Abstract

SEMICONDUCTOR DEVICE AND METHOD OF FORMING VERTICAL INTERCONNECT STRUCTURE USING STUD BUMPS

A semiconductor device is made by forming a conductive layer over a temporary carrier. The conductive layer includes a wettable pad. A stud bump is formed over the wettable pad. The stud bump can be a stud bump or stacked bumps. A semiconductor die is mounted to the carrier. An encapsulant is deposited over the semiconductor die and around the stud bump. A first interconnect structure is formed over a first surface of the encapsulant. The first interconnect structure includes a first IPD and is electrically connected to the stud bump. The carrier is removed. A second interconnect structure is formed over a second surface of encapsulant opposite the first interconnect structure. The second interconnect structure includes a second IPD. The first or second IPD includes a capacitor, resistor, or inductor. The semiconductor devices are stackable and electrically connected through the stud bump.

(Fig. 4)