Major breakthrough in EUV

Japan-based Gigaphoton is one of the two major players when it comes to extreme ultraviolet (EUV) source development for future lithography applications. EUV technology has been relatively slow to mature, but Gigaphoton recently announced a major breakthrough: it has successfully achieved 24-hour continuous operation of its EUV light source with average output power of 60W on its prototype laser-produced plasma (LPP) light sources, using operating patterns that simulate usage in an high-volume manufacturing (HVM) environment. "This result demonstrates that Gigaphoton is very close to realising high power, low cost, and stable LPP light sources required by our customers. Our expertise and efforts to develop the LPP light source will accelerate the development of EUV scanners for HVM. This achievement will also further encourage the industry to employ EUV scanners for their next-generation lithography processes," says Akinori Matsui, Chief corporate planning manager at Gigaphoton.

Gigaphoton Inc. was founded in 2000 as a leading-edge technology company to support the semiconductor industry in the 21st century. Since then, the company has been developing and marketing user-friendly, highly innovative laser light sources and delivering them to major lithography tool suppliers in the global semiconductor industry. In addition, they have been aggressively working on the development and mass-production of Extreme Ultra Violet (EUV) light sources as the next-generation lithography light sources. Gigaphoton already has grown to dominate the Asian market including Japan with a large number of installed bases including most of major semiconductor device manufacturers in this region as the world's leading excimer laser light source manufacturer. The company also continues to enjoy rapid growth in the US and European markets. Mr. Matsui explains that EUV is a next-generation lithography technology using an extreme ultraviolet (EUV) wavelength. Chip makers need this technology as they need their semiconductor lithography machines to print finer features with every new generation of chips. EUV's extremely short wavelength allows for this. The technology is extremely complicated however, which explains why it has taken longer than expected for the technology to mature.

Gigaphoton's latest achievement is a major step forward in that respect. It was achieved as part of a programme subsidised by the New Energy and Industrial Technology Development Organization (NEDO). Mr. Matsui explains that the achievement was a result of further advancements in key technologies developed by Gigaphoton, such as Droplet Generators capable of producing tin (Sn) droplets smaller than 20 µm in diameter, the short-wavelength, solid-state pre-pulse laser and main pulse CO_2 laser, and debris mitigation technology using high-output superconducting magnets and Sn etching. Gigaphoton is planning to start operation of a high-output pilot unit by the end of 2015, and remains committed to furthering its R&D efforts with goals of achieving continuous operation at 250W output levels, which is considered as a requirement for manufacturing applications such as memory devices.

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