

D E S C R I P T I O N

CASSETTE HOUSING, PROBER,
SERVER RACK, AND STORAGE SYSTEM

5

Technical Field

Embodiments described herein relate generally to a cassette housing, a prober, a server rack, and a storage system.

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Background Art

Probe cards are used as inspection jigs to relay electrical signals between a semiconductor wafer on which semiconductor chips are formed and an inspection device that inspects the semiconductor chips. The semiconductor wafer further includes pad electrodes formed thereon. The probe cards each include a probe card substrate and a probe.

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The probe card is electrically connected to a semiconductor wafer by a prober. More specifically, the prober brings the pad electrode of the semiconductor wafer into contact with the probe of the probe card. With this structure, the semiconductor chip of a semiconductor wafer is electrically connected to the probe card substrate of the probe card.

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Citation List

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Patent Literatures

Patent Literature 1: JP 2020-188076 A

Patent Literature 2: US 10663511 B

Patent Literature 3: US 7975759 B

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Summary of Invention

Technical Problem

One of embodiments described herein provides a cassette housing, a prober, a server rack and a storage system which can carry out temperature adjustment with

respect to a semiconductor wafer including a plurality of non-volatile memory chips.

Solution to Problem

According to one embodiment, a cassette housing
5 includes a storage unit, a probe card, and a container. The storage unit stores a semiconductor wafer including a plurality of nonvolatile memory chips. The probe card includes a probe to be brought into contact with a pad electrode provided on the semiconductor wafer. The
10 container contains heat transfer fluid for lowering or raising temperature of the semiconductor wafer stored in the storage unit.

Brief Description of Drawings

FIG. 1 is a block diagram showing an example of a
15 configuration of a storage system according to a first embodiment.

FIG. 2 is a diagram showing a temperature adjustment mechanism of a cassette housing and a probe of the storage system according to the first
20 embodiment.

FIG. 3 is a diagram showing a temperature adjustment mechanism of a server rack of the storage system according to the first embodiment.

FIG. 4 is a diagram showing an example in which a
25 probe card substrate is immersed in a cooling liquid in the cassette housing of the storage system according to the first embodiment.

FIG. 5 is a diagram showing an example in which a probe of a probe card and a pad electrode of a wafer
30 are immersed in heat transfer fluid in the cassette housing of the storage system according to the first embodiment.

FIG. 6 is a diagram showing an example in which a

wafer is immersed in heat transfer fluid in the cassette housing of the storage system according to the first embodiment.

FIG. 7 is a diagram showing an example in which a cassette housing storing a wafer is cooled or heated with heat-transfer fluid in a storage system according to a second embodiment.

FIG. 8 is a diagram showing a temperature adjustment mechanism of the storage system according to the second embodiment.

FIG. 9 is a diagram showing a temperature adjustment mechanism of a storage system according to a third embodiment.

FIG. 10 is a diagram showing a modified example of the temperature adjustment mechanism of the storage system according to the third embodiment.

Mode for Carrying Out the Invention

Embodiments will be described below with reference to the drawings.

(First Embodiment)

The first embodiment will now be described. The first embodiment is a high-capacity storage system that uses non-diced semiconductor wafers. Further, in the first embodiment, a plurality of semiconductor wafers are replaceable.

FIG. 1 is a block diagram showing an example of a configuration of a storage system 1 according to the first embodiment. The storage system 1 includes, as storage, a plurality of semiconductor wafers (or simply, wafers) 100. The storage system 1 selects a predetermined number of wafers 100 from the plurality of wafers 100. The storage system 1 uses the predetermined number of wafers 100 thus selected. The

wafers 100 each include a plurality of NAND flash memory chips (NAND chips). Further, the storage system 1 includes a plurality of cassette housings 200. The cassette housings 200 each include a probe card 210.
5 The cassette housings 200 each accommodate the wafer 100.

The storage system 1 includes a wafer stocker 10, a cassette stocker 20, a prober (cassetter) 30, a cassette transport device 40, and a server rack 50.

10 The wafer stocker 10 is a device for storing wafers 100. The wafer stocker 10 stores a plurality of wafers 100.

The cassette stocker 20 is a device for storing cassette housings 200. The cassette stocker 20 stores
15 a plurality of cassette housings 200. The plurality of cassette housings 200 stored in the cassette stocker 20 may include cassette housings 200 in which wafers 100 are stored and cassette housings 200 in which wafers 100 are not stored, mixedly present.

20 The prober 30 is a device which brings the pad electrodes 101 of the wafer 100 and the probes 211 of the probe card 210 into contact with each other, respectively.

The cassette transport device 40 is a device that
25 transports the cassette housings 200. The cassette transport device 40 transports the cassette housings 200 from the cassette stocker 20 to the server rack 50. Further, the cassette transport device 40 transports the cassette housings 200 from the server rack 50 to
30 the cassette stocker 20. Furthermore, the cassette transport device 40 transports the cassette housings 200 from the prober 30 to the server rack 50. The cassette transport device 40 transports the cassette

housings 200 from the server rack 50 to the prober 30.

The server rack 50 is a device that stores a host computer 51. The number of host computers 51 stored in the server rack 50 may be one or more.

5 The host computer 51 is, for example, a file server. The host computer 51 includes a processor 52 and a storage unit 53.

 The processor 52 is a device that executes programs. The processor 52 executes the process of
10 writing data to or reading data from a wafer 100 in the cassette housing 200.

 The storage unit 53 is a device for storing the cassette housings 200. In the storage unit 53, the cassette housings 200 in which the wafer 100 is stored,
15 are stored. The number of cassette housings 200 stored in the storage unit 53 may be one or more.

 Next, the internal configuration of the prober 30 will be described. The prober 30 includes an attachment/detachment device 31. The
20 attachment/detachment device 31 is a device that integrates or separates the wafer 100 and the cassette housing 200 into or from each other. In the prober 30, when a wafer 100 is stored in a respective cassette housing 200 by the attachment/detachment device 31, the
25 pad electrodes of the wafer 100 and the probes of the respective probe card in the cassette housing 200 are brought into contact with each other. As a result, the NAND chip of the wafer 100 and the probe card substrate of the probe card are electrically connected to each
30 other.

 Next, the replacement of wafers 100 in a cassette housing 200 stored in the server rack 50 with wafers 100 in a cassette housing 200 stored in the cassette

stocker 20 or wafers 100 stored in the wafer stocker 10 will be explained.

When a wafer 100 on which the processor 52 of the host computer 51 is about to write or read data to or from is present in the server rack 50 while stored in the cassette housing 200, the storage system 1 does not need to replace the wafer 100.

When a wafer 100 on which the processor 52 is about to write or read data to or from is not present in the server rack 50, the storage system 1 carry out swapping of a wafer 100 in the cassette housing 200 stored in the server rack 50 with the wafer 100 in the cassette housing 20 stored in the cassette stocker, or the wafer 100 in the wafer stocker 10.

For example, when a wafer 100 on which the processor 52 is about to write data is present in the cassette stocker 20 while stored in the cassette housing 200, the storage system 1 swaps cassette housings 200 between the server rack 50 and the cassette stocker 20. The cassette housing 200 to be removed from the server rack 50 is, for example, the cassette housing 200 that stores the wafer 100 that has not been accessed by the processor 52 for the longest period of time in the server rack 50.

For example, when a wafer 100 on which the processor 52 is about to write data is present in the wafer stocker 10, the storage system 1 stores the wafer 100 which the processor 52 is about to write data to in the cassette housing 200 by the prober 30. Further, the storage system 1 removes from the server rack 50, a cassette housing 200 that stores the wafer 100 that has not been accessed by the processor 52 for the longest period of time in the server rack 50, for example. The

storage system 1 moves the cassette housing 200 removed from the server rack 50 to the cassette stocker 20.

Furthermore, the storage system 1 moves the cassette housing 200, which is made to store the wafer 100 by the prober 30, from the prober 30 to the server rack 50.

Next, a temperature adjustment mechanism will be described. The temperature adjustment mechanism is a mechanism that lowers or raises the temperature of the wafer 100. The temperature adjustment mechanism is provided in the cassette housing 200, the prober 30, and the server rack 50. FIG. 2 is a diagram showing the temperature adjustment mechanism of the cassette housing 200 and the prober 30.

First, the temperature adjustment mechanism of the cassette housing 200 will be explained. The cassette housing 200 includes an upper casing 201 and a lower casing 202. The upper casing 201 is a member that covers an upper surface side of the wafer 100. On the upper casing 201, the probe card 201 is placed. The lower casing 202 is a member that covers a lower surface side of the wafer 100. On an inner wall portion of the lower casing 202, a storage unit 203 is provided.

The upper casing 201 and the lower casing 202 are fit with each other to form a container 204. The container 204 accommodates heat transfer fluid 300 for lowering or raising temperature. The heat transfer fluid 300 is, for example, fluorocarbon-based hydrofluoroether. The heat transfer fluid 300 may as well be liquid nitrogen.

The container 204 includes an inlet port and an outlet port for the heat transfer fluid 300. While the

cassette housing 200 is not stored in the prober 30 or the server rack 50, the inlet port and the outlet port of the heat transfer fluid 300 are closed. When the cassette housing 200 is stored in the prober 30 or the server rack 50, the inlet port and the outlet port of the heat transfer fluid 300 are open.

Next, the temperature control mechanism of the prober 30 will be described. The prober 30 includes a fluid supply pipe 31A, a fluid discharge pipe 31B and a pump (fluid device) 32. The fluid supply pipe 31A is a hollow cylindrical member, for example, used to transport the heat transfer fluid 300 from outside the cassette housing 200 to inside the cassette housing 200. The fluid discharge pipe 31B is a hollow cylindrical member, for example, used to transport the heat transfer fluid 300 from inside the cassette housing 200 to outside the cassette housing 200. The pump 32 is a device that transports the heat transfer fluid 300 from one end side of the fluid supply pipe 31A and the fluid discharge pipe 31B to the other end side.

When a wafer 100 is stored in the cassette housing 200 by the attachment/detachment device 31, the prober 30 injects the heat transfer fluid 300 from the fluid supply pipe 31A into the cassette housing 200 by the pump 32. When the wafer 100 is removed from the cassette housing 200 by the attachment/detachment device 31, the prober 30 discharges the heat transfer fluid 300 in the cassette housing 200 from the fluid discharge pipe 31B by the pump 32. The prober 30 circulates the heat transfer fluid 300 in the cassette housing 200.

Next, the temperature control mechanism of the

server rack 50 will be described. FIG. 3 is a diagram showing the temperature adjustment mechanism of the server rack 50. FIG. 3 shows the temperature adjustment mechanism of the cassette housing 200 as

5 well. The server rack 50 includes a fluid supply pipe 54A, a fluid discharge pipe 54B and a pump 55. The fluid supply pipe 54A is, for example, a hollow cylindrical member. The fluid supply pipe 54A is used to inject the heat transfer fluid 300 from outside the cassette housing 200 into the cassette housing 200.

10 The fluid discharge pipe 54B is, for example, a hollow cylindrical member. The fluid discharge pipe 54B is used to discharge the heat transfer fluid 300 from inside the cassette housing 200 to outside the cassette housing 200. The pump 32 is a device that transports the heat transfer fluid 300 from one end side of the fluid supply pipe 54A and the fluid discharge pipe 54B to the other end side. The server rack 50 injects the heat transfer fluid 300 into the cassette housing 200.

15 20 Further, the server rack 50 discharges the heat transfer fluid 300 from inside the cassette housing 200. Thus, the server rack 50 circulates the heat transfer fluid 300 in the cassette housing 200.

25 A cassette housing 200 that does not contain the heat transfer fluid 300 may be brought to the server rack 50 by the cassette transport device 40. In this case, when the cassette housing 200 stored in the cassette stocker 20 is brought to the server rack 50 by the cassette transport device 40, the cassette housing 200 is filled with the heat transfer fluid 300. The server rack 50 may discharge all of the heat transfer fluid 300 in the cassette housing 200 when the cassette housing 200 is removed from the server rack 50. The

cassette housing 200 storing the wafer 100 may be stored in the cassette stocker 20 while the heat transfer fluid 300 contained therein. Alternatively, the cassette housing 200 containing the wafer 100 may be stored in the cassette stocker 20 while the heat transfer fluid 300 not contained therein.

Subsequently, some examples of cooling in the cassette housing 200 by the heat transfer fluid 300 will be described below.

<Example 1>

FIG. 4 shows a first example in which the probe card substrate 210 of a probe card is immersed in the heat transfer fluid 300 within the cassette housing 200. The probe card includes the probe card substrate 210 and the probe 211.

In this first example, the container 204 is formed so that the probe card substrate 212 is immersed in the heat transfer fluid 300. In the first example, the device on the probe card substrate 212 can be lowered or raised in temperature by the heat transfer fluid 300.

<Example 2>

FIG. 5 shows a second example in which the probe 211 of the probe card and the pad electrode 101 of the wafer 100 are immersed in the heat transfer fluid 300 in the cassette housing 200.

In the second example, the upper casing 201 and the lower casing 202 are fit with each other to form the container 204 so that the probe 211 and the pad electrode 101 are immersed in the heat transfer fluid 300. In the second example, the probe 211 of the probe card 210 and the pad electrode 101 of the wafer 100 can be lowered or raised in temperature by the heat

transfer fluid 300.

Note that the temperature adjustment mechanism shown in FIG. 5 as the second example may be combined with the temperature adjustment mechanism shown in
5 FIG. 4 as the first example.

<Example 3>

FIG. 6 shows a third example in which the wafer 100 is immersed in the heat transfer fluid 300 in the cassette housing 200.

10 In the third example, the upper casing 201 and the lower casing 202 are fit with each other to form the container 204 for the heat transfer fluid 300 so that the wafer 100 is immersed in the heat transfer fluid 300. In the third example, the wafer 100 can be cooled
15 by the heat transfer fluid 300. More specifically, the NAND chip formed on the wafer 100 can be lowered or raised in temperature by the heat transfer fluid 300.

Note that the temperature adjustment mechanism shown in FIG. 6 as the third example may be combined
20 with one or both of the temperature adjustment mechanism shown in FIG. 4 as the first example and that shown in FIG. 5 as the second example.

As described above, the storage system 1 of the first embodiment includes its independent temperature
25 adjustment mechanism for circulating the heat transfer fluid in the cassette housing 200. With this structure, the storage system 1 of the first embodiment can carry out the temperature adjustment with respect to the wafer 100 containing a plurality of NAND chips.

30 (Second Embodiment)

Next, a second embodiment will be described.

The second embodiment, as in the case of the first embodiment, is a high-capacity storage system that uses

non-diced semiconductor wafers. The same structural elements as those of the first embodiment are designated by the same reference symbols. Further, explanations regarding the same structural elements as those of the first embodiment will be omitted.

FIG. 7 is a diagram showing an example in which a cassette housing 200 storing a wafer 100 is lowered or raised in temperature with the heat transfer fluid 300 in a storage system 1 of the second embodiment. FIG. 7 shows a state in which the cassette housing 200 storing the wafer 100 is stored in the prober 30.

The storage system 1 of the first embodiment circulates the heat transfer fluid 300 in the cassette housing 200. On the other hand, in the storage system 1 of the second embodiment, the cassette housing 200 itself is immersed in the heat transfer fluid 300 in the prober 30 and the server rack 50. Thus, in the storage system 1 of the second embodiment, the entire cassette housing 200 is lowered or raised in temperature. For this purpose, the prober 30 includes a container 33. The container 33 is a device that contains the heat transfer fluid 300. The container 33 is provided to seal the cassette housing 200. The server rack 50 includes a container 56. The container 56 is a device that contains the heat transfer fluid 300. The container 56 is provided to seal the cassette housing 200.

FIG. 8 is a diagram showing the temperature adjustment mechanism of the storage system 1 of the second embodiment. In FIG. 8, the cassette housing 200 is accommodated in the prober 30.

In the first embodiment, the prober 30 injects the heat transfer fluid 300 into the cassette housing 200

by use of the fluid supply pipe 31A, the fluid discharge pipe 31B, and the pump 32. Further, the prober 30 discharges the heat transfer fluid 300 from inside the cassette housing 200. Thus, the prober 30 circulates the heat transfer fluid 300 in the cassette housing 200. On the other hand, in the second embodiment, the prober 30 injects the heat transfer fluid 300 into the container 33 by use of the fluid supply pipe 31A, the fluid discharge pipe 31B, and the pump 32. Further, the prober 30 discharges the heat transfer fluid 300 from inside the container 33. Thus, the prober 30 circulates the heat transfer fluid 300 in the prober 30. More specifically, the prober 30 circulates the heat transfer fluid 300 around the cassette housing 200. The server rack 50 injects the heat transfer fluid 300 to the container 56. Further, the server rack 50 discharges the heat transfer fluid 300 from the container 56. Thus, the server rack 50 circulates the heat transfer fluid 300 in the server rack 50. More specifically, the server rack 50 circulates the heat transfer fluid 300 around the cassette housing 200.

An example of cooling the cassette housing 200 with the prober 30 is, for example, the case where a cassette housing 200 that has been removed from the server rack 50 and transported thereto is cooled. The wafer 100 in the cassette housing 200, which has been removed from the server rack 50, is stored in the cassette stocker 20 while being contained in the cassette housing 200. Or, the wafer 100 in the cassette housing 200, which has been removed from the server rack 50, is stored in the wafer stocker 10 in a state which has been removed from the cassette housing

200. Note here that when the cassette housing 200 is brought from the server rack 50 to the prober 30, the temperature of the wafer 100 in the cassette housing 200 may have been raised in the server rack 50. The
5 prober 30 cools the wafer 100 whose temperature has been raised in the server rack 50, before moving it to the wafer stocker 10, for example, by cooling the entire cassette housing 200 so as not to affect other wafers 100 that are stored at a lower temperature.

10 Cooling of the cassette housing 200 in the server rack 50 is carried out to suppress the temperature rise of the wafer 100 due to heat generated by devices on the probe card substrate 212, for example.

As described above, the storage system 1 of the
15 second embodiment has a unique temperature control mechanism that circulates heat transfer fluid around the cassette housing 200. As a result, the storage system 1 of the second embodiment can carry out temperature adjustment with respect to the wafer 100
20 containing multiple NAND chips.

(Third Embodiment)

Next, a third embodiment will be described.

The third embodiment, as in the cases of the first embodiment and the second embodiment, is also a high-
25 capacity storage system that uses non-diced semiconductor wafers. As to the structural elements identical to those of the first embodiment and the second embodiment, the same reference symbols as those are used here. Further, explanations regarding the
30 identical structural elements to those of the first and second embodiments will be omitted.

FIG. 9 is a diagram showing the temperature adjustment mechanism of a storage system 1 according to

the third embodiment.

In the storage systems 1 of the first embodiment and the second embodiment, lowering or raising temperature is carried out by heat transfer fluid. By contrast, the storage system 1 of the third embodiment brings insulating members 213 into contact with the wafer 100. In this manner, the storage system 1 of the third embodiment carries out lowering or raising in temperature by thermal conduction. The insulating members 213 are provided on a surface where the probes 211 of the probe card 210 are placed in the cassette housing 200, which opposes the wafer 100 stored in the cassette housing 200. The surface on which the probes 211 of the probe card 210 are provided is exposed from an inner wall portion of the upper casing 201.

When the prober 30 stores a wafer 100 in the cassette housing 200, the insulating members 212 are physically brought into contact with the wafer 100 when the upper casing 201 and the lower casing 202 are fit with each other. However, the insulating members 213 are not electrically connected to the wafer 100. The insulating members 213 each have, for example, a shape of a pin, a projection, or a plane.

By use of heat conduction mediated by the insulating members 212, which are not electrically connected to the wafer 100, the storage system 1 of the third embodiment can carry out the temperature adjustment with respect to the wafer 100, which includes multiple NAND chips.

FIG. 10 is a diagram showing a modified example of the temperature adjustment mechanism in the third embodiment.

FIG. 10 shows an example in which the insulating

members 213 of FIG. 9 are provided as cushions 214 that reduces the propagation to the wafer 100 of shocks given to the cassette housing 200 during transportation thereof, for example. Further, the cushions 214
5 secures the wafer 100 within the cassette housing 200. FIG. 10, part (A), shows the state of the cushions 214 before the upper casing 201 and the lower casing 202 are fit with each other. FIG. 10, part (B) shows the state of the cushions 214 after the upper casing 201
10 and the lower casing 202 are fit with each other.

When the prober 30 stores the wafer 100 in the cassette housing 200, the cushions 214, which are insulator, are physically brought into contact with the wafer 100 when the upper casing 201 and the lower
15 casing 202 are fit with each other as shown in FIG. 10, part (B). However, the cushions 214 are not electrically connected to the wafer 100. In this modified example, the temperature adjustment with respect to the wafer 100 including a plurality of NAND
20 chips can be carried out by heat conduction mediated by the cushions 213, which are not electrically connected to the wafer 100.

As described above, in the storage system 1 of the third embodiment, the insulators 212 are brought into
25 contact with the wafer 100 in the cassette housing 200. That is, the storage system 1 of the third embodiment includes a unique temperature adjustment mechanism that carries out lowering or raising in temperature by thermal conduction. In this manner, the storage system
30 1 of the third embodiment can carry out the temperature adjustment with respect to the wafer 100 containing multiple NAND chips.

The embodiments are only examples and the scope of

the invention is not limited thereto.

Reference Signs List

	1... Storage system
	10... Wafer stocker
5	20... Cassette stocker
	30... Prober (Cassetter)
	31... Attachment/detachment device
	31A... Fluid supply pipe
	31B... Fluid discharge pipe
10	32... Pump
	33... Container
	40... Cassette transport device
	50... Server rack
	51... Host computer
15	52... Processor
	53... Storage unit
	54A... Fluid supply pipe
	54B... Fluid discharge pipe
	55... Pump
20	56... Container
	100... Wafer
	101... Pad electrode
	200... Cassette housing
	201... Upper casing
25	202... Lower casing
	203... Storage unit
	204... Container
	210... Probe card
	211... Probe
30	212... Probe card substrate
	213... Insulating member
	214... Cushion
	300... Heat transfer fluid.

C L A I M S

1. A cassette housing comprising:

a storage unit that stores a semiconductor wafer that includes a plurality of nonvolatile memory chips;

5 a probe card that includes a probe to be brought into contact with a pad electrode provided on the semiconductor wafer; and

a container that contains heat transfer fluid for lowering or raising temperature of one or both of the probe card and the semiconductor wafer stored in the storage unit.

2. The cassette housing of claim 1, wherein the container is configured such that a printed circuit board on a second surface on a reverse side of a first surface of the probe card is immersed in the heat transfer fluid, the first surface facing the semiconductor wafer stored in the storage unit.

3. The cassette housing of claim 1, wherein the housing is configured such that the probe provided on a surface of the probe card, which faces the semiconductor wafer stored in the storage unit, and a pad electrode provided on a surface of the semiconductor wafer, which faces the probe card, are immersed in the heat transfer fluid liquid.

25 4. The cassette housing of claim 1, wherein the container is configured such that the semiconductor wafer stored in the storage unit is immersed in the heat transfer fluid.

5. The cassette housing of any one of claims 1 to 4, wherein

the heat transfer fluid includes fluorocarbon.

6. A cassette housing comprising:

a storage unit that stores a semiconductor wafer

that includes a plurality of nonvolatile memory chips;
and

a probe card that includes a probe to be brought
into contact with a pad electrode provided on the
semiconductor wafer; wherein

the probe card includes an insulating member
provided on a surface facing the semiconductor wafer
stored in the storage unit, the insulating member being
in physical contact with the semiconductor wafer and
not electrically connected to the semiconductor wafer.

7. The cassette housing of claim 6, wherein
the insulating member has a shape of a pin, a
projection, or a plane.

8. The cassette housing of claim 6, wherein
the insulating member is provided as a cushion
that reduces propagation to the semiconductor wafer by
impact given to the cassette housing and secures the
semiconductor wafer within the cassette housing.

9. A prober comprising:
an attachment/detachment device that integrates or
separates a semiconductor wafer and a cassette housing
with or from each other, the semiconductor wafer
including a plurality of nonvolatile memory chips, the
cassette housing including a probe card, the probe card
including a probe to be brought into contact with a pad
electrode provided on the semiconductor wafer; and

a fluid device that injects or discharges heat
transfer fluid for lowering or raising temperature of
one or both of the semiconductor wafer and the probe
card to or from a container, the container being
provided in the cassette housing, and containing the
heat transfer fluid.

10. The prober of claim 9, wherein

the fluid device circulates the heat transfer fluid in the cassette housing via the container.

11. A prober comprising:

an attachment/detachment device that integrates or
5 separates a semiconductor wafer and a cassette housing
with or from each other, the semiconductor wafer
including a plurality of nonvolatile memory chips, the
cassette housing including a probe card, the probe card
including a probe to be brought into contact with a pad
10 electrode provided on the semiconductor wafer; and

a container that contains heat transfer fluid for
lowering or raising temperature of the cassette housing
in which the semiconductor wafer is mounted by the
attachment/detachment device.

12. The prober of claim 11, further comprising:
a fluid device that injects or discharges the heat
transfer fluid to or from the container.

13. The prober of any one of claims 9 to 12,
wherein the heat transfer fluid includes fluorocarbon.

14. A server rack comprising:

a processor;

a storage unit that stores a cassette housing in
which a semiconductor wafer including a plurality of
nonvolatile memory chips, to or from which writing or
25 reading of data is to be required from the processor,
is mounted, and in which a probe card including a probe
to be brought into contact with a pad electrode
provided on the semiconductor wafer is provided; and

a fluid device that injects or discharges heat
30 transfer fluid for lowering or raising temperature of
one or both of the semiconductor wafer and the probe
card to or from a container, the container being
provided in the cassette housing, and containing the

heat transfer fluid.

15. A server rack comprising:

a processor;

5 a storage unit that stores a cassette housing in which a semiconductor wafer including a plurality of nonvolatile memory chips, to or from which writing or reading of data is to be required from the processor, is mounted, and in which a probe card including a probe to be brought into contact with a pad electrode

10 provided on the semiconductor wafer is provided; and

a container that contains heat transfer fluid for lowering or raising temperature of the cassette housing stored in the storage unit.

15 16. The server rack of claim 15, further comprising a fluid device that injects or discharges the heat transfer fluid to or from the container.

17. The server rack of any one of claims 14 to 16, wherein the heat transfer fluid includes fluorocarbon.

20 18. A storage system comprising:

a cassette housing;

a prober; and

a server rack, wherein

the cassette housing includes:

25 a first storage unit that stores a semiconductor wafer that includes a plurality of nonvolatile memory chips,

30 a probe card that includes a probe to be brought into contact with a pad electrode provided on the semiconductor wafer, and

a container that contains heat transfer fluid for lowering or raising temperature of one or both of the probe card and the semiconductor wafer stored in

the first storage unit,

the prober includes:

an attachment/detachment device that
integrates or separates the semiconductor wafer and the
cassette housing with or from each other, and

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a first fluid device that injects or
discharges heat transfer fluid for lowering or raising
temperature of one or both of the semiconductor wafer
and the probe card to or from the container that is
provided in the cassette housing, and

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the server rack includes:

a processor that requests writing or reading
of data to or from the plurality of nonvolatile memory
chips;

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a second storage unit that stores the
cassette housing in which the semiconductor wafer is
stored; and

a second fluid device that injects or
discharges the heat transfer fluid to or from the
container that is provided in the cassette housing
stored in the second storage unit.

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19. A storage system comprising:

a prober; and

a server rack, wherein

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the prober includes:

an attachment/detachment device that
integrates or separates a semiconductor wafer and a
cassette housing with or from each other, the
semiconductor wafer including a plurality of
nonvolatile memory chips, the cassette housing
including a probe card, the probe card including a
probe to be brought into contact with a pad electrode
provided on the semiconductor wafer; and

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a first container that contains heat transfer fluid for lowering or raising temperature of the cassette housing in which the semiconductor wafer is mounted by the attachment/detachment device,

5 the server rack includes:

a processor that requests writing or reading of data to or from the plurality of nonvolatile memory chips,

10 a storage unit that stores the cassette housing in which the semiconductor wafer is stored, and

a second container that contains heat transfer fluid for lowering or raising temperature of the cassette housing stored in the storage unit.