Emerging Trends in Wafer Singulation

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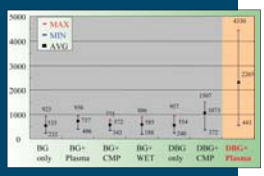

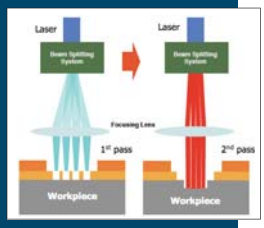

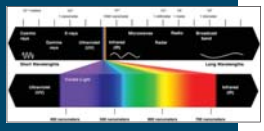

Mechanical Blade Dicing is the traditional method for wafer singulation. Mechanical blade sawing requires the frequent purchase of replacement blades, so the cost of consumables must be factored into the economic decision. For hard materials applications, such as sapphire wafers for High-Brightness LEDs, blade wear can be expensive, so laser scribing/dicing can be more cost effective. Laser systems can, inherently, produce smaller cut widths, or kerfs, than mechanical blades. This may enable wafers with smaller street widths resulting in more die per wafer. The trend toward thinner wafers and ultra low-k dielectrics is driving companies to consider alternatives to the traditional mechanical blade approach.

The report reviews traditional wafer singulation methods such as mechanical blade dicing, diamond tool scribe-and-break, and laser scribe-and-break. It compares these methods to emerging trends in wafer singulation including laser full-cut dicing and plasma dicing. Full text analysis provides critical details of the new developments and applications. Technology needs for laser dicing in target markets such as through silicon wafers (TSV), wafers with low-k or ultra low-k materials, and thin wafers used in memory products are described. Also described are memory applications with thin die including solid state drives, microSD cards, and stacked die CSPs.

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