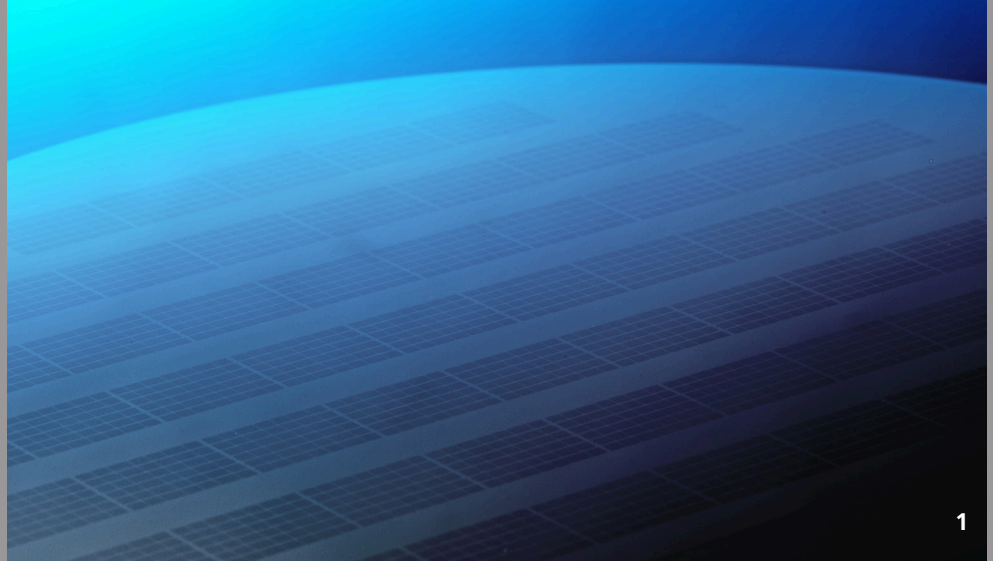

PRECISION LASER PROCESSING FOR MICROELECTRONICS

Laser for microelectronics

The microelectronics market's rapid growth is driving the demand for new, flexible, ecological and cost-efficient solutions for material processing and patterning. The target of realizing green, environmentally friendly production and reducing or avoiding the use of chemicals, while at the same time minimizing the energy required to manufacture a chip, is creating new opportunities for digital, laser-based manufacturing technologies. Especially in the fields of printed circuit board manufacturing, wafer dicing and packaging, as well as in the production of flexible photonic integrated circuits (PIC), the use of lasers can provide immediate benefits if the precision and quality of the processes meet the rigorous requirements of this emerging industry.

UV and DUV radiation as enabler

The required level of accuracy, flexibility and quality of the components can only be achieved through careful selection of the laser source as well as the system technology. Excimer and solid-state UV as well as DUV lasers are used to achieve higher resolution and reduced surface roughness of the generated structures. The short wavelengths enable high spatial resolution as well as efficient interaction with the material. This leads to a higher efficiency of the processes compared to visible or IR radiation and to a lower damage of the underlying layers and surrounding structures.

Result and fields of application

Using high-power UV lasers available at the recently established UV Center of Excellence with Coherent, it was possible to demonstrate the fabrication of different sub-µm structures using direct laser ablation. In addition, the flexibility of the laser-based approach enables the processing of flat wafers and complex 3D surfaces for which traditional mask-based lithography techniques have reached their limits. The unique picosecond laser system with 266 nm wavelength allows the generation of structures with an edge roughness < 500 nm and paves the way for novel forward-looking laser delamination/ transfer processes for the fabrication of microelectronic components.

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1 Laser precision ablation for microelectronics components.

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DQS certified by DIN EN ISO 9001, Reg.-No.: DE-69572-01