Canon looks to nanoimprint tech for 2nm lithography – October 16, 2023

Canon has launched a lithography system for 5nm processes using nanoimprint technology that it believes can be used down to 2nm.

The nanoimprint lithography (NIL) technology, pioneered by EVG in Europe and Toppan in Japan, presses a 6in mask imprinted with the circuit pattern on the resist on the wafer like a stamp.

Because its circuit pattern transfer process does not go through an optical mechanism, fine circuit patterns on the mask can be faithfully reproduced on the wafer. This allows complex two- or three-dimensional circuit patterns to be formed in a single imprint, which may reduce the cost of patterning a wafer.

The nanoimprint technique also avoids the need for complex extreme ultraviolet (EUV) light sources and optics that drive the cost of 2nm lithography systems from Dutch competitor ASML to many millions of dollars. This also reduces the energy requirements for a wafer fab.

- Canon prepares to ramp nano-imprint lithography
- EVG, Toppan team for nanoimprint photonics lithography
- Toppan spins out its semiconductor mask business

Canon's FPA-1200NZ2C NIL system for 300mm wafers enables patterning with a minimum linewidth of 14nm, equivalent to the 5nm node required to produce most advanced logic semiconductors. Further improvement of mask technology will take NIL to a minimum linewidth of 10nm says Canon and this corresponds to the 2nm node it says.

The NIL lithography system also uses newly developed environmental control technology that suppresses the contamination with fine particles in the equipment.

This enables high-precision alignment which is necessary for the manufacture of semiconductors with an increasing number of layers and the reduction of defects due to fine particles, and enables the formation of fine and complex circuits.

- Deal creates first nanoimprint lithography system with inkjet printing
- Intel spins out $4.3bn chip mask making business

As well as leading edge silicon chips, the NIL lithography systems can be used for other applications such as metalenses for mixed reality optics that need microstructures of tens of nanometres.

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