

CLAIMS

1. A manufacturing method for a support piece used in manufacturing of a semiconductor device having a dolmen structure including a substrate, a first chip disposed on the substrate, a plurality of support pieces disposed around the first chip, on the substrate, and a second chip disposed to be supported by the plurality of support pieces and to cover the first chip, the method comprising:

(A) preparing a laminate film including a base material film, an adhesive layer, and a support piece formation film, in this order;

(B) forming a plurality of support pieces on a surface of the adhesive layer by singulating the support piece formation film; and

(C) picking up the support piece in a state in which the support piece is thrust up from the base material film side by a ~~plurality of needles~~member having at least two flat tip surfaces,

wherein the support piece formation film is a film including a thermosetting resin layer or a film including a layer in which at least a part of a thermosetting resin layer is cured, or a multi-layer film including a thermosetting resin layer, and a resin layer or a metal layer having rigidity higher than that of the thermosetting resin layer.

2. ~~A~~The manufacturing method for a support piece according to Claim 1~~used in manufacturing of a semiconductor device having a dolmen structure including a substrate, a first chip disposed on the substrate, a plurality of support pieces disposed around the first chip, on the substrate, and a second chip disposed to be supported by the plurality of support pieces and to cover the first chip, the method comprising:~~ wherein the member having at least two flat tip surfaces

comprises:

a tubular member having a first flat tip surface;

a central member contained in the tubular member, the central member having a second flat tip surface; and

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~~(A) preparing a laminate film including a base material film, an~~

~~—adhesive layer, and a support piece formation film, in this order;~~

~~——(B) forming a plurality of support pieces on a surface of the adhesive layer by singulating the support piece formation film; and~~

wherein (C) picking up the support piece in a state in which the support piece is thrust up from the base material film side by ~~a~~ the member having ~~a flat tip surface,~~ at least two flat tip surfaces comprises:

thrusting up the support piece by both the tubular member and the central member such that the first flat tip surface is at least substantially flush with the second flat tip surface when contacting the base material film side; and

one of:

extending the central member out of the tubular member such that the first flat tip surface is no longer flush with the second flat tip surface to further thrust up the support piece;

and

lowering the tubular member such that the first flat tip surface is no longer flush with the second flat tip surface.

~~——wherein the support piece formation film is a film including a thermosetting resin layer or a film including a layer in which at least a part of a thermosetting resin layer is cured, or a multi-layer film including a thermosetting resin layer, and a resin layer or a metal layer having rigidity higher than that of the thermosetting resin layer.~~

3. The manufacturing method for a support piece according to claim 1 or 2,

wherein the resin layer is a polyimide layer.

4. The manufacturing method for a support piece according to

claim 1 or 2,

wherein the metal layer is a copper layer or an aluminum layer.

5. The manufacturing method for a support piece according to claim 1 or 2,

5 wherein the support piece formation film is a film including a thermosetting resin layer, or a film including a layer in which at least a part of a thermosetting resin layer is cured, and

10 the step (B) includes a step of forming a cutout to the middle of the support piece formation film in a thickness direction, and a step of singulating the support piece formation film in a cooled state by expansion, in this order.

6. The manufacturing method for a support piece according to any one of claims 1 to 4,

wherein the support piece formation film is a multi-layer film including a thermosetting resin layer, and a resin layer or a metal layer having rigidity higher than that of the thermosetting resin layer, and in the laminate film, the thermosetting resin layer is positioned between the resin layer or the metal layer and the adhesive layer, and

the step (B) includes a step of forming a cutout to the middle of the thermosetting resin layer in a thickness direction by cutting the resin layer or the metal layer of the support piece formation film, and a step of singulating the support piece formation film in a cooled state by expansion, in this order.

7. The manufacturing method for a support piece according to any one of claims 1 to 6,

wherein the adhesive layer is a pressure-sensitive adhesive layer.

8. The manufacturing method for a support piece according to any one of claims 1 to 6,

wherein the adhesive layer is an ultraviolet-curable adhesive layer.

9. A manufacturing method for a semiconductor device having a dolmen structure including a substrate, a first chip disposed on the substrate, a plurality of support pieces disposed around the first chip, on the substrate, and a second chip disposed to be supported by the plurality of support pieces and to cover the first chip, the method comprising:

(D) disposing ~~a~~the first chip on ~~a~~the substrate;

(E) disposing the plurality of support pieces manufactured by the manufacturing method according to any one of claims 1 to 8 around the first chip or around a region in which the first chip is to be disposed, on the substrate;

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(F) preparing a adhesive piece-attached chip including ~~a~~the second chip, and an adhesive agent piece provided on one surface of the second chip; and

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(G) constructing ~~a~~the dolmen structure by disposing the adhesive piece-attached chip on surfaces of the plurality of support pieces.