Samsung 7nm EUV LPP spells out new day for its chip-making future

October 22 2018, by Nancy Owano

The wraps are off Samsung's 7nm LPP EUV process, which has been years in development. The news is that Samsung has now swung into the next stage of producing chips using that process.

Pulse reported that "The company said it will be mass producing chips using its 7nm low power plus (LPP) process with extreme ultraviolet lithography technology which the company has spent over a decade to develop."

The company news release said that by 2020, Samsung expects to secure additional capacity with a new EUV line for customers who need high-volume manufacturing for next-generation chip designs.

(Samsung's research and development in EUV began in the 2000s. One of the factors contributing to their progress was getting the right equipment in its facilities via partnerships with the tool providers, to ensure the stability of EUV wafers.)

Tech watchers have been following Samsung's keen focus on how to leverage EUV patterning technology, knowing it was no longer a case of if but when.

Back in March, Mark Richards in *EE Times* said extreme ultraviolet lithography (EUV) was finally on the verge of being inserted into volume manufacturing.

ZDNet in June reported that Samsung gave the first detailed look at its 7nm platform, which *ZDNet* said was likely to be the chipmaking process to use a form of lithography that has been in the works for decades.

John Morris wrote that Samsung was likely to introduce a form of lithography known as EUV using extreme ultra-violet light, "in development for some 30 years."

Brandon Hill in *HotHardware* shed light on the EUV approach and its advantages. "Rather than using conventional argon fluoride immersion techniques, Samsung's EUV instead uses 13.5nm wavelength light (versus 193nm) to expose silicon wafers. In addition, EUV allows for the use of a single mask (instead of 4) to create a silicon wafer later. This leads to reduced complexity and cost for production."

Months later, on Oct. 18, the announcement was headlined, "Samsung Electronics Starts Production of EUV-based 7nm LPP Process."

Specifically, Samsung passed the development phase and has started wafer production of its process node, 7LPP, described as " 7-nanometer (nm) LPP (Low Power Plus) with extreme ultraviolet (EUV) lithography technology."

Why this matters: Introducing the EUV process node reflects a quiet revolution in the semiconductor industry.

Samsung Electronics' Charlie Bae said the "fundamental shift in how wafers are manufactured gives our customers the opportunity to significantly improve their products' time to market with superior throughput, reduced layers, and better yields." Their 7LPP process can reduce the number of masks by about 20% compared to non-EUV process.

Morris in June had touched on this reduction in mask steps: "By using EUV at 7nm, Samsung can fabricate contacts and some metal layers with a single step rather than using 193nm ArFi with multiple exposures. Samsung has previously said this will reduce mask steps."

Translation: Samsung has figured out a way of simplifying the manufacturing process by reducing the number of layers needed on each chip, said *SilconAnGLE*.

What's next? "The company did not reveal who would be the first customer to apply its 7nm chips but it aims to expand EUV lines by 2020," said *Pulse*.

As semiconductor manufacturer, Samsung has been investing billions on capacity expansion and advanced process technology R&D.

AnandTech shared some details on the locale of this activity. "Samsung produces its 7LPP EUV chips at its Fab S3 in Hwaseong, South Korea," said Billy Tallis and Anton Shilov. "The company can process 1500 wafers a day on each of its ASML Twinscan NXE:3400B EUVL step and scan systems with a 280 W light source."

Citation: Samsung 7nm EUV LPP spells out new day for its chip-making future (2018, October 22) retrieved 18 April 2024 from https://techxplore.com/news/2018-10-samsung-7nm-euv-lpp-day.html