

CLAIMS

1. 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
5 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 steps of:

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

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

(C) picking up the support piece from the first adhesive layer;

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

(E) disposing the plurality of support pieces around the first chip
15 or around a region in which the first chip is to be disposed, on the substrate;

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

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

wherein the support piece formation film has a multi-layer
25 structure that includes ~~including at least~~ a resin layer and a pair of second adhesive layers sandwiching the resin layer, wherein ~~having a~~the
tensile elastic modulus of the resin layer is 8.0 MPa or ~~more~~greater.

2. The manufacturing method for a semiconductor device according to claim 1,

wherein the first adhesive layer is ultraviolet-curable, and
the method further comprises a step: irradiating the first
adhesive layer with an ultraviolet ray, between the step (B) and the step
(C).

3. The manufacturing method for a semiconductor device
according to claim 1 or 2,

wherein each of the pair of second adhesive layers of the support
piece formation film includes a thermosetting resin layer, and

the method further comprises a step: heating the support piece
formation film or the support piece, before the step (G).

4. 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,

wherein the support piece has a multi-layer structure ~~including~~
~~at least~~that includes a resin piece and a pair of first bonding adhesive
pieces sandwiching the resin piece, wherein ~~having a~~the tensile elastic
modulus of the resin piece is 8.0 MPa or ~~more~~greater.

~~5. The semiconductor device according to claim 4,~~

~~wherein the support piece includes the resin piece, and a~~
~~bonding adhesive piece provided on one surface of the resin piece, and~~

~~the resin piece contains a material different from that of the~~
~~bonding adhesive piece.~~

65. The semiconductor device according to claim 4,
wherein the support piece has a three-layer structure of the resin

piece, and ~~a~~the pair of first bonding adhesive pieces ~~interposing the resin piece therebetween~~, and

the resin piece contains a material different from that of the pair of first bonding adhesive pieces.

5 ~~7~~6. The semiconductor device according to claim ~~6~~5,
wherein a ratio of a total thickness of the pair of first bonding adhesive pieces to a thickness of the three-layer structure is 0.1 to 0.9.

~~8~~7. The semiconductor device according to any one of claims 4 to ~~7~~6, further comprising:

10 a second bonding adhesive piece provided to cover at least a region of the second chip facing the first chip,

wherein the first chip is apart from the second bonding adhesive piece.

~~9~~8. The semiconductor device according to claim ~~8~~7,

15 wherein the second bonding adhesive piece continuously extends to a circumferential edge side of the second chip from the region of the second chip and is interposed between the second chip and the plurality of support pieces.

~~10~~9. The semiconductor device according to any one of claims 4 to ~~7~~6, further comprising:

20 a second bonding adhesive piece provided to cover at least a region of the second chip facing the first chip,

wherein the first chip is in contact with the second bonding adhesive piece.

25 ~~11~~10. The semiconductor device according to claim 9,

wherein the second bonding adhesive piece continuously

extends to a circumferential edge side of the second chip from the region of the

second chip and is interposed between the second chip and the plurality of support pieces.

~~12~~11. A support piece formation laminate film used in a manufacturing process 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 film comprising:

a base material film;

~~an~~ a first adhesive layer; and

a support piece formation film, in this order,

wherein the support piece formation film has a multi-layer structure ~~including at least that includes~~ a resin layer and a pair of second adhesive layers sandwiching the resin layer, wherein the ~~having~~ a tensile elastic modulus of the resin layer is 8.0 MPa or ~~more~~greater.

~~13~~12. The support piece formation laminate film according to claim ~~12~~11, wherein the resin layer is a polyimide layer.

~~14~~13. The support piece formation laminate film according to claim ~~12~~11 or ~~13~~12, wherein a thickness of the support piece formation film is 5 to 180 μm .

~~15~~14. The support piece formation laminate film according to any one of claims ~~12—11~~ to ~~14~~13, wherein the first adhesive layer is pressure-sensitive or ultraviolet-curable.

~~16~~15. The support piece formation laminate film according to any one of claims ~~12—11~~ to ~~15~~14,

wherein each of the pair of second adhesive layers of the support

piece formation film includes a thermosetting resin layer, and

the thermosetting resin layer contains a material different from that of the resin layer.

~~17~~16. The support piece formation laminate film according to claim ~~16~~15, wherein the thermosetting resin layer contains an epoxy resin.

~~18~~17. The support piece formation laminate film according to claim ~~16~~15 or ~~17~~16, wherein the thermosetting resin layer contains an elastomer.

~~19~~18. A manufacturing method for a support piece formation laminate film used in a manufacturing process 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 steps of:

preparing an adhesive film including a base material film, and ~~an~~ a first adhesive layer formed on one surface of the base material film; and

laminating a support piece formation film on a surface of the first adhesive layer,

wherein the support piece formation film has a multi-layer structure ~~including at least~~that includes a resin layer and a pair of second adhesive layers sandwiching the resin layer, wherein ~~having a~~the tensile elastic modulus of the resin layer is 8.0 MPa or ~~more~~greater.

~~20~~19. A manufacturing method for a support piece formation laminate film used in a manufacturing process 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 steps of:

preparing a laminate film including a base material film, an adhesive layer, and a first thermosetting resin layer, in this order; ~~and~~

bonding a resin layer having a tensile elastic modulus of 8.0 MPa or ~~more~~-greater to a surface of the first thermosetting resin layer;

and

forming a second thermosetting resin layer on the resin layer.