

microVEGA® xMR

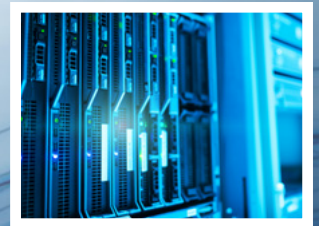
SELECTIVE LASER ANNEALING FOR MONOLITHIC MAGNETIC SENSORS

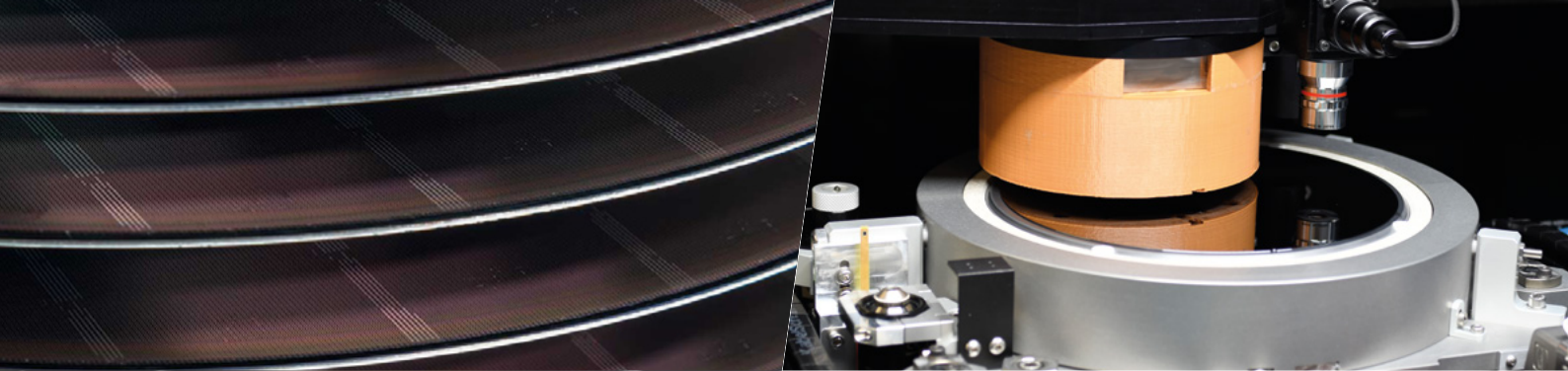
The microVEGA xMR system provides high-throughput laser annealing for monolithic magnetic sensor formation.

Thanks to its highly flexible tool configuration, the microVEGA xMR can accommodate both the laser-based programming of Giant Magnetoresistance (GMR) and Tunnel Magnetoresistance (TMR) sensors. It simplifies the pinning for monolithically integrated sensor chips to an easily adjustable one-step process, making it an ideal production solution in terms of cost, throughput, yield, and sensitivity.

HIGHLIGHTS

- Single platform for both GMR and TMR sensors
- Cost-efficient production of monolithically integrated sensor chips in just one production step
- In-plane and out-of-plane sensor programming
- Very high energy homogeneity - resulting in improved sensor quality
- Flexible recipe programming and wide parameter range





microVEGA® xMR - SYSTEM CONFIGURATION



The microVEGA xMR system combines a selective laser spot with a local, in-situ rotatable magnetic field. Based on selective heating and the concurrent application of a magnetic field, the reference layer of defined sensor fields is pinned in the desired direction, thus defining the sensitivity axis of the sensor structure. The heat-affected zone beyond the sensor chip is within a range of just a few micrometers. As a result, individual sensors can be placed closer to one another and closer to logic elements, creating the perfect base for monolithic, integrated concepts. The system's unique selectivity and precision, as well as its high flexibility in terms of process parameters such as laser pulse energy, magnetic orientation, and sensor dimensions, enable smaller sensors and new designs.

Suitable for	Adjustment of magnetic orientation (in- and out-of-plane), sensor position and sensor dimension for - Giant Magnetoresistance (GMR) sensors and - Tunnel Magnetoresistance (TMR) sensors
Wafer dimensions	- Wafer sizes up to 300 mm - Option: bridge-tool capability
Accuracy	- System positioning accuracy: up to $\pm 2.5 \mu\text{m}$ - Accuracy of magnetic field direction (orientation): $\pm 0.01^\circ$
Laser source and beam path	- ns laser source - NIR laser wavelength - Spot size in X and Y programmable by recipe
Integrated measurement	- Power sensor at chuck level - Laser beam analyzer at wafer level - Gauss-meter integrated - All relevant data are saved in log files
Standards	- CE/UL as option - SEMI as option - Laser class 1 - ISO class 5
Options	- Heating chuck - EFEM handling system for SMIF/FOUP and open cassette - SECS/GEM interface - Automatic magnet exchange unit (permanent magnet and electromagnet) - Air-conditioning system
System dimensions	Approx. 2,700 mm x 2,300 mm x 2,100 mm (width, height, depth)



Rev. 2025-03 Changes in accordance to technical progress are reserved.
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