device and the through electrode.

[0006] Embodiments of the present invention provide a method of manufacturing a device-embedded board and a device-embedded board capable of improving reliability of electrical connection between an electronic device and a board, and a device embedded board.

[MEANS FOR SOLVING PROBLEM]

[0007] According to a first aspect of the present invention, there is provided a method of manufacturing a device-embedded board including: a first step of preparing an electronic device, an inner board having a first opening capable of accommodating the electronic device, a first outer board having a through hole filled with conductive paste, and a second outer board; a second step of temporarily fixing the electronic device to the first outer board; a third step of stacking the first and second outer boards and the inner board with each other so that the electronic device is inserted into the first opening and the inner board is sandwiched between the first and second outer boards; and a fourth step of fixing the first and second outer boards and the inner board to each other by heating and pressing the first and second outer boards and the inner board; wherein the electronic device includes: a device main body having a first main surface in which an electrode pad is disposed; a first insulating layer having a second opening and disposed on the first main surface side with respect to the device main body; and a first wiring layer disposed on the first insulating layer to cover the second opening and electrically connected to the electrode pad, the second step includes pressing the electronic device against the first outer board in a state in which the conductive paste is in contact with the first wiring layer.

[0008] In an embodiment of the first aspect

, the first wiring layer may include: a concave part disposed in the second opening; and a convex part disposed on the first insulating layer, and the second step may include pressing the electronic device against the first outer board in a state in which the conductive paste overlaps the convex part and the concave part when viewed along a pressing direction.

[0009] In an embodiment of the first aspect, the first wiring layer may include: a concave part disposed in the second opening; and a convex part disposed on the first insulating layer, the concave part may have an inner diameter smaller than an outer diameter of the conductive paste, and the second step may include bringing the conductive paste into contact with a portion of the convex part adjacent to an outer edge of the concave part over an entire circumference.

[0010] In an embodiment of the first aspect, the electronic device may include: a second insulating layer having a third opening and interposed between the device main body and the first insulating layer; and a second wiring layer disposed on the second insulating layer to cover the third opening and electrically connected to the electrode pad, the first insulating layer may be laid on the second insulating layer so that the first insulating layer covers the second wiring layer and a part of the second wiring layer faces the second opening, and the first wiring layer may be connected to the second wiring layer via the second opening.

[0011] In an embodiment of the first aspect, the second

insulating layer may be laid on the device main body so that the third opening faces the electrode pad.

[0012] In an embodiment of the first aspect, the first outer board may include: a substrate having an electrical insulation; a third wiring layer disposed on a second main surface of the substrate; and an adhesive disposed on a third main surface of the substrate, the through hole may penetrate the substrate and the adhesive and may be closed by the third wiring layer, the conductive paste may be in contact with the third wiring layer, and the second step may include pressing the electronic device against the first outer board while heating the adhesive in a state in which the conductive paste is in contact with the first wiring layer.

[0013] According to a second aspect of the present invention, there is provided a device-embedded board including: an electronic device; a first outer board on which the electronic device is mounted, an inner board having a first opening accommodating the electronic device and laid on the first outer board; and a second outer board laid on the inner board to cover the electronic device, the electronic device includes: a device main body having a first main surface in which an electrode pad is disposed; a first insulating layer having a second opening and disposed on the first main surface side with respect to the device main body; and a first wiring layer disposed on the first insulating layer to cover the second opening and electrically connected to the electrode pad, the first wiring layer includes: a concave part disposed in the second opening; and a convex part disposed on the first insulating layer, the first outer board includes a conductive paste via connected to the first wiring layer, and the conductive paste via is connected to the convex part and the concave part.

[0014] In an embodiment of the second aspect, the concave part may have an inner diameter smaller than an outer diameter of the conductive paste via, and the conductive paste via may be connected to a portion of the convex part adjacent to an outer edge of the concave part over an entire circumference.

[0015] In an embodiment of the second aspect , the electronic device may include: a second insulating layer having a third opening and interposed between the device main body and the first insulating layer; and a second wiring layer disposed on the second insulating layer to cover the third opening and electrically connected to the electrode pad, the first insulating layer may be laid on the second insulating layer so that the first insulating layer covers the second wiring layer and a part of the second wiring layer faces the second opening, and the first wiring layer may be connected to the second wiring layer via the second opening.

[0016] In an embodiment of the second aspect , the second insulating layer may be laid on the device main body so that the third opening faces the electrode pad.

[0017] In an embodiment of the second aspect , the first outer board may include: an insulating substrate having an electrical insulation; a third wiring layer disposed on a second main surface of the insulating substrate; and an adhesive disposed on a third main surface of the insulating substrate, the device-embedded board may have a through hole that penetrates the insulating substrate and the adhesive and that is closed by the third wiring layer, and the conductive paste via may be disposed in the through hole and may be connected to the third wiring layer.

[EFFECT OF THE INVENTION]

[0018] In embodiments of the present invention, since the electronic device and the first outer board are pressed in a state in which the conductive paste is in contact with the first wiring layer of the electronic device when the electronic device and the first outer board are temporarily fixed to each other, the manufacturing process can proceed to the fourth step in a state in which the conductive particles contained in the conductive paste are in sufficient contact with the conductor layer of the electronic device, and the conductive paste can be cured. In embodiments of the present invention, since the first wiring layer of the electronic device comprises, in addition to the concave part disposed in the second opening, a convex part disposed on the first insulating layer and the conductive paste via is connected to the convex part and the concave part, the conductive paste can be first brought into contact with the convex part when the electronic device is temporarily fixed to the first outer board. Therefore, in embodiments of the present invention, it is possible to improve the reliability of the electrical connection between the electronic device and the first outer board.

[BRIEF DESCRIPTION OF DRAWING(S)]

[0019] FIG. 1 is a cross-sectional view showing the device-embedded board in the embodiment of the present invention;

FIG. 2 is a cross-sectional view showing the re-wiring structure of the electronic device in the embodiment of the present invention and is an enlarged view of portion II in FIG. 1;

FIG. 3 is a diagram showing the positional relationship between the conductive paste via and the concave part of the conductive layer in the embodiment