPTION

MOUNTING STRUCTURE FOR CHIP COMPONENT

5 TECHNICAL FIELD

[0001] The present disclosure relates to a mounting structure for a chip component.

BACKGROUND ART

10 [0002] Conventionally, as a method of mounting an electronic component on a printed wiring board, a flow soldering method and a reflow soldering method are well known.

[0003] Patent Literature 1 discloses a flow soldering method. A printed wiring board used in the flow soldering method includes: a substrate formed with a substrate electrode on which various circuit elements are surface mounted and an opening into which a lead terminal of a lead component is inserted; and a sheet member that is peelable and formed
15 with an opening at a position corresponding to the opening of the substrate. Then, an adhesive layer having adhesiveness is formed at a predetermined position other than the substrate electrode formed on the substrate, and the surface on which the adhesive layer is formed is covered with the sheet member.

[0004] Patent Literature 2 discloses a reflow soldering method. A mounting structure for
20 this reflow soldering method is a mounting structure for a chip component, the structure formed by soldering terminal electrodes at both ends of the chip component to two lands on a printed wiring board. In this mounting structure, the two lands formed on the printed wiring board are conductor films having a shape in which a part of opposite sides of a circular shape is cut off and two sides formed by the cutting are opposed to each other
25 substantially in parallel.

Citation List

Patent Literature

[0005] PTL 1: Unexamined Japanese Patent Publication No. H8-116153

PTL 2: Unexamined Japanese Patent Publication No. 2007-194462

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SUMMARY OF THE INVENTION

[0006] The present disclosure provides a mounting structure for a chip component, the structure enabling stable adhesive printing on a printed wiring board and mounting and

disposing of a small chip component.

[0007] The mounting structure for the chip component according to the present disclosure comprises the chip component including both terminal electrodes, and two lands on a printed wiring board, the both terminal electrodes being soldered to the two lands by a flow soldering method. The chip component is a small surface mounted device (SMD) component having a size of 0.6 mm × 0.3 mm, and the dimension between the two lands is more than or equal to 0.23 mm and less than or equal to 0.25 mm.

[0008] The mounting structure for the chip component in the present disclosure enables stable adhesive printing on the printed wiring board mounted with the small SMD component (for example, 0.6 mm × 0.3 mm (0603 size)) that is a chip component, which has not been conventionally possible. This enables mounting and disposing of the small SMD component. By defining the dimension between the two lands, an adhesive printing defect can be eliminated and falling off of the small SMD component during flow soldering work can be eliminated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Fig. 1 is a plan view showing a mounting structure for a chip component in an exemplary embodiment.

Fig. 2 is a plan view showing another mounting structure for a chip component in the exemplary embodiment.

DESCRIPTION OF EMBODIMENT

[0010] (Knowledge and the like underlying the present disclosure)

At the time when the inventors arrived at devising of the present disclosure, the flow soldering method has very high productivity.

[0011] With the recent downsizing of SMD components (surface mounted components), the size of the SMD components mounted on a printed wiring board has also been downsized. As an example, the SMD component surface area has become about half from 1.0 mm × 0.5 mm (1005 size) to 0.6 mm × 0.3 mm (0603 size).

[0012] Because, in the flow soldering method, the size limit of SMD components that can be subjected to flow soldering is 1.0 mm × 0.5 mm, there are an increasing number of small SMD components that cannot be mounted in the flow soldering method.

[0013] A major problem in mounting the small SMD component having an SMD

component size of 0.6 mm × 0.3 mm by the flow soldering method is that it is very difficult to perform stable adhesive printing on the printed wiring board. This is because, due to the small component size, it is not possible to secure the land size and the land-to-land distance at which the adhesive printing can be performed on the lower part of the

5 SMD component.

[0014] Even if the adhesive printing can be performed, an adhesive amount (adhesive force) cannot be secured, and there is a possibility that the target small SMD component is detached by a solder jet in a flow tank during the flow soldering work. In addition, even if the soldering is performed in the flow tank, soldering defects such as insufficient solder and solder bridges possibly occur due to the misalignment in the position of the adhesive printing. The inventors have found a problem that it is difficult to secure the quality of the substrate when the small SMD component is mounted by the flow soldering method as described above, and have come to constitute the subject of the present disclosure in order to solve the problem.

15 [0015] Accordingly, the present disclosure provides a mounting structure for a chip component, the structure enabling stable adhesive printing on a printed wiring board and mounting and disposing of a small chip component.

[0016] Hereinafter, an exemplary embodiment is described in detail with reference to the accompanying drawings. However, unnecessary detailed description is omitted in some cases. For example, detailed description of already well-known matters and repeated description of substantially the same configuration are omitted in some cases. This is to avoid an unnecessary redundancy in the following description and to facilitate understanding of a person skilled in the art.

[0017] Note that, the accompanying drawings and the following description are only presented to help those skilled in the art fully understand the present disclosure and are not intended to limit the subject matters as claimed in the claims.

[0018] (Exemplary embodiment)

Hereinafter, with reference to Fig. 1 and Fig. 2, an exemplary embodiment is described.

30 [0019] [1-1. Configuration]

Fig. 1 is a plan view showing a mounting structure for a chip component in the exemplary embodiment. Fig. 1 shows a mounting structure for small SMD component 2 being a chip component having a size of 0.6 mm × 0.3 mm. The mounting structure shown

in Fig. 1 shows an example in which small SMD component 2 is mounted in a form along a land shape, and an example in which a solder resist has a non solder mask defined (NSMD) structure partially along the land shape.

5 **[0020]** Two lands 3 on which small SMD component 2 is mounted are formed on printed wiring board 1. Dimension t1 between the inner sides of two lands 3 is set to more than or equal to 0.23 mm and less than or equal to 0.25 mm. In addition, dimension t2 of a portion of land 3 where small SMD component 2 is mounted is set to 0.2 mm, and width dimension t3 is set to 0.3 mm. Further, longitudinal dimension t4 of each of two lands 3 is set to more than or equal to 0.65 mm and less than or equal to 1.2 mm. Note that the
10 direction of width dimension t3 herein coincides with the lateral direction of small SMD component 2. Further, the direction of longitudinal dimension t4 herein coincides with the longitudinal direction of small SMD component 2.

[0021] Note that dimension t1 is set to more than or equal to 0.23 mm and less than or equal to 0.25 mm, because if dimension t1 is smaller than 0.23 mm, there is a problem that
15 a printing error such as application of an adhesive on land 3 occurs due to deviation or the like in the adhesive printing. Furthermore, if dimension t1 is smaller than 0.23 mm, there is a problem that the solder bridge is generated between terminal electrodes at both ends of small SMD component 2 at the time of soldering. In addition, if dimension t1 is larger than 0.25 mm, there is a problem that a possibility increases in occurrence of a solder bonding
20 error in which the terminal electrode of small SMD component 2 and land 3 are not soldered due to deviation in mounting the component. By setting dimension t1 to more than or equal to 0.23 mm and less than or equal to 0.25 mm, the above problem can be solved.

[0022] In addition, longitudinal dimension t4 of each of two lands 3 is set to more than or equal to 0.65 mm and less than or equal to 1.2 mm or less, because in the case of small
25 SMD component 2 having a size of 0.6 mm × 0.3 mm, land 3 to be soldered is very small, and if longitudinal dimension t4 is smaller than 0.65 mm, there is a problem that moisture gas is generated between the substrate and the solder at the time of performing the flow soldering work, and the soldering is possibly hindered. By setting longitudinal dimension
30 t4 to more than or equal to 0.65 mm and less than or equal to 1.2 mm, the above problem can be solved. Further, by setting longitudinal dimension t4 to less than or equal to 1.2 mm, small SMD components 2 can be mounted on printed wiring board 1 at high density.

[0023] In addition, in the other three directions of each of lands 3, protrusions 4a each

configured to draw circuit pattern 4 connected to a GND pattern, a power supply pattern circuit, or the like are provided. Protrusions 4a each include a copper foil. That is, land 3 has protrusions 4a. Circuit pattern 4 connected to land 3 is connected along the shape of each protrusion 4a via protrusion 4a. Although three protrusions 4a are provided in the present exemplary embodiment, at least one protrusion 4a may be provided. In other words, protrusion 4a may be provided at a portion of land 3 to which circuit pattern 4 is connected (a drawing part of circuit pattern 4).

[0024] Solder resist 5 is formed around land 3 and circuit pattern 4. Solder resist 5 prevents a soldered portion of land 3 from becoming abnormally large when the pattern is drawn in an insulation printing (resist ink) part.

[0025] The adhesive printing is performed between the inner sides of two lands 3, and small SMD component 2 is placed thereon to temporarily fix small SMD component 2. Note that the adhesive printing may be performed using a metal mask or a dispenser device.

[0026] Thereafter, the printed wiring board is turned over again, and if there is an odd-shaped electronic component, the component is mounted by hand or using a robot mounting machine. Then, by performing the flow soldering work, printed wiring board 1 and mounted small SMD component 2 are soldered and can be electrically conducted.

[0027] Fig. 2 is a plan view showing another mounting structure for a chip component in the exemplary embodiment. Fig. 2 shows a mounting structure for small SMD component 2 being a chip component having a small SMD component size of 0.6 mm × 0.3 mm. In the mounting structure shown in Fig. 2, a pattern drawn in each of two lands 3 indicates wiring of solid pattern 6. A thermal pattern (cross-shaped pattern) is formed by connecting solid pattern 6 to a drawing pattern of circuit pattern 4. That is, in the mounting structure shown in Fig. 2, each land 3 has at least two protrusions 4a. Further, solid pattern 6 connected only to at least two protrusions 4a is provided on printed wiring board 1. Solid pattern 6 is connected along the shape of each protrusion 4a of at least two protrusions 4a.

[0028] In this way, the land sizes of two lands 3 can be configured not to be extremely changed, and an amount of heat applied to lands 3 can be suppressed, that is, the temperatures of two lands 3 can be kept the same. Then, deviation of the component, cracking of the component, and the like can be prevented.

[0029] [1-2. Advantageous effects and the like]

As described above, the mounting structure for the chip component according to

the present exemplary embodiment is a mounting structure for a chip component comprises small SMD component 2 including both terminal electrodes, and two lands 3 on printed wiring board 1, both terminal electrodes being soldered to two lands 3 by a flow soldering method.. The size of the small SMD component is 0.6 mm × 0.3 mm, and the dimension

5 between two lands 3 is more than or equal to 0.23 mm and less than or equal to 0.25 mm.

[0030] This enables the stable adhesive printing on printed wiring board 1, which has not been possible conventionally, and enables mounting and disposing of small SMD component 2. Further, by defining the dimension between two lands 3, the adhesive printing defect can be eliminated and falling off of the small SMD component 2 during

10 flow soldering work can be eliminated.

[0031] Furthermore, by defining the dimension between two lands 3 to 0.23 mm to 0.25 mm, the adhesive printing defect can be eliminated and falling off of the small SMD component during flow soldering work can be eliminated.

[0032] In addition, the longitudinal dimension of land 3 is more than or equal to 0.65 mm

15 and less than or equal to 1.2 mm.

[0033] As a result, by defining the longitudinal dimension of land 3, solder contact and solder wettability at the time of the flow soldering work can be improved.

[0034] In the mounting structure for the chip component in which the both-end terminal electrodes of the chip component are soldered to the two lands on printed wiring board 1,

20 the structure has the shape that can draw the pattern on the lands or the shape that becomes the thermal land when the solid pattern is formed.

[0035] Thus, by performing pattern wiring along the pattern drawing shape to the protrusion for drawing in two lands 3, the stress on mounted small SMD component 2 can be alleviated against the expansion and contraction of printed wiring board 1, and the

25 component breakage can be eliminated. In addition, at the time of drawing solid pattern 6, the pattern wiring along the shape of protrusion 4a is performed to form the thermal land, and an amount of solder during the flow soldering work can be stabilized, which can improve soldering quality.

[0036] In addition, land 3 has protrusion 4a. Further, circuit pattern 4 connected to land 3

30 is connected along the shape of protrusion 4a via protrusion 4a.

[0037] In addition, land 3 has at least two protrusions 4a. Further, the solid pattern connected only to at least two protrusions 4a is provided on printed wiring board 1. Solid pattern 6 is connected along the shape of each protrusion 4a of at least two protrusions 4a.

[0038] (Other exemplary embodiments)

As described above, the exemplary embodiment has been described as an example of the technique disclosed in the present application. However, the techniques in the present disclosure are not limited to the above exemplary embodiment, and can also be applied to exemplary embodiments in which change, substitution, addition, omission, and the like are performed.

[0039] Accordingly, hereinafter, another exemplary embodiment is exemplified.

[0040] The present invention is not limited to the above example, and the shape of the chip component may be any shape. In addition, the land, the pattern, and the resist shape may be, for example, a rounded shape or a pattern disposed only in a portion where the pattern is actually drawn. The configuration allows soldering to be performed on two lands with the same amount of solder during the flow soldering, and the stress due to the expansion and contraction of the printed wiring board on the terminal parts at both ends of the chip component can be equalized.

[0041] Note that the above-described exemplary embodiment is to exemplify the techniques in the present disclosure, and therefore, various modifications, replacements, additions, omissions, and the like can be made in the scope of the claims or in an equivalent scope thereof.

INDUSTRIAL APPLICABILITY

[0042] The mounting structure for the chip component in the present disclosure enables improvement in productivity and achievement of inexpensive production cost, which are characteristics of the flow soldering method, and can be applied to applications of various electrical appliances.

REFERENCE MARKS IN THE DRAWINGS

[0043]	1	printed wiring board
	2	small SMD component (chip component)
	3	land
	4	circuit pattern
	4a	protrusion
	5	solder resist
	6	solid pattern

CLAIMS

1. A mounting structure for a chip component, the mounting structure comprising:

- 5 the chip component including both terminal electrodes; and
 two lands on a printed wiring board, the both terminal electrodes being soldered to
the two lands by a flow soldering method, wherein
 the chip component is a small surface mounted device (SMD) component having a
size of 0.6 mm × 0.3 mm, and
10 the two lands are disposed with a dimension that is more than or equal to 0.23 mm
and less than or equal to 0,25 mm between the two lands.

2. The mounting structure for the chip component according to Claim 1, wherein
each of the two lands has a longitudinal dimension that is more than or equal to 0.65 mm
15 and less than or equal to 1.2 mm.

3. The mounting structure according to Claim 1 or 2, wherein the mounting
structure has a shape capable of drawing a pattern on the two lands or a shape that becomes
a thermal land when a solid pattern is formed.
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4. The mounting structure according to Claim 1 or 2, wherein
the each of the two lands has a protrusion, and
the each of the two lands is connected with a circuit pattern that is connected via
the protrusion along a shape of the protrusion.
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5. The mounting structure according to Claim 1 or 2, wherein
the each of the two lands includes at least two protrusions, and
the printed wiring board is provided with, on the printed wiring board, a solid
pattern connected only to the at least two protrusions, and the solid pattern is connected
30 along a shape of each of the at least two protrusions.