

microMIRA™

HIGH THROUGHPUT LASER LIFT-OFF FOR MICROLED APPLICATION

The microMIRA LLO system provides highly uniform, force-free lift-off of different layers on wafers at high processing speed. In order to profit from the alike crystal structures, most of the Gallium Nitride (GaN) based microLEDs are grown on sapphire. The lift-off process from a transparent and costly material such as sapphire is a big challenge that only laser technology can achieve in reasonable productivity. The microMIRA laser system can be used especially for GaN lift-off from glass and sapphire substrates in microLED display manufacturing as well as in semiconductor manufacturing.

HIGHLIGHTS

- Force-free and extremely fast line beam laser processing
- Damage-free due to thermo-mechanical effects
- Fully automated system
- Low production costs
- Integration of adjacent manufacturing steps for higher fab productivity





microMIRA™ - SYSTEM CONFIGURATION FOR MICROLED APPLICATION

Laser Lift-Off (LLO) of GaN on sapphire wafers to silica, sapphire or other materials

Suitable for	<ul style="list-style-type: none"> • microLED • miniLED • Vertical LED • LED
Substrate size	<ul style="list-style-type: none"> • Wafer up to 8" (200 mm)
Laser source and beam path	<ul style="list-style-type: none"> • Excimer laser source with different wavelengths depending on customer application (e.g. 248 nm) • Line beam dimensions at sample surface: 205 mm x 0.33 mm for 8" wafer
Throughput	<ul style="list-style-type: none"> • 60 wafers/hour for 8" GaN on sapphire including process and handling time (depending on system setup and customers workpiece)
Positioning system	<ul style="list-style-type: none"> • High precision, direct driven Y, Z axis (with optional theta-stage) • Y axis: positioning accuracy $\pm 5 \mu\text{m}$, repeatability $\pm 1.5 \mu\text{m}$ • Z axis: positioning accuracy $\pm 3 \mu\text{m}$, repeatability $\pm 1.5 \mu\text{m}$
Alignment	<ul style="list-style-type: none"> • Manual, semi-automated or fully-automated work piece alignment with • X, Y system and optical measurement system • Automatic Z positioning and surface mapping
Software microMMI	<ul style="list-style-type: none"> • Control and supervise of all hardware components and machining parameters • Different user levels (administrator, supervisor, operator) • Data input file types: DXF, CSV, Gerber, CLI, others on request
Options	<ul style="list-style-type: none"> • Beam analysis and power measurement • Debonding module • Quality inspection • Cleaning module • Up to 4 SMIF load ports • Other auxiliary modules available on request
Standards	<ul style="list-style-type: none"> • Laser class 1 housing with integrated control panel • Certified laser window or overview camera (webcam) • Clean room class specification: ISO 3 for handling and frontside ISO 5 for lift-off process and laser beam system • Active exhaust system available as option
System dimensions	<ul style="list-style-type: none"> • 6,500 mm x 5,700 mm x 2,200 mm incl. handling and laser source