

Claims

What is claimed:

1. A method of making a semiconductor device, comprising:
providing a semiconductor die formed in a base substrate material;
forming a notch in the base substrate material outside a footprint of the semiconductor die;
disposing the semiconductor die over a carrier with a surface of the semiconductor die physically contacting the carrier, wherein the notch is disposed between the carrier and the base substrate material;
depositing an encapsulant over and around the semiconductor die and into the notch between the base substrate material and carrier;
removing the semiconductor die from the carrier after depositing the encapsulant; and
forming a fan-in interconnect structure over the semiconductor die after removing the semiconductor die from the carrier.
2. The method of claim 1, further including forming the fan-in interconnect structure contained completely within a footprint of the semiconductor die.
3. The method of claim 1, further including removing a portion of the encapsulant to make a back surface of the semiconductor die coplanar with a back surface of the encapsulant.

4. The method of claim 1, further including depositing the encapsulant with an active surface of the semiconductor die coplanar to a front surface of the encapsulant.
5. The method of claim 1, further including forming the fan-in interconnect structure in contact with the encapsulant.
6. The method of claim 1, further including depositing the encapsulant over a back surface of the semiconductor die.
7. A method of making a semiconductor device, comprising:
 - providing a semiconductor die including a notch formed in an active surface of the semiconductor die;
 - depositing an encapsulant over the semiconductor die and into the notch; and
 - forming a fan-in interconnect structure over the semiconductor die after depositing the encapsulant, wherein the fan-in interconnect structure includes a conductive layer formed completely within a footprint of the semiconductor die.
8. The method of claim 7, further including forming the fan-in interconnect structure on the encapsulant.
9. The method of claim 7, further including depositing the encapsulant over a back surface of the semiconductor die.
10. The method of claim 7, further including depositing the encapsulant with an active surface of the semiconductor die coplanar to a front surface of the encapsulant.

11. A method of making a semiconductor device, comprising:
 providing a semiconductor die including a notch;
 disposing the semiconductor die over a carrier;
 depositing an encapsulant over the carrier, around the semiconductor die, and into the notch;
 removing the carrier after depositing the encapsulant; and
 forming a fan-in interconnect structure over the semiconductor die after depositing the encapsulant, wherein the fan-in interconnect structure includes a conductive layer formed completely within a footprint of the semiconductor die.
12. The method of claim 11, further including removing a portion of the encapsulant to make a back surface of the semiconductor die coplanar with a back surface of the encapsulant
13. The method of claim 11, further including depositing the encapsulant with an active surface of the semiconductor die coplanar to a front surface of the encapsulant.
14. The method of claim 11, further including forming the fan-in interconnect structure in contact with the encapsulant.
15. The method of claim 11, further including depositing the encapsulant over a back surface of the semiconductor die.
16. A method of making a semiconductor device, comprising:
 providing a semiconductor die including a notch formed in an edge of an active surface of the semiconductor die;

disposing the semiconductor die on a carrier with the active surface of the semiconductor die oriented toward the carrier;

depositing an encapsulant over the semiconductor die and carrier and into the notch;

removing the semiconductor die from the carrier after depositing the encapsulant; and

forming an interconnect structure over the semiconductor die after removing the semiconductor die from the carrier.

17. The method of claim 16, further including forming the interconnect structure contained completely within a footprint of the semiconductor die.

18. The method of claim 16, further including forming the interconnect structure on the encapsulant

19. The method of claim 16, further including depositing the encapsulant over a back surface of the semiconductor die.

20. The method of claim 16, further including depositing the encapsulant with an active surface of the semiconductor die coplanar to a front surface of the encapsulant.