

Abstract

A semiconductor device has a first interconnect structure, second interconnect structure, and a semiconductor die disposed between the first interconnect structure and second interconnect structure. The semiconductor die can have a photonic area. An embedded interconnect structure is disposed between the first interconnect structure and second interconnect structure. The embedded interconnect structure has a height sufficient to span a gap between the first interconnect structure and second interconnect structure. The embedded interconnect structure can be a plurality of conductive posts, and a second encapsulant deposited around the conductive posts. The embedded interconnect structure can be a plurality of e-bar structures, and a second encapsulant deposited around the e-bar structures. The embedded interconnect structure can also be a plurality of vertical loop wires, and a second encapsulant deposited around the vertical loop wires. A first encapsulant is deposited around the semiconductor die and embedded interconnect structure.

(Fig. 5c)