## Claims

What is claimed:

1. A semiconductor device, comprising:

a substrate;

a via extending through the substrate;

a first insulating layer disposed on sidewalls of the via;

an electrically conductive material disposed in the via over the first insulating layer to form a through silicon via (TSV);

a first interconnect structure disposed over a first ~~side~~surface of the substrate;

a semiconductor die or ~~a~~ component mounted to the first interconnect structure;

an encapsulant disposed over the first interconnect structure and semiconductor die or component; and

a second interconnect structure disposed over ~~the~~a second ~~side~~surface of the substrate, the second interconnect structure being electrically connected to the TSV.

2. The semiconductor device of claim 1, wherein the first interconnect structure includes:

a first conductive layer disposed over the TSV;

a second insulating layer disposed over the first conductive layer and substrate;

a second conductive layer disposed over the first conductive layer; and

a third insulating layer disposed over the second conductive layer and second insulating layer.

3. The semiconductor device of claim 2, wherein the first interconnect structure further includes:

a conductive pillar disposed over the second conductive layer;

a fourth insulating layer disposed around the conductive pillar; and

a third conductive layer disposed over the conductive pillar, wherein the third conductive layer is electrically connected to the semiconductor die or component.

4. The semiconductor device of claim 1, further including a printed circuit board, the semiconductor device mounted to the printed circuit board through the second interconnect structure.

5. The semiconductor device of claim 1, wherein the second interconnect structure includes:

a second insulating layer disposed over the second surface of the substrate and TSV; and

a first conductive layer disposed over the TSV and in contact with the TSV through the second insulating layer.

6. The semiconductor device of claim 1, wherein the second interconnect structure includes:

a second insulating layer disposed over the second surface of the substrate and the TSV;

a first conductive layer disposed over the TSV to extend the conductivity of the TSV;

a third insulating layer disposed over the second insulating layer and the first conductive layer; and

a second conductive layer disposed over the first conductive layer.

7. A semiconductor device, comprising:

a substrate;

a conductive via disposed through the substrate;

~~an electrically conductive material disposed in the via to form a conductive via;~~

a first interconnect structure disposed over a first ~~side~~surface of the substrate;

a semiconductor die or a component ~~mounted to~~disposed over the first interconnect structure and the conductive via;

an encapsulant deposited over the first interconnect structure and semiconductor die or component; and

a second interconnect structure disposed over ~~the~~a second ~~side~~surface of the substrate~~, the second interconnect structure being~~ and electrically connected to the conductive via.

8. The semiconductor device of claim 7, wherein the first interconnect structure includes:

a first conductive layer disposed over the conductive via;

a first insulating layer disposed over the first conductive layer and substrate;

a second conductive layer disposed over the first conductive layer;

a second insulating layer disposed over the second conductive layer and first insulating layer;

a conductive pillar disposed over the second conductive layer;

a third insulating layer disposed around the conductive pillar; and

a third conductive layer disposed over the conductive pillar and electrically connected to the semiconductor die or component.

9. The semiconductor device of claim 7, wherein the first interconnect structure includes a conductive bump.

10. The semiconductor device of claim 7, the second interconnect structure including:

a first insulating layer disposed over the second surface of the substrate and the conductive via; and

a first conductive layer disposed over the conductive via.

11. The semiconductor device of claim 7, wherein the second interconnect structure includes:

a first insulating layer disposed over the substrate;

a first conductive layer disposed over the conductive via to extend the conductivity of the conductive via;

a second insulating layer disposed over the first insulating layer and first conductive layer; and

a second conductive layer disposed over the first conductive layer.

12. The semiconductor device of claim 7, wherein a thickness of the substrate is less than 300 µm.

13. A semiconductor device, comprising:

a substrate;

a conductive via disposed through the substrate;

a first interconnect structure disposed over a first ~~side~~surface of the substrate;

a semiconductor die or a component ~~mounted to~~disposed over the first interconnect structure; and

an encapsulant disposed over the first interconnect structure and the semiconductor die or component.

14. The semiconductor device of claim 13, further including a second interconnect structure disposed over a second ~~side~~surface of the substrate, the second interconnect structure electrically connected to the conductive via.

15. The semiconductor device of claim 13, wherein the first interconnect structure includes a bond wire.

16. The semiconductor device of claim 1~~3~~4, wherein the second interconnect structure includes:

a first insulating layer disposed over the second surface of the substrate; and

a first conductive layer disposed over the conductive via.

17. The semiconductor device of claim 1~~3~~4, wherein the second interconnect structure includes:

a first insulating layer disposed over the second surface of the substrate;

a first conductive layer disposed over the conductive via to extend the conductivity of the conductive via;

a second insulating layer disposed over the first insulating layer and the first conductive layer; and

a second conductive layer disposed over the first conductive layer.

18. The semiconductor device of claim 13, wherein the first interconnect structure includes:

a first conductive layer disposed over the conductive via;

a first insulating layer disposed over the first conductive layer and the substrate;

a second conductive layer disposed over the first insulating layer;

a second insulating layer disposed over the second conductive layer and the first insulating layer;

a conductive pillar disposed over the second conductive layer;

a third insulating layer disposed around the conductive pillar; and

a third conductive layer disposed over the conductive pillar, the semiconductor die or component electrically connected to the third conductive layer.

19. The semiconductor device of claim 13, wherein a thickness of the substrate is in a range of about 10 µm to about 50 µm.

20. A semiconductor device, comprising:

a substrate;

a conductive via disposed partially through the substrate;

a first interconnect structure disposed over a first ~~side~~surface of the substrate;

a semiconductor component ~~mounted to~~disposed over the first interconnect structure; and

an encapsulant disposed over the first interconnect structure and the semiconductor component.

21. The semiconductor device of claim 20, wherein the first interconnect structure includes a conductive paste.

~~22. The semiconductor device of claim 21, wherein the second interconnect structure includes:~~

~~forming a first insulating layer over a second side of the substrate; and~~

~~a first conductive layer disposed over the conductive via.~~

~~23. The semiconductor device of claim 21, wherein the second interconnect structure includes:~~

~~a first insulating layer disposed over a second surface of the substrate;~~

~~a first conductive layer disposed over the conductive via;~~

~~a second insulating layer disposed over the first insulating layer and the first conductive layer; and~~

~~a second conductive layer disposed over the first conductive layer.~~

24<u>2</u>. The semiconductor device of claim 20, wherein the first interconnect structure includes:

a first conductive layer over the conductive via;

a first insulating layer over the first conductive layer;

a second conductive layer over the first insulating layer; and

a second insulating layer over the second conductive layer and the first insulating layer.

2~~5~~3. The semiconductor device of claim 2~~4~~2, wherein the first interconnect structure further includes:

a conductive pillar over the second conductive layer;

a third insulating layer around the conductive pillar; and

a third conductive layer over the conductive pillar, the semiconductor component electrically connected to the third conductive layer.

24. The semiconductor device of claim 20, wherein a thickness of the substrate is in a range of 10 μm to 50 μm.

25. The semiconductor device of claim 20, wherein a thickness of the substrate is less than 300 μm.