die attach film can be used without particular limitation.

Examples of the inorganic filler (D) include each inorganic powder made of ceramics, such as silica, clay, gypsum, calcium carbonate, barium sulfate, alumina (aluminum oxide), beryllium oxide, magnesium oxide, silicon carbide, silicon nitride, aluminum nitride, boron nitride; a metal or alloys, such as aluminum, copper, silver, gold, nickel, chromium, tin, zinc, palladium, solder; and carbons, such as carbon nanotube, graphene.

{0054}

The average particle diameter (d50) of the inorganic filler (D) is not particularly limited, and is preferably from 0.01 to 6.0 μm, preferably from 0.01 to 5.0 μm, and more preferably from 0.1 to 3.5 μm from the viewpoint of enhancing the die attach performance while suppressing the formation of any jig mark. The average particle diameter (d50) is a so-called median diameter, and refers to a particle diameter at which the cumulative volume is 50% when the particle size distribution is measured by the laser diffraction scattering method and the total volume of the particles is defined as 100% in the cumulative distribution. In one embodiment of the die attach film, an inorganic filler having an average particle diameter (d50) of 0.1 to 3.5 μm is included when attention is paid to the inorganic filler (D). In another preferable embodiment, it is possible to include an inorganic filler having an average particle diameter (d50) of more than 3.5 μm.

{0055}

The Mohs hardness of the inorganic filler is not particularly limited, and is preferably 2 or more and more preferably from 2 to 9 from the viewpoint of enhancing the die attach performance while suppressing the occurrence of any jig mark. The Mohs hardness can be measured with a Mohs hardness meter.

{0056}

The inorganic filler (D) may contain a thermally conductive inorganic filler (inorganic filler having a thermal conductivity of 12 W/m·K or more) in an

CLAIMS

{Claim 1}

A dicing die attach film, comprising:

a dicing film, and

a die attach film stacked on the dicing film,

wherein the die attach film comprises an organic solvent having a boiling point of 100°C or more and less than 150°C and a vapor pressure of 50 mmHg or less, the organic solvent is at least one of methyl isobutyl ketone (MIBK), toluene, diethyl ketone, butyl acetate, and diethyl carbonate, and

wherein an amount of the organic solvent in the die attach film satisfies the following (a):

(a) when 1.0 g of the die attach film is immersed in 10.0 mL of acetone at 4°C for 24 hours, an amount of the organic solvent extracted into the acetone is 400 μg or less.

{Claim 2}

The dicing die attach film according to claim 1, wherein the organic solvent has a boiling point of 103 to 135°C and a vapor pressure of 3.0 to 35.0 mmHg.

{Claim 3}

The dicing die attach film according to claim 2, wherein the amount of the organic solvent extracted into the acetone in the above (a) is 300 μg or less.

{Claim 4}

The dicing die attach film according to any one of the preceding claims, wherein the organic solvent is methyl isobutyl ketone or toluene.

{Claim 5}

The dicing die attach film according to any one of claims 1 to 4, wherein the die attach film comprises:

an epoxy resin (A),

an epoxy resin curing agent (B),

a polymer component (C), and

an inorganic filler (D), and

wherein when the die attach film is heated at a temperature rising rate of 5°C/min from 25°C, a melt viscosity of the die attach film at 120°C reaches a range of 500 to 10,000 Pa•s.

{Claim 6}

The dicing die attach film according to any one of claims 1 to 5, wherein the epoxy resin curing agent (B) contains an imidazole compound.

{Claim 7}

The dicing die attach film according to any one of claims 1 to 6, wherein the dicing film is energy ray-curable.

{Claim 8}

A method of producing the dicing die attach film according to any one of claims 1 to 7, comprising the steps of:

forming a film using varnish obtained by dissolving or dispersing components of the die attach film in an organic solvent having a boiling point of 100°C or more and less than 150°C and a vapor pressure of 50 mmHg or less; and

subjecting the obtained film to drying treatment to form the die attach film.

{Claim 9}

The method of producing a dicing die attach film according to claim 8, wherein the organic solvent used for the varnish has a boiling point of 103 to 135°C and a vapor pressure of 5.0 to 35.0 mmHg.

{Claim 10}

A semiconductor package, comprising:

a semiconductor chip and a circuit board which are bonded to each other with a thermally cured product of a bonding agent, and/or

semiconductor chips which are bonded to each other with a thermally cured product of a bonding agent,

wherein the bonding agent is derived from the die attach film of the dicing die attach film according to any one of claims 1 to 7.

{Claim 11}

A method of producing a semiconductor package, comprising the steps of:

a first step of thermocompression bonding the dicing die attach film according to any one of claims 1 to 7 to a back surface of a semiconductor wafer where at least one semiconductor circuit is formed on a surface so that the die attach film is in contact with the back surface of the semiconductor wafer;

a second step of integrally dicing the semiconductor wafer and the die attach film to obtain a semiconductor chip with a bonding agent layer, the semiconductor chip with a bonding agent layer including a piece of the die attach film and a semiconductor chip on the dicing film

a third step of removing the semiconductor chip with a bonding agent layer from the dicing film and thermocompression bonding the semiconductor chip with a bonding agent layer and a circuit board via the bonding agent layer; and

a fourth step of thermally curing the bonding agent layer.