Abstract

A semiconductor device is manufactured using a transparent carrier. A build-up interconnect structure is formed on the transparent carrier. An opening is formed through the build-up interconnect structure. A semiconductor die is disposed over the build-up interconnect structure with a photonic circuit of the semiconductor die aligned to the opening. An ultraviolet (UV) lamp is disposed over the carrier opposite the semiconductor die. The UV lamp emits a UV light that impinges on the photonic circuit through the carrier and opening. An underfill is deposited between the build-up interconnect structure and semiconductor die while the UV lamp emits the UV light. The underfill is a photobond acrylate. The UV light cures the underfill before the underfill flows into the opening.

(Fig. 2f)