

CLAIMS

1. A tester apparatus comprising:

a vacuum conduit defining a vacuum passage;

a wafer holder for releasably holding a wafer, the wafer holder having a plurality of vacuum openings therethrough, each vacuum opening connecting a rear side of the wafer to the vacuum passage so that, when a vacuum is applied to the vacuum passage, the vacuum secures the rear side of the wafer to the wafer holder, wherein each vacuum opening has an inlet opening at the wafer, an outlet opening remote from the wafer, and an enlarged section between the inlet opening and the outlet opening to reduce arcing between the openings;

a contactor board;

contactor contacts mounted to the contactor board, each contactor contact having a surface positioned to make contact with a respective front wafer terminal on a front side of the wafer; and

an electric tester connected to the contactor contacts, such that, in use, current conducts through the front side wafer contacts and the contactor contacts between the electric tester and a circuit in the wafer to test the circuit.

2. The tester apparatus of claim 1, further comprising:

a thermal chuck, in use, the wafer holder being thermally connected to the thermal chuck and heat transferring between the thermal chuck and the wafer.

3. The tester apparatus of claim 2, wherein the thermal chuck has a thermal passage so that, in use, a fluid flows through the thermal passage and heat transfers between the fluid and the thermal chuck.

4. The tester apparatus of claim 1, wherein the wafer holder has at least a portion that is electrically conductive and has an exposed surface to make contact with a rear wafer terminal on a rear side of the wafer; and

an electrical conductor connecting the portion that is electrically conductive such that, in use, the circuit is connected through the rear wafer contact, the exposed surface of the portion that is electrically conductive and the electrical path to the electric tester.

5. The tester apparatus of claim 1, wherein the wafer holder includes:

a wafer chuck; and

a tray for releasably holding a wafer the tray being releasable positioned on the wafer chuck, the wafer chuck having a vacuum passage therethrough, the tray having a plurality of vacuum openings therethrough, each vacuum opening connecting a rear side of the wafer to the vacuum passage in the wafer chuck so that, when a vacuum is applied to the vacuum passage, the vacuum secures the rear side of the wafer to the tray.

6. The tester apparatus of claim 5, wherein the tray includes:

an electric insulator around the inlet opening of each vacuum opening.

7. The tester apparatus of claim 5, wherein the tray has at least a portion that is electrically conductive and has an exposed surface to make contact with a rear wafer terminal on a rear side of the wafer; and

an electrical conductor connecting the portion that is electrically conductive such that, in use, the circuit is connected through the rear wafer contact, the exposed surface of the portion that is electrically conductive and the electrical path to the electric tester.

8. The tester apparatus of claim 7, further comprising:

at least one wafer chuck pin mounted to the contactor board, the wafer chuck pin having a grounding contact making contact with the wafer chuck.

9. The tester apparatus of claim 8, wherein the wafer chuck pin extends past an edge of the tray.

10. The tester apparatus of claim 8, further comprising a plurality of wafer chuck pins.

11. The tester apparatus of claim 7, wherein the tray includes a return terminal area that is electrically connected to the exposed surface of the tray and the contactor front contacts that are mounted to the contactor board are power contactor front contacts, and the electrical return conductor includes:

a contactor return contact mounted to the contactor board and having a surface positioned to make contact with the return terminal area on the tray.

12. The tester apparatus of claim 1, further comprising:
a plurality of wafer contact pins mounted to the contactor board, the power contactor front contacts being located on the wafer contact pins; and
at least one return terminal pin mounted to the contactor board, the contactor return contact being on the return terminal pin.
13. The tester apparatus of claim 12, wherein the return terminal pin extends past an edge of the wafer.
14. The tester apparatus of claim 12, further comprising a plurality of return terminal pins.
15. The tester apparatus of claim 11, further comprising:
a signal distribution board that includes:
a signal distribution board substrate;
signal distribution board contacts on the signal distribution board substrate;
signal distribution board terminals on the signal distribution board substrate; and
signal distribution board conductors connecting the signal distribution board contacts to the signal distribution board terminals.
16. The tester apparatus of claim 15, further comprising:
a stiffener plate that is positioned to support the signal distribution board substrate.

17. A method of testing a wafer comprising:

releasably holding a wafer in a wafer holder, the wafer holder having a plurality of vacuum openings therethrough, each vacuum opening connecting a rear side of the wafer to the vacuum passage;

applying a vacuum to the vacuum passage, the vacuum securing the rear side of the wafer to the wafer holder;

moving a contactor board and the tray relatively towards one another so that surfaces of contactor contacts mounted to the contactor board make contact with respective front wafer contacts on a front side of the wafer;

conducting current through the front side wafer contacts and the contactor contacts between an electric tester and a circuit in the wafer to test the circuit, wherein each vacuum opening has an inlet opening at the wafer, an outlet opening remote from the wafer, and an enlarged section between the inlet opening and the outlet opening to reduce arcing between the openings; and

removing the wafer from the tray.

18. The method of claim 17, further comprising:

thermally connecting the tray to the thermal chuck; and

transferring heat between the thermal chuck and the wafer.

19. The method of claim 18, wherein a fluid flows through the thermal passage of the thermal chuck and heat transfers between the fluid and the thermal chuck.

20. The method of claim 17, wherein the tray has at least a portion that is electrically conductive and has an exposed surface to make contact with a rear wafer terminal on a rear side of the wafer, the circuit being connected through the rear wafer terminal, the exposed surface of the portion that is electrically conductive and the electrical path to the electric tester.

21. The method of claim 17, wherein the wafer holder includes:

a wafer chuck; and

a tray for releasably holding a wafer the tray being releasable positioned on the wafer chuck, the wafer chuck having a vacuum passage therethrough, the tray having a plurality of vacuum openings therethrough, each vacuum opening connecting a rear side of the wafer to the vacuum passage in the wafer chuck so that, when a vacuum is applied to the vacuum passage, the vacuum secures the rear side of the wafer to the tray.

22. The method of claim 20, wherein the tray includes:

an electric insulator around the inlet opening of each vacuum opening.

23. The method of claim 20, further comprising:

making contact between a grounding contact of at least one wafer chuck pin mounted to the contactor board and the wafer chuck.

24. The method of claim 23, wherein the wafer chuck pin extends past an edge of the tray.

25. The method of claim 24, further comprising making contact between a plurality of wafer chuck pins mounted to the contactor board and the wafer chuck.

26. The method of claim 27, wherein the tray includes a return terminal area that is electrically connected to the exposed surface of the tray and the contactor front contacts that are mounted to the contactor board are power contactor front contacts, and the electrical return conductor includes:

a contactor return contact mounted to the contactor board and having a surface positioned to make contact with the return terminal area on the tray.

27. The method of claim 26, wherein:

a plurality of wafer contact pins are mounted to the contactor board, the power contactor front contacts being located on the wafer contact pins; and

at least one return terminal pin is mounted to the contactor board, the contactor return contact being on the return terminal pin.

28. The method of claim 27, wherein the return terminal pin extends past an edge of the wafer.

29. The method of claim 27, wherein a plurality of return terminal pins are mounted to the contactor board.

30. The method of claim 26, further comprising:
- attaching the contactor board to a signal distribution board that includes:
 - a signal distribution board substrate;
 - signal distribution board contacts on the signal distribution board substrate;
 - signal distribution board terminals on the signal distribution board substrate; and
 - signal distribution board conductors connecting the signal distribution board contacts to the signal distribution board terminals.
31. The method of claim 30, further comprising:
- positioning a stiffener plate to support the signal distribution board substrate.