



## Frequently Asked Questions

### **Q1. What was announced on February 24, 2009?**

A. A group of 20 leading companies throughout the semiconductor industry have collaborated and launched the eBeam Initiative, a forum dedicated to the education and promotion of an innovative, new manufacturing approach known as design-for-e-beam (DFEB). The eBeam Initiative aims to increase design starts and reduce time-to-market in the semiconductor industry.

### **Q2. What is the DFEB approach?**

A. DFEB is a design-to-manufacturing approach to enhance the throughput of e-beam lithographic exposure. DFEB uses character or cell projection (CP) technology combined with design and software techniques to reduce a design's required shot count, resulting in increased CP e-beam direct-write (EbDW) throughput. A technology backgrounder on DFEB is available on the eBeam Initiative website, [www.ebeam.org](http://www.ebeam.org).

### **Q3. Who are the charter members of the eBeam Initiative?**

A. Charter members and advisors spanning the semiconductor ecosystem include: Advantest, Alchip Technologies, Altos Design Automation, Cadence Design Systems, CEA/Leti, D2S, Dai Nippon Printing, D. E. Shaw Research, e-Shuttle, eSilicon Corporation, Fastrack Design, Fujitsu Microelectronics, Magma Design Automation, PMC-Sierra, Qualcomm, STMicroelectronics, Tela Innovations, Toppan Printing, Virage Logic and Vistec Electron Beam Lithography Group.

### **Q4. Who are the target members and how do companies join the eBeam Initiative?**

A. Membership is open to any company developing products and technologies for IC design and manufacturing. More information on how to join can be found at [www.ebeam.org](http://www.ebeam.org). Design Team Advisors are invited by the eBeam Initiative Steering Group.

### **Q5. What are the classes of membership and fees?**

A. There are two classes of membership open to new members: an Ecosystem member and a Steering Group member. Fees are exchanged for in-kind contributions. The role of the Ecosystem member is to make technical and business in-kind contributions that demonstrate validation and product support of the DFEB approach. The role of the Steering Group member is to invest in the development of products and proof points to reduce barriers to adoption of DFEB and to approve Design Team Advisors for the Initiative. The Managing Sponsor facilitates the Design Team Advisors, Steering Group and general initiative programs. D2S serves as the Managing Sponsor.

**Q6: What industry need does this collaboration address? What primary benefits does it provide?**

A. The continually rising cost of masks limits the variety and number of designs in the industry. With the DFEB approach, virtually maskless ICs are now possible, resulting in more prototypes, derivatives and high-value/low volume ICs. The benefits of the eBeam Initiative will be increased investment in multiple DFEB supply chains and a reduction in barriers to adoption, leading to an accelerated adoption amongst a broad number of customers.

**Q7. Why is an industry wide collaboration needed and why is now the right time?**

A. DFEB requires the combined efforts of design and manufacturing. This collaboration brings together those critical players in the global ecosystem combined with leaders in the design community to accelerate the adoption of this new approach. Now is the right time because mask costs continue to increase, optical lithography is increasingly more difficult, and the technology to make maskless ICs now possible is now enabled with DFEB.

**Q8. What are the goals of the Initiative?**

A. The eBeam Initiative aims to increase design starts and reduce time-to-market in the semiconductor industry. There are three specific objectives: 1) to reduce barriers to adoption of DFEB 2) increase the investment in multiple DFEB supply chains and 3) accelerate the adoption of DFEB by more customers

**Q9: How soon do you expect to see tangible results of the Initiative?**

A. A group of members presented a paper at SPIE 2009 on early collaboration to optimize DFEB with EbDW equipment. This is an example of "Manufacturing Proven" which is the 2009 theme in the eBeam Initiative roadmap. "Design Proven DFEB" is the theme in the 2010 Initiative roadmap followed by "Multiple chip suppliers" in 2011.

**Q10: How long is the Initiative expected to last?**

A. The initial term of the Initiative is 3 years, with the end goal of having multiple manufacturing sources available to the industry. The Managing Sponsor, D2S, may choose to extend the Initiative beyond 3 years with the mutual consent of members.

**Q11. How much of a cost-savings will design teams realize using the DFEB approach?**

A. In general, the majority of the cost savings will be found in applying DFEB to the CAD layers. Contact suppliers of DFEB solutions for more information.

**Q12. How much time is saved using the DFEB approach?**

A. RET and OPC are not needed and time associated with mask design, mask manufacturing, mask inspection and repair is eliminated.

**Q13. What needs to change in the ecosystem to support DFEB?**

A. DFEB leverages the character projection capability of today's EbDW equipment by optimizing the physical design to reduce e-beam shot count which in turn increases throughput. DFEB works with existing synthesis products from EDA companies today. DFEB methodology education and training will be needed and are key goals for the Initiative along with development projects to further reduce e-beam shot count reduction.

**Q14: What about other approaches such as parallel e-beam? Are they part of this Initiative?**

A. The focus of this Initiative is on utilizing current EbDW solutions using character projection capabilities. The hardware capability for this is available in 2009 for production use.