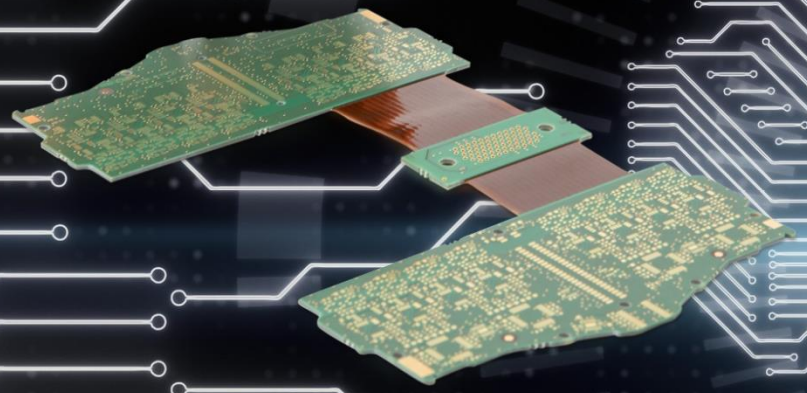
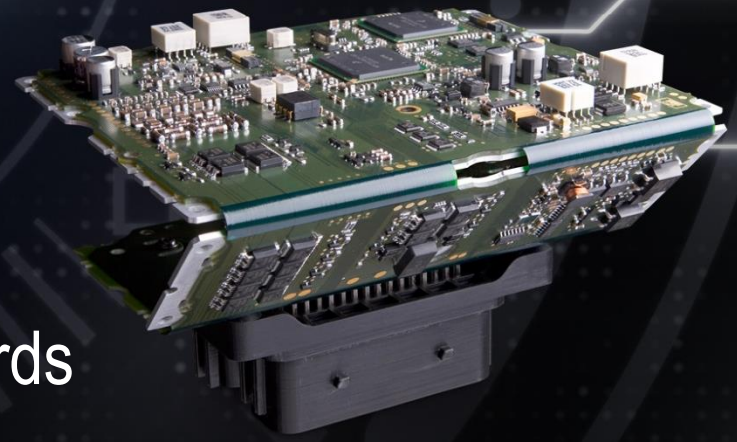
WÜRTH ELEKTRONIK





ADVANCED SOLUTION CENTER

The solution to all special and unusual printed circuit boards

Jürgen Wolf

AGENDA

1. **Introduction to the Advanced Solution Center**
2. **Insight into 1st stage of** MORE.**technology:** DEVICE.**embedding**
3. **Insight into 1st stage of** MORE.**technology:** STRETCH.**flex**
4. **Insight into 1st stage of** MORE.**technology: Technology Partner**
5. **Summary**

AGENDA

1. **Introduction to the Advanced Solution Center**
2. Insight into 1st stage of MORE.technology: DEVICE.embedding
3. Insight into 1st stage of MORE.technology: STRETCH.flex
4. Insight into 1st stage of MORE.technology: Technology Partner
5. Summary

YOUR SPEAKER

Jürgen Wolf

- **Head of Advanced Solution Center**
  - Responsible for the technology of embedding of components/functions into the printed circuit board and for stretchable PCBs (STRETCH.**flex**)
  - Support of sales for the embedding technology and novel technologies
  - Qualification, planning and further development of the technologies
- **With Würth Elektronik Circuit Board Technology since 2008**

How to contact me:

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- **E-Mail: juergen.wolf@we-online.de**

Save my contact details directly in your address book!

INTRODUCTION

Advanced Solution Center – ASC

What is the Advanced Solution Center?

- **The Advanced Solution Center is**
  - Technology-oriented
  - Customer-oriented
  - solution-oriented
  - Additionally the new “D” from our R&D

INTRODUCTION

Advanced Solution Center – ASC

Why an Advanced Solution Center?

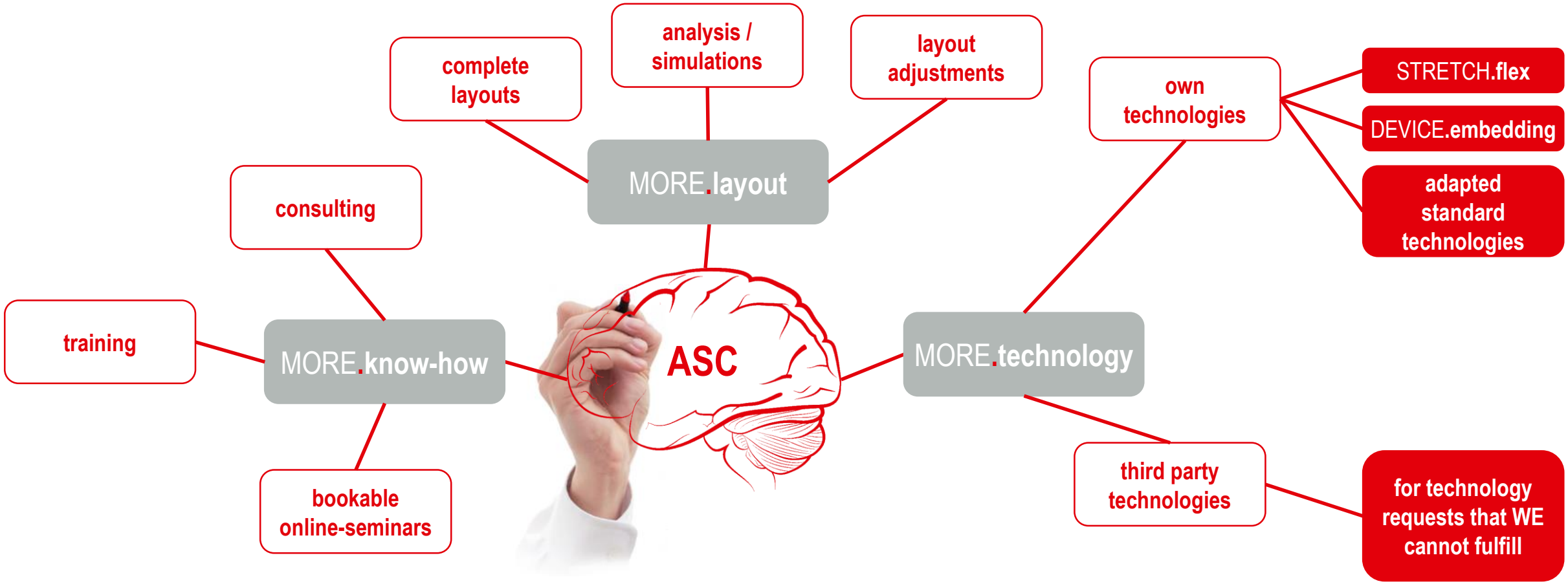
- We offer printed circuit board solutions for your complex, technological products
- The Advanced Solution Center evaluates the possibility of manufacturability in our German plants and, if necessary, transfers it to the technical project team (TPM) on site
- Even if it is not in WE's standard PCB portfolio
- If it cannot be manufactured at WE: we are looking for or may already have a competent partner who can manufacture these demanding PCBs on our behalf

Your advantages

- You have fewer contacts for PCB-specific questions
- You can concentrate on what is most important to you
- You benefit fully from the enormous technological know-how at WE Circuit Board Technology

INTRODUCTION

Advanced Solution Center – ASC



INTRODUCTION

Advanced Solution Center – ASC

Implementation

1st stage – MORE.**technology**

- Start with the first cooperation partner for “high technologies” and advanced technologies
- Technology consulting

2nd stage – MORE.**layout**

- Layout service via WE Systems Engineering Service India
- ASC as an European port of support

3rd stage – MORE.**know-how**

- Establishing of training program

AGENDA

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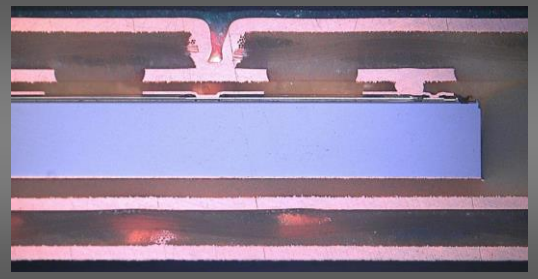
5 Summary

INSIGHT INTO 1ST STAGE OF MORE.technology

DEVICE.embedding



MICROVIA.embedding

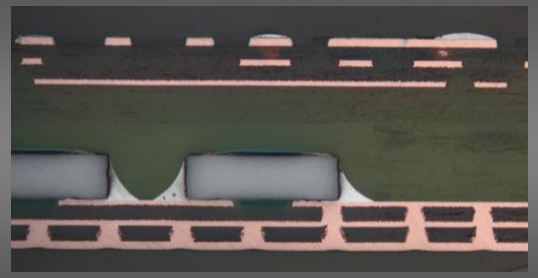
Bare Dies, dedicated passives

mounted onto inner layer core or Cu-foil

electrical contact through microvias

highest reliability

large volumes



SOLDER.embedding

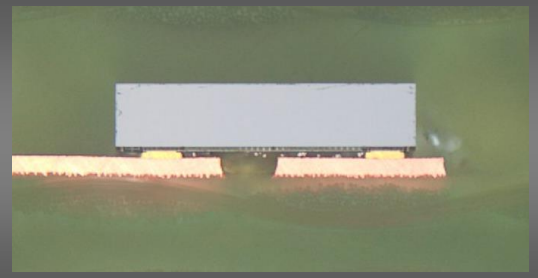
SMD components

soldered onto inner layer core

electrical contact by solder

high reliability

small, medium and large volumes



FLIP-CHIP.embedding

Bumped Bare Dies

mounted onto inner layer core

electrical contact by ACA

high reliability

small, medium and large volumes

INSIGHT INTO 1ST STAGE OF MORE.technology

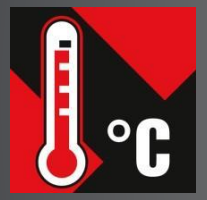
DEVICE.embedding

Miniaturisation

- Package replacement
- Space savings of assembly area on the outer layers

Performance/ Function

- Integrated shielding
- Short signal paths
- Protection against plagiarism



Reliability

- Protection against environmental influences
- Secure and full-surface fixing
- Thermal management

For more information and webinars on embedding technology, please visit:

www.we-online.com/embedding

Samples available upon request

AGENDA

1 Introduction to the Advanced Solution Center

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3 **Insight into 1st stage of MORE.technology: STRETCH.flex**

4 Insight into 1st stage of MORE.technology: Technology Partner

5 Summary

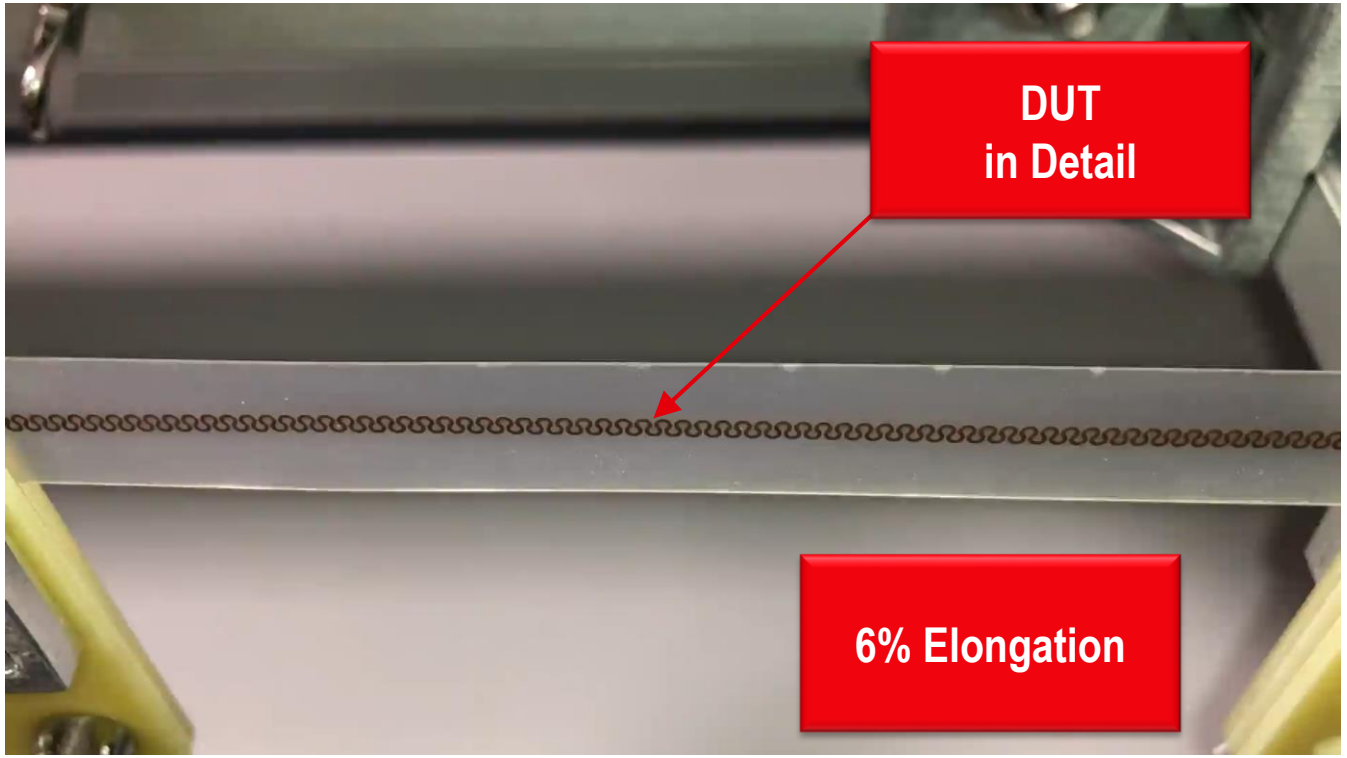
INSIGHT INTO 1ST STAGE OF MORE.technology

STRETCH.flex – Basics and Concept

Concept – stretchable printed circuit board

- Thermoplastic polyurethane (TPU) acts as new copper clad substrate material
- Design of the tracks in meander form to realize the stretchability

  Depending on the layout:
  dynamic stretchability of 5 – 20%
- Very adaptable material – almost every shape is realizable
- Various further processing options e.g. thermoforming/deep drawing, back injection moulding, laminating, etc.:



INSIGHT INTO 1ST STAGE OF MORE.technology

STRETCH.flex – Properties

Material properties

- Extensive testing necessary
- Multiple rotation (n x 180°) without influence on stability and electrical properties
- Dynamic stretchability of 5 – 20 %
- Skin-friendly material
- Softening area: 155 – 185°C
- Multiple processing options (assembly in reflow, thermoforming/deep drawing, laminating…)

Fields of application

- Medical Technology
- Sensor Technology
- Smart Textiles
- (Soft-) Robotics
- IoT (Internet of Things)
- Wearable Technology

Further information about STRETCH.flex:
www.we-online.com/stretch

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5 Summary

INSIGHT INTO 1ST STAGE OF MORE.technology

Technology Partner

- **Through close collaboration**
  - with our technical project teams in the plants (TPM), or
  - with technology partners

  we offer the possibility to have PCBs manufactured that do not comply with the standard portfolio

- **Especially through cooperation, the options can be expanded:**
  - Multilayer up to 60 layers
  - Anylayer HDI with staggered and stacked microvias
  - Heavy Copper (up to 210 µm with UL, up to 400 µm without)
  - Cu-Busbars, Cu-Inlays resp. Cu-Coins
  - High frequency and microwave circuits
  - Depending on technology down to 50 µm line/space

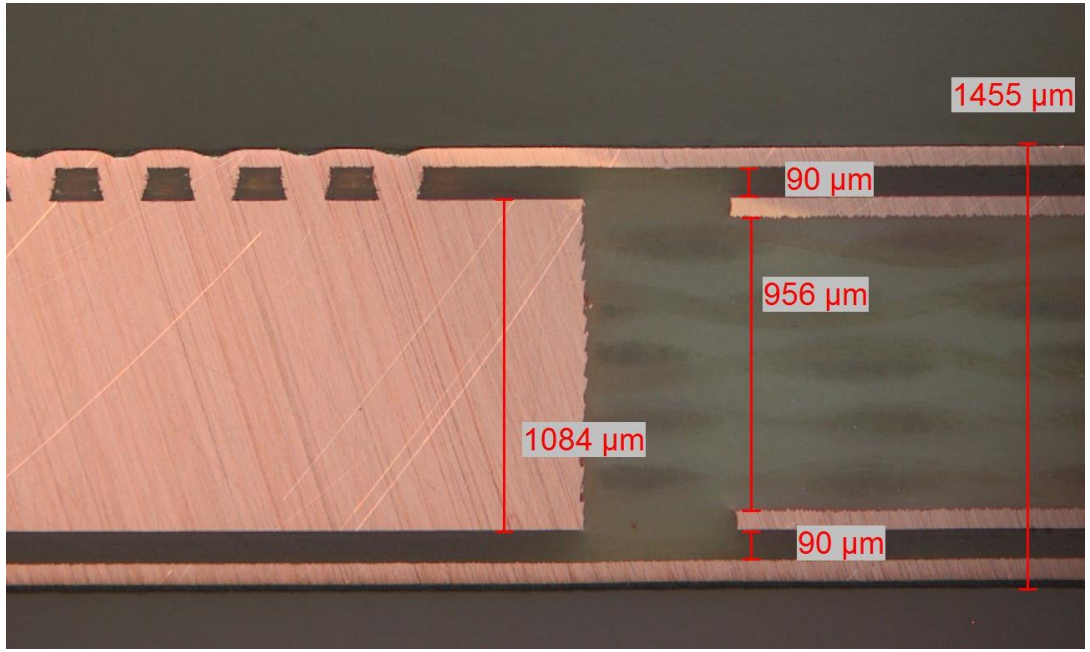
Options are being further expanded

Updates and info: www.we-online.com/asc

INSIGHT INTO 1ST STAGE OF MORE.technology

Technology Partner – Application Examples

1mm Cu-profile in PCB – contacted by Cu-filled microvias

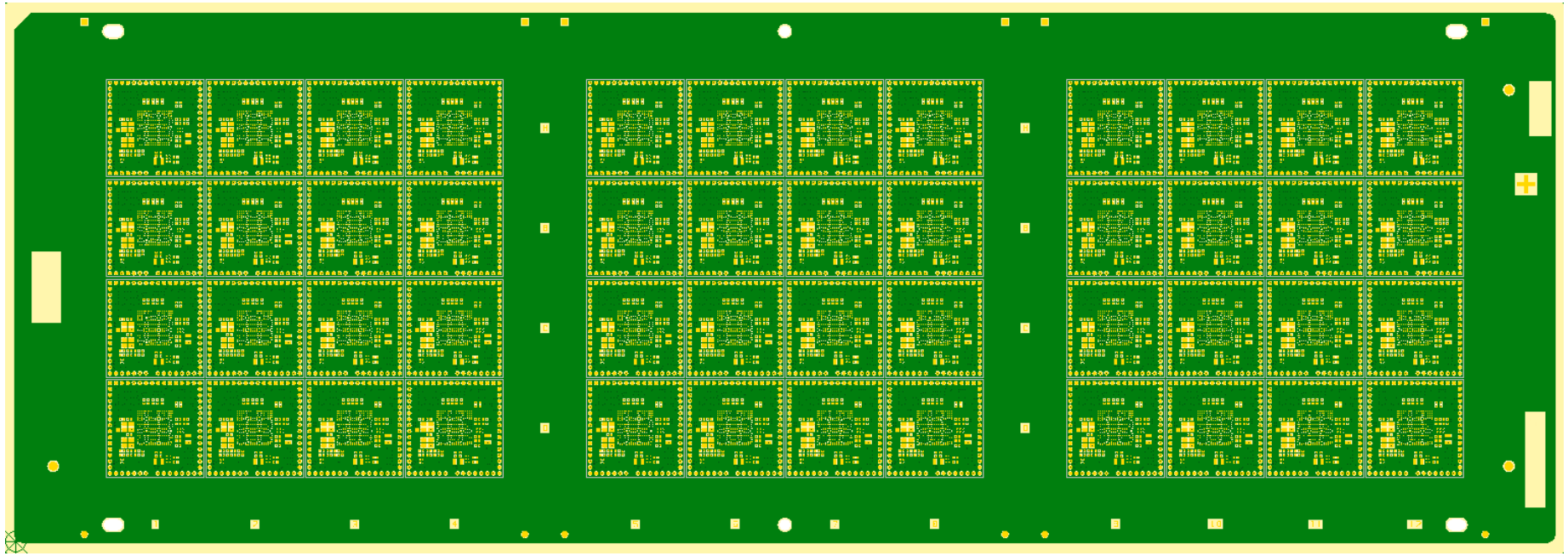


1 mm copper profile in FR4

INSIGHT INTO 1ST STAGE OF MORE.technology

Technology Partner – Application Examples

Finest structures using the example of a customised FCBGA - IC Substrate



Custom FCBGA Panel - 4-layer anylayer with 50µm L/S on outer layers and inner layers / stacked, filled microvias

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5 **Summary**

ADVANCED SOLUTION CENTER

Summary

In future, the Advanced Solution Center will offer you

- PCB solutions to your complex, technological products
- Check and handover in our German plants with the support of the technical teams on site - if possible
- competent partners who manufacture these demanding PCBs on our behalf - if not possible at WE
- Management of PCB production
- Fewer contacts for PCB-specific questions

This allows you to

- concentrate on what is essential for you
- benefit fully from the enormous technological know-how at WE

Thank you for your attention!

JÜRGEN WOLF

Head of Advanced Solution Center

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