

MAGAZINE FOR SEMICONDUCTOR PACKAGE

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to a magazine for a
5 semiconductor package. More particularly, the present invention
relates to a magazine for a semiconductor package for loading
semiconductor integrated circuit semi-processed goods so as to
transfer or transport them between processes.

(b) Description of the Related Art

10 A semiconductor package process is a technology that protects
semiconductor chips from external mechanical, physical and chemical
impacts by separating high quality semiconductor chips from each other,
after fabrication and testing electrical characteristics of wafers, and
embodying them as a package so that they can maintain their electrical and
15 physical characteristics, and enables them to be mounted on PCBs (printed
circuit boards)

A die attach process in the semiconductor package process is used
for adhering the semiconductor chips to a strip-shaped lead frame pad
(hereinafter referred to as a "semiconductor chip") using conductive epoxy
20 adhesive which enables the semiconductor integrated circuit semi-processed
goods to be safely transported or transferred by loading them on a magazine
in a subsequent process.

A conventional magazine (10) for loading such semiconductor strips
so as to transport or transfer them between semiconductor processes after

the die-attach process has an inlet/outlet (11) on each end for loading and unloading semiconductor strips, as shown in Fig. 1, and has a plurality of guides formed as a unitary block on each side, which are made of aluminum. The length of loaded semiconductor strips is determined by the length of the
5 sides (12) on which guides are formed, the number of loaded semiconductor strips is determined by the number of loaded steps (13) of guide formed on side, and the width of loaded semiconductor strip is determined by the width between sides (14).

In addition, the sizes of semiconductor strips manufactured in a
10 semiconductor package process are vary. Particularly, the most important factor in determining the size of the magazine is the width of semiconductor strips rather than the number of loaded steps or the number of semiconductor strips.

Accordingly, the conventional magazine has disadvantages in that
15 the control of size thereof is difficult, the cost for manufacturing the magazine is high and the time period for manufacturing the magazine is long because magazines of various sizes should be manufactured in order to load semiconductor strips of various sizes thereon. In addition, since the material of the unitary magazine is made from aluminum, it is heavy and thus it is
20 inconvenient to transfer it.

In addition, when semiconductor chips on semiconductor strips containing static electricity contact the magazine made of aluminum, they diffuse temporarily and suffer from electrical damage, causing inferiority in

the semiconductor manufacture.

SUMMARY OF THE INVENTION

The present invention is made to solve these problems, and accordingly, it is an object of the present invention to provide a magazine for
5 a semiconductor package on which semiconductor strips of various sizes can be loaded without increasing the manufacturing cost and time period of manufacture.

It is another object of the present invention to provide a magazine for a semiconductor package which can prevent inferiority of semiconductor
10 manufacture due to static electricity damage.

In order to achieve these objects, the present invention provides a magazine for a semiconductor package for loading semiconductor strips so as to transfer them in a semiconductor package process, comprising a body having a plurality of guides formed on one side thereof for loading said
15 semiconductor strips, upper and lower plates that are manufactured separately from said bodies and that have a width corresponding to the width of said semiconductor strip, and connection means for connecting said body and upper and lower plates.

Said body and upper and lower plates are preferably made of
20 aluminum.

In addition, the present invention provides a magazine for a semiconductor package for loading semiconductor strips so as to transfer them in a semiconductor package process, comprising conductive

engineering plastic bodies having a plurality of guides formed on one side thereof for loading said semiconductor strips, conductive engineering plastic upper and lower plates that are manufactured separately from said bodies and have a width corresponding to the width of said semiconductor strips, and connection means for connecting said body and upper and lower plates.

Said conductive engineering plastic preferably has a glass transition temperature of 100 or more in the case it is made of an amorphous resin, and it preferably has a melting point of 200 or more in the case it is made of a crystalline resin.

In addition, said conductive engineering plastic preferably has a surface resistance of 10^3 to 10^{12} .

In addition, said conductive engineering plastic is preferably selected from the group consisting of carbon fiber, carbon black, whisker, nickel coated carbon fiber, stainless steel fiber and copper coated fiber.

Said bodies and upper and lower plates are preferably specifically colored according to the size of said semiconductor strips, and said upper plate and lower plates are preferably differently colored from each other.

Said connection means preferably comprise a block formed on said body or on upper and lower plates, and a groove formed on said upper and lower plates or on the body, into which said block is fixed. In addition, said connection means is preferably a hook or pin.

In addition, the magazine of the present invention may further comprise margin controlling projecting parts formed on both edges of said

bodies or upper and lower plates, and margin controlling grooves formed on both edges of said upper and lower plates or bodies and located opposite to said projecting parts. In addition, the magazine of the present invention may further comprise an end cap made of plastic for supporting said
5 semiconductor strips loaded on said bodies so as to prevent them from falling down.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig 1 schematically shows a magazine for a semiconductor package of the prior art.

10 Fig 2 schematically shows a magazine for a semiconductor package according to one embodiment of the present invention.

Fig 3 schematically shows a connection part between bodies and upper and lower plates in a semiconductor package according to one embodiment of the present invention.

DETAILED DESCRIPTION AND THE PREFERRED EMBODIMENTS

The preferred embodiment of the present invention will be explained with reference to figures.

Fig. 2 schematically shows a magazine for a semiconductor package according to one embodiment of the present invention.

20 As shown in Fig 2, a magazine (30) for a semiconductor package according to one embodiment of the present invention is manufactured by separately constructing bodies (31, 31') having a plurality of guides formed on one side thereof for loading semiconductor strips and an upper plate (32) and a lower plate (33) corresponding to the size of the semiconductor strips,
25 the connecting bodies (31, 31') on which the plurality of guides are formed

are oppositely located and fixed, using connection means, for example a pin (35) located in the direction perpendicular to the direction of assembly.

The bodies (31, 31') and upper plate (32) and lower plate (33) are prepared from aluminum or conductive engineering plastic. In addition, in the case a conductive engineering plastic is made of an amorphous resin, a
5 conductive engineering plastic having a glass transition temperature of 100 or more is used, and in the case it is made of crystalline resin, a conductive engineering plastic having a melting point of 200 or more is used. In addition, the conductive engineering plastic has a surface resistance of 10^3
10 to 10^{12} , and it can be carbon fiber, carbon black, whisker, nickel coated carbon fiber, stainless steel fiber, copper coated fiber, etc.

Herein, since a magazine for a semiconductor package made of aluminum has a surface resistance of approximately 100 and a conductivity of 100%, if static electricity is charged in materials during a semiconductor
15 manufacture process, the static electricity promptly dissipates and damages products causing inferiority of the semiconductors manufactured. However, when a magazine for a semiconductor package (30) is made of a conductive engineering plastic, since the conductive engineering plastic has a surface resistance of 10^3 to 10^{12} , it can protect the semiconductor strips from static
20 electricity and therefore decrease the rate of inferior products produced in the total package process.

In addition, since the magazine made of aluminum is one-colored, it is difficult to differentiate lots and thus material blending problems can occur.

However, since the magazine made of a conductive engineering plastic can be colored variously colors according to the sizes of strips, it is possible to color an upper plate and a lower plate with different colors to solve the problem of material blending by lot, thereby facilitating stock management of semiconductor strips by lot in the package process and preventing material blending.

In addition, when a magazine for a semiconductor package made of conductive engineering plastic was given a thermal stability test at 175 °C for 1 month, it did not show a change in its size, and it was not affected by high temperature acid and alkali in a chemical resistance test.

It also maintained its mechanical strength and size after plasma treatment characteristics test with no contamination being discovered inside the plasma equipment, and no cracks occurred during a mechanical strength test in which the magazine was dropped from a height of 1.5 m. Accordingly, the weight of a magazine for a semiconductor package can be made lighter by forming it with a light conductive engineering plastic, while maintaining the same positive characteristics of those made of aluminum.

In addition, when a semiconductor strip having an appropriate size is loaded on a magazine formed by connecting bodies (31, 31') and an upper plate (32) and a lower plate (33), an end cap (34) can be combined therewith so that a semiconductor strip loaded on the magazine will not fall down during the semiconductor package process, and it may therefore be safely transferred. The end cap (34) is made of plastic so that it can fix to the

bodies (31, 31') without falling down, and it is preferable to determine the assembly size of the end cap in consideration of the flexibility of the plastic. With the conventional unitary magazine, since it is impossible to use an end cap, semiconductor strips can fall and damage the semiconductor or crack the solder mask in the mold process causing inferior semiconductor manufacture, but in the magazine of the present invention, since it is easy to use an end cap there is no concern for semiconductor strips falling, and thus damage to semiconductors, and particularly the rate of inferior production in the mold process, can decrease.

10 Fig. 3 schematically shows a connection part between bodies and upper and lower plates in the magazine for a semiconductor package according to one embodiment of the present invention.

Although a pin (35) is used as a connection means for connecting an upper plate (32), lower plate (33) and bodies (31, 31') in Fig. 2, blocks (40) of various shapes such as square, oval, etc. are used to connect an upper plate (32), lower plate (33) and bodies (31, 31') in Fig. 3. Specifically, blocks (40) are formed on an upper plate (32) and a lower plate (33), grooves are formed on bodies (31, 31'), and then bodies (31, 31') are located so that the sides on which a plurality of guides are opposite to each other, and the blocks (40) of an upper plate (32) and a lower plate (33) having width corresponding to the size of semiconductor strip are inserted into the grooves. The blocks (40) can be formed on bodies (31, 31') instead of being formed on an upper plate (32) and a lower plate (33), and they can be

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formed on an upper plate (32), a lower plate (33) and bodies (31, 31') simultaneously.

In addition, a hook (50) can be used as a connection means for connecting an upper plate (32), a lower plate (33) and bodies (31, 31').
5 Specifically, a hook is installed on an upper plate (32) and a lower plate (33) or on bodies (31, 31'), the bodies (31, 31') being located so that each side thereof on which a plurality of guides are formed face each other, the upper (32) and lower (33) plates having a width corresponding to the size of the semiconductor strips are closely adhered to the bodies, and then the upper
10 (32) and lower (33) plates and the bodies (31, 31') are connected by the hook (50).

In addition, in order to control a margin against a total length of magazine (30) occurring in the process of connecting upper and lower plates and bodies, a margin controlling projecting part (41) can be formed on both
15 edges of the bodies (31, 31'), and a margin controlling groove which is opposite to the margin controlling projecting part (41) can be formed on both edges of the upper and lower plates. Accordingly, upper (32) and lower (33) plates and bodies (31, 31') can be accurately connected to margin controlling projecting parts (41) of bodies (31, 31') without a margin by locating the
20 bodies (31, 31') so that each side thereof on which a plurality of guides are formed may face each other, with accurately adhering margin controlling grooves of the upper (32) and lower (33) plates having a width corresponding to the size of the semiconductor strips and then connecting

upper (32) and lower (33) plates and bodies (31, 31') by connection means. The locations of the margin controlling projecting parts (41) and the margin controlling grooves can be exchanged or crossed.

When a semiconductor strip of a specific size is transferred using the
5 magazine (30) formed as mentioned above in the semiconductor package process, semiconductor strips of different sizes can be loaded without manufacturing another magazine by separating upper (32) and lower (33) plates from the bodies (31, 31') of the magazine, changing the upper (32) and lower (33) plates with those having a width corresponding to the width of
10 the different size semiconductor strip, and connecting them to bodies (31, 31') as mentioned above.

Although the above embodiment uses a pin (35), blocks (40) and a hook (50) as connection means for connecting bodies (31, 31') and upper (32) and lower (33) plates, a common connection equipments such as
15 screws and slide holes (specifically, forming slide holes on sides of the upper (32) and lower (33) plates, forming slide holes opposite to those of the upper and lower plates on the sides of bodies (31, 31'), and connecting each slide hole) can be used.

As explained, since according to the present invention, bodies and a
20 plurality of upper and lower plates satisfying various sizes of semiconductor strips are separately manufactured and assembled to form a magazine for a semiconductor package, semiconductor strips of various sizes can be loaded thereon without manufacturing a separate magazine, and thus the cost for

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manufacturing the magazines can be reduced and the time period of manufacturing magazines can be shortened. In addition, the yield of semiconductor manufacture can be improved, since electrical damage to semiconductor chips can be prevented by forming a magazine using a
5 conductive engineering plastic.

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WHAT IS CLAIMED IS:

1. A magazine for a semiconductor package for loading semiconductor strips so as to transfer them in a semiconductor package process, said magazine comprising:

5 bodies having a plurality of guides formed on one side of each for loading said semiconductor strips;

upper and lower plates having a width corresponding to the width of said semiconductor strips, which are manufactured separately from said bodies;

connection means for connecting said bodies and said upper and lower plates;

10 and

an end cap for supporting said semiconductor strips loaded on said bodies so as to prevent them from falling down.

2. The magazine for a semiconductor package according to claim 1, wherein said bodies and upper and lower plates are made of aluminum.

15 3. A magazine for a semiconductor package for loading semiconductor strips so as to transfer them in a semiconductor package process, said magazine comprising:

conductive engineering plastic bodies having a plurality of guides formed on one side of each for loading said semiconductor strips;

conductive engineering plastic upper and lower plates having a width
20 corresponding to the width of said semiconductor strips, which are manufactured separately from said bodies;

a pin as a connection means for connecting said bodies and said upper and lower plates; and

an end cap made of plastic for supporting said semiconductor strips loaded on said bodies so as to prevent them from falling down.

4. The magazine for a semiconductor package according to claim 3, wherein said conductive engineering plastic has a glass transition temperature of 100
5 or more if it is made of amorphous resin, and it has a melting point of 200 or more if it is made of crystalline resin.

5. The magazine for a semiconductor package according to claim 3, wherein said conductive engineering plastic has a surface resistance of 10^3 to 10^{12} .

6. The magazine for a semiconductor package according to claim 3,
10 wherein said conductive engineering plastic is selected from the group consisting of carbon fiber, carbon black, whisker, nickel coated carbon fiber, stainless steel fiber and copper coated fiber.

7. The magazine for a semiconductor package according to claim 1, wherein said bodies and upper and lower plates are colored with specific colors
15 according to the size of said semiconductor strips.

8. The magazine for a semiconductor package according to claim 7, wherein said upper plate and lower plate are differently colored from each other.

9. The magazine for a semiconductor package according to any one of claims 1 to 8, wherein said connection means comprises a block formed on
20 said bodies or on said upper and lower plates, and a groove formed on said upper and lower plates or on said bodies into which said block is inserted

10. The magazine for a semiconductor package according to claim 1, wherein said connection means is a hook or a pin.

11. The magazine for a semiconductor package according to any one of claims 1 to 8, further comprising;

margin controlling projecting parts formed on both edges of said bodies or on said upper and lower plates; and

5 margin controlling grooves formed on both edges of said upper and lower plates or on said bodies, located opposite to said margin controlling projecting parts.

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