US Patent & Trademark Office
Patent Public Search | Text View

United States Patent Application Publication 20250266332
Kind Code A1
Publication Date August 21, 2025
Inventor(s) MATSUBARA; Hiroaki et al.

ELECTRONIC DEVICE

Abstract

An electronic device comprises an electronic component, a sealing resin and a lead. The sealing resin includes a surface facing a first direction and covering the electronic component. The lead includes a root portion extending from the surface in the first direction, a mounting portion offset on the thickness direction with respect to the root portion, and an extending portion connected to the root portion through a first bent portion and to the mounting portion through a second bent portion. The lead includes a first section including the root portion, and a second section including the mounting portion. A width of the first section is greater than a width of the second section. A first section boundary between the first section and the second section is located between a boundary, which is between the root portion and the first bent portion, and a center of the extending portion.

Inventors: **MATSUBARA; Hiroaki (Kyoto-shi, JP), UMENO; Ryohei (Kyoto-shi, JP), NEGORO; Takahiro (Kyoto-shi, JP)**

Applicant: **Rohm Co., Ltd.** (Kyoto-shi, JP)

Family ID: **1000008603671**

Appl. No.: **19/189854**

Filed: **April 25, 2025**

Foreign Application Priority Data

JP	2022-175672	Nov. 01, 2022

Related U.S. Application Data

parent WO continuation PCT/JP2023/037986 20231020 PENDING child US 19189854

Publication Classification

Int. Cl.: **H01L23/495** (20060101); **H01L23/31** (20060101)

U.S. Cl.:

CPC **H01L23/49548** (20130101); **H01L23/3107** (20130101);

Background/Summary

TECHNICAL FIELD
[0001] The present disclosure relates to an electronic device.
[0002] BACKGROUND ART
[0003] Conventionally, a semiconductor device that is manufactured using a lead frame has been known as an example of various kinds of electronic devices. One example of such a semiconductor device is described in JP-A-2022-55599, for example. The conventional semiconductor device disclosed in the document includes a semiconductor element, a conductive support, and a sealing resin. The conductive support includes a die pad and a plurality of terminals (input-side terminals, high-voltage output-side terminals, and low-voltage output-side terminals). The semiconductor device is of an SOP (Small Outline Package) package type. In the SOP package type, the plurality of terminals are bent in a gull-wing shape. The semiconductor device is mounted on a circuit board in a vehicle, electrical equipment, or the like.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0004] FIG. **1** is a plan view of an electronic device according to a first embodiment.
[0005] FIG. **2** is a plan view, in which the sealing resin shown in FIG. **1** is indicated by imaginary lines.
[0006] FIG. **3** is a front view of the electronic device according to the first embodiment.
[0007] FIG. **4** is a bottom view of the electronic device according to the first embodiment.
[0008] FIG. **5** is a left-side view of the electronic device according to the first embodiment.
[0009] FIG. **6** is a right-side view of the electronic device according to the first embodiment.
[0010] FIG. **7** is a cross-sectional view taken along a line VII-VII of FIG. **2**.
[0011] FIG. **8** is a cross-sectional view taken along a line VIII-VIII of FIG. **2**.
[0012] FIG. **9** is an enlarged view illustrating a relevant part of the electronic device according to the first embodiment, wherein the upper portion is an enlargement of a part of FIG. **1** and lower portion is an enlargement of a part of FIG. **5**.
[0013] FIG. **10** is an enlarged view illustrating a relevant part of the electronic device according to the first embodiment, wherein the upper portion is an enlargement of a part of FIG. **1** and the lower portion is an enlargement of a part of FIG. **6**.
[0014] FIG. **11** is the schematic diagram of the electronic components of the electronic device according to the first embodiment.
[0015] FIG. **12** is an enlarged plan view illustrating a relevant part of the electronic device according to the first embodiment during its manufacturing process.
[0016] FIG. **13** is a plan view of an electronic device according to a variation of the first embodiment, with the sealing resin indicated by imaginary lines.
[0017] FIG. **14** is an enlarged view illustrating a relevant part of the electronic device according to the variation of the first embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.

[0018] FIG. **15** is an enlarged view illustrating a relevant part of the electronic device according to the variation of the first embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0019] FIG. **16** is an enlarged view illustrating a relevant part of an electronic device according to another variation of the first embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0020] FIG. **17** is an enlarged view illustrating a relevant part of an electronic device according to another variation of the first embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0021] FIG. **18** is an enlarged plan view illustrating a relevant part of an electronic device according to another variation of the first embodiment.
[0022] FIG. **19** is an enlarged plan view illustrating a relevant part of an electronic device according to another variation of the first embodiment.
[0023] FIG. **20** is an enlarged plan view illustrating a relevant part of an electronic device according to another variation of the first embodiment.
[0024] FIG. **21** is a plan view of an electronic device according to a second embodiment, with the sealing resin indicated by imaginary lines.
[0025] FIG. **22** is a back view of the electronic device according to the second embodiment.
[0026] FIG. **23** is an enlarged view illustrating a relevant part of the electronic device according to the second embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0027] FIG. **24** is an enlarged view illustrating a relevant part of the electronic device according to the second embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0028] FIG. **25** is a plan view of an electronic device according to a variation of the second embodiment, with the sealing resin indicated by imaginary lines.
[0029] FIG. **26** is an enlarged view illustrating a relevant part of the electronic device according to the variation of the second embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0030] FIG. **27** is an enlarged view illustrating a relevant part of the electronic device according to the variation of the second embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0031] FIG. **28** is an enlarged view illustrating a relevant part of an electronic device according to another variation of the second embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0032] FIG. **29** is an enlarged view illustrating a relevant part of an electronic device according to another variation of the second embodiment, wherein the upper portion is an enlarged plan view of the relevant part and the lower portion is an enlarged side view of the relevant part.
[0033] FIG. **30** is a plan view of an electronic device according to a third embodiment, with the sealing resin indicated by imaginary lines.
[0034] FIG. **31** is a plan view of an electronic device according to a fourth embodiment, with the sealing resin indicated by imaginary lines.
[0035] FIG. **32** is the schematic diagram of the electronic components of the electronic device according to the fourth embodiment.
[0036] FIG. **33** is a plan view of an electronic device according to a variation of the fourth embodiment, with the sealing resin indicated by imaginary lines.
[0037] FIG. **34** is a plan view of an electronic device according to a fifth embodiment.
[0038] FIG. **35** is a plan view of an electronic device according to a sixth embodiment.

DETAILED DESCRIPTION OF EMBODIMENTS

[0039] The following describes preferred embodiments of the present disclosure in detail with

reference to the drawings. In the following, identical or similar elements are denoted by the same reference signs, and redundant explanations are omitted. In the present disclosure, the terms such as “first”, “second”, and “third” are used merely as labels and are not intended to impose ordinal requirements on the items to which these terms refer.
[0040] In the description of the present disclosure, the expression “An object A is formed in an object B”, and “An object A is formed on an object B” imply the situation where, unless otherwise specifically noted, “the object A is formed directly in or on the object B”, and “the object A is formed in or on the object B, with something else interposed between the object A and the object B”. Likewise, the expression “An object A is disposed in an object B”, and “An object A is disposed on an object B” imply the situation where, unless otherwise specifically noted, “the object A is disposed directly in or on the object B”, and “the object A is disposed in or on the object B, with something else interposed between the object A and the object B”. Further, the expression “An object A is located on an object B” implies the situation where, unless otherwise specifically noted, “the object A is located on the object B, in contact with the object B”, and “the object A is located on the object B, with something else interposed between the object A and the object B”. Still further, the expression “An object A overlaps with an object B as viewed in a certain direction” implies the situation where, unless otherwise specifically noted, “the object A overlaps with the entirety of the object B”, and “the object A overlaps with a part of the object B”. Also, the expression “An object A (or the material thereof) contains a material C” includes “the object A (or the material thereof) is made of a material C” and “the object A (or the material thereof) is mainly composed of a material C”.
First Embodiment
[0041] FIGS. **1** to **11** show an electronic device Al according to a first embodiment. The electronic device A**1** includes a first lead **11**, a second lead **12**, a plurality of third leads **13**, a fourth lead **14**, a fifth lead **15**, a die pad **4**, an electronic component **5**, a plurality of connection members **61** to **66**, and a sealing resin **7**. In the illustrated example, the electronic device A**1** includes eleven third leads **13**, and the number of the third leads **13** is not particularly limited. The specific use of the electronic device A**1** is not particularly limited, and includes detecting the battery voltage of an electric vehicle, for example. The electronic device Al may be used not only for detecting the battery voltage of an electric vehicle but also for detecting other voltages in an electric vehicle, as well as voltages in industrial equipment, home appliances, power supplies, or the like. The electronic device A**1** is a surface-mount semiconductor device and, in the present embodiment, is of a Small Outline Package (SOP) type, as shown in FIGS. **1** to **11**.
[0042] For convenience of explanation, the thickness direction of the electronic device A**1** is referred to as a “thickness direction z”. In the following description, “above”, “below”, “upper”, “lower”, “top surface” and “bottom surface” indicate the relative positional relationship of each component in the thickness direction z, and do not necessarily define the relationship with respect to the direction of gravity. The term “plan view” means as viewed in the thickness direction z. One direction orthogonal to the thickness direction z is referred to as a “first direction y”. The direction orthogonal to the thickness direction z and the first direction y is referred to as a “second direction x”.
[0043] The first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, the fifth lead **15** and the die pad **4** contain metals such as Cu (copper), Ni (nickel) and Fe (iron). The first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, the fifth lead **15** and the die pad **4** are formed from a single lead frame. The first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, the fifth lead **15** and the die pad **4** are formed, for example, by processing selected from punching, bending, or etching on a metal plate material. Each of the first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, the fifth lead **15** and the die pad **4** may be provided with a plating layer comprising Ag (silver), Ni, Au (gold) or the like at appropriate positions.
[0044] The first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14** and the fifth lead

15 are electrically connected to the electronic component **5** and form a conductive path in the electronic device A**1**. The first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14** and the fifth lead **15** are spaced apart from each other. The first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, and the fifth lead **15** each include a portion covered by the sealing resin **7** and a portion exposed from the sealing resin **7**.

[0045] The first lead **11** includes an outer lead **21** and an inner lead **31**. The outer lead **21** and the inner lead **31** are connected to each other and are integrally formed.

[0046] The outer lead **21** is a part of the first lead **11** that is exposed from the sealing resin **7**. The outer lead **21** projects from the sealing resin **7** on one side of the first direction y. In plan view, the outer lead **21** has a rectangular shape with the first direction y as its longitudinal direction. The outer lead **21** is bent in a gull-wing shape as viewed in the second direction x. The outer lead **21** includes a root portion **211**, a mounting portion **212**, an extending portion **213**, and two bent portions **214** and **215**.

[0047] The root portion **211** is a base of the outer lead **21**. As shown in FIGS. **1** and **2**, the root portion **211** is located at the end of the outer lead **21** that is close to the sealing resin **7** in the first direction y. In other words, the root portion **211** is located closer to the sealing resin **7** than the mounting portion **212** and the extending portion **213** in the first direction y. The root portion **211** is located above the mounting portion **212** in the thickness direction z and projects from the center of the sealing resin **7** in the thickness direction z.

[0048] The mounting portion **212** is a tip of the outer lead **21**. When the electronic device A**1** is mounted on a circuit board, the mounting portion **212** is bonded to the circuit board. As shown in FIGS. **1** and **2**, the mounting portion **212** is located at the end opposite to the sealing resin **7** in the first direction y. In other words, the mounting portion **212** is located farther from the sealing resin **7** than the root portion **211** and the extending portion **213** in the first direction y. The mounting portion **212** is located below the root portion **211** in the thickness direction z.

[0049] The extending portion **213** is connected to the root portion **211** through the bent portion **214** and to the mounting portion **212** through the bent portion **215**. The extending portion **213** is inclined with respect to the root portion **211** and the mounting portion **212** as viewed in the second direction x. The extending portion **213** is also inclined with respect to the thickness direction z as viewed in the second direction x.

[0050] The bent portion **214** is interposed between the root portion **211** and the extending portion **213**. The bent portion **214** is curved from the root portion **211** downwardly in the thickness direction z. The bent portion **215** is interposed between the mounting portion **212** and the extending portion **213**. The bent portion **215** is curved from the mounting portion **212** upwardly in the thickness direction z. The two bent portions **214** and **215** are each curved as viewed in the second direction x.

[0051] As shown in FIG. **9**, the outer lead **21** includes a first section **21**A and a second section **21**B. The first section **21**A and the second section **21**B are connected to each other. In the illustrated example, the first section **21**A and the second section **21**B are each rectangular in plan view. The first section **21**A includes the root portion **211**. The second section **21**B includes the mounting portion **212**. The first section **21**A has a width (dimension in the second direction x) W.sub.21A greater than a width (dimension in the second direction x) W.sub.218 of the second section **21**B. For example, the width W.sub.218 is 2 to 6 times the width W.sub.21A.

[0052] As understood from FIG. **9**, a boundary (hereinafter referred to as a “first section boundary”) **21**C between the first section **21**A and the second section **21**B is located between a boundary **2101**, which is between the root portion **211** and the bent portion **214**, and a central boundary **2103** of the extending portion **213**. The central boundary **2103** of the extending portion **213** extends in the normal direction to the extending portion **213** at the center in an extending direction from the bent portion **214** to the bent portion **215**. In the present embodiment, the first section boundary **21**C overlaps with the boundary **2101**. In the present disclosure, a boundary **2102** between the bent portion **214** and the extending portion **213** and a boundary **2104** between the bent portion **215** and the extending portion **213** are each parallel to the central boundary **2103**. In such a configuration, the first section **21**A includes the root portion **211**, while the second section **21**B includes the mounting portion **212**, the extending portion **213**, and the two bent portions **214** and **215**.

[0053] The inner lead **31** is a part of the first lead **11** that is covered by the sealing resin **7**. The inner lead **31** extends inward from the outer lead **21** toward the sealing resin **7**.

[0054] The second lead **12** includes an outer lead **22** and an inner lead **32**.

[0055] The outer lead **22** is a part of the second lead **12** that is exposed from the sealing resin **7**. The outer lead **22** projects from the sealing resin **7** on one side of the first direction y. In plan view, the outer lead **22** has a rectangular shape with the first direction y as its longitudinal direction. In the present embodiment, the plan view shape of the outer lead **22** is congruent to the plan view shape of the outer lead **21**, but unlike this configuration, these plan view shapes may not be congruent to each other. The outer lead **22** is bent in a gull-wing shape as viewed in the second direction x. The outer lead **22** overlaps with outer lead **21** as viewed in the second direction x. The outer lead **22** includes a root portion **221**, a mounting portion **222**, an extending portion **223**, and two bent portions **224** and **225**.

[0056] The mounting portion **222** is a tip of the outer lead **22**. When the electronic device A**1** is mounted on a circuit board, the mounting portion **222** is bonded to the circuit board. As shown in FIGS. **1** and **2**, the mounting portion **222** is located at the end opposite to the sealing resin **7** in the first direction y. In other words, the mounting portion **222** is located farther from the sealing resin **7** than the root portion **221** and the extending portion **223** in the first direction y. The mounting portion **222** is located below the root portion **221** in the thickness direction z. The mounting portion **222** is aligned with the mounting portion **212** in the thickness direction z.

[0057] The root portion **221** is a base of the outer lead **22**. As shown in FIGS. **1** and **2**, the root portion **221** is located at the end of the outer leads **22** that is close to the sealing resin **7** in the first direction y. In other words, the root portion **221** is located closer to the sealing resin **7** than the mounting portion **222** and the extending portion **223** in the first direction y. The root portion **221** is located above the mounting portion **222** in the thickness direction z and projects from the center of the sealing resin **7** in the thickness direction z. The root portion **221** is aligned with the root portion **211** in the thickness direction z.

[0058] The extending portion **223** is connected to the root portion **221** through the bent portion **224** and to the mounting portion **222** through the bent portion **225**. The extending portion **223** is inclined with respect to the mounting portion **222** and the root portion **221** as viewed in the second direction x.

[0059] The bent portion **224** is interposed between the root portion **221** and the extending portion **223**. The bent portion **224** is curved from the root portion **221** downwardly in the thickness direction z. The bent portion **225** is interposed between the mounting portion **222** and the extending portion **223**. The bent portion **225** is curved from the mounting portion **222** upwardly in the thickness direction z. The two bent portions **224** and **225** are each curved as viewed in the second direction x.

[0060] As shown in FIG. **10**, the outer lead **22** includes a third section **22**A and a fourth section **22**B. The third section **22**A and the fourth section **22**B are connected to each other. The third section **22**A includes the root portion **221**. The fourth section **22**B includes the mounting portion **222**. The third section **22**A has a width (dimension in the second direction x) W.sub.22A greater than a width (dimension in the second direction x) W.sub.228 of the fourth section **22**B. For example, the width W.sub.22B is 2 to 6 times the width W.sub.22A. In the present embodiment, the width W.sub.21A of the first section **21**A and the width W.sub.22A of the third section **22**A are the same, and the width W.sub.218 of the second section **21**B and the width W.sub.228 of the fourth section **22**B are the same, but they may be different.

[0061] As understood from FIG. **10**, a boundary (hereinafter referred to as a “second section boundary”) **22**C between the third section **22**A and the fourth section **22**B is located between a boundary **2201**, which is between the root portion **221** and the bent portion **224**, and a central boundary **2203** of the extending portion **223**. The central boundary **2203** of the extending portion **223** extends in the normal direction to the extending portion **223** at the center in an extending direction from the bent portion **224** to the bent portion **225**. In the present embodiment, the second section boundary **22**C overlaps with the boundary **2201**. In the present disclosure, a boundary **2202** between the bent portion **224** and the extending portion **223** and a boundary **2204** between the bent portion **225** and the extending portion **223** are each parallel to the central boundary **2203**. In this configuration, the third section **22**A includes the root portion **221**, while the fourth section **22**B includes the mounting portion **222**, the extending portion **223**, and the two bent portions **224** and **225**.
[0062] The inner lead **32** is a part of the second lead **12** that is covered by the sealing resin **7**. The inner lead **32** is connected to the outer lead **22** and extends inward from the outer lead **22** toward the sealing resin **7**.
[0063] The third leads **13** each include an outer lead **23** and an inner lead **33**. Accordingly, the electronic device A**1** includes a plurality of outer leads **23** and a plurality of inner leads **33**. The outer leads **23** and the inner leads **33** are shared by each of the third leads **13**, unless otherwise specifically noted.
[0064] The outer lead **23** is a part of each third lead **13** that is exposed from the sealing resin **7**. Each outer lead **23** projects from the sealing resin **7** to the other side of the first direction y. In plan view, each outer lead **23** has a band-like shape with the first direction y as its longitudinal direction. The outer leads **23** are disposed at equal intervals along the second direction x. Each outer lead **23** is bent in a gull-wing shape as viewed in the second direction x. The outer leads **23** overlap with each other as viewed in the second direction x. The outer lead **23** includes a root portion **231**, a mounting portion **232**, an extending portion **233**, and two bent portions **234** and **235**. Thus, the electronic device A**1** includes a plurality of root portions **231**, a plurality of mounting portions **232**, a plurality of extending portions **233**, and a plurality of bent portions **234** and **235**. The root portion **231**, the mounting portion **232**, the extending portion **233**, and the two bent portions **234** and **235**, described below, are shared by each of the outer leads **23**, unless otherwise specifically noted.
[0065] The mounting portion **232** is a tip of the outer lead **23**. When the electronic device A**1** is mounted on a circuit board, the mounting portion **232** is bonded to the circuit board. As shown in FIGS. **1** and **2**, the mounting portion **232** is located at the end opposite to the sealing resin **7** in the first direction y. In other words, the mounting portion **232** is located farther from the sealing resin **7** than the root portion **231** and the extending portion **233** in the first direction y. The mounting portion **232** is located below the root portion **231** in the thickness direction z. The mounting portions **232** are aligned with each other in the thickness direction z. The mounting portions **232** are disposed at equal intervals along the second direction x. Each mounting portion **232** has a width (dimension in the second direction x) W.sub.23 (see FIG. **1**) less than or equal to the width W.sub.218 of the second section **21**B and the width W.sub.228 of the fourth section **22**B. In other words, the width W.sub.21B of the second section **21**B and the width W.sub.228 of the fourth section **22**B are greater than or equal to the width W.sub.23 of each mounting portion **232**, respectively. In the present embodiment, the width W.sub.23 of each mounting portion **232** is, for example, 0.15 mm or more and 0.5 mm or less.
[0066] The root portion **231** is a base of the outer lead **23**. As shown in FIGS. **1** and **2**, the root portion **231** is located at the end of the outer leads **23** that is close to the sealing resin **7** in the first direction y. In other words, the root portion **231** is located closer to the sealing resin **7** than the mounting portion **232** and the extending portion **233** in the first direction y. The root portion **231** is located above the mounting portion **232** in the thickness direction z and projects from the center of the sealing resin **7** in the thickness direction z. The root portions **231** are aligned with each other in

the thickness direction z. The width (dimension in the second direction x) of the root portion **231** is equal to the width W.sub.23 of the mounting portion **232**.
[0067] The extending portion **233** connects the mounting portion **232** and the root portion **231**. The extending portion **233** is inclined with respect to the mounting portion **232** and the root portion **231** as viewed in the second direction x. The width (dimension in the second direction x) of the extending portion **233** is equal to the width W.sub.23 of the mounting portion **232**.
[0068] The bent portion **234** is interposed between the root portion **231** and the extending portion **233**. The bent portion **234** is curved from the root portion **231** downwardly in the thickness direction z. The bent portion **235** is interposed between the mounting portion **232** and the bent portion **234**. The bent portion **235** is curved from the mounting portion **232** upwardly in the thickness direction z. The two bent portions **234** and **235** are each curved as viewed in the second direction x.
[0069] The inner lead **33** is the portion of each third lead **13** that is covered by the sealing resin **7**. The inner lead **33** is connected to the outer lead **23** and extends inward from the outer lead **23** toward the sealing resin **7**.
[0070] The fourth lead **14** includes an outer lead **24** and an inner lead **34**.
[0071] The outer lead **24** is a part of the fourth lead **14** that is exposed from the sealing resin **7**. The outer lead **24** projects from the sealing resin **7** to the other side of the first direction y. The outer lead **24** is located on the other side of the second direction x with respect to the outer leads **23**. The outer lead **24** is bent in a gull-wing shape as viewed in the second direction x. The outer lead **24** overlaps with each outer lead **23** as viewed in the second direction x. The outer lead **24** includes a plurality of parts that are separated from each other. In the examples shown in FIGS. **1** and **2**, it includes two separated parts. In plan view, each of the separated parts of the outer lead **24** has a rectangular shape with the first direction y as its longitudinal direction. In the present embodiment, the plan view shape of each of the separated parts is congruent to the plan view shape of the outer lead **23**, but unlike this configuration, these plan view shapes may not be congruent to each other. Each of the separated parts of the outer lead **24** includes a root portion **241**, a mounting portion **242**, an extending portion **243**, and two bent portions **244** and **245**. Thus, in the example shown in FIGS. **1** and **2**, the outer lead **24** includes two root portions **241**, two mounting portions **242**, two extending portions **243**, and a plurality of bent portions **244** and **245**. The root portion **241**, the mounting portion **242**, the extending portion **243**, the bent portion **244** and the bent portion **245**, described below, are shared by each of the separated parts of the outer lead **24**, unless otherwise specifically noted.
[0072] The mounting portion **242** is a tip of each of the separated parts of the outer lead **24**. When the electronic device A**1** is mounted on a circuit board, the mounting portion **242** is bonded to the circuit board. As shown in FIGS. **1** and **2**, the mounting portion **242** is located at the end opposite to the sealing resin **7** in the first direction y. In other words, the mounting portion **242** is located farther from the sealing resin **7** than the root portion **241**, the extending portion **243**, and the two bent portions **244** and **245** in the first direction y. The mounting portion **242** is located below the root portion **241** in thickness direction z. The mounting portion **242** is aligned with each mounting portion **232** in the thickness direction z. The two mounting portions **242** are adjacent to each other in the second direction x on the other side of the second direction x with respect to the mounting portions **232**. Each of the two mounting portions **242** has a width (dimension in the second direction x) W.sub.24 (see FIG. **1**), for example, equal to the width W.sub.23 of each mounting portion **232**. The width W.sub.24 of each of the two mounting portions **242** may also be equal to the width W.sub.218 of the second section **21**B. In the present embodiment, the width W.sub.24 of each of the two mounting portions **242** is, for example, 0.15 mm or more and 0.5 mm or less. A spacing d**4** between the two mounting portions **242** (see FIG. **3**) is equal to a spacing d**3** between the two mounting portions **232** adjacent in the second direction x. Among the two mounting portions **242**, the one located on the other side of the second direction x includes an end on the

other side of the second direction x, which overlaps with the end of the first section **21**A on the other side of the second direction x, as viewed in the first direction y. Among the two mounting portions **242**, the one located on one side of the second direction x includes an end on one side of the second direction x, which overlaps with the end of the first section **21**A on one side of the second direction x, as viewed in the first direction y.

[0073] The root portion **241** is a base of each separated part of the outer lead **24**. As shown in FIGS. **1** and **2**, the root portion **241** is located at the end of each separated part of the outer lead **24** that is close to the sealing resin **7** in the first direction y. In other words, the root portion **241** is located closer to the sealing resin **7** than the mounting portion **242**, the extending portion **243**, and the two bent portions **244** and **245** in the first direction y. The root portion **241** is located above the mounting portion **242** in the thickness direction z and projects from the center of the sealing resin **7** in the thickness direction z. The root portion **241** is aligned with each root portion **231** in the thickness direction z. The width (dimension in the second direction x) of each of the two root portions **241** is equal to the width W.sub.24 of each of the two mounting portions **242**.

[0074] The extending portion **243** is connected to the root portion **241** through the bent portion **244** and to the mounting portion **242** through the bent portion **245**. The extending portion **243** is inclined with respect to the root portion **241** and the mounting portion **242** as viewed in the second direction x. The width (dimension in the second direction x) of the extending portion **243** is equal to the width W.sub.24 of the root portion **241**. The bent portion **244** is interposed between the root portion **241** and the extending portion **243**. The bent portion **244** is curved from the root portion **241** downwardly in the thickness direction z. The bent portion **245** is interposed between the mounting portion **242** and the extending portion **243**. The bent portion **245** is curved from the mounting portion **242** upwardly in the thickness direction z. The two bent portions **244** and **245** are each curved as viewed in the second direction x.

[0075] The inner lead **34** is a part of the fourth lead **14** that is covered by the sealing resin **7**. The inner lead **34** is connected to the outer lead **24** and extends inward from the outer lead **24** toward the sealing resin **7**. The inner lead **34** includes a branched portion **341**, as shown in FIG. **2**. The branched portion **341** is located at the end of the inner lead **34** that is connected to the outer lead **24**. The branched portion **341** is connected to each of the root portions **241**. The branched portion **341** includes the same number of branches as the number of root portions **241**. Thus, in a configuration where the outer lead **24** includes the two root portions **241**, the branched portion **341** includes two branches. The branched portion **341** includes the ends of branches from which the two respective root portions **241** extend. Hence, the two mounting portions **242** of the outer lead **24** have the same potential.

[0076] The fifth lead **15** includes an outer lead **25** and an inner lead **35**.

[0077] The outer lead **25** is a part of the fifth lead **15** that is exposed from the sealing resin **7**. As shown in FIG. **2**, the outer lead **25** projects from the sealing resin **7** to the other side of the first direction y. The outer lead **25** is located on one side of the second direction x with respect to the outer leads **23**. The outer lead **25** is bent in a gull-wing shape as viewed in the second direction x. The outer lead **25** overlaps with each outer lead **23** as viewed in the second direction x. The outer lead **25** includes a plurality of parts that are separated from each other. In the examples shown in FIGS. **1** and **2**, it includes two separated parts. In plan view, each of the separated parts of the outer lead **25** has a rectangular shape with the first direction y as its longitudinal direction. In the present embodiment, the plan view shape of each of the separated parts is congruent to the plan view shape of the outer lead **23**, but unlike this configuration, these plan view shapes may not be congruent to each other. Each of the separated parts of the outer lead **25** includes a root portion **251**, a mounting portion **252**, an extending portion **253**, and two bent portions **254** and **255**. Thus, in the example shown in FIGS. **1** and **2**, the outer lead **25** includes two root portions **251**, two mounting portions **252**, two extending portions **253**, and a plurality of bent portions **254** and **255**. The root portion **251**, the mounting portion **252**, the extending portion **253**, the bent portion **254** and the bent portion

255, described below, are shared by each of the separated parts of the outer lead **25**, unless otherwise specifically noted.

[0078] The mounting portion **252** is a tip of each of the separated parts of the outer lead **25**. When the electronic device A**1** is mounted on a circuit board, the mounting portion **252** is bonded to the circuit board. In FIGS. **1** and **2**, the mounting portion **252** is located at the end opposite to the sealing resin **7** in the first direction y. In other words, the mounting portion **252** is located farther from the sealing resin **7** than the root portion **251**, the extending portion **253**, and the two bent portions **254** and **255** in the first direction y. The mounting portion **252** is located below the root portion **251** in thickness direction z. The mounting portion **252** is aligned with each mounting portion **232** in the thickness direction z. The two mounting portions **252** are adjacent to each other in the second direction x on one side of the second direction x with respect to the mounting portions **232**. Each of the two mounting portions **252** has a width (dimension in the second direction x) W.sub.25 (see FIG. **1**), for example, equal to the width W.sub.23 of each mounting portion **232**. The width W.sub.25 of each of the two mounting portions **252** may also be equal to the width W.sub.21B of the second section **21**B. In the present embodiment, the width W.sub.25 of each of the two mounting portions **252** is, for example, 0.15 mm or more and 0.5 mm or less. A spacing d**5** between the two mounting portions **252** (see FIG. **3**) is equal to the spacing d**3** between the two adjacent mounting portions **232** in the second direction x. Among the two mounting portions **252**, the one located on the other side of the second direction x includes an end on the other side of the second direction x, which overlaps with the end of the third section **22**A on the other side of the second direction x, as viewed in the first direction y. Among the two mounting portions **252**, the one located on one side of the second direction x includes an end on one side of the second direction x, which overlaps with the end of the third section **22**A on one side of the second direction x, as viewed in the first direction y.

[0079] The root portion **251** is a base of each separated part of the outer lead **25**. As shown in FIGS. **1** and **2**, the root portion **251** is located at the end of each separated part of the outer lead **25** that is close to the sealing resin **7** in the first direction y. In other words, the root portion **251** is located closer to the sealing resin **7** than the mounting portion **252** and the extending portion **253** in the first direction y. The root portion **251** is located above the mounting portion **252** in the thickness direction z and projects from the center of the sealing resin **7** in the thickness direction z. The root portion **251** is aligned with each root portion **231** in the thickness direction z. The width (dimension in the second direction x) of each of the two root portions **251** is equal to the width W.sub.25 of each of the two mounting portions **252**.

[0080] The extending portion **253** is connected to the root portion **251** through the bent portion **254** and to the mounting portion **252** through the bent portion **255**. The extending portion **253** is inclined with respect to the root portion **251** and the mounting portion **252** as viewed in the second direction x. The width (dimension in the second direction x) of the extending portion **253** is equal to the width W.sub.25 of the root portion **251**.

[0081] The bent portion **254** is interposed between the root portion **251** and the extending portion **253**. The bent portion **254** is curved from the root portion **251** downwardly in the thickness direction z. The bent portion **255** is interposed between the mounting portion **252** and the extending portion **253**. The bent portion **255** is curved from the root portion **251** upwardly in the thickness direction z. The two bent portions **254** and **255** are each curved as viewed in the second direction x.

[0082] The inner lead **35** is a part of the fifth lead **15** that is covered by the sealing resin **7**. The inner lead **35** is connected to the outer lead **25** and extends inward from the outer lead **25** toward the sealing resin **7**. The inner leads **33** are located between the two inner leads **34** and **35**. The inner lead **35** includes a branched portion **351**, as shown in FIG. **2**. The branched portion **351** is located at the end of the inner lead **35** that is connected to the outer lead **25**. The branched portion **351** is connected to each of the root portions **251**. The branched portion **351** includes the same number of branches as the number of root portions **251**. Thus, in a configuration where the outer lead **25** includes the two root portions **251**, the branched portion **351** includes two branches. The branched portion **351** includes ends of branches from which the two respective root portions **251** extend. Hence, the two mounting portions **252** of the outer lead **25** have the same potential.

[0083] In the electronic device A**1**, the mounting portion **212** and the mounting portion **222** are adjacent to each other with a spacing d**12** (see FIG. **4**) along the second direction x. The mounting portions **232** are arranged with the spacing d**3** (see FIG. **3**) along the second direction x. The spacing d**12** (see FIG. **4**) along the second direction x between the mounting portion **212** and the mounting portion **222** is greater than the spacing d**3** (see FIG. **3**) along the second direction x between the two mounting portions **232** adjacent in the second direction x. The spacing d**12** may be 10 to 20 times the spacing d**3**. In the present embodiment, the spacing d**12** may be 5 mm or more and 10 mm or less, and the spacing d**3** may be 0.25 mm or more and 5 mm or less. Given that the potential difference between the mounting portion **212** and the mounting portion **222** is about 800 V, the spacing d**12** is preferably 4 mm or more. The spacing d**3** is equal to a spacing d**34** (see FIG. **3**) along the second direction x between one of the two mounting portions **242** and its adjacent mounting portion **232**, and to a spacing d**35** (see FIG. **3**) between one of the two mounting portions **252** and its adjacent mounting portion **232**.

[0084] The die pad **4** supports the electronic component **5**. The die pad **4** includes a first pad **41** and a second pad **42**. The first pad **41** and the second pad **42** are spaced apart from each other. The respective plan view shapes of the first pad **41** and the second pad **42** are not particularly limited but are rectangular in the illustrated example. As shown in FIG. **2**, the first pad **41** and the second pad **42** may be aligned in the first direction y, and the first pad **41** is offset on one side of the first direction y with respect to the second pad **42**. As shown in FIG. **2**, the first pad **41** is connected to the inner lead **31**. The first pad **41** and the first lead **11** are integrally formed. The second pad **42** is connected to the two inner leads **34** and **35**. The second pad **42**, the fourth lead **14** and the fifth lead **15** are integrally formed.

[0085] In the electronic device A**1**, the respective shapes and positional relationships of the die pad **4** and each of the inner leads **31**, **32**, **33**, **34** and **35** are not limited to the illustrated example, and may be changed according to the specifications of the electronic device A**1**.

[0086] The electronic component **5** is an element to perform an electrical function in the electronic device A**1**. The specific function of the electronic component **5** is not particularly limited, but in the present embodiment, the electronic component **5** has the function of detecting voltage. In the illustrated example, the electronic component **5** includes a first chip **51** and a second chip **52** that are separated from each other.

[0087] The first chip **51** is mounted on the first pad **41**. In the present embodiment, the first chip **51** sends a first signal according to the potential of the first lead **11** and a second signal according to the potential of the second lead **12** to the second chip **52**. The first chip **51** includes a plurality of electrodes **511**, **512** and **513** on its top surface in the thickness direction z.

[0088] The second chip **52** is mounted on the second pad **42**. In the present embodiment, the second chip **52** receives the first signal and the second signal from the first chip **51** and sends a third signal according to the potential difference between the first lead **11** and the second lead **12**. In other words, the second chip **52** sends a detection signal (third signal) of the voltage applied between the first lead **11** and the second lead **12**. The second chip **52** includes pluralities of electrodes **521** and **522** on its top surface in the thickness direction z.

[0089] In the electronic device A**1**, the electronic component **5** (the first chip **51** and the second chip **52**) includes circuity shown in FIG. **11**, for example. As shown in FIG. **11**, the first chip **51** includes a plurality of resistor elements R**1** to R**4**, and the second chip **52** includes an operational amplifier OP and a resistor element R**5**. The circuity of the electronic component **5** is not limited to the example shown in FIG. **11**.

[0090] The two resistor elements R**1** and R**2** are connected in series with each other. The two resistor elements R**1** and R**2** divide a voltage at a terminal T**1** (potential difference between a potential of a terminal T**1** and a reference potential of a ground GND). In the present embodiment, the terminal T**1** corresponds to each electrode **512**. The connection point of the two resistor elements R**1** and R**2** is connected to a non-inverting input terminal of the operational amplifier OP. The two resistor elements R**3** and R**4** are connected in series with each other. The two resistor elements R**3** and R**4** divide a voltage of a terminal T**2** (potential difference between a potential of a terminal T**2** and a reference potential of a ground GND). In the present embodiment, the terminal T**2** corresponds to each electrode **511**. The connection point of the two resistor elements R**3** and R**4** is connected to an inverting input terminal of the operational amplifier OP. When the electronic device A**1** detects the voltage of a battery installed in an electric vehicle, the terminal T**1** and the terminal T**2** are electrically connected to the high-potential side terminal and the low-potential side terminal, respectively.

[0091] The operational amplifier OP receives the first signal according to the potential of the terminal T**1** (in the present embodiment, a signal of the divided voltage of the terminal T**1**) and the second signal according to the potential of the terminal T**2** (in the present embodiment, a signal obtained of the divided voltage of the terminal T**2**), and sends the third signal according to the potential difference between the terminal T**1** and the terminal T**2**. The resistor element R**5** is an element for determining the amplification gain of the operational amplifier OP (i.e., a feedback resistor), and one end of the resistor element R**5** is connected to the inverting input terminal of the operational amplifier OP, and the other end is connected to the output terminal of the operational amplifier OP. The second chip **52** does not necessarily include the resistor element R**5**.

[0092] The plurality of connection members **61** to **66** each electrically connects the parts spaced apart from each other. In the illustrated example, each connection member **61** to **66** is a bonding wire. Alternatively, each connection member **61** to **66** may be a metal plate instead of a bonding wire. The connection members **61** to **66** each contain Au, Al (aluminum), or Cu.

[0093] As shown in FIG. **2**, the connection member **61** is bonded to the electrode **511** of the first chip **51** and the inner lead **31**, and electrically connects the first chip **51** and the first lead **11**. In other words, the outer lead **21** of the first lead **11** is electrically connected to the first chip **51** of the electronic component **5** via the connection member **61**.

[0094] As shown in FIG. **2**, the connection member **62** is bonded to the electrode **512** of the first chip **51** and the inner lead **32**, and electrically connects the first chip **51** and the second lead **12**. In other words, the outer lead **22** of the second lead **12** is electrically connected to the first chip **51** of the electronic component **5** via the connection member **62**.

[0095] As shown in FIG. **2**, the connection members **63** are bonded to the respective electrodes **521** of the second chip **52** and the respective inner leads **33**, and electrically connect the second chip **52** and the respective third leads **13**. In other words, the outer lead **23** of each third lead **13** is electrically connected to the second chip **52** of the electronic component **5** via one of the connection members **63**.

[0096] As shown in FIG. **2**, the connection member **64** is bonded to the electrode **521** of the second chip **52** and the inner leads **34**, and electrically connect the second chip **52** and the fourth lead **14**. In other words, the outer lead **24** of the fourth lead **14** is electrically connected to the second chip **52** of the electronic component **5** via the connection member **64**.

[0097] As shown in FIG. **2**, the connection member **65** is bonded to the electrode **521** of the second chip **52** and the inner lead **35**, and electrically connects the second chip **52** and the fifth lead **15**. In other words, the outer lead **25** of the fifth lead **15** is electrically connected to the second chip **52** of the electronic component **5** via the connection member **65**.

[0098] As shown in FIG. **2**, the connection members **66** are each bonded to the electrode **513** of the first chip **51** and the electrode **522** of the second chip **52**, and electrically connect the first chip **51** and the second chip **52**. Hence, the connection members **66** form transmission paths for the first signal and the second signal.

[0099] The sealing resin **7** covers the die pad **4** (the first pad **41** and the second pad **42**), the electronic component **5** (the first chip **51** and the second chip **52**), the connection members **61** to **66**, and a part of each of the first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, and the fifth lead **15**. The sealing resin **7** contains an insulative material such as epoxy resin, for example. Preferably, the sealing resin **7** is made of a resin material with a CTI (Comparative Tracking Index) of 600 V or higher. The sealing resin **7** has, for example, a cuboid. The sealing resin **7** has a dimension along the second direction x of, for example, 5 mm to 10 mm and a dimension along the first direction y of, for example, 3 mm to 13 mm. The sealing resin **7** includes a resin obverse surface **71**, a resin reverse surface **72**, and a plurality of resin side surfaces **731** to **734**.

[0100] The resin obverse surface **71** and the resin reverse surface **72** are spaced apart from each other in the thickness direction z. The resin obverse surface **71** faces one side of the thickness direction z, and the resin reverse surface **72** faces the other side of the thickness direction z. The resin obverse surface **71** is a top surface of the sealing resin **7**, and the resin reverse surface **72** is a bottom surface of the sealing resin **7**.

[0101] The paired resin side surfaces **731** and **732** are spaced apart from each other in the first direction y. The resin side surface **731** faces one side of the first direction y, and the resin side surface **732** faces the other side of the first direction y. The paired resin side surfaces **733** and **734** are spaced apart from each other in the second direction x. The resin side surface **733** faces one side of the second direction x, and the resin side surface **734** faces the other side of the second direction x.

[0102] As shown in FIGS. **1**, **2** and **4** to **6**, the two outer leads **21** and **22** each project from the resin side surface **731**. As shown in FIGS. **1** to **3**, **5** and **6**, the outer leads **23**, **24** and **25** each project from the resin side surface **732**.

[0103] The operative effects of the electronic device A**1** are as follows.

[0104] In the electronic device A**1**, the outer lead **21** includes the root portion **211**, the mounting portion **212**, and the extending portion **213** that is connected to the root portion **211** through the bent portion **214** and to the mounting portion **212** through the bent portion **215**. Further, the outer lead **21** includes the first section **21**A including the root portion **211** and the second section **21**B including the mounting portion **212**. The width (dimension in the second direction x) W.sub.21A of the first section **21**A is greater than the width (dimension in the second direction x) W.sub.218 of the second section **21**B. Studies by the inventor of the present application have revealed the following in such a configuration where the width of the root portion **211** (the width W.sub.21A of the first section **21**A) is greater than the width of the mounting portion **212** (the width W.sub.21B of the second section **21**B). That is, it has been revealed that the variation in the shape of the outer lead **21** is suppressed when the first section boundary **21**C between the first section **21**A and the second section **21**B is disposed between the boundary **2101**, which is between the root portion **211** and the bent portion **214**, and the central boundary **2103** of the extending portion **213**, as compared to the case, for example, where the first section boundary **21**C is disposed at the boundary **2104** (see FIG. **9**) between the extending portion **213** and the bent portion **215** or at the boundary **2105** (see FIG. **9**) between the mounting portion **212** and the bent portion **215**. The electronic device A**1** includes the first section boundary **21**C located between the boundary **2101**, which is between the root portion **211** and the bent portion **214**, and the central boundary **2103** of the extending portion **213**, thereby suppressing the variation of the shape of the outer lead **21**. Thus, it is possible to reduce poor bonding between the electronic device A**1** and the circuit board. In the electronic device A**1**, the first section boundary **21**C is located between the boundary **2101**, which is between the root portion **211** and the bent portion **214**, and the boundary **2102** between the bent portion **214** and the extending portion **213**. Studies by the inventor of the present application have revealed that the closer the first section boundary **21**C is to the boundary **2101** than to the central boundary **2103**, the less the variation in the shape of the outer lead **21** is. Therefore, since the first section boundary **21**C is located between the boundary **2101** and the boundary **2102**, thereby further suppressing the variation in the shape of the outer lead **21** in the electronic device A**1**. In particular, in the electronic device A**1**, the first section boundary **21**C overlaps with the boundary **2101** between the root portion **211** and the bent portion **214**, which preferably suppresses the variation in the shape of the outer lead **21**.

[0105] In the electronic device A**1**, the outer lead **22** includes the root portion **221**, the mounting portion **222**, and the extending portion **223** that is connected to the root portion **221** through the bent portion **224** and to the mounting portion **222** through the bent portion **225**. Further, the outer lead **22** includes the third section **22**A including the root portion **221** and the fourth section **22**B including the mounting portion **222**. The width (dimension in the second direction x) W.sub.22A of the third section **22**A is greater than the width (dimension in the second direction x) W.sub.228 of the fourth section **22**B. The second section boundary **22**C between the third section **22**A and the fourth section **22**B is disposed between the boundary **2201** (see FIG. **10**) between the root portion **221** and the bent portion **224** and the central boundary **2203** (see FIG. **10**) of the extending portion **223**. Thus, as with the outer lead **21**, the variation in the shape of the outer lead **22** is suppressed in the electronic device A**1**, as compared to the case where second section boundary **22**C is, for example, disposed at the boundary **2204** (see FIG. **10**), which is between the extending portion **223** and the bent portion **225**, or at the boundary **2205** (see FIG. **10**) between the mounting portion **222** and the bent portion **225**.

[0106] In the electronic device A**1**, the second section boundary **22**C is located between the boundary **2201**, which is between the root portion **221** and the bent portion **224**, and the boundary **2202** (see FIG. **10**) between the bent portion **224** and the extending portion **223**. Thus, it is possible to further suppress the variation in the shape of the outer lead **22** in the electronic device A**1**, as with the outer lead **21**. In particular, in the electronic device A**1**, the second section boundary **22**C overlaps with the boundary **2201** between the root portion **221** and the bent portion **224**, which preferably suppresses the variation in the shape of the outer lead **22**.

[0107] In the electronic device A**1**, the two outer leads **21** and **22** are adjacent to each other in the second direction x with the spacing d**12**, and the outer leads **23** are arranged in the second direction x with the spacing d**3**. The spacing d**12** is greater than the spacing d**3**. Such a configuration increases the creepage distance between the two outer leads **21** and **22** (distance along the surface of the sealing resin **7**) rather than the creepage distance between the outer leads **23** (distance along the surface of the sealing resin **7**), so that discharge is less likely to occur between the two outer leads **21** and **22** even when a high voltage is applied between the two outer leads **21** and **22**. Hence, in the electronic device A**1**, discharge between the two outer leads **21** and **22** can be suppressed while reducing the device size. In other words, the electronic device A**1** has a favorable package structure for suppressing electrical discharges between the two outer leads **21** and **22**.

[0108] In a configuration where the spacing d**12** is greater than the spacing d**3** as described above, the variation in the shape of the two outer leads **21** and **22** tends to be greater than the variation in the shape of the outer leads **23**. Therefore, as described above, the first section boundary **21**C is disposed between the boundary **2101** and the central boundary **2103** and the second section boundary **22**C is disposed between the boundary **2201** and the central boundary **2203**, which is preferable in suppressing the variation of the shape of the two outer leads **21** and **22** in a package structure where the spacing d**12** is greater than the spacing d**3**.

[0109] In the electronic device A**1**, the first section **21**A includes the root portion **211**. In the manufacturing process of the electronic device A**1**, the first lead **11**, the second lead **12**, the third leads **13**, the fourth lead **14**, and the fifth lead **15** are, as shown in FIG. **12**, connected to each other through the tie bar **91** and included in the single lead frame **9**. This tie bar **91** is, for example, connected to the root portion **211** of the first lead **11**, the root portion **221** of the second lead **12**, the root portion **231** of each third lead **13**, the root portion **241** of the fourth lead **14**, and the root portion **251** of the fifth lead **15**. In the lead frame **9**, the inner lead **31** is held by the tie bar **91** at the connection point C**1** shown in FIG. **12**. Hence, the load of the inner lead **31** is applied to the

connection point C**1**. In particular, in the electronic device A**1**, the inner lead **31** is connected to the first pad **41**, so that the load on the first pad **41** is also applied to the connection point C**1**, thereby further increasing the load on the connection point C**1**. For example, in the manufacturing process of the electronic device A**1**, loads will be applied to the inner lead **31** and the first pad **41** during transporting the lead frame **9**, bonding the first chip **51** to the first pad **41**, and bonding each of the connection members **61** and **62**. If the strength of the connection point C**1** is insufficient to withstand such loads, the first lead **11** may become deformed (e.g., the connection point C**1** may bend in the direction of gravity or in the direction of the pressure applied during bonding the first chip **51**). On the other hand, the electronic device Al can appropriately secure the width of the connection point C**1**, as the width (dimension in the second direction x) W.sub.21A of the first section **21**A is greater than the width (dimension in the second direction x) W.sub.21B of the second section **21**B. This improves the strength of the connection point C**1**, thereby suppressing deformation of the first lead **11**. In other words, the deformation of the first lead **11** in the electronic device A**1** can be suppressed.
[0110] The same is true for the second lead **12**. That is, the electronic device A**1** can appropriately secure the width of the connection point C**2** (see FIG. **12**), as the third section **22**A includes the root portion **221**, and the width (dimension in the second direction x) W.sub.22A of the third section **22**A is greater than the width (dimension in the second direction x) W.sub.22B of the fourth section **22**B. This improves the strength of the connection point C**2**, thereby suppressing deformation of the second lead **12** in the electronic device A**1**.
[0111] Other embodiments and variations of the electronic device of the present disclosure are described below. Various parts of embodiments and variations may be selectively used in any appropriate combination as long as it is technically compatible.
[0112] FIGS. **13** to **15** show an electronic device A**11** according to a variation of the first embodiment. The electronic device A**11** differs from the electronic device A**1** in the following points. In the electronic device A**11**, each outer lead **24** and **25** shares the same shape as the outer lead **21** (the outer lead **22**).
[0113] The outer lead **24** of the electronic device A**11** includes the root portion **241**, the mounting portion **242**, the extending portion **243** and the two bent portions **244** and **245**. Thus, the outer lead **24** of the electronic device A**11** is not separated into multiple parts.
[0114] As shown in FIG. **14**, the outer lead **24** of the electronic device A**11** includes two sections **24**A and **24**B. The two sections **24**A and **24**B are connected to each other. The section **24**A includes the root portion **241**. The section **24**B includes the mounting portion **242**. The section **24**A has a width (dimension in the second direction x) W.sub.24A greater than a width (dimension in the second direction x) W.sub.248 of the section **24**B. In one example, the width W.sub.24B is 2 to 6 times the width W.sub.24A.
[0115] As understood from FIG. **14**, a section boundary **24**C between the two sections **24**A and **24**B is located between the boundary **2401**, which is between the root portion **241** and the bent portion **244**, and the central boundary **2403** of the extending portion **243**. The central boundary **2403** of the extending portion **243** extends in the normal direction to the extending portion **243** at the center in an extending direction from the bent portion **244** to the bent portion **245**. In the present embodiment, the section boundary **24**C overlaps with the boundary **2401**. In the present disclosure, the boundary **2402** between the bent portion **244** and the extending portion **243** and the boundary **2404** between the bent portion **245** and the extending portion **243** are each parallel to the central boundary **2403**. In such a configuration, the section **24**A includes the root portion **241**, while the section **24**B includes the mounting portion **242**, the extending portion **243**, and the two bent portions **244** and **245**.
[0116] The outer lead **25** of the electronic device A**11** includes the root portion **251**, the mounting portion **252**, the extending portion **253** and the two bent portions **254** and **255**. Thus, the outer lead **25** of the electronic device A**11** is not separated into multiple parts.

[0117] As shown in FIG. **15**, the outer lead **25** of the electronic device A**11** includes two sections **25**A and **25**B. The two sections **25**A and **25**B are connected to each other. The section **25**A includes the root portion **251**. The section **25**B includes the mounting portion **252**. The section **25**A has a width (dimension in the second direction x) W.sub.25A greater than a width (dimension in the second direction x) W.sub.25B of the section **25**B. In one example, the width W.sub.25B is 2 to 6 times the width W.sub.25A.
[0118] As understood from FIG. **15**, a section boundary **25**C between the two sections **25**A and **25**B is located between the boundary **2501**, which is between the root portion **251** and the bent portion **254**, and the central boundary **2503** of the extending portion **253**. The central boundary **2503** of the extending portion **253** extends in the normal direction to the extending portion **253** at the center in an extending direction from the bent portion **254** to the bent portion **255**. In the present embodiment, the section boundary 25**20** C. overlaps with the boundary **2501**. In the present disclosure, the boundary **2502** between the bent portion **254** and the extending portion **253** and the boundary **2504** between the bent portion **255** and the extending portion **253** are each parallel to the central boundary **2503**. In such a configuration, the section **25**A includes the root portion **251**, while the section **25**B includes the mounting portion **252**, the extending portion **253**, and the two bent portions **254** and **255**.
[0119] The variation in the shape of each of the outer leads **21** and **22** in the electronic device A**11** can be suppressed, as with the electronic device A**1**. In addition, the electronic device A**11** may have a configuration in common with the electronic device A**1**, thereby achieving the same effect as the electronic device A**1**.
[0120] Further, in the electronic device A**11**, the outer lead **24** is configured in the same manner as the outer lead **21** (the outer lead **22**). Hence, the variation in the shape of the outer lead **24** can be suppressed in the electronic device A**11**, as compared to the case where the section boundary **24**C is, for example, disposed at the boundary **2404** (see FIG. **14**) between the extending portion **243** and the bent portion **245** or at the boundary **2405** (see FIG. **14**) between the mounting portion **242** and the bent portion **245**. Similarly, the outer lead **25** is configured in the same manner as the outer lead **21** (the outer lead **22**). Hence, the variation in the shape of the outer lead **25** can be suppressed in the electronic device A**11**, as compared to the case where the section boundary **25**C is, for example, disposed at the boundary **2504** (see FIG. **15**) between the extending portion **253** and the bent portion **255** or at the boundary **2505** (see FIG. **15**) between the mounting portion **252** and the bent portion **255**.
[0121] In the above first embodiment (and its variation), an example is shown where the first section boundary **21**C overlaps with the boundary **2101** between the root portion **211** and the bent portion **214**. As described above, the first section boundary **21**C may need to be located between the boundary **2101** and the central boundary **2103**. As another example, as shown in FIG. **16**, the electronic device of the present disclosure may be configured such that the first section boundary **21**C overlaps with the boundary **2102** between the extending portion **213** and the bent portion **214**. Alternatively, as shown in FIG. **17**, the electronic device of the present disclosure may be configured such that the first section boundary **21**C overlaps with the central boundary **2103** of the extending portion **213**, for example. Such a configuration is also applicable to each of the outer leads **22**, **24** and **25**.
[0122] In the above first embodiment (including variations), the first section **21**A and the second section **21**B are each rectangular in plan view, but at least one of the first section **21**A and the second section **21**B may be tapered in plan view. For example, in the electronic device of the present disclosure, the second section **21**B may have a shape tapering toward the tip of the mounting portion **212** (the far side end edge from the sealing resin **7**), as shown in FIG. **18**. Alternatively, in the electronic device of the present disclosure, the first section **21**A may have a shape tapering toward the tip of the root portion **211** (the end edge on the side far from the sealing resin **7** and connected to the bent portion **214**), as shown in FIG. **19**. Alternatively, in the electronic

device of the present disclosure, each of the first section **21**A and the second section **21**B may be tapered, as shown in FIG. **20**. Unlike the examples shown in FIGS. **18** to **20**, the end of the first section **21**A connecting to the second section **21**B and the end of the second section **21**B connecting to the first section **21**A may have the same width (second dimension in the second direction x). Such a configuration is also applicable to each outer lead **22**, **24** and **25**.

Second Embodiment

[0123] FIGS. **21** to **24** show an electronic device A**2** according to a second embodiment. The electronic device A**2** differs from the electronic device A**1** in the following points. First, the outer lead **21** includes two second sections **21**B. Second, the outer lead **22** includes two fourth sections **22**B.

[0124] As shown in FIG. **23**, in plan view, the outer lead **21** of the electronic device A**2** includes the two second sections **21**B extending from one first section **21**A in the first direction y. The two second sections **21**B are spaced apart from each other in the second direction x. Each first section boundary **21**C between the two respective second sections **21**B and the first section **21**A is located between the boundary **2101**, which is between the root portion **211** and the bent portion **214**, and the central boundary **2103** of the extending portion **213**, and in the illustrated example, overlaps with the boundary **2101**. Each second section **21**B includes the mounting portion **212**, the extending portion **213**, and the two bent portions **214** and **215**. The spacing dl (see FIG. **22**) along the second direction x between the two second sections **21**B (the mounting portions **212**) is, for example, equal to the spacing d**3**. In the illustrated example, the outer lead **21** includes the two second sections **21**B, but may include three or more second sections **21**B.

[0125] As shown in FIG. **24**, in plan view, the outer lead **22** of the electronic device A**2** includes the two fourth sections **22**B extending from one third section **22**A in the first direction y in plan view. The two fourth sections **22**B are spaced apart from each other in the second direction x. Each second section boundary **22**C between the two respective fourth sections **22**B and the third section **22**A is located between the boundary **2201**, which is between the root portion **221** and the bent portion **224**, and the central boundary **2203** of the extending portion **223**, and in the illustrated example, overlaps with the boundary **2201**. Each fourth section **22**B includes the mounting portion **222**, the extending portion **223**, and the two bent portions **224** and **225**. The spacing d**2** (see FIG. **22**) along the second direction x between the two fourth sections **22**B (the mounting portions **222**) is, for example, equal to the spacing d**3**. In the illustrated example, the outer lead **22** includes the two fourth sections **22**B, but may include three or more fourth sections **22**B.

[0126] The variation in the shape of outer lead **21** in the electronic device A**2** can be suppressed, as with the electronic device A**1**. Further, the variation in the shape of outer lead **22** in the electronic device A**2** can be suppressed, as with the electronic device A**1**. In addition, the electronic device A**2** may have a configuration in common with the electronic device A**1**, thereby achieving the same effect as the electronic device A**1**.

[0127] FIGS. **25** to **27** show an electronic device A**21** according to a variation of the second embodiment. The electronic device A**21** differs from the electronic device A**2** in the following points. That is, in the electronic device A**21**, each outer lead **24** and **25** has the same shape as the outer lead **21** (the outer lead **22**).

[0128] As shown in FIG. **26**, in plan view, the outer lead **24** of the electronic device A**21** includes the two sections **24**B extending from one section **24**A in the first direction y. The two sections **24**B are spaced apart from each other in the second direction x. Each section boundary **24**C between the section **24**A and the two respective sections **24**B is located between the boundary **2401**, which is between the root portion **241** and the bent portion **244**, and the central boundary **2403** of the extending portion **243**, and in the illustrated example, overlaps with the boundary **2401**. Each section **24**B includes the mounting portion **242**, the extending portion **243**, and the two bent portions **244** and **245**. The spacing d**4** (see FIG. **25**) along the second direction x between the two sections **24**B (the mounting portions **242**) is, for example, equal to the spacing d**3**. In the illustrated

example, the outer lead **24** includes the two sections **24**B, but may include three or more sections **24**B.
[0129] As shown in FIG. **27**, in plan view, the outer lead **25** of the electronic device A**21** includes the two sections **25**B extending from one section **25**A in the first direction y. The two sections **25**B are spaced apart from each other in the second direction x. Each section boundary **25**C between the section **25**A and the two respective sections **25**B is located between the boundary **2501**, which is between the root portion **251** and the bent portion **254**, and the central boundary **2503** of the extending portion **253**, and in the illustrated example, overlaps with the boundary **2501**. Each section **25**B includes the mounting portion **252**, the extending portion **253**, and the two bent portions **254** and **255**. The spacing d**5** (see FIG. **25**) along the second direction x between the two sections **25**B (the mounting portions **252**) is, for example, equal to the spacing d**3**. In the illustrated example, the outer lead **25** includes the two sections **25**B, but may include three or more sections **25**B.
[0130] The variation in the shape of each outer lead **21** and **22** in the electronic device A**21** can be suppressed, as with the electronic device A**2**. In addition, the electronic device A**21** may have a configuration in common with the electronic device A**2**, thereby achieving the same effect as the electronic device A**2**.
[0131] Further, in the electronic device A**21**, since each of the two outer leads **24** and **25** is configured in the same manner as the outer lead **21** (the outer lead **22**), the variation in the shape of each outer lead **24** and **25** can be suppressed.
[0132] In the above first embodiment (and its variation), an example is shown where each first section boundary **21**C overlaps with the boundary **2101** between the root portion **211** and the bent portion **214**. As described above, the first section boundary **21**C may need to be located between the boundary **2101** and the central boundary **2103**. In a configuration different from the electronic device A**2**, as shown in FIG. **28**, the first section boundary **21**C may overlap with the boundary **2102** between the extending portion **213** and the bent portion **214**, for example. Alternatively, in a configuration different from the electronic device A**2**, as shown in FIG. **29**, the first section boundary **21**C may be configured to overlap with the central boundary **2103** of the extending portion **213**, for example. Such a configuration is also applicable to each of the outer leads **22**, **24** and **25**.
[0133] As understood from the above second embodiment (and its variation), in the electronic device of the present disclosure, the number of the second sections **21**B, the fourth sections **22**B, the sections **24**B and the sections **25**B is not limited to one and may be two or more.
Third Embodiment
[0134] FIG. **30** shows an electronic device A**3** according to a third embodiment. The electronic device A**3** differs from the electronic device A**1** in that it does not comprise the fourth lead **14** and the fifth lead **15**.
[0135] The external appearance of the electronic device A**3** is the same as that of the electronic device A**1**. However, in the electronic device A**3**, the third leads **13** includes one located at the outermost side in the second direction x and one located at the opposite outermost side in the second direction x, both of which are connected to the second pad **42**.
[0136] The variation in the shape of each outer lead **21** and **22** in electronic device A**3** can be suppressed, as with the electronic devices A**1** and A**2**. In In addition, the electronic device A**3** may have a configuration in common with the electronic devices A**1** and A**2**, thereby achieving the same effect as each of the electronic devices A**1** and A**2**.
Fourth Embodiment
[0137] FIGS. **31** and **32** show an electronic device A**4** according to a fourth embodiment. The electronic device A**4** differs from the electronic device A**1** in the function of the electronic component **5**.
[0138] The electronic component **5** of the electronic device A**4** has a power conversion function

rather than a voltage detection function. The first chip **51** and the second chip **52** are switching elements, respectively. In the circuit diagram of FIG. **32**, each of the first chip **51** and the second chip **52** is shown as an example of an IGBT (Insulated Gate Bipolar Transistor), but may be another type of transistor, such as a MOSFET (Metal-Oxide-Semiconductor Field Effect Transistor) or a bipolar transistor rather than an IGBT.

[0139] As shown in FIG. **32**, the first chip **51** includes three electrodes **511**, **512** and **513**. In the example where the first chip **51** is an IGBT, the electrode **511** is the gate, the electrode **512** is the emitter, and the electrode **513** is the collector. The first chip **51** is configured, for example, in a vertical structure, with the two electrodes **511** and **512** disposed on the top surface (the surface facing upward in the thickness direction z) and the electrode **513** on the bottom surface (the surface facing downward in the thickness direction z). The first chip **51** is bonded to the first pad **41** through a conductive bonding material such as solder, electrically connecting the electrode **513** on the bottom surface to the first pad **41**.

[0140] As shown in FIG. **32**, the second chip **52** includes three electrodes **521**, **522** and **523**. In the example where the second chip **52** is an IGBT, the electrode **521** is the gate, the electrode **522** is the emitter, and the electrode **523** is the collector. The second chip **52** is configured, for example, in a vertical structure, with the two electrodes **521** and **522** disposed on the top surface (the surface facing upward in the thickness direction z) and the electrode **523** on the bottom surface (the surface facing downward in the thickness direction z). The second chip **52** is bonded to the second pad **42** through a conductive bonding material such as solder, electrically connecting the electrode **523** on the bottom surface to the second pad **42**.

[0141] The first chip **51** and the second chip **52** may have a horizontal structure rather than the vertical structure. In this case, the electrode **513** is disposed on the top surface of the first chip **51**, and the electrode **523** is disposed on the top surface of second chip **52**. Thus, the electrode **513** and the first pad **41** (or optionally the inner lead **31**) may be electrically connected to each other through a bonding wire or a metal plate, and the electrode **523** and the second pad **42** (or optionally the inner lead **34** or the inner lead **35**) may be electrically connected to each other through a bonding wire or a metal plate.

[0142] In the electronic device A**4**, the connection member **61** is bonded to the electrode **511** and the inner lead **33** of one of the third leads **13**, thereby electrically connecting them. The mounting portion **232** of the third lead **13** to which the connection member **61** is bonded serves as a signal input terminal for receiving a drive signal of the first chip **51**. The connection members **62** are bonded to the electrode **512** and the second pad **42**, thereby electrically connecting them. The connection member **63** is bonded to the electrode **512** and the inner lead **33** of one of the third leads **13**, thereby electrically connecting them. The mounting portion **232** of the third lead **13** to which the connection member **63** is bonded serves as a detection terminal for detecting a current flowing through the first chip **51**. The connection member **64** is bonded to the electrode **521** and the inner lead **33** of one of the third leads **13**, thereby electrically connecting them. The mounting portion **232** of the third lead **13** to which the connection member **64** is bonded serves as a signal input terminal for receiving a drive signal of the second chip **52**. The connection members **65** are bonded to the electrode **522** and the inner lead **32** of the second lead **12**, thereby electrically connecting them. The connection member **66** is bonded to the electrode **522** and the inner lead **33** of one of the third leads **13**, thereby electrically connecting them. The mounting portion **232** of the third lead **13** to which the connection member **66** is bonded serves as a detection terminal for detecting a current flowing through the second chip **52**.

[0143] The electronic device A**4** receives a power supply voltage (e.g., DC voltage) at the outer lead **21** and the outer lead **22**, and converts it to a predetermined voltage (e.g., AC voltage) through the respective switching operations of the first chip **51** and the second chip **52**. This converted voltage is output from the two outer leads **24** and **25**.

[0144] The variation in the shape of each of the outer leads **21** and **22** in the electronic device A**4** can be suppressed, as with the electronic devices A**1** to A**3**. In addition, the electronic device A**4** may have a configuration in common with the electronic devices A**1** to A**3**, thereby achieving the same effect as each of the electronic devices A**1** to A**3**.

[0145] FIG. **33** shows an electronic device A**41** according to a variation of the fourth embodiment. The second chip **52** of the electronic device A**41** is not a switching element but a control IC to control the drive of the first chip **51**. Such a variation also achieves the same effect as the electronic device A**4**.

[0146] As understood from the above fourth embodiment and its variation, the function of the electronic component **5** is not limited to the voltage detection function in the electronic devices of the present disclosure. In the electronic device of the present disclosure, the electronic component **5** (the first chip **51** and the second chip **52**) includes a semiconductor element made of semiconductor material.

Fifth Embodiment

[0147] FIG. **34** shows an electronic device A **5** according to a fifth embodiment. As understood from FIG. **34**, the electronic device A**5** differs from the electronic device A**1** in that the first chip **51** and the second chip **52** are mounted on a single pad (a pad **40** described below).

[0148] In the electronic device A**5**, the die pad **4** includes one pad **40**. The first chip **51** and the second chip **52** are mounted on the pad **40**. In the illustrated example, the pad **40** (the die pad **4**) is spaced apart from the first lead **11**, the second lead **12** and the third leads **13**, and is connected to the fourth lead **14** and the fifth lead **15**.

[0149] In the electronic device A**5**, the outer lead **21** includes parts separated from each other, each of which includes the root portion **211**, the mounting portion **212**, the extending portion **213**, and the two bent portions **214** and **215**. However, in the electronic device A**5**, each separated part of the outer lead **21** has the same respective widths (dimensions in the second direction x) as the root portion **211**, the mounting portion **212**, the extending portion **213**, and the two bent portions **214** and **215**. Similarly, in the electronic device A**5**, the outer lead **22** includes parts separated from each other, each of which includes the root portion **221**, the mounting portion **222**, the extending portion **223**, and the two bent portions **224** and **225**. However, in the electronic device A**5**, each separated part of the outer lead **22** has the same respective widths (dimensions in the second direction x) of the root portion **221**, the mounting portion **222**, the extending portion **223**, and the two bent portions **224** and **225**.

[0150] In the electronic device A**5**, the variation in the shape of each outer lead **24** and **25** can be suppressed, as with the electronic devices A**11** and A**21**.

[0151] In addition, the electronic device A**5** may have a configuration in common with the electronic devices A**1** to A**4**, A**11**, A**21**, and A**41**, thereby achieving the same effect as each of the electronic devices A**1** to A**4**, A**11**, A**21**, and A**41**.

[0152] As understood from the above fifth embodiment, in the electronic device of the present disclosure, the die pad **4** is not limited to the configuration including the first pad **41** and the second pad **42**. In other words, in the electronic device of the present disclosure, whether or not the die pad **4** is divided into a plurality of pads is not particularly limited.

Sixth Embodiment

[0153] FIG. **35** shows an electronic device A**6** according to a sixth embodiment. The electronic device A**6** differs from the electronic device A**5** in that the electronic component **5** is formed in a single chip **50**.

[0154] The chip **50** may include a first functional portion **501** and a second functional portion **502**. The chip **50** integrates the first functional portion **501** and the second functional portion **502** into a single chip. The respective functions of the first functional portion **501** and the second functional portion **502** are not particularly limited. For example, the first functional portion **501** functions as sending a signal according to the potential of the outer lead **21** and a signal according to the potential of the outer lead **22**, as with the first chip **51** of the electronic device A**1**, and the second functional portion **502** functions as sending a signal according to the potential difference between the two outer leads **21** and **22**, as with the second chip **52** of the electronic device A**1**. Unlike this configuration, the first functional portion **501** may have a switching function as with the first chip **51** of the electronic device A**3**, and the second functional portion **502** may have a switching function as with the second chip **52** of the electronic device A**3**. The first functional portion **501** and the second functional portion **502** are conducted, for example, by internal wiring (not shown) of the chip **50**.

[0155] The variation in the shape of each outer lead **24** and **25** in the electronic device A**6** can be suppressed, as with electronic device A**5**. In addition, the electronic device A**6** may have a configuration in common with the electronic devices A**1** to A**5**, A**11**, A**21**, and A**41**, thereby achieving the same effect as each of the electronic devices A**1** to A**5**, A**11**, A**21**, and A**41**.

[0156] As understood from the above sixth embodiment, in the electronic device of the present disclosure, the electronic component **5** is not limited to a configuration including the first chip **51** and the second chip **52**. In other words, in the electronic device of the present disclosure, whether or not the electronic component **5** is configured to include a plurality of chips is not particularly limited.

[0157] In the above first to sixth embodiments (and their variations), two or more of the outer leads **21**, **22**, **24** and **25** include two sections (the first section **21**A and the second section **21**B, the third section **22**A and the fourth section **22**B, the section **24**A and the section **24**B, or the section **25**A and the section **25**B) with different widths from each other. Unlike this example, only one of the outer leads **21**, **22**, **24** and **25** may be configured to include two sections with different widths from each other. For example, one of the outer leads **21**, **22**, **24** and **25** that exhibits the greatest variation in shape may be configured to include two sections with different widths.

[0158] The electronic devices according to the present disclosure are not limited to the embodiments described above. The specific configuration of each part of the electronic device of the present disclosure may suitably be designed and changed in various manners. For example, the present disclosure includes the embodiments described in the following clauses.

Clause 1

[0159] An electronic device comprising: [0160] an electronic component; [0161] a sealing resin including a first resin side surface facing one side of a first direction orthogonal to a thickness direction and covering the electronic component; and [0162] an outer lead including a root portion extending from the first resin side surface in the first direction, a mounting portion offset on one side of the thickness direction with respect to the root portion, and an extending portion connected to the root portion through a first bent portion and connected to the mounting portion through a second bent portion, [0163] wherein the outer lead includes a first section including the root portion, and a second section including the mounting portion and connected to the first section, [0164] a dimension of the first section in a second direction orthogonal to the thickness direction and the first direction is greater than a dimension of the second section in the second direction, and [0165] a first section boundary between the first section and the second section is located between a first boundary, which is between the root portion and the first bent portion, and a center of the extending portion in an extending direction from the first bent portion to the second bent portion.

Clause 2

[0166] The electronic device according to clause 1, wherein the first section boundary is located between the first boundary and a second boundary, which is between the first bent portion and the extending portion.

Clause 3

[0167] The electronic device according to clause 2, wherein the first section boundary overlaps with the first boundary.

Clause 4

[0168] The electronic device according to any one of clauses 1 to 3, wherein the extending portion

is inclined with respect to the thickness direction as viewed in the second direction.
Clause 5
[0169] The electronic device according to any one of clauses 1 to 4, wherein the outer lead includes an additional second section, the two second sections are spaced apart in the second direction.
Clause 6
[0170] The electronic device according to any one of clauses 1 to 5, further comprising a second outer lead, in addition to a first outer lead corresponding to the outer lead, [0171] wherein the second outer lead is disposed on one side of the second direction with respect to the first outer lead and projects from the first resin side surface.
Clause 7
[0172] The electronic device according to clause 6, wherein an entirety of the second outer lead overlaps with an entirety of the first outer lead as viewed in the second direction.
Clause 8
[0173] The electronic device according to clause 7, wherein the second outer lead includes a third section extending from the first resin side surface in the first direction and a fourth section connected to the third section, [0174] a dimension of the third section in the second direction is greater than a dimension of the fourth section in the second direction, [0175] a second section boundary between the third section and the fourth section overlaps with the first section boundary as viewed in the first direction.
Clause 9
[0176] The electronic device according to any one of clauses 6 to 8, further comprising a plurality of third outer leads, wherein the sealing resin includes a second resin side surface facing a side opposite to the first resin side surface in the first direction, and each of the plurality of third outer leads projects from the second resin side surface.
Clause 10
[0177] The electronic device according to clause 9, wherein the plurality of third outer leads are disposed at equal intervals along the second direction, and [0178] a spacing along the second direction between the first outer lead and the second outer lead is greater than a spacing along the second direction of the plurality of third outer leads.
Clause 11
[0179] The electronic device according to clause 9 or 10, wherein each of the plurality of third outer leads has a uniform width in the second direction from a base close to the sealing resin in the first direction to a tip far from the sealing resin in the first direction.
Clause 12
[0180] The electronic device according to clause 11, wherein each of the plurality of third outer leads includes a dimension in the second direction that is equal to the dimension of the second section in the second direction.
Clause 13
[0181] The electronic device according to any one of clauses 6 to 12, wherein each of the first outer lead and the second outer lead is electrically connected to the electronic component.
Clause 14
[0182] The electronic device according to clause 13, further comprising a die pad covered by the sealing resin, [0183] wherein the electronic component is mounted on the die pad.
Clause 15
[0184] The electronic device according to clause 14, further comprising a first inner lead covered by the sealing resin and extending from the first outer lead, [0185] wherein the die pad includes a first pad connected to the first inner lead, and [0186] the electronic component includes a first chip mounted on the first pad.
Clause 16
[0187] The electronic device according to clause 15, further comprising a second inner lead

covered by the sealing resin and extending from the second outer lead, [0188] wherein the second inner lead is electrically connected to the first chip via a wire.
Clause 18
[0189] The electronic device according to clause 15 or 16, wherein the die pad includes a second pad spaced from the first pad, and the electronic component includes a second chip mounted on the second pad.
[0190] The electronic device according to any one of clauses 1 to 17, wherein the sealing resin includes a resin reverse surface facing the one side of the thickness direction, and [0191] the mounting portion overlaps with the resin reverse surface as viewed in the first direction.
REFERENCE NUMERALS
[0192] A**1**, A**11**, A**2**, A**21**, A , A**4**, A**41**, A**5**, A**6**: Electronic device [0193] **11**: First lead **12**: Second lead **13**: Third lead **14**: Fourth lead [0194] **15**: Fifth lead **21**: Outer lead **211**: Root portion [0195] **212**: The mounting portion **213**: Extending portion **214**, **215**: Bent portion [0196] **21**A: First section **21**B: Second section **21**C: First section boundary [0197] **2101**, **2102**, **2104**, **2105**: Boundary **2103**: Central boundary [0198] **22**: Outer lead **221**: Root portion **222**: The mounting portion [0199] **223**: Extending portion **224**, **225**: Bent portion [0200] **22**A: Third section **22**B: Fourth section **22**C: Second section boundary [0201] **2201**, **2202**, **2204**, **2205**: Boundary **2203**: Central boundary [0202] **23**: Outer lead **231**: Root portion **232**: The mounting portion [0203] **233**: Extending portion **234**, **235**: Bent portion [0204] **24**: Outer lead **241**: Root portion **242**: The mounting portion [0205] **243**: Extending portion **244**, **245**: Bent portion [0206] **2401**, **2402**, **2404**, **2405**: Boundary **2403**: Central boundary [0207] **24**A: Section **24**B: Section **24**C: Section boundary [0208] **25**: Outer lead **251**: Root portion **252**: The mounting portion [0209] **253**: Extending portion **254**, **255**: Bent portion [0210] **2501**, **2502**, **2504**, **2505**: Boundary **2503**: Central boundary [0211] **25**A: Section **25**B: Section **25**C: Section boundary [0212] **31** to **35**: Inner lead **341**, **351**: Branched portion [0213] **4**: Die pad **40**: Pad **41**: First pad **42**: Second pad [0214] **5**: Electronic component **50**: Chip **501**: First functional portion [0215] **502**: Second functional portion **51**: First Chip **511** to **513**: Electrode [0216] **52**: Second chip **521** to **523**: Electrode [0217] **61** to **66**: Connection members **7**: Sealing resin [0218] **71**: Resin obverse surface **72**: Resin reverse surface [0219] **731** to **734**: Resin side surface **9**: Lead frame **91**: Tie bar [0220] C**1**, C**2**: Connection point GND: Ground OP: Operational amplifier [0221] R**1** to R**5**: Resistor element T**1**, T**2**: Terminal

Claims

1. An electronic device comprising: an electronic component; a sealing resin including a first resin side surface facing one side of a first direction orthogonal to a thickness direction and covering the electronic component; and an outer lead including a root portion extending from the first resin side surface in the first direction, a mounting portion offset on one side of the thickness direction with respect to the root portion, and an extending portion connected to the root portion through a first bent portion and connected to the mounting portion through a second bent portion, wherein the outer lead includes a first section including the root portion, and a second section including the mounting portion and connected to the first section, a dimension of the first section in a second direction orthogonal to the thickness direction and the first direction is greater than a dimension of the second section in the second direction, and a first section boundary between the first section and the second section is located between a first boundary, which is between the root portion and the first bent portion, and a center of the extending portion in an extending direction from the first bent portion to the second bent portion.
2. The electronic device according to claim 1, wherein the first section boundary is located between the first boundary and a second boundary, which is between the first bent portion and the extending portion.
3. The electronic device according to claim 2, wherein the first section boundary overlaps with the

first boundary.

4. The electronic device according to claim 1, wherein the extending portion is inclined with respect to the thickness direction as viewed in the second direction.

5. The electronic device according to claim 1, wherein the outer lead includes an additional second section, the two second sections are spaced apart in the second direction.

6. The electronic device according to claim 1, further comprising a second outer lead, in addition to a first outer lead corresponding to the outer lead, wherein the second outer lead is disposed on one side of the second direction with respect to the first outer lead and projects from the first resin side surface.

7. The electronic device according to claim 6, wherein an entirety of the second outer lead overlaps with an entirety of the first outer lead as viewed in the second direction.

8. The electronic device according to claim 7, wherein the second outer lead includes a third section extending from the first resin side surface in the first direction and a fourth section connected to the third section, a dimension of the third section in the second direction is greater than a dimension of the fourth section in the second direction, a second section boundary between the third section and the fourth section overlaps with the first section boundary as viewed in the first direction.

9. The electronic device according to claim 6, further comprising a plurality of third outer leads, wherein the sealing resin includes a second resin side surface facing a side opposite to the first resin side surface in the first direction, and each of the plurality of third outer leads projects from the second resin side surface.

10. The electronic device according to claim 9, wherein the plurality of third outer leads are disposed at equal intervals along the second direction, and a spacing along the second direction between the first outer lead and the second outer lead is greater than a spacing along the second direction of the plurality of third outer leads.

11. The electronic device according to claim 9, wherein each of the plurality of third outer leads has a uniform width in the second direction from a base close to the sealing resin in the first direction to a tip far from the sealing resin in the first direction.

12. The electronic device according to claim 11, wherein each of the plurality of third outer leads includes a dimension in the second direction that is equal to the dimension of the second section in the second direction.

13. The electronic device according to claim 6, wherein each of the first outer lead and the second outer lead is electrically connected to the electronic component.

14. The electronic device according to claim 13, further comprising a die pad covered by the sealing resin, wherein the electronic component is mounted on the die pad.

15. The electronic device according to claim 14, further comprising a first inner lead covered by the sealing resin and extending from the first outer lead, wherein the die pad includes a first pad connected to the first inner lead, and the electronic component includes a first chip mounted on the first pad.

16. The electronic device according to claim 15, further comprising a second inner lead covered by the sealing resin and extending from the second outer lead, wherein the second inner lead is electrically connected to the first chip via a wire.

17. The electronic device according to claim 15, wherein the die pad includes a second pad spaced from the first pad, and the electronic component includes a second chip mounted on the second pad.

18. The electronic device according to claim 1, wherein the sealing resin includes a resin reverse surface facing the one side of the thickness direction, and the mounting portion overlaps with the resin reverse surface as viewed in the first direction.