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(54) Title of Invention SEMICONDUCTOR DEVICE

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Specification

1. Title of Invention

SEMICONDUCTOR DEVICE

2. Scope of Patent Claims

A semiconductor device comprising a rectangular bump electrode having a long side perpendicular to at least one side of the semiconductor device.

3. Detailed Description of Invention

Field of Industrial Applicability

The present invention relates to a semiconductor device, and more particularly relates to a semiconductor device having a bump electrode.

Conventional Art

Conventionally, in this type of semiconductor device, all bump electrodes in the device have a square shape, as illustrated in FIG. 3.

FIG. 3 is a plan view illustrating this type of semiconductor device. In FIG. 3, 31 indicates a bump electrode, and this bump electrode 31 is formed in a square shape.

Problem to Be Solved by Invention

As semiconductor devices become more sophisticated, there is a trend toward more pins, and as a method for drawing out electrodes, a TAB method using bump electrodes allows for higher density than wire bonding.

However, even in the TAB method, reducing the size of the bump electrodes and the distance between the electrodes poses many technical difficulties compared to reducing the size of the internal elements, such as in terms of bonding strength and short circuits between electrodes due to deformation of the bump electrodes. Therefore, when a semiconductor device has only square bump electrodes as in a conventional semiconductor device, it is impossible to reduce the size of the semiconductor device below a size that is uniquely determined by the number of bump electrodes, the length of one side of the bump electrodes, and the distance between the electrodes, and there is a drawback in that the size of the semiconductor device must be increased as the number of pins increases.

The present invention has been configured in view of the foregoing conventional circumstances, and therefore an object of the present invention is to provide a novel semiconductor device which eliminates the foregoing drawbacks inherent in the conventional technology and enables reduction of the device area without reducing the bonding strength.

Differences of Invention From Prior Art

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The present invention differs from the conventional semiconductor device described above in that it has a rectangular bump electrode having a long side perpendicular to at least one side of the rectangular bump electrode.

Means for Solving Problem

In order to achieve the above object, the semiconductor device according to the present invention is configured to include a rectangular bump electrode having a long side perpendicular to at least one side of the rectangular bump electrode.

Examples

Embodiment of the present invention will be described below with reference to the drawings.

FIG. 1 is a plan view illustrating a first embodiment of the present invention.

Referring to FIG. 1, in this first embodiment, bump electrodes 11 provided on a semiconductor device 10 are formed in rectangular shapes, with long sides extending perpendicular to the sides of the semiconductor device 10. A ratio of short sides to long sides is, for example, 1:1.44. When the electrode area is the same as that of a conventional square bump electrode, the short side is about 83% of the length of one side of the square bump electrode. In this first embodiment, the area is reduced to 92% of that of a conventional semiconductor device 30 illustrated in FIG. 3.

On the other hand, since the area of the bump electrode 11 is the same as that of the conventional one, the bonding strength is almost the same as that of the conventional one, and this does not pose a problem. The greater the number of electrodes, the greater the reduction effect, and when the electrode spacing is the same, in the present embodiment, a reduction of up to about 80% is possible.

FIG. 2 is a plan view illustrating a second embodiment of the present invention.

Referring to FIG. 2, in the present embodiment, a ratio of a short side to a long side of a bump electrode 21 is 1:2. The length of the short side of the present embodiment is about 70% of the length of one side of a conventional bump electrode of the same area. As the short side is reduced, it is necessary to improve bonding accuracy and strengthen the strength of the inner lead, but in the present embodiment, it is possible to reduce the short side by up to approximately 65% compared to the conventional case, assuming the electrode spacing is the same.

Effect of invention

As described above, according to the present invention, in the case of a semiconductor device having many pins in which the bump electrodes are a determining factor in the size of the device, due to having a rectangular bump electrode having a long side perpendicular to at least one side, it is possible to obtain the effect of reducing the area of the semiconductor device without reducing the bonding strength.

4. Brief Description of Drawings

FIG. 1 is a plan view illustrating the first embodiment of the present invention, FIG. 2 is a plan view illustrating the second embodiment of the present invention, and FIG. 3 is a plan view of a conventional semiconductor device of this type.

10, 30 ... Semiconductor device, 11, 21, 31 ... Bump electrode

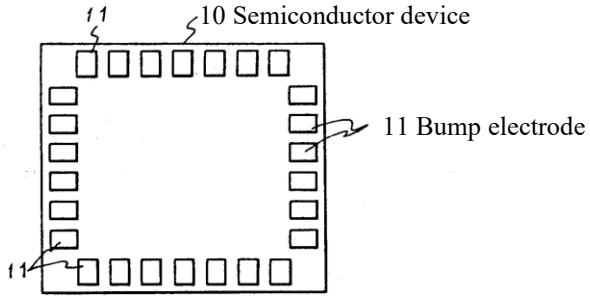


FIG. 1

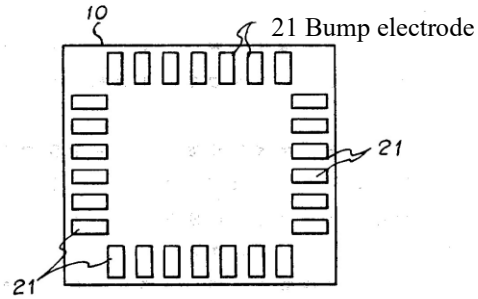


FIG. 2

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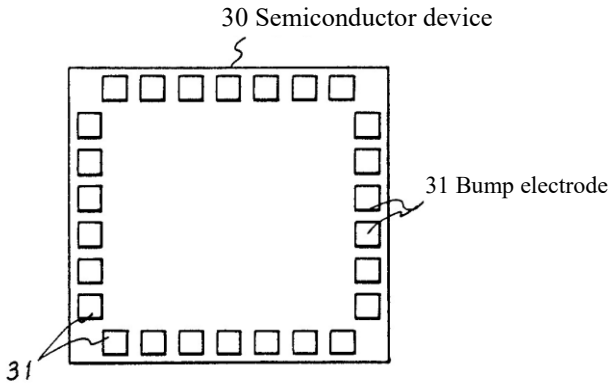


FIG. 3

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