The path to the 3D-IC Ecosystem

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"Successful design and assembly of complex, fine-pitch circuit boards (AND 2.5D/3D Assemblies) is a ***Team Sport."*** *Note 1*

What Should the EDA Industry Address in the Next Couple of Years?

Answer – Be part of the team

The team needs to consist of (as a minimum):

1. *The device suppliers (it maybe one, such as TSMC in the Xilinix Virtex 7 case or many.)*
2. *The interposer designer and supplier*
3. *The assembler*
4. *The material suppliers (different interconnects, different TSVs, different device thicknesses will need different materials, such as underfill, solder, epoxy, etc.)*
5. *An understanding Pharmacist or Beverage Supplier (to alleviate the stresses.)*

Note 1: http://www.ti.com/lit/an/spraav2/spraav2.pdf

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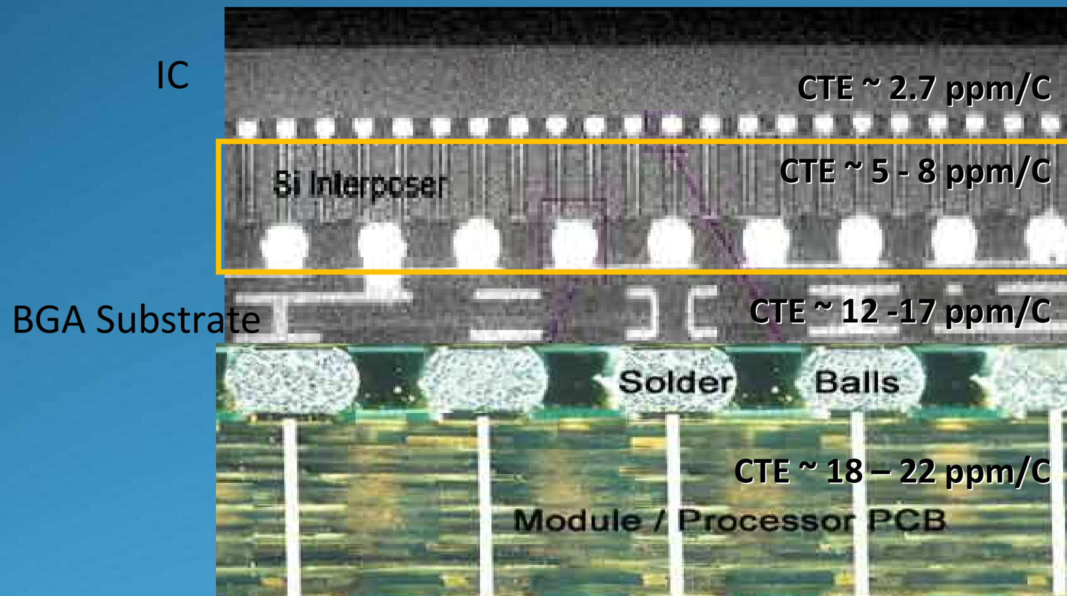
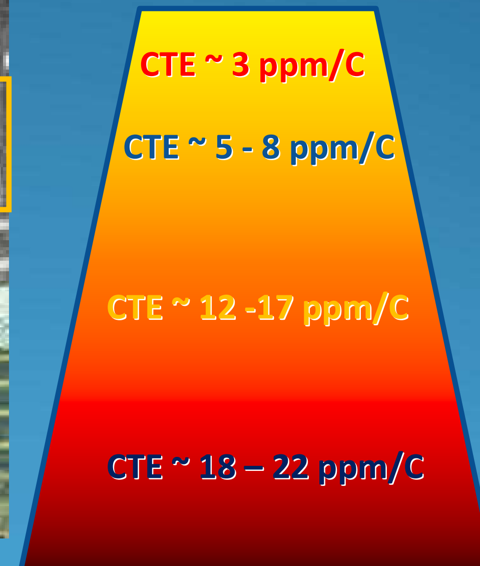
EDPS-2012 2.5D/3D Panel

The result can be either a reliable assembly and product or a career limiting event!

IC

BGA Substrate





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What Should the EDA Industry Do Beyond the next Couple of Years?

1. Develop a better understanding of the different types of TSVs, e.g. Tungsten vs. Copper, TSV processes (First, Middle, Last, Hidden vs Through), and the trace metal differences (FEOL vs. BEOL, vs. HDI PCB).
2. Coordinate with the assembly equipment suppliers to create an acceptable file exchange to program device registration and placement.
3. Create databases of the design guidelines which help define the selection of assembly processes, equipment, and materials.
4. Encourage and participate in the creation of standards, such as Workmanship, which drive both design and assembly tool development.

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What Should the EDA Industry Do Beyond the next Couple of Years?

5.Develop suitable floorplaning tools for the single chips,

e.g. fewer vias = less cost; big vs small diameter vias; keepout areas

6. Develop 3D chip to chip planning tools,

e.g., avoid stacking TSVs on top of TSVs or traces on top of TSVs (they swell)

7.Provide thermal planning tools (Mid-stack chips get hot)

8.Provide cost modeling tools to address designer driven issues, such as when to use a 3D module vs. an 2.5D interposer module vs. a single chip.

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What is PPM Associates Role in this Effort?

1. Provide Education for Users and Suppliers in the benefits and issues of 2.5D and 3D
2. Provide a Confidential Sounding Board for Users and Suppliers
3. Assist in the facilitation and orderly creation of the essential standards, infrastructure and forums to stimulate the 2.5D/3D evolution.

To that goal I'm happy to announce the alliance of Herb Reiter, Dieter Bergman and I in a newly launched effort to creating the "2.5D/3D Council" – modeled after the very successful Surface Mount Council (1985 – 1999).

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