

Abstract

A semiconductor device has a first semiconductor die. A first interconnect structure, such as a conductive pillar including a bump formed over the conductive pillar, and second interconnect structure are formed in a peripheral region of the first semiconductor die. A second semiconductor die is disposed over the first semiconductor die between the first interconnect structure and the second interconnect structure. A height of the second semiconductor die is less than a height of the first interconnect structure. A footprint of the second semiconductor die is smaller than a central region of the first semiconductor die. An encapsulant is deposited over the first semiconductor die and second semiconductor die. Alternatively, the second semiconductor die is disposed over a semiconductor package including a plurality of interconnect structures. External connectivity from the single side fo-WLCSP is performed without the use of conductive vias to provide a high throughput and device reliability.

(Fig. 5i)