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DEVICE FOR UNILATERAL ETCHING OF A SEMICONDUCTOR WAFER

The invention relates to a device for unilateral etching of a semiconductor wafer after the style of an etching cell, consisting of a base member in the form of a plate with a central opening which is smaller than the semiconductor wafer, and a lid which closes the central opening on one side of the base member and is held releasably on the base member, the semiconductor wafer being adapted to be held on the base member by means of a sealing arrangement consisting of two elastic seals which are disposed in spaced relationship concentrically around the central opening and between which a vacuum conduit leads.

In a known device of the said kind (DE 197 28 962 A1) the sealing arrangement is disposed on the side of the base member remote from the lid. Consequently, when the semiconductor wafer is immersed into the etching batch, it is also subjected to the action of the etching agent in the edge zone and the back next to the sealing arrangement This etching agent attack is undesirable and in many cases obstructs further processing of the wafer.

The technical problem underlying the invention is so to develop a device of the type referred to in the preamble that the edge zone and back of the semiconductor wafer are reliably removed from the agent of the etching agent.

To solve this problem, according to the present invention, the sealing arrangement is disposed on the side of the base member facing the lid and the lid, engaging over the sealing arrangement and the semiconductor wafer held thereon, is held releasably on the base member with the interposition of another sealing arrangement on the base member consisting of two elastic seals which are arranged in spaced relationship concentrically around the other sealing arrangement and between which another vacuum conduit leads.

The advantage of the invention is that a very simple constructional step means that only the zone situated within the sealing arrangement on one side of the semiconductor wafer is exposed to the etching agent. The edge zone and the back of the semiconductor wafer are completely withdrawn from the etching agent and in this way cannot in any way be damaged.

There are a number of possibilities for further development of the invention. In a preferred embodiment, the lid is mounted pivotably on the base member. This greatly facilitates handling during charging and removal of a semiconductor wafer. Advantageously, the elastic seals are constructed as lip seals.

Basically it is possible to make the base member together with the sealing arrangements from plastics in one piece. In the long term, however, it is more cost effective if the construction is such that the sealing arrangements are held replaceably on the base member.

It is also advisable for the lid to have a conventional contact spring arrangement with contact springs held against the semiconductor wafer. An etching electrode arrangement can also be integrated in the base member. It is also advisable to provide the base member with at least one duct leading into the lid chamber, for example so that pressure equalisation with the free atmosphere can be effected to avoid damage to the semiconductor wafer during etching, such damage being due to temperature gradients.

The invention is explained in detail below with reference to a drawing illustrating one exemplified embodiment. In the drawing:

Fig. 1 is a plan view of a device for unilateral etching of a semiconductor wafer.

Fig. 2 is a section through the subject matter of Fig. 1 and

Fig. 3 is a similar section to Fig. 2 through another embodiment.

The devices illustrated in the drawings serve for unilateral etching of a semiconductor wafer 1, e.g. a silicon wafer, after the style of an etching cell. The basic construction of the device consists, firstly, of a base member 2 of plate shape and a lid 3. The base member 2 has a central opening 4, the diameter of which is smaller than the diameter of the semiconductor wafer 1. The lid 3 closes the central opening 4 on one side of the base member 2 and is held releasably on the base member 2. The semiconductor wafer 1 is held on the base member 2 by means of a sealing arrangement 5. The latter consists of two elastic seals 6, 7 which are disposed in spaced relationship concentrically around the central opening 4 and between which a vacuum conduit 8 leads.

In both embodiments, the arrangement is such that the sealing arrangement 5 is disposed on the side of the base member 2 facing the lid 3 and the lid 3, engaging over the sealing arrangement 5 and the semiconductor wafer 1 held thereon, is held releasably on the base member 2 with the interposition of another sealing arrangement 9.

In all the cases the elastic seals 6, 7 are constructed as lip seals. The lid 3 in each case has the conventional contact spring arrangement 11 with contact springs 12 held against the semiconductor wafer 1. The base member 2 is also provided with two ducts 13 which lead into the lid chamber 14 formed between the lid 3 and the semiconductor wafer 1. Pressure equalisation, protective gas scavenging to discharge noxious gases or for drying and the like, can be effected by way of said ducts 13.

In the embodiment shown in Figs. 1 and 2, the lid 3 is held on the base member 2 by means of the additional sealing arrangement 9, which is of the same construction as the other sealing arrangement 5. The additional sealing arrangement 9 thus also consists of two seals 6, 7 in the form of lip seals, which are disposed in spaced relationship concentrically in this case around the other sealing arrangement 5 and between which another of vacuum conduit 10 leads. The base member 2 with the two sealing arrangements 5, 9 is made in one piece of plastics.

In the embodiment shown in Fig. 3, the lid 3 is mounted on the base member 2 so as to be pivotable and can be pressed against the base member 2 by means of a fixing yoke 15, while an elastic sealing ring inserted at the edge is compressed as the additional sealing arrangement 9. It will also be seen that the base member 2 and the sealing arrangement 5 are in this case made of different materials. The sealing arrangement 5 is held replaceably on the base member 2 by means of a screw clamp ring.

Claims:

1. A device for unilateral etching of a semiconductor wafer (1) after the style of an etching cell, consisting of a base member (2) in the form of a plate with a central opening (4) which is smaller than the semiconductor wafer (1), and a lid (3) which closes the central opening (4) on one side of the base member (2) and is held releasably on the base member (2). The semiconductor wafer is adapted to be held on the base member (2) by means of a sealing arrangement (5) consisting of two elastic seals which are disposed in spaced relationship concentrically around the central opening (4) and between which a vacuum conduit (8) leads, characterised in that the sealing arrangement (5) is disposed on the side of the base member (2) facing the lid (3), and that the lid (3), engaging over the sealing arrangement (5) and the semiconductor wafer (1) held thereon, is held releasably on the base member (2) with the interposition of another sealing arrangement (9) on the base member (2) consisting of two elastic seals (6, 7) which are arranged in spaced relationship concentrically around the other sealing arrangement (5) and between which another vacuum conduit (10) leads.

2. A device according to claim 1, characterised in that the lid (3) is mounted pivotably on the base member (2).

3. A device according claim 1 or 2, characterised in that the elastic seals (6, 7) are constructed as lip seals.

4. A device according to any one of claims 1 to 3, characterised in that the sealing arrangements (5, 9) are held replaceably on the base member (2).

5. A device according to any one of claims 1 to 3, characterised in that the lid (3) has a contact spring arrangement (11) with contact springs (12) held against the semiconductor wafer (1).

6. A device according to any one of claims 1 to 5, characterised in that the base member (2) has at least one duct (13) leading into the lid chamber (14).