

CLAIMS

1. A manufacturing method for a semiconductor device having a dolmen structure, the semiconductor device comprising: 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 processes of:

(A) preparing a laminate film comprising a base material film, a pressure-sensitive adhesive layer and a support piece formation film in order;

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

(C) picking up a said support piece from the pressure-sensitive adhesive layer;

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

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

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

(G) constructing a 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

structure comprising at least a metal layer and a thermosetting resin layer,
wherein the thermosetting resin layer is in contact with the pressure-
sensitive adhesive layer,

wherein the support piece comprises a metal piece which is obtained
by singulating the metal layer and a bonding adhesive piece obtained by
singulating the thermosetting layer, and

wherein the melt viscosity at 120°C of the thermosetting resin layer
and bonding adhesive piece is 4300 to 50000 Pa.s..

2. The manufacturing method for a semiconductor device according to claim 1, wherein a process of irradiating the pressure-sensitive adhesive layer with an ultraviolet ray is not provided between the process (B) and the process (C).

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

~~wherein the support piece formation film comprises a thermosetting resin layer, and~~

wherein the method further comprises a process of heating the support piece formation film or the support piece before the process (G).

~~4. A semiconductor device having a dolmen structure, the semiconductor device comprising:~~

~~— 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 a support piece has a multi-layer structure comprising at least a metal piece.~~

~~5. — The semiconductor device according to claim 4, wherein the~~

~~support piece has a two-layer structure of the metal piece and a bonding adhesive piece provided on one surface of the metal piece.~~

~~6. The semiconductor device according to claim 4,
wherein the support piece has a three-layer structure of the metal piece and a pair of bonding adhesive pieces interposing the metal piece therebetween, and
wherein a ratio of a total thickness of the bonding adhesive pieces to a thickness of the support piece is 0.1 to 0.9.~~

~~7. The semiconductor device according to any one of claims 4 to 6,
further comprising a 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 bonding adhesive piece.~~

~~8. The semiconductor device according to claim 7, wherein the bonding adhesive piece continuously extends to a circumferential edge of the second chip from the region of the second chip and is interposed between the second chip and the plurality of support pieces.~~

~~9. The semiconductor device according to any one of claims 4 to 6,
further comprising a 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 bonding adhesive piece.~~

~~10. The semiconductor device according to claim 9, wherein the bonding adhesive piece continuously extends to a circumferential edge of the second chip from the region of the second chip and is interposed between the second chip and the plurality of support pieces.~~

~~11~~4. A support piece formation laminate film used in a manufacturing process of a semiconductor device having a dolmen structure, the semiconductor device comprising: 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, in order:

a base material film;

a pressure-sensitive adhesive layer; and

a support piece formation film,

wherein the support piece formation film has a multi-layer structure comprising at least a metal layer and a thermosetting resin layer,

wherein the thermosetting resin layer is in contact with the pressure-sensitive adhesive layer,

wherein the support piece comprises a metal piece which is obtained by singulating the metal layer and a bonding adhesive piece obtained by singulating the thermosetting layer, and

wherein the melt viscosity at 120°C of the thermosetting resin layer and bonding adhesive piece is 4300 to 50000 Pa.s..

~~12~~5. The support piece formation laminate film according to claim ~~11~~4, wherein the metal layer is a copper layer or an aluminum layer.

~~13~~6. The support piece formation laminate film according to claim ~~11~~4 or

~~12~~5, wherein a thickness of the support piece formation film is 5 to 180 μm .

~~14~~7. The support piece formation laminate film according to any one

of claims ~~11~~4 to ~~13~~6, wherein the pressure-sensitive adhesive layer does not contain a resin having a photoreactive carbon-carbon double bond.

~~15. The support piece formation laminate film according to any one of claims 11 to 14, wherein the support piece formation film comprises a thermosetting resin layer.~~

~~16~~8. The support piece formation laminate film according to claim ~~15~~4, wherein the thermosetting resin layer contains an epoxy resin.

~~17~~9. The support piece formation laminate film according to claim ~~15~~~~or~~ ~~16~~8, wherein the thermosetting resin layer contains an elastomer.

~~18. A manufacturing method for a support piece formation laminate film used in a manufacturing process of a semiconductor device having a dolmen structure, the semiconductor device comprising: 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 processes of:~~

~~—— preparing an adhesive film comprising a base material film and a pressure-sensitive adhesive layer formed on one surface of the base material film; and~~

~~—— laminating a support piece formation film on a surface of the pressure-sensitive adhesive layer;~~

~~—— wherein the support piece formation film has a multi-layer~~

~~structure comprising at least a metal layer.~~

1910. A manufacturing method for a support piece formation laminate film used in a manufacturing process of a semiconductor device having a dolmen structure, the semiconductor device comprising: 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 processes of:

preparing a laminate film comprising a base material film, a pressure-sensitive adhesive layer and a thermosetting resin layer in order; and

forming a metal layer on a surface of the thermosetting resin layer;

wherein the support piece formation film has a multi-layer structure comprising at least a metal layer and a thermosetting resin layer,

wherein the thermosetting resin layer is in contact with the pressure-sensitive adhesive layer,

wherein the support piece comprises a metal piece which is obtained by singulating the metal layer and a bonding adhesive piece obtained by singulating the thermosetting layer, and

wherein the melt viscosity at 120°C of the thermosetting resin layer and bonding adhesive piece is 4300 to 50000 Pa.s..