> COMPLEXITY REQUIRES CLOSE COOPERATION

- > 3-D packages will increase the amount of possible defects and resulting monetary loss.
- > Additional tests are required. Ideal setups from wafer probing to final test will leverage process synergies.
- > Experienced equipment suppliers are needed to cooperatively develop the best possible solution.

> INTEGRATED SOLUTIONS FOR BEST YIELD

Requirements of in-process test are going far beyond final test technology. Plug & Yield® enables aligned design and optimization of the test cell components to achieve viable, robust and cost efficient solutions.

Collaborative value engineering of the fully integrated and harmonized setups enables the development of the best technical solution at the lowest price.

>> *economy through technology*

> FOR MORE INFORMATION

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3D Integration

In-Process Test for Highest Assembly Yield

Solutions for electrical test of partial stacks

3-D Integration

Partial stack test for 3-D packages

> KNOWN GOOD DIE AND FINAL TEST IS NOT ENOUGH

Established test processes cannot cope with the assembly risks of 3-D packages. New process steps are applied on the ultra-thin wafer in between probing and assembly. Bad parts in a die stack can corrupt good ones. Smart test distribution with sharing as much data as possible will add the concept of “known good stack”.

> SPECIAL REQUIREMENTS FOR PARTIAL STACK TEST

Partial stacks expose bare dies and require sophisticated solutions to balance contact forces. Low force pins allow the ability to control the risk of cracking the stacks.

> SUPPLY CHAIN OPTIMIZATION IS KEY

Successful production of 3-D packages requires a fully reliable supply chain for all functional parts of the stacked package. Additionally, semiconductor designers and manufacturers can benefit from cooperating with equipment suppliers in order to ensure best design for test at the lowest cost.

> 3-D ADDS COMPLEXITY TO ASSEMBLY

With 3-D integration additional risks during the assembly process need to be considered — Issues may result from:

> TWSS processes

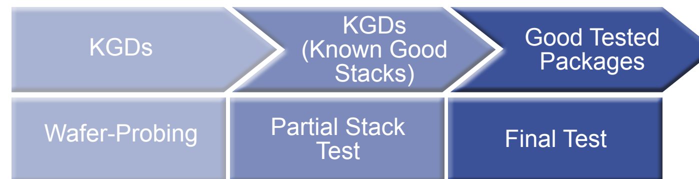
> dies, changing their electrical behavior

> interposers

> laminations

> flip chip and TSV bonding

KGDs cannot not eliminate this risk. Bad parts or partial stack will corrupt good ones. Final test is very late, so systematic failures will have an impact on large assembly volumes before they are discovered during final test.



> STACKED DIE HANDLING

Assembly in-process test deals with highly sensitive partial stacks.

- **bare die requires new solutions for back side support to avoid cracking**
- **high compliance contacting probes to accommodate for flection**
- **reliable contacting with low force and best yield**
- **smart re-test function to avoid multiple touch downs on good parts**