

Abstract

A semiconductor device has a substrate and interconnect structure formed over a die attach area of the substrate. An insulating layer is formed over a surface of the substrate. A trench is formed in the insulating layer between the die attach area and interconnect structure to extend around a perimeter of the die attach area. A semiconductor die is disposed over the die attach area. An underfill material is deposited under the semiconductor die. The trench prevents or impedes excess underfill material from reaching the interconnect structure. A T-bar structure is formed between the die attach area and interconnect structure to extend around a perimeter of the die attach area. The trench and/or T-bar structure operate as an overflow structure to impede the flow of the underfill material. A plurality of trenches and/or a plurality of T-bar structures can alternate around a perimeter of the die attach area.

(Fig. 3j)