~~Device and Method for Bonding of substrates~~

CLAIMS

~~Amended Claims~~

1. A device for especially temporary bonding of a first substrate (15) with a second substrate with the following features:

- a mounting apparatus for mounting of the first substrate (15) on a mounting contour (8, 8', 8", 8"', 8^{IV}) with an active mounting surface (7, 7', 7", 7"', 7^{IV}) of the mounting apparatus with

a) an outer ring section (10) for controllable fixing of the first substrate (15) and

b) an inner ring section (11) which is set back in one at least largely relative to the mounting surface (7, 7', 7", 7"', 7^{IV}),

- deformation means for controllable deformation of the first substrate (15), the deformation means being made to act within the outer ring section and

- bonding means for bonding of the first substrate (15) to the second substrate (15') by removal of the deformed first substrate (15) from the mounting apparatus, characterized in that the mounting contour (8, 8', 8", 8"', 8^{IV}) in the inner ring section (11) has at least one support surface (12, 12', 12") for supporting the semiconductor substrate (15), the support surface (12, 12', 12") being included in the mounting surface (7, 7', 7", 7"', 7^{IV}).

2. The device as claimed in Claim 1, wherein the mounting contour (8, 8', 8", 8"', 8^{IV}) and/or the mounting surface (7, 7', 7", 7"', 7^{IV}) and/or the mounting apparatus is/are made rotationally symmetrical, especially concentric to a center Z of the mounting apparatus.

3. The device as claimed in claim 1 or 2, wherein at least one negative pressure channel (3)

which interrupts the mounting surface (7, 7', 7", 7"', 7^{IV}) is provided in the outer ring section (10) of the mounting contour (8, 8', 8", 8"', 8^{IV}).

4. The device as claimed in claim 3, wherein the negative pressure channel (3) runs concentrically, especially in the shape of a circular ring, to a center Z of the mounting apparatus, especially around the entire periphery.

5. The device as claimed in Claim 3 or 4, wherein the ring width b_A of the outer, especially circular ring-shaped ring section (10) is smaller than the ring width b_1 of the inner ring section (11).

6. The device as claimed in one of the preceding claims, wherein the projection surface of the mounting contour (8, 8', 8", 8"') is at least twice, especially three times, as large as the active mounting surface (7, 7', 7", 7"', 7^{IV}).

7. The device as claimed in one of the preceding claims, wherein the support surface (12, 12', 12'') is circular ring shaped, preferably concentrically to the center Z.

8. The device as claimed in one of the preceding claims, wherein the deformation means are made to act on the semiconductor substrate (15) on the side of the mounting surface (7, 7', 7", 7"', 7^{IV}) especially outside, preferably solely outside the mounting surface (7, 7', 7", 7"', 7^{IV}).

9. The device as claimed in one of the preceding claims, wherein the deformation means is at least one pressure element (6, 6', 6", 6"') which penetrates the mounting contour (8, 8', 8", 8"', 8^{IV}).

10. The device as claimed in one of the preceding claims, wherein the deformation means are made such that the deformation takes place concentrically to the first substrate (15).

11. The device as claimed in Claim 2, wherein in the inner ring section (11) there are especially individually triggerable fixing elements (16) for fixing of the corresponding fixing

sections along the first substrate (15).

12. A method for especially temporary bonding of a first substrate (15) to a second substrate with the following steps, especially the following sequence:

- mounting the first substrate (15) on a mounting contour (8, 8', 8", 8"', 8^{IV}) with an active mounting surface (7, 7', 7", 7"', 7^{IV}) of the mounting apparatus (1) with

a) an outer ring section (10) for controllable fixing of the first substrate (15),

b) an inner ring section (11) which is set back in one at least largely relative to the mounting surface (7, 7', 7", 7"', 7^{IV}), wherein the mounting contour (8, 8', 8", 8"', 8^{IV}) in the inner ring section (11) has at least one support surface (12, 12', 12") for supporting the semiconductor substrate (15), the support surface (12, 12', 12") being included in the mounting surface (7, 7', 7", 7"', 7^{IV}),

- deforming the first substrate (15) within the outer ring section by deformation means for controllable deformation of the first substrate (15)

- bonding the first substrate (15) to the second substrate by bonding means by removal of the deformed first substrate (15) from the mounting apparatus.

13. The method as claimed in Claim 12, wherein bonding takes place essentially concentrically proceeding from the middle M of the contact surface of the first and second substrate (15) by deformation of the first substrate (15).

14. The method as claimed in one of claims 12 or 13, wherein distortions and/or strains of the first and/or second substrate which have been determined by an upstream measurement method are reduced by action, especially by controlled distortion and/or strain of sections of the first and/or second substrate, on the first and/or second substrate, especially by means of fixing elements (16) for fixing of corresponding fixing sections.

15. A device for especially temporary bonding of a first substrate (15) with a second substrate with the following features:

- a mounting apparatus for mounting of the first substrate (15) on a mounting contour (8, 8', 8", 8"', 8^{IV}) with an active mounting surface (7, 7', 7", 7"', 7^{IV}) of the mounting apparatus with

a) an outer ring section (10) for controllable fixing of the first substrate (15) and

b) an inner ring section (11) which is set back at least largely relative to the mounting surface (7, 7', 7", 7"', 7^{IV}),

- deformation means for controllable deformation and herewith pretensioning of the first substrate (15), wherein the deformation means are designed to act within the outer ring section and

- bonding means for automatic bonding of the first substrate (15) with the second substrate (15') due to the pretensioning, characterized in that the mounting contour (8, 8', 8", 8"', 8^{IV}) in the inner ring section (11) has at least one support surface (12, 12', 12") for supporting the semiconductor substrate (15), the support surface (12, 12', 12") being included in the mounting surface (7, 7', 7", 7"', 7^{IV}).

16. A device for especially temporary bonding of a first substrate (15) with a second substrate with the following features:

- a mounting apparatus for mounting of the first substrate (15) on a mounting contour (8, 8', 8", 8"', 8^{IV}) with an active mounting surface (7, 7', 7", 7"', 7^{IV}) of the mounting apparatus with

a) an outer ring section (10) for controllable fixing of the first substrate (15) and

b) an inner ring section (11) which is set back in one at least largely relative to the mounting surface (7, 7', 7", 7"', 7^{IV}),

- deformation means for controllable deformation of the first substrate (15), the deformation means being made to act within the outer ring section and

- bonding means for bonding of the first substrate (15) to the second substrate (15') by removal of the deformed first substrate (15) from the mounting apparatus, characterized in that the mounting contour (8, 8', 8", 8"', 8^{IV}) in the inner ring section (11) has at least one support surface (12, 12', 12") for supporting the semiconductor substrate (15), the support surface (12, 12', 12") being included in the mounting surface (7, 7', 7", 7"', 7^{IV})

wherein the ring width b_A of the outer ring section (10) is smaller than the ring width b_I of the inner ring section (11), wherein the ratio of the ring width b_A to b_I is less than 1 to 3.

17. A device for especially temporary bonding of a first substrate (15) with a second substrate with the following features:

- a mounting apparatus for mounting of the first substrate (15) on a mounting contour (8, 8', 8", 8"', 8^{IV}) with an active mounting surface (7, 7', 7", 7"', 7^{IV}) of the mounting apparatus with

a) an outer ring section (10) for controllable fixing of the first substrate (15) and

b) an inner ring section (11) which is set back at least largely relative to the mounting surface (7, 7', 7", 7"', 7^{IV}),

- deformation means for controllable deformation and herewith pretensioning of the first substrate (15), wherein the deformation means are designed to act within the outer ring section and

- bonding means for automatic bonding of the first substrate (15) with the second substrate (15') due to the pretensioning, characterized in that the mounting contour (8, 8', 8", 8"', 8^{IV}) in the inner ring section (11) has at least one support surface (12, 12', 12") for supporting the semiconductor substrate (15), the support surface (12, 12', 12") being included in the mounting surface (7, 7', 7", 7"', 7^{IV})

wherein the ring width b_A of the outer ring section (10) is smaller than the ring width b_I of the inner ring section (11), wherein the ratio of the ring width b_A to b_I is less than 1 to 3.