CLAIMS

We claim:

1. A microelectronic device package, comprising:

a substrate having a first terminal and a second terminal on a surface of the substrate, the first terminal being outboard of the second terminal;

a first die spaced apart from the first surface of the substrate, wherein the first die includes a first bond site and a backside having a first footprint;

a wirebond between the first bond site and the first terminal;

a second die between the first die and the first surface of the substrate and having a second bond site, wherein the second die is in a flip-chip arrangement having an active surface facing the surface of the substrate; and

an adhesive at least partially between the first die and the first surface of the substrate, the adhesive at least substantially encapsulating the second die and the second terminal, wherein the adhesive is a non-conductive material, wherein the adhesive includes a first portion between the first die and the surface of the substrate and a second portion between the first die and the second die, the first portion having a thickness greater than that of the second portion, and wherein the adhesive has a second footprint substantially equal to the first footprint.

2. The microelectronic device package of claim 1 wherein the first and second dies are two of a plurality of dies stacked on each other on the substrate, and wherein the plurality of dies includes at least eight dies.

3. A microelectronic device package, comprising:

a substrate having a first terminal and a second terminal on a surface of the substrate, the first terminal being outboard of the second terminal;

a first die spaced apart from the first surface of the substrate and having a first bond site;

a wirebond between the first bond site and the first terminal;

a second die between the first die and the first surface of the substrate and having a second bond site, wherein the second die is in a flip-chip arrangement having an active surface facing the surface of the substrate; and

an adhesive at least partially between the first die and the first surface of the substrate, the adhesive at least substantially encapsulating the second die and the second terminal, wherein the adhesive is a non-conductive material, wherein the adhesive includes a first portion between the first die and the surface of the substrate and a second portion between the first die and the second die, the first portion being outboard of the second die, and wherein the adhesive has a footprint that corresponds to that of the first die.

4. A microelectronic device package, comprising:

a substrate having a first terminal and a second terminal on a surface of the substrate, the first terminal being outboard of the second terminal;

a first die spaced apart from the first surface of the substrate and having a first bond site;

a wirebond between the first bond site and the first terminal;

a second die between the first die and the first surface of the substrate and having a second bond site, wherein the second die is in a flip-chip arrangement having an active surface facing the surface of the substrate; and

an adhesive at least partially between the first die and the first surface of the substrate, the adhesive at least substantially encapsulating the second die and the second terminal, wherein the adhesive is a non-conductive material, wherein the adhesive includes a first portion between the first die and the surface of the substrate and a second portion between the first die and the second die, wherein the first portion is configured to couple the first die to the substrate, and further wherein the second portion is

configured to couple the first die to the second die, and wherein the adhesive has a width equal to that of the first die.

5. A microelectronic device package, comprising:

a substrate having a first terminal and a second terminal inboard of the first terminal on a surface of the substrate;

a first die carried by the substrate, the first die having a first footprint, wherein the first die is electrically coupled to the first terminal via a wirebond;

a second die between the first die and the substrate, the second die having a second footprint that is smaller than the first footprint of the first die, wherein the second die is electrically coupled to the second terminal via a solder ball between the second die and the substrate; and

an adhesive having a first portion adjacent to a second portion, the first portion being between the first die and the second die and the second portion being between the first die and the substrate, wherein the adhesive is a non-conductive material, and wherein the second portion of the adhesive has a footprint corresponding to the first footprint.

6. The microelectronic device package of claim 5 wherein

the surface of the substrate is a first surface and wherein the substrate further includes a plurality of solder balls on a second surface opposite the first surface,

and wherein the first die includes a first bond site on a first active surface and a first backside surface opposite the first active surface,

and wherein the second die includes a second bond site on a second active surface and a second backside surface opposite the second active surface, the second active surface facing the first surface of the substrate,

and wherein the first portion of the adhesive is a peripheral portion directly between the first backside surface of the first die and the first surface of the substrate,

and wherein the second portion of the adhesive is a central portion inside of the peripheral portion such that the second portion of the adhesive is directly between the first backside surface of the first die and the second backside surface of the second die,

and further wherein

the wirebond is between the first terminal and the first bond site;

the solder ball is between the second terminal and the second bond site, the wirebond being outboard of the solder ball.

7. The microelectronic device package of claim 5 wherein the second footprint of the second die is within the first footprint of the first die.

8. The microelectronic device package of claim 5 wherein the first and second footprints are generally centered relative to each other.

9. The microelectronic device package of claim 5 wherein the first die includes a first bond site and the second die includes a second bond site, and wherein the wirebond is between the first terminal and the first bond site and the solder ball is between the second terminal and the second bond site, the wirebond being outboard of the solder ball.

10. The microelectronic device package of claim 5, further comprising a non-conductive layer between the first portion of the adhesive and the second die and between the second portion of the adhesive and the substrate such that the first and second portions of the adhesive are between the first die and the non-conductive layer, the non-conductive layer substantially encapsulating the second die.

11. A method for assembling a microelectronic device package, comprising:

applying an adhesive to a first backside surface of a first die, the first die having a first active surface opposite the first backside surface and a first bond site on the first active surface;

attaching a second die to a surface of a substrate, the second die having a second active surface facing the surface of the substrate, a second backside surface facing the first backside surface, and a second bond side on the second active surface, wherein the substrate includes a first terminal and a second terminal on the surface of the substrate, and wherein the first terminal is outboard of the second terminal;

coupling the second bond site of the second die to the second terminal with a solder ball;

positioning the first backside surface of the first die to be superimposed with the second die with the adhesive applied on the first backside surface, wherein the adhesive is a non-conductive material; and

at least substantially encapsulating the second die with the adhesive on the first backside surface of the first die, wherein the first backside surface of the first die is spaced apart from the second die, and wherein the adhesive directly contacts the second backside surface of the second die; and

placing a wirebond between the first terminal and the first bond site.

12. The method of claim 11, further comprising:

at least substantially encapsulating the solder ball and the second terminal with the adhesive on the first backside surface of the first die; and

encapsulating the first die, the adhesive, the second die, the wirebond, and the solder ball with an encapsulant.

13. The method of claim 11, further comprising attaching the first die to the second die and the substrate with the adhesive on the first backside surface of the first die.

14. The method of claim 11 wherein applying an adhesive includes applying an adhesive having a footprint generally equal to a first footprint of the first die to the first backside surface of the first die, and wherein substantially encapsulating the second die includes substantially encapsulating the second die with the adhesive on the first

backside surface of the first die, the second die having a second footprint less than the first footprint.

15. The method of claim 11 wherein applying an adhesive includes applying an adhesive having a footprint generally equal to a first footprint of the first die to the first backside surface of the first die, and wherein substantially encapsulating the second die includes substantially encapsulating the second die with the adhesive on the first backside surface of the first die, the second die having a second footprint less than and within the first footprint.

16. The method of claim 11 wherein applying an adhesive includes applying an adhesive having a footprint generally equal to a first footprint of the first die to the first backside surface of the first die, and wherein substantially encapsulating the second die includes substantially encapsulating the second die with the adhesive on the first backside surface of the first die, the second die having a second footprint less than and generally centered with the first footprint.

17. The method of claim 11 wherein the first and second dies are two of a plurality of at least eight dies, and wherein the method further comprises positioning the third through eighth dies sequentially on each other on the active surface of the first die.

18. The method of claim 11, further comprising disposing an encapsulant over the first and second dies after the first die is attached to the second die.

CLAIMS

We claim :

1. A method for assembling a microelectronic device package, comprising:

applying an adhesive to a first backside surface of a first die, the first die having a first active surface opposite the first backside surface and a first bond site on the first active surface;

attaching a second die to a surface of a substrate, the second die having a second active surface facing the surface of the substrate, a second backside surface facing the first backside surface, and a second bond side on the second active surface, wherein the substrate includes a first terminal and a second terminal on the surface of the substrate, and wherein the first terminal is outboard of the second terminal;

coupling the second bond site of the second die to the second terminal with a solder ball;

positioning the first backside surface of the first die to be superimposed with the second die with the adhesive applied on the first backside surface, wherein the adhesive is a non-conductive material;

at least substantially encapsulating the second die with the adhesive on the first backside surface of the first die such that the adhesive has a first portion between the surface of the substrate and the first backside surface of the first die and a second portion between the first die and the second die, wherein the first and second portions of the adhesive are composed of the same material, wherein the first backside surface of the first die is spaced apart from the second die, and wherein the adhesive directly contacts the second backside surface of the second die; and

placing a wirebond between the first terminal and the first bond site.

2. The method of claim 1, further comprising:

at least substantially encapsulating the solder ball and the second terminal with the adhesive on the first backside surface of the first die; and

encapsulating the first die, the adhesive, the second die, the wirebond, and the solder ball with an encapsulant.

3. The method of claim 1 wherein applying an adhesive includes applying an adhesive having a footprint generally equal to a first footprint of the first die to the first backside surface of the first die, and wherein substantially encapsulating the second die includes substantially encapsulating the second die with the adhesive on the first backside surface of the first die, the second die having a second footprint less than the first footprint.

4. The method of claim 1 wherein applying an adhesive includes applying an adhesive having a footprint generally equal to a first footprint of the first die to the first backside surface of the first die, and wherein substantially encapsulating the second die includes substantially encapsulating the second die with the adhesive on the first backside surface of the first die, the second die having a second footprint less than and within the first footprint.

5. The method of claim 1 wherein applying an adhesive includes applying an adhesive having a footprint generally equal to a first footprint of the first die to the first backside surface of the first die, and wherein substantially encapsulating the second die includes substantially encapsulating the second die with the adhesive on the first backside surface of the first die, the second die having a second footprint less than and generally centered with the first footprint.

6. The method of claim 1 wherein the first and second dies are two of a plurality of at least eight dies, and wherein the method further comprises positioning the third through eighth dies sequentially on each other on the active surface of the first die.

7. The method of claim 1, further comprising disposing an encapsulant over the first and second dies after the first die is attached to the second die.