Claims

What is claimed:

1. A method of making a semiconductor device, comprising:

providing a first semiconductor wafer including a plurality of first semiconductor die;

singulating the first semiconductor wafer to separate each of the first semiconductor die;

providing a first carrier, wherein a size of the first carrier is independent of both a size and number of the first semiconductor die singulated from the first semiconductor wafer; and

disposing the first semiconductor die over the first carrier in a high-density arrangement after singulating the first semiconductor wafer.

2. The method of claim 1, wherein the first carrier accommodates a greater number of first semiconductor die than the number of first semiconductor die singulated from the first semiconductor wafer.

3. The method of claim 1, further including:

providing a second semiconductor wafer including a plurality of second semiconductor die wherein a width of the second semiconductor wafer is different than a width of the first semiconductor wafer and a width of the second semiconductor die is different than a width of the first semiconductor die;

singulating the second semiconductor wafer to separate the second semiconductor die; and

disposing the second semiconductor die over a second carrier with a width of the second carrier approximately equal to a width of the first carrier, wherein a number of second semiconductor die disposed over the second carrier is independent from a number of second semiconductor die singulated from the second semiconductor wafer.

4. The method of claim 1, further including disposing a plurality of second semiconductor die over a second carrier with a size of the second semiconductor die different than a size of the first semiconductor die and a size of the second carrier approximately equal to a size of the first carrier.

5. The method of claim 1, further including disposing a plurality of second semiconductor die over the first carrier, the second semiconductor die including a size different from the size of the first semiconductor die.

6. The method of claim 1, further including:

disposing the first semiconductor die over the first carrier to form a reconstituted panel; and

singulating the reconstituted panel to form a plurality of semiconductor packages.

7. A method of making a semiconductor device, comprising:

providing a first semiconductor wafer including a first quantity of first semiconductor die;

providing a second semiconductor wafer including a second quantity of first semiconductor die;

providing a carrier; and

disposing the first semiconductor die over the carrier, wherein a size of the carrier is independent of a size of the first semiconductor die and accommodates each of the first quantity of first semiconductor die from the first semiconductor wafer and a portion of the first semiconductor die from the second semiconductor wafer.

8. The method of claim 7, further including disposing a second semiconductor die over the carrier , the size of the carrier independent of a size of the second semiconductor die.

9. The method of claim 8, further including:

removing the first semiconductor die from the carrier; and

disposing the second semiconductor die over the carrier after removing the first semiconductor die.

10. The method of claim 7, further including disposing a second semiconductor die over the carrier, the second semiconductor die including a size different from the size of the first semiconductor die.

11. The method of claim 7, further including:

disposing the first semiconductor die over the carrier to form a reconstituted panel; and

singulating the reconstituted panel to form a plurality of semiconductor packages.

12. The method of claim 7, further including depositing an encapsulant over the first semiconductor die and carrier.

13. The method of claim 7, wherein the first quantity of first semiconductor die represents every first semiconductor die formed on the semiconductor wafer.

14. A method of making a semiconductor device, comprising:

providing a semiconductor die;

depositing an encapsulant over and around the semiconductor die to form a reconstituted panel;

forming an interconnect structure over the reconstituted panel by,

forming a conductive layer extending over the semiconductor die and outside a footprint of the semiconductor die,

etching the conductive layer to completely remove the conductive layer outside the footprint of the semiconductor die,

forming a first insulating layer extending over the semiconductor die and outside the footprint of the semiconductor die, and

etching the first insulating layer to completely remove the first insulating layer outside a footprint of the semiconductor die; and

singulating the reconstituted panel through the encapsulant.

15. The method of claim 14, further including:

providing a carrier including a fixed size independent of a size of the semiconductor die; and

disposing the semiconductor die over the carrier.

16. The method of claim 15, further including:

providing a semiconductor wafer including a plurality of the semiconductor die; and

singulating the semiconductor wafer to separate the semiconductor die, wherein a number of semiconductor die disposed over the carrier is independent from a number of semiconductor die on the semiconductor wafer.

17. The method of claim 14, wherein singulating the reconstituted panel through the encapsulant exposes a side of the semiconductor die from the encapsulant by completely removing the encapsulant from the side of the semiconductor die.

18. The method of claim 14, wherein singulating the reconstituted panel through the encapsulant leaves a portion of encapsulant covering a side of the semiconductor die.

19. The method of claim 14, further including:

removing the encapsulant from a surface of the semiconductor die opposite an active surface of the semiconductor die to expose the surface of the semiconductor die; and

forming a second insulating layer on the surface of the semiconductor die after removing the encapsulant.

20. A method of making a semiconductor device, comprising:

providing a first semiconductor die;

disposing a second semiconductor die adjacent to the first semiconductor die;

depositing an encapsulant over the first semiconductor die and second semiconductor die to form a reconstituted panel;

forming an interconnect structure over the semiconductor die without forming the interconnect structure over the encapsulant; and

removing a portion of the encapsulant, a portion of the first semiconductor die, and a portion of the second semiconductor die in a single process step.

21. The method of claim 20, further including singulating the reconstituted panel through the encapsulant to completely remove the encapsulant from between the first semiconductor die and second semiconductor die.

22. The method of claim 20, further including singulating the reconstituted panel through the encapsulant while leaving a first portion of encapsulant covering a side of the first semiconductor die.

23. The method of claim 20, further including:

providing a semiconductor wafer including a plurality of semiconductor die; and

singulating the semiconductor wafer to separate the first semiconductor die and second semiconductor die from the semiconductor wafer; and

disposing the first semiconductor die and second semiconductor die over a carrier, wherein a number of semiconductor die disposed over the carrier is independent from

a number of semiconductor die singulated from the semiconductor wafer.

24. The method of claim 20, wherein the single process step includes singulating the reconstituted panel between the first semiconductor die and second semiconductor die.

25. The method of claim 21, wherein the single process step includes a backgrinding operation that reduces a thickness of the first semiconductor die and second semiconductor die.