# Innovative Laser MicroJet Technology

## Synova SA

The Laser MicroJet is the perfect technology for singulation of semiconductors when delicate materials are involved such as gallium arsenide (GaAs), indium phosphide (InP) and low-k materials or with hard materials such as silicon carbide (SiC).

Synova's Laser Microjet is a revolutionary hybrid cutting process combining a laser beam and a water jet, where a hair-thin water jet guides the laser beam on to the wafer. Contrary to standard cutting methods, the Laser MicroJet uses the water jet to cool the material surface for optimal protection against thermal damage. At the same time, water is used as a natural layer of protection to prevent deposition or contamination. Both of these surface protection features offer significant improvements to standard cutting processes that boost device yields. In addition to consistently demonstrating superior quality results, the Laser MicroJet is a highly reliable, maintenance-free cutting technology, which does not wear or need replacement like traditional blade methods. This has proven to have significant cost-of-ownership advantages for chipmakers compared to older cutting processes. This water jet-guided process not only reaches unprecedented speeds of up to 200 mm/s for thin silicon wafers (50 microns), but also provides parallel and narrow cuts from 75 microns to 25 microns, and has no wafer thickness limitations.

Apart from standard operations such as cutting, scribing and drilling, the Laser MicroJet provides a unique solution for performing edge grinding, which considerably reduces wafer breakage for thin semiconductors (< 150 microns thick). While semiconductor applications represent the lion's share of Synova's business, the Laser MicroJet is a versatile technology that can be used in a number of other industries and its applications.

Key Benefits:

- No thermal stress, thanks to water-jet cooling
- No particle contamination or need of a surface protection layer
- Outstanding cutting results with no burrs or slag
- Chipping and cracking of materials on the wafer edge, which can result from traditional cutting methods, are avoided
- No mechanical stress thereby enabling high die fracture strength
- Flexible process - in addition to high-quality cutting, allows drilling, scribing, grooving, edge grinding, or marking processes on wafers
- Scalable process with a wide variety of applications in the semiconductor sector including the dicing of low-k wafers, gallium GaAs wafers, solar cells, power semiconductors, multi-project wafers or thin wafers, etc
- Through-cutting of any thickness

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