

Claims

1. A method of processing a wafer (W), having on one side (1) a device area (2) with a plurality of devices, partitioned by a plurality of division lines (11), and a peripheral marginal area (3) having no devices and being formed around the device area (2), wherein the device area (2) is formed with a plurality of protrusions (14) protruding from a plane surface of the wafer (W) and the method comprises:

providing a protective film (4);

providing a base sheet (7) having a cushioning layer (13) applied to a front surface (17) thereof;

attaching a front surface of the protective film (4), for covering the devices on the wafer (W), to the one side (1) of the wafer (W), wherein the protective film (4) is adhered to at least the peripheral marginal area (3) with an adhesive (9), and wherein the protective film (4) is applied to the wafer (W) in solid form;

attaching a back surface of the protective film (4) opposite to the front surface thereof to the cushioning layer (13),

wherein the protrusions (14) protruding from the plane surface of the wafer (W) are embedded in the cushioning layer (13) and a back surface (18) of the base sheet (7) opposite to the front surface (17) thereof is substantially parallel to the side (6) of the wafer (W) being opposite to the one side (1); and

grinding the side (6) of the wafer (W) being opposite to the one side (1) for adjusting the wafer thickness.

2. The method according to claim 1, wherein

the protective film (4) and the base sheet (7), having the cushioning layer (13) applied to the front surface (17) thereof, are laminated first, forming a protective sheeting (5, 5') comprising the base sheet (7), the cushioning layer (13) and the protective film (4) attached to the cushioning layer (13), and

the protective sheeting (5, 5') is subsequently attached to the one side (1) of the wafer (W), such that the protrusions (14) protruding from the plane surface of the wafer (W) are covered by the protective film (4) and embedded in the cushioning layer (13), and the back surface (18) of the base sheet (7) is substantially parallel to the side (6) of the wafer (W) being opposite to the one side (1).

3. The method according to claim 1, wherein

the protective film (4) is attached to the one side (1) of the wafer (W) first, and

the one side (1) of the wafer (W), having the protective film (4) attached thereto, is subsequently attached to the front surface (17) of the base sheet (7), so that the protrusions (14) protruding from the plane surface of the wafer (W) are embedded in the cushioning layer (13) and the back surface (18) of the base sheet (7) is substantially parallel to the side (6) of the wafer (W) being opposite to the one side (1).

4. The method according to any one of claims 1 to 3, further comprising cutting the wafer (W) along the division lines (11).

5. The method according to any one of claims 1 to 4, further comprising removing the protective film (4), the cushioning layer (13) and the base sheet (7) from the wafer (W).

6. The method according to claim 5 as dependent on claim 4, wherein the cutting of the wafer (W) is performed before or after removing the protective film (4), the cushioning layer (13) and the base sheet (7) from the wafer (W).

7. The method according to any one of the preceding claims, wherein the adhesive (9) for adhering the protective film (4) to the one side (1) of the wafer (W) is provided only in the peripheral marginal area (3) or the adhesive (9) is provided over an entire contact area of the one side (1) of the wafer (W) and the protective film (4).

8. The method according to any one of the preceding claims, wherein the protective film (4) is expandable and the protective film (4) is expanded when it is attached to the one side (1) of the wafer (W), so as to follow the contours of the protrusions (14) protruding from the plane surface of the wafer (W).

9. The method according to any one of the preceding claims, wherein the cushioning layer (13) is curable by an external stimulus, such as UV radiation, heat, an electric field and/or a chemical agent.

10. The method according to claim 9, further comprising applying the external stimulus to the cushioning layer (13) so as to cure the cushioning layer (13), before grinding the side (6) of the wafer (W) being opposite to the one side (1).

11. The method according to any one of the preceding claims, further comprising cutting off a portion or portions (23) of the protective film (4) and/or the cushioning layer (13) and/or the base sheet (7) which laterally extends or extend

beyond a circumference of the wafer (W), before grinding the side (6) of the wafer (W) being opposite to the one side (1).

12. The method according to any one of the preceding claims, wherein the base sheet (7) is made of a rigid material, such as PET and/or silicon and/or glass and/or SUS.

13. The method according to any one of the preceding claims, wherein the protective film (4) has a thickness in the range of 5 to 200 μm .

14. The method according to any one of the preceding claims, wherein the cushioning layer (13) has a thickness in the range of 20 to 300 μm .

15. A protective sheeting (5, 5') for use in processing a wafer (W), the wafer (W) having on one side (1) a device area (2) with a plurality of devices, wherein the device area (2) is formed with a plurality of protrusions (14) protruding from a plane surface of the wafer (W), the protective sheeting (5, 5') comprising:

a base sheet (7);

a cushioning layer (13) applied to a front surface (17) of the base sheet (7);

a protective film (4), a back surface of which is attached to the cushioning layer (13); and

an adhesive layer (9) applied to at least part of a front surface of the protective film (4) opposite to the back surface thereof,

wherein the cushioning layer (13) is curable by an external stimulus, such as UV radiation, heat, an electric field and/or a chemical agent, and

wherein the protective film (4) is expandable and is configured so as to be expanded when being attached to the one side of the wafer (W), so as to partially or closely follow the contours of the protrusions (14) protruding from the plane surface of the wafer (W).

16. The protective sheeting (5, 5') according to claim 15, wherein the adhesive layer (9) has a substantially annular shape.

17. The protective sheeting (5, 5') according to claim 16, wherein the inner diameter of the adhesive layer (9) is smaller than the diameter of a semiconductor-sized wafer (W).

18. The protective sheeting (5, 5') according to claim 16 or 17, wherein the outer diameter of the adhesive layer (9) is larger than the inner diameter of a semiconductor-sized annular frame (25) for holding a semiconductor-sized wafer (W).