CLAIMS

1. A microelectronic circuit testing pack, comprising:

a portable supporting structure including first and second components for holding a substrate therebetween, the substrate carrying a microelectronic circuit and having a plurality of terminals connected to the microelectronic circuit;

a plurality of contacts on the second component, the contacts matching the terminals for making contact to the terminals;

a pressure differential cavity seal between the first and second components, the pressure differential cavity seal forming an enclosed pressure differential cavity together with surfaces of the first and second components;

a first passage formed through one of the first and second components, the first passage having a first opening at the pressure differential cavity and a second opening outside the pressure differential cavity;

a first valve connected to the first passage, opening of the first valve allowing air to flow between an area outside the first and second components and the pressure differential cavity, and closing of the first valve keeping air from flowing between the area outside the first and second components and the pressure differential cavity;

a first interface, on the portable supporting structure and connected to the contacts, for connection to a second interface on a stationary structure when the portable supporting structure is removably held by the stationary structure;

a pressure sensor positioned to detect a pressure in the pressure differential cavity; and

an electrical pressure sensor interface connected to the pressure sensor to

communicate the pressure with an electric tester.

2. The microelectronic circuit testing pack of claim 1, wherein the pressure sensor is positioned distant from the pressure differential cavity and a pressure sensing passage connects the pressure differential cavity with the pressure sensor.

3. The microelectronic circuit testing pack of claim 2, wherein the first passage is formed in the first component.

4. The microelectronic circuit testing pack of claim 3, wherein the first component includes a backing plate and a signal distribution board, wherein a portion of the signal distribution board is located between the backing plate and the second component, wherein the pressure sensing passage is formed in the backing plate.

5. The microelectronic circuit testing pack of claim 4, wherein the pressure sensing passage is formed through the signal distribution board.

6. The microelectronic circuit testing pack of claim 1, wherein the pressure sensor is secured to the portable supporting structure.

7. The microelectronic circuit testing pack of claim 1, wherein the pressure differential cavity seal is secured to the first component when the first and second components are apart.

8. The microelectronic circuit testing pack of claim 1, wherein the pressure differential cavity seal is a lip seal.

9. The microelectronic circuit testing pack of claim 1, wherein the first valve is a first check valve, a second passage being formed through a component having the first check valve, the second passage having a first opening at the pressure differential cavity and a second opening outside the pressure differential cavity, further comprising:

a second valve connected to the second passage, opening of the second valve allowing air to flow between the area outside the first and second components and the pressure differential cavity and closing of the second valve keeping air from flowing between the area outside the first and second components and the pressure differential cavity.

10. The microelectronic circuit testing pack of claim 1, wherein the substrate is a wafer with a plurality of microelectronic circuits.

11. The microelectronic circuit testing pack of claim 1, wherein the contacts are pins, each pin having a spring that is depressed against a spring force thereof when the respective contact is depressed by a respective one of the terminals.

12. A tester apparatus, comprising:

a portable supporting structure including first and second components for holding a substrate therebetween, the substrate carrying a microelectronic circuit and having a

plurality of terminals connected to the microelectronic circuit;

a plurality of contacts on the second component, the contacts matching the terminals for making contact to the terminals;

a pressure differential cavity seal between the first and second components, the pressure differential cavity seal forming an enclosed pressure differential cavity together with surfaces of the first and second components;

a first passage formed through one of the first and second components, the first passage having a first opening at the pressure differential cavity and a second opening outside the pressure differential cavity;

a first valve connected to the first passage, opening of the first valve allowing air to flow between an area outside the first and second components and the pressure differential cavity, and closing of the first valve keeping air from flowing between the area outside the first and second components and the pressure differential cavity;

a first interface on the portable supporting structure and connected to the contacts;

a stationary structure, the portable supporting structure being receivable to be held by the stationary structure and being removable from the stationary structure;

a second interface on the stationary structure, the second interface being connected to the first interface when the portable supporting structure is held by the stationary structure, and being disconnected from the first interface when the portable supporting structure is removed from the stationary structure;

an electrical tester connected through the second interface, the first interface, and the contacts to the terminals so that signals are transmitted between the electrical tester and the microelectronic circuit to test the microelectronic circuit; and

a pressure monitoring system that includes:

a pressure sensor positioned to detect a pressure in the pressure differential cavity; and

an electrical pressure sensor interface connected to the pressure sensor to communicate the pressure with an electric tester.

13. The tester apparatus of claim 12, wherein the pressure sensor is positioned distant from the pressure differential cavity and a pressure sensing passage connects the pressure differential cavity with the pressure sensor.

14. The tester apparatus of claim 13, wherein the first passage is formed in the first component.

15. The tester apparatus of claim 14, wherein the first component includes a backing plate and a signal distribution board, wherein a portion of the signal distribution board is located between the backing plate and the second component, wherein the pressure sensing passage is formed in the backing plate.

16. The tester apparatus of claim 15, wherein the pressure sensing passage is formed through the signal distribution board.

17. The tester apparatus of claim 12, wherein the pressure sensor is secured to the portable supporting structure.

18. The tester apparatus of claim 12, wherein the pressure monitoring system includes:

an electrical pressure connector interface on the stationary structure, the electrical pressure sensor interface releasably making contact with the electrical pressure connector interface to communicate the pressure with the electric tester.

19. The tester apparatus of claim 18, wherein the electrical pressure sensor interface includes at least a first contact and the pressure monitoring system includes at least a first terminal, wherein the first contact engages with the first terminal when the portable supporting structure is received by the stationary structure and the first contact disengages from the first terminal when the portable supporting structure is removed from the stationary structure.

20. The tester apparatus of claim 19, wherein the electrical pressure sensor interface is in a printed circuit board having a substrate and the first contact is formed on the substrate.

21. The tester apparatus of claim 19, wherein the electrical pressure sensor interface includes at least a second contact and the pressure monitoring system includes at least a second terminal, wherein the second contact engages with the second terminal when the portable supporting structure is received by the stationary structure and the second contact disengages from the second terminal when the portable supporting structure is removed from the stationary structure.

22. The tester apparatus of claim 12, wherein the pressure differential cavity seal surrounds the contacts and the terminals.

23. The tester apparatus of claim 12, wherein the pressure differential cavity seal is secured to the first component when the first and second components are apart.

24. The tester apparatus of claim 12, wherein the pressure differential cavity seal is a lip seal.

25. The tester apparatus of claim 12, wherein the first valve is a first check valve, a second passage being formed through a component having the first check valve, the second passage having an first opening at the pressure differential cavity and an second opening outside the pressure differential cavity, further comprising:

a second valve connected to the second passage, opening of the second valve allowing air to flow between the area outside the first and second components and the pressure differential cavity and closing of the second valve keeping air from flowing between the area outside the first and second components and the pressure differential cavity.

26. The tester apparatus of claim 12 wherein the stationary structure includes a thermal chuck, the second component of the portable supporting structure including a thin chuck contacting the thermal chuck to allow for transfer of heat between the portable supporting structure and the thermal chuck.

27. The tester apparatus of claim 12 wherein the substrate is a wafer with a plurality of microelectronic circuits.

28. The tester apparatus of claim 12 wherein the contacts are pins, each pin having a spring that is depressed against a spring force thereof when the respective contact is depressed by a respective one of the terminals.

29. A method of testing a microelectronic circuit held by a substrate, comprising:

holding the substrate between first and second components of a portable supporting structure, the second component having contacts against terminals of the substrate connected to the microelectronic circuit, wherein a first passage is formed through one of the first and second components, the first passage having an first opening at a pressure differential cavity and a second opening outside the pressure differential cavity;

locating a pressure differential cavity seal between the first and second components to form an enclosed cavity by surfaces of the first and second components and the pressure differential cavity seal;

opening a first valve to allow air to flow between an area outside the first and second components and the pressure differential cavity;

closing the first valve, keeping air from flowing between the area outside the first and second components and the pressure differential cavity;

receiving the portable supporting structure by a stationary structure with a first interface on the portable supporting structure connected to a second interface on the

stationary structure;

transmitting signals between an electrical tester and the microelectronic circuit through the terminals, contacts, and first and second interfaces to test the microelectronic circuit;

detecting, with a pressure monitoring system, a pressure in the pressure differential cavity; and

communicating the pressure with an electric tester.

30. The method of claim 29 wherein the pressure sensor is positioned distant from the pressure differential cavity and a pressure sensing passage connects the pressure differential cavity with the pressure sensor.

31. The method of claim 30 wherein the first passage is formed in the first component.

32. The method of claim 31, wherein the first component includes a backing plate and a signal distribution board, wherein a portion of the signal distribution board is located between the backing plate and the second component, wherein the pressure sensing passage is formed in the backing plate.

33. The method of claim 32, wherein the pressure sensing passage is formed through the signal distribution board.

34. The method of claim 29, wherein the pressure sensor is secured to the portable supporting structure.

35. The method of claim 29, wherein the pressure monitoring system includes:

an electrical pressure connector interface on the stationary structure, the electrical pressure sensor interface releasably making contact with the electrical pressure connector interface to communicate the pressure with the electric tester.

36. The method of claim 35, wherein the electrical pressure sensor interface includes at least a first contact and the pressure monitoring system includes at least a first terminal, wherein the first contact engages with the first terminal when the portable supporting structure is received by the stationary structure and the first contact disengages from the first terminal when the portable supporting structure is removed from the stationary structure.

37. The method of claim 36, wherein the electrical pressure sensor interface is in a printed circuit board having a substrate and the first contact is formed on the substrate.

38. The method of claim 36, wherein the electrical pressure sensor interface includes at least a second contact and the pressure monitoring system includes at least a second terminal, wherein the second contact engages with the second terminal when the portable supporting structure is received by the stationary structure and the second contact disengages from the second terminal when the portable supporting structure is removed from the stationary structure.

39. The method of claim 33, wherein the pressure differential cavity seal surrounds the contacts and the terminals.

40. The method of claim 34, wherein the pressure differential cavity seal is secured to the first component when the first and second components are apart.

41. The method of claim 29, wherein the pressure differential cavity seal is created with a lip seal.

42. The method of claim 29, wherein the first valve is a first check valve, a second passage being formed through a component having the first check valve, the second passage having an first opening at the pressure differential cavity and an second opening outside the pressure differential cavity, further comprising:

opening a second valve, being a second valve connected to the second passage, to allow air to flow between the area outside the first and second components and the pressure differential cavity.

43. The method of claim 29, wherein the stationary structure includes a thermal chuck, the second component of the portable supporting structure including a thin chuck.

44. The method of claim 29, wherein the substrate is a wafer with a plurality of microelectronic circuits.

45. The method of claim 29, wherein the contacts are pins, each pin having a spring that is depressed against a spring force thereof when the respective contact is depressed by a respective one of the terminals.