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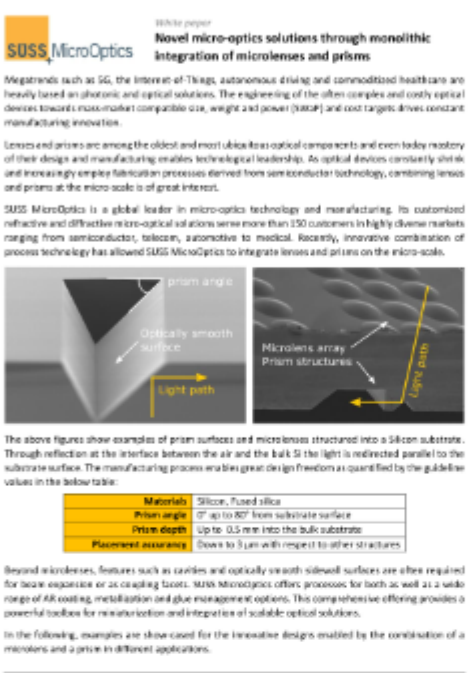
PHOTONICS spectra®

WHITE PAPERS & APPLICATION NOTES


White paper

SUSS MicroOptics

Novel micro-optics solutions through monolithic integration of microlenses and prisms

Megatrends such as 5G, the Internet of Things, autonomous driving and commoditized healthcare are heavily based on photonic and optical solutions. The engineering of the often complex and costly optical devices towards mass-market compatible size, weight and power (SWaP) and cost targets drives constant manufacturing innovation.

Lenses and prisms are among the oldest and most ubiquitous optical components and even today mastery of their design and manufacturing enables technological leadership. As optical devices constantly shrink and increasingly employ fabrication processes derived from semiconductor technology, combining lenses and prisms at the micro-scale is of great interest.

SUSS MicroOptics is a global leader in micro-optics technology and manufacturing. Its customized refractive and diffractive micro-optical solutions serve more than 150 customers in highly diverse markets ranging from semiconductor, telecom, automotive to medical. Recently, innovative combination of process technology has allowed SUSS MicroOptics to integrate lenses and prisms on the micro-scale.

The above figures show examples of prism surfaces and microlenses structured into a Silicon substrate. Through reflection at the interface between the air and the bulk Si the light is redirected parallel to the substrate surface. The manufacturing process enables great design freedom as quantified by the guideline values in the below table:

Materials	Silicon, Fused silica
Prism angle	0° up to 80° from substrate surface
Prism depth	Up to 0.5 mm into the bulk substrate
Placement accuracy	Down to 3 µm with respect to other structures

Beyond microlenses, features such as cavities and optically smooth sidewall surfaces are often required for beam expansion or as coupling facets. SUSS MicroOptics offers processes for both as well as a wide range of AR coating, metallization and glue management options. This comprehensive offering provides a powerful toolbox for miniaturization and integration of scalable optical solutions.

In the following, examples are showcased for the innovative designs enabled by the combination of a microlens and a prism in different applications.

Novel Micro-optics Solutions Through Monolithic Integration of Microlenses and Prisms

SUSS MicroOptics is a global leader in micro-optics technology and manufacturing. Innovative combination of process technology has allowed SUSS MicroOptics to integrate micro-lenses and prisms on wafer-scale. In combination with the comprehensive offering of AR coating, metallization and glue management options, SUSS MicroOptics provides a powerful toolbox to design breakthrough solutions for advanced photonics assembly and packaging.

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