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Dicing die attach film for 3D stacked die QFN packages

Abstract

The application of die attach film (DAF) in semiconductor packaging is become wider especially in three dimensional (3D) QFN stacked die package. As wafer getting thinner until beyond 100 μm, challenges in die attach process become greater and die attach paste may not be suitable in most cases. DAF has many advantages including no die tilt, no void, consistent bond line, no bleed out which improves the real estate on the bottom die. This paper reveals the difference of two types of DAF. In dicing die attach film (DDAF) application for QFN stacked die, there are several common responses so the focus will be elucidated the common defect after lamination process and dicing process. Defect like bubble, whisker formation, adhesive merging and flying die are for lamination process. While, chipping at backside, front side and sidewall, and also crack will be inspected for the dicing process. Lamination parameters such as temperature, pressure and speed will be optimized in order to get the best parameter combination for these two types of DAF. In the dicing process the critical parameter such as spindle rotation, saw speed, and blade grit size will be determined based on experimental works. Qualitative analysis will be carried out in order to understand the chipping, crack, adhesive merging and whisker formation. Tools like high power microscope (50x - 500 x magnificent) and SEM will be used to see those defect. The results that show all two types of DAF give the same response at the same parameter setting were presented and thoroughly discussed.

Keywords — Dicing process, die attach film, laminating process, SEM, stacked die