

Application and Technology of EBDW (Electron Beam Direct Writing):The
Impact on its Business Circumstances

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In this presentation, our vision for EBDW (Electron Beam Direct Writing) applied to from circuit development use with shuttle run to small volume manufacturing will be discussed. Effects of innovations achieved by technology will be considered on the viewpoint of business structure change. It is intended to describe the direction to which EBDW technology should target.

EBDW technology has been started to be used since 1970s. In 1980s it has been used as a technique to reduce cycle time of product development. The major motivation to use EBDW was to eliminate mask making lead time. As the scale of LSI has been increasing, drawing data volume to be exposed on a wafer have been increasing, that resulted in sagging improvement of EBDW throughput. With these technical background, application of EBDW has been limited only for early stage circuit evaluation. Use for product manufacturing has not been gotten on the stage. Recently, the industry has started paying attention on mask-less lithography because of the reticle cost rising.

The motivation to design original LSIs is declining year over year, because the opportunities for LSI developments have been getting fewer as System on a Chip advanced more and rising up design cost. In addition, the higher performance of general purpose processor makes motivation lower to fabricate specific purpose LSI. As a matter of fact, calculation and symbol processing point of view, it has been rare that an specific LSI with high uniqueness in the true sence of the word.

We could not get in the projects that are no confidence to expand the future revenue with these situation. Although there are much more wants

to fabricate PoC(Proof of Concept) chips, not only for start up fabless companies, but established companies, the larger development cost makes less opportunities to do something new.

We are thinking of the contribution to provide the fields for many designers to create thier originality go through the extend the prototyping opportunities to combine shuttle services and EBDW.

In addition, we are planning to support pre production devices that involves small volume production for nicher market needs. It is capable to see market reaction or to develop software prior to chip release that is closely related to product value, and we think it is also good value for the applications which is required for advanced performance even if the market volume is not so large.

It is ovious that EBDW throughput is the key issue to do such business coverage from prototyping to small volume production.

A throughput as generally known depends on the equipment overhead, process technology(resist sensitivity) ,and compression technique of EB drawing data. A maintaining photolithography compatible EBDW is enables us to switch from prototyping phase to mass production phase.

In this discussion, how those elemental technologies give rise to the impact for the environment of EBDW will be discussed.