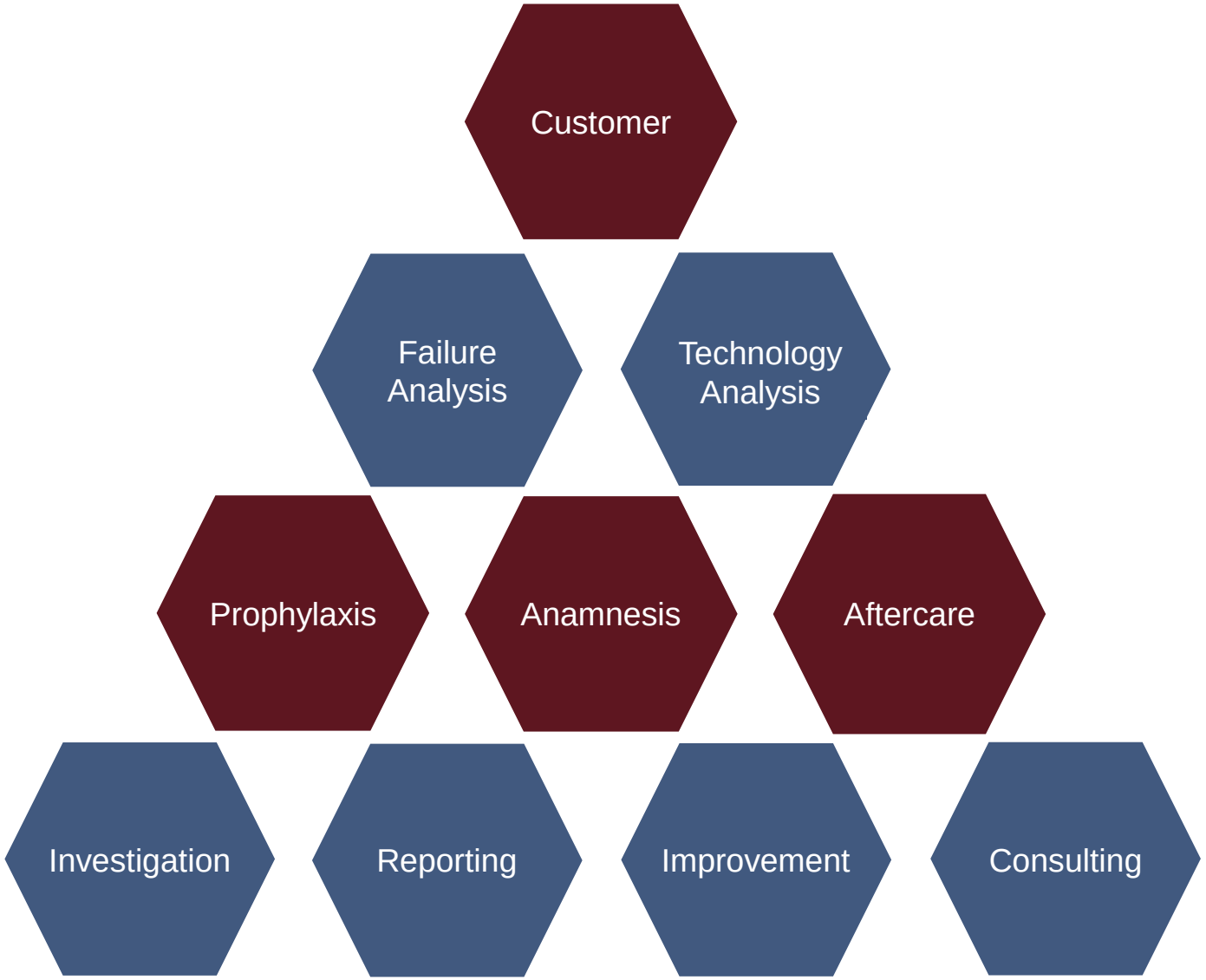
RoodMicrotec

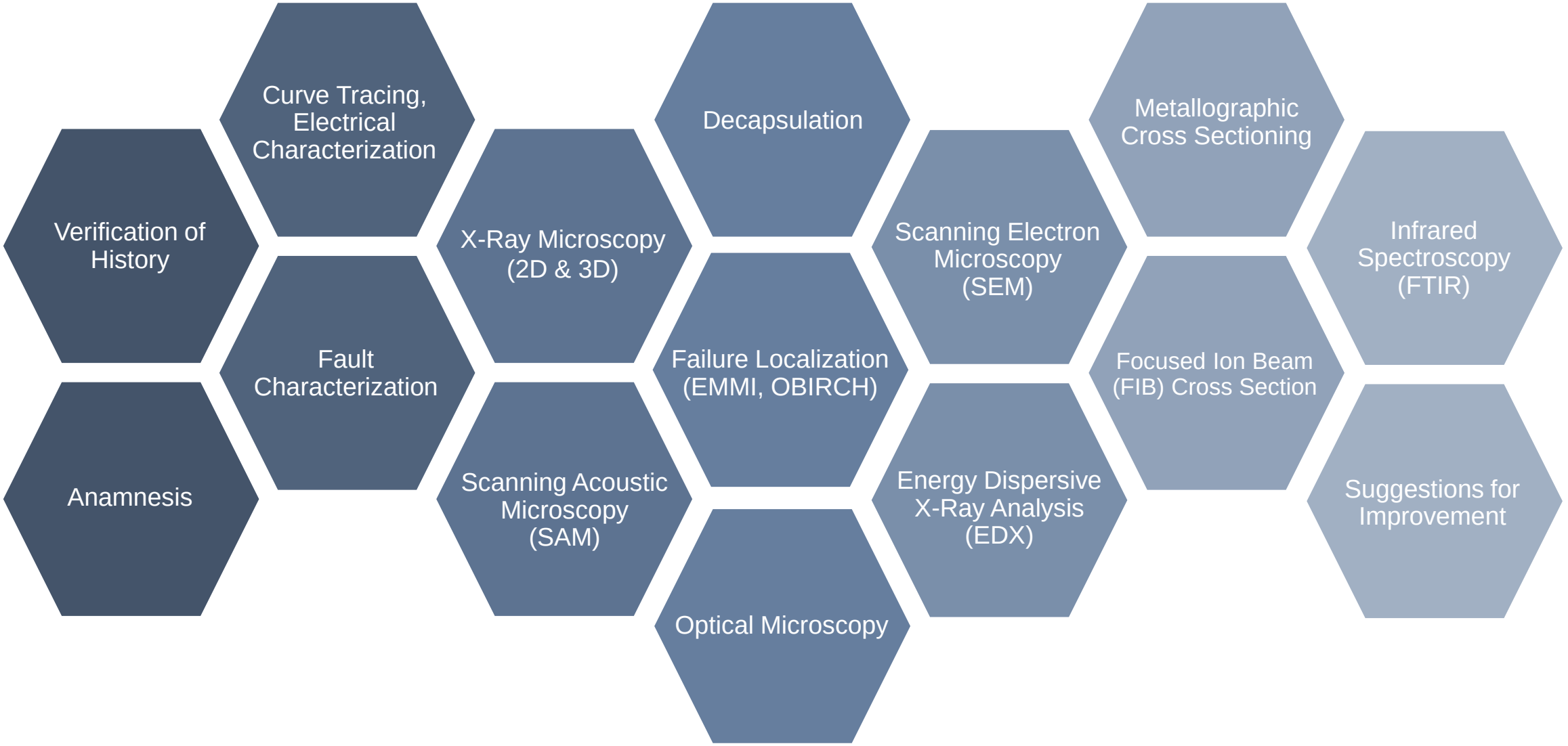
Part of MICROTESTGROUP

Failure and Technology Analysis

Our Mission

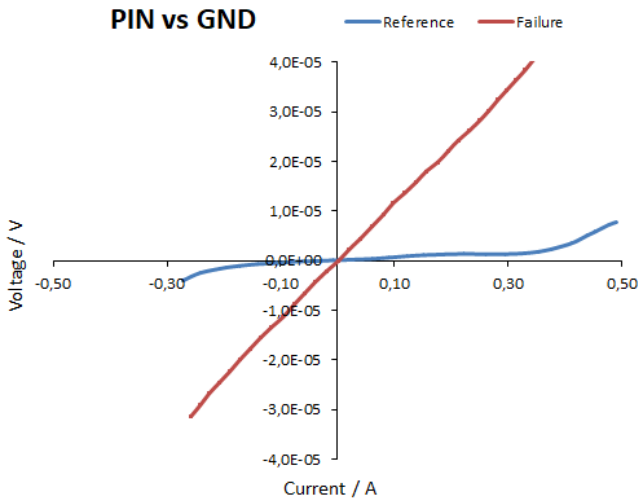

Customer
Failure Analysis
Technology Analysis
Prophylaxis
Anamnesis
Aftercare
Investigation
Reporting
Improvement
Consulting

Failure Analysis



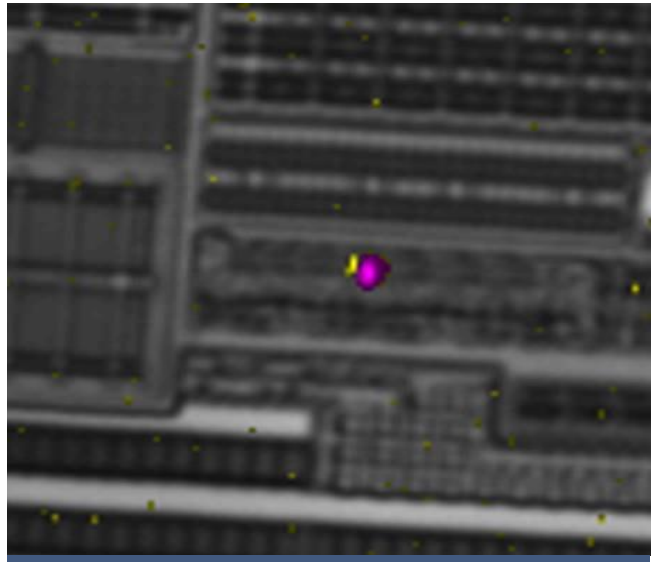
Failure Analysis – Integrated Circuit

1. Electrical Characterization



Curve tracer - Ohmic behaviour (8.7 kΩ)

2. Localization on Die Level



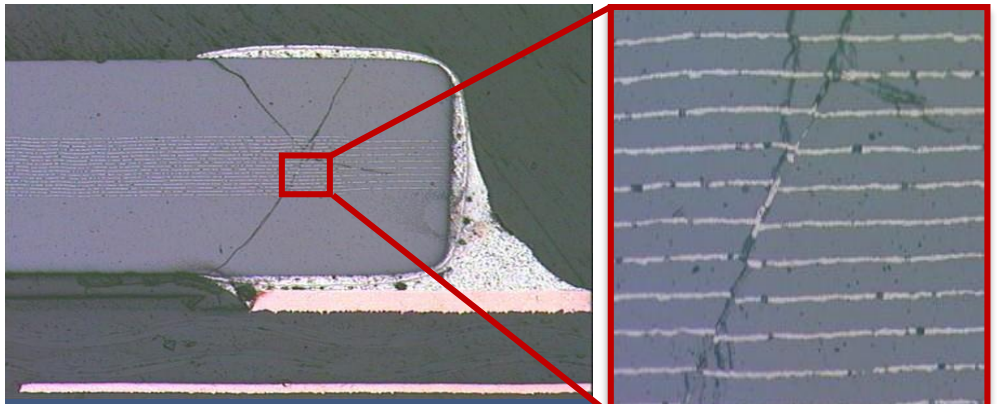
Backside OBIRCH - Signal in digital circuit

3. Physical Determination

SEM bulk silicon inspection
MOSFET gate oxide damage

Root cause: ESD induced gate oxide breakdown

Failure Analysis – Ceramic Capacitor

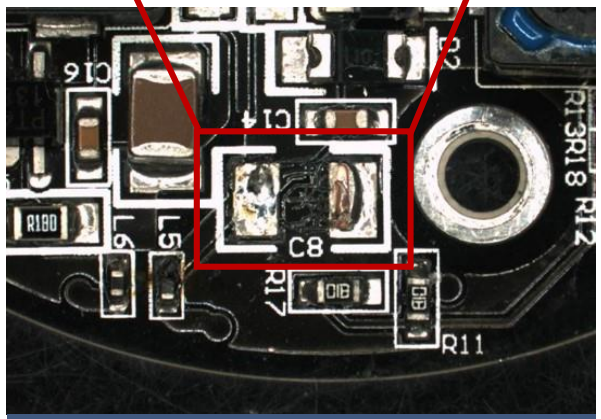


Cross section showing short circuit

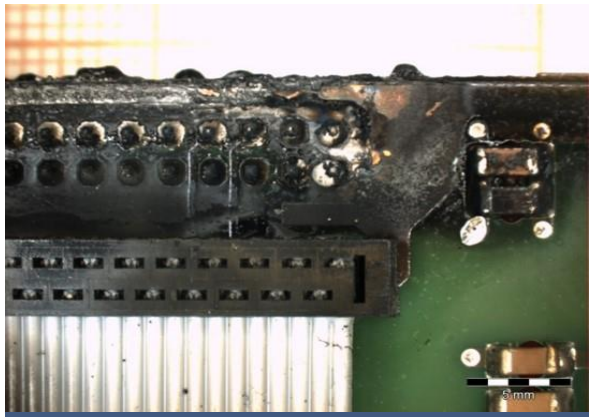
Cracks after removal of metallization

Sources of mechanical overstress:

- Board assembly
- Singulation of a multi panel
- Assembly of components in press-fit technology
- Assembly in the system (e.g. screwed connections)
- Temperature change loads of fully molded printed circuit board assemblies

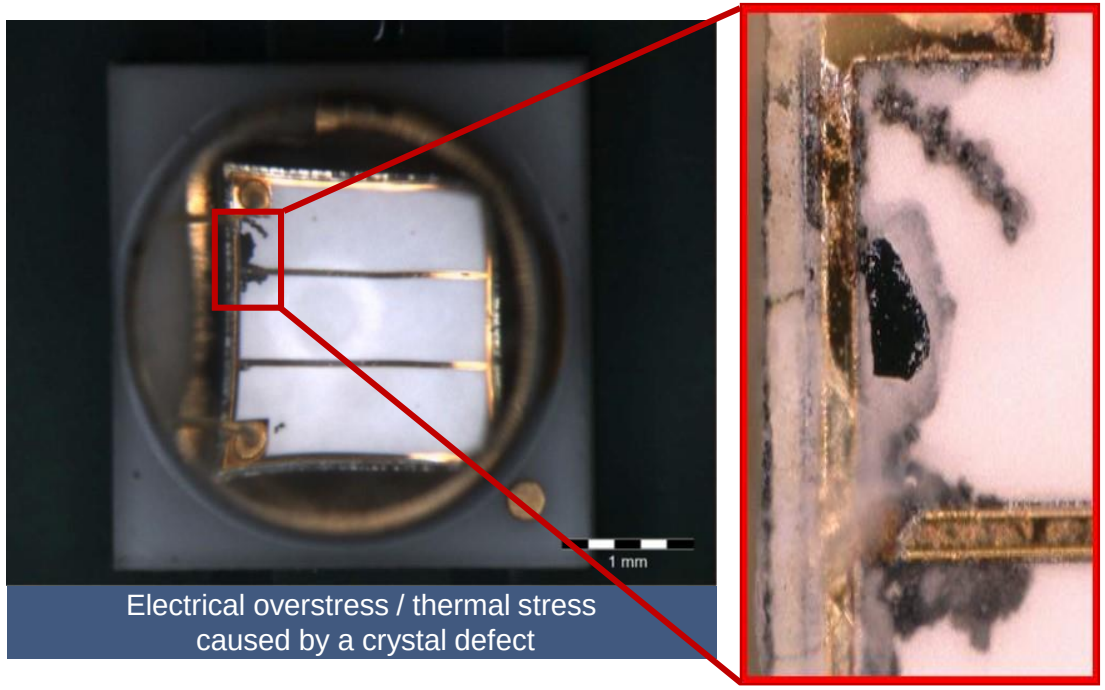


Capacitor desoldered near mounting point

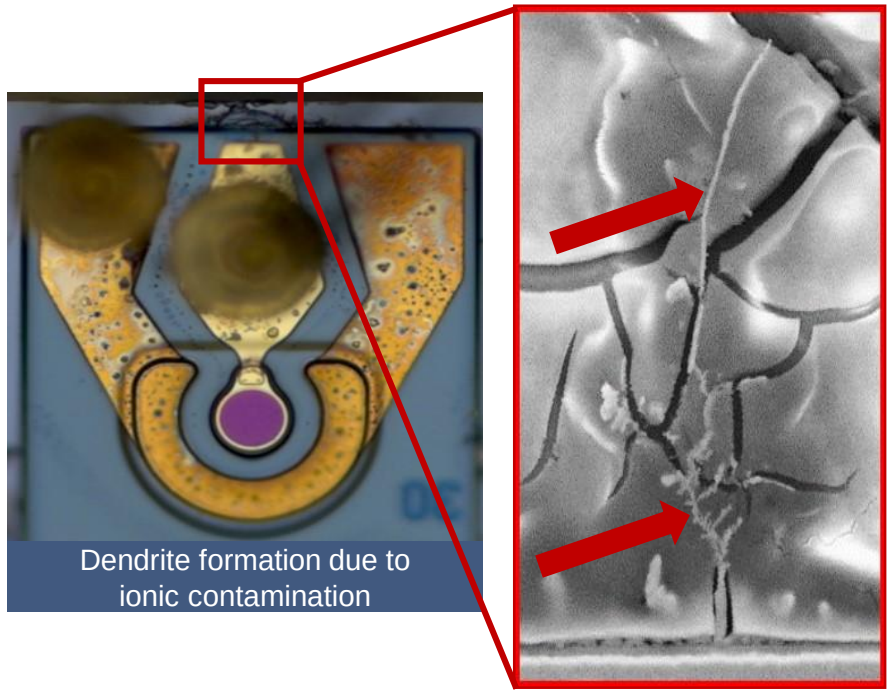


Capacitor near press fit connection

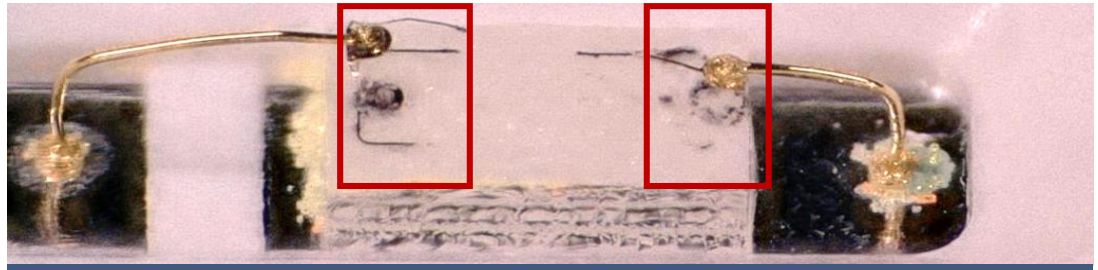
Failure Analysis – LED



Electrical overstress / thermal stress caused by a crystal defect

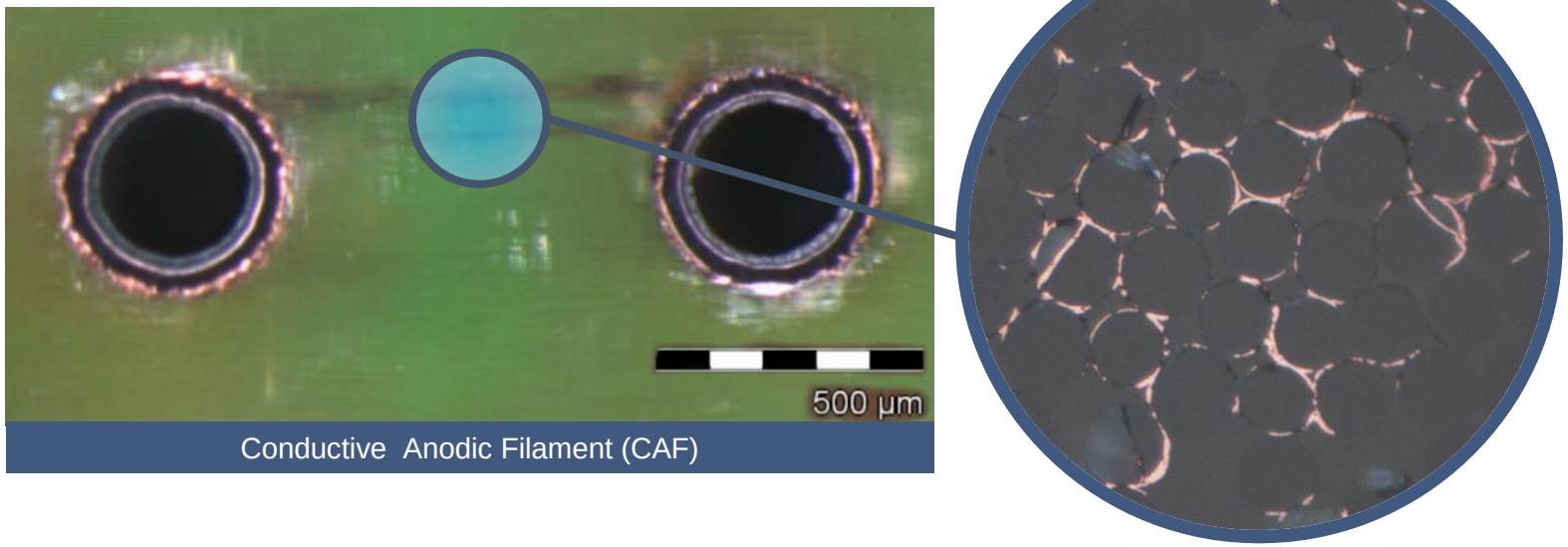


Dendrite formation due to ionic contamination



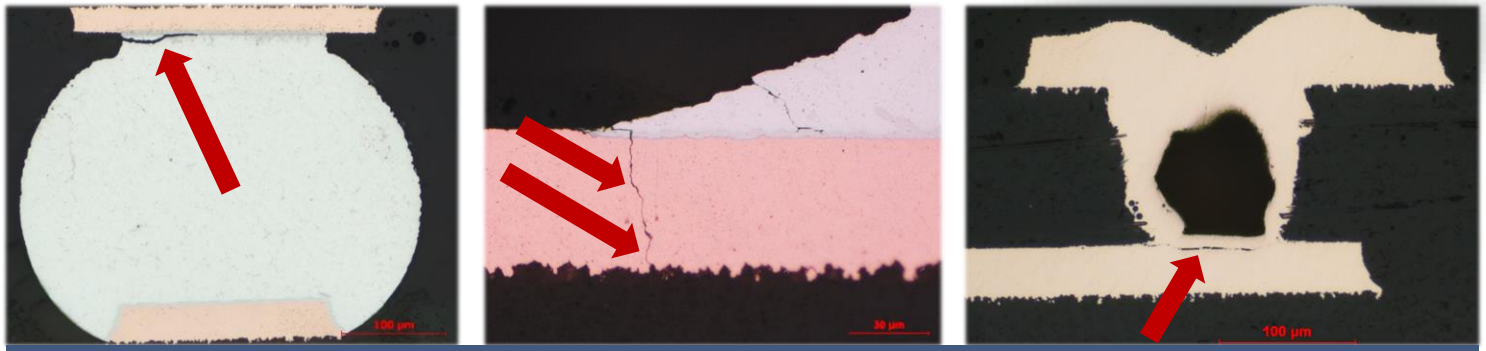
Bond lift-off

Failure Analysis – Printed Circuit Board Assembly (PCBA)



Conductive Anodic Filament (CAF)

Cross section of poor solder joint and the resulting failure (thermal overstress)

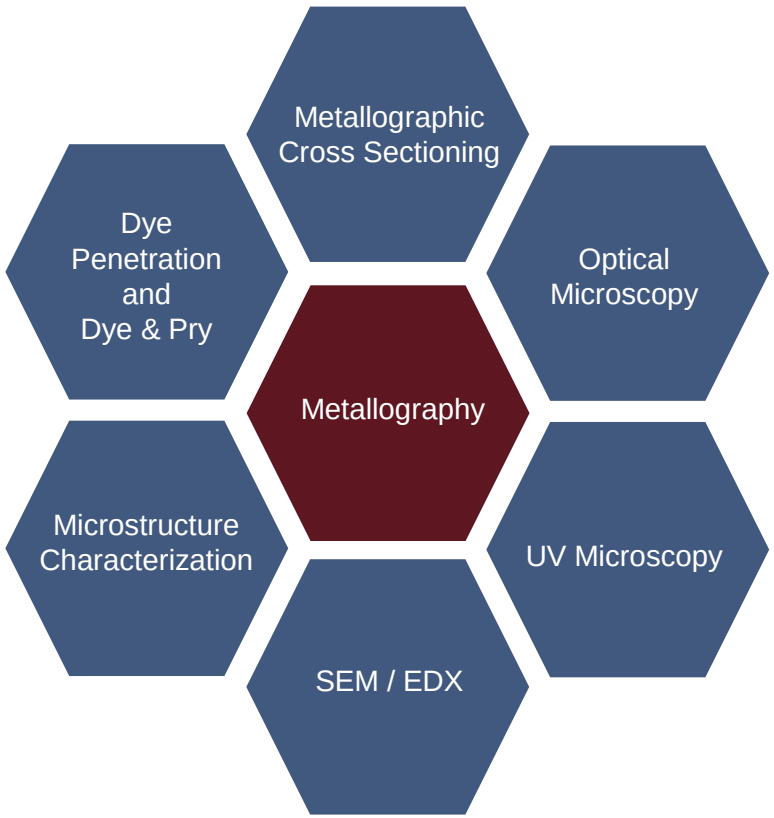


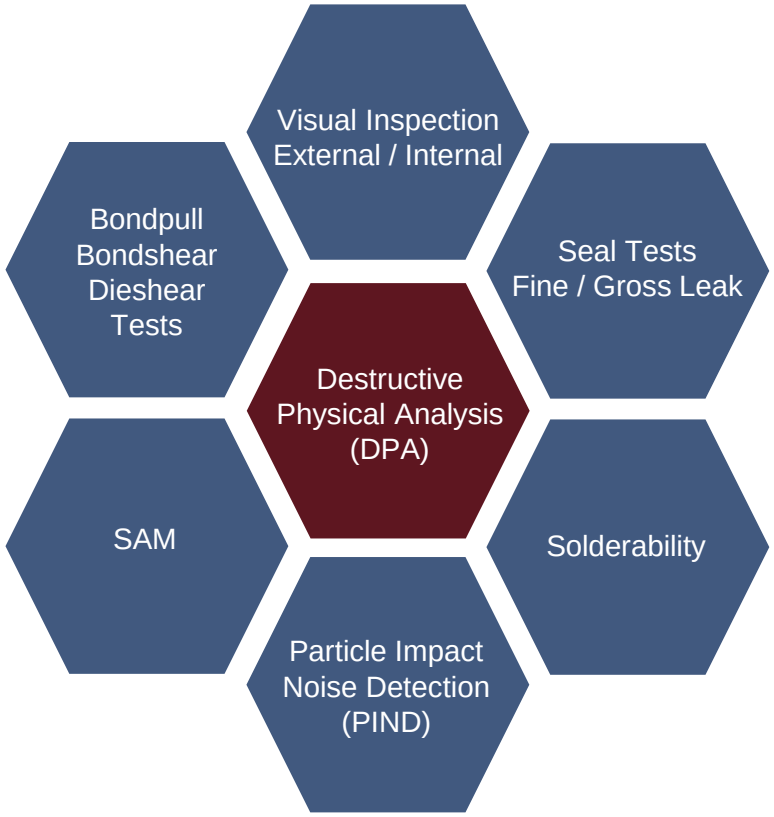
Cracks in solder joints, tracks and microvia

Typical failures on PCBA-Level:

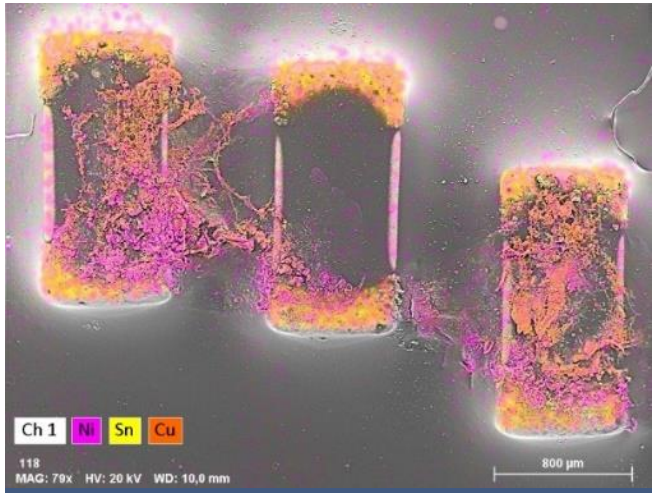
- Whisker growth
- Conductive Anodic Filaments (CAF)
- Delamination
- Dendrite formation
- Material migration
- Insufficient solder joints
- Cracks in solder joints, tracks and vias

Technology Analysis

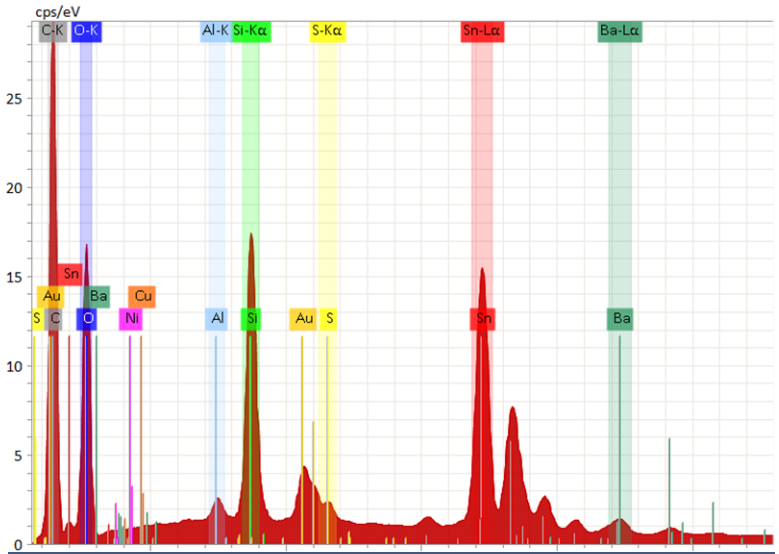




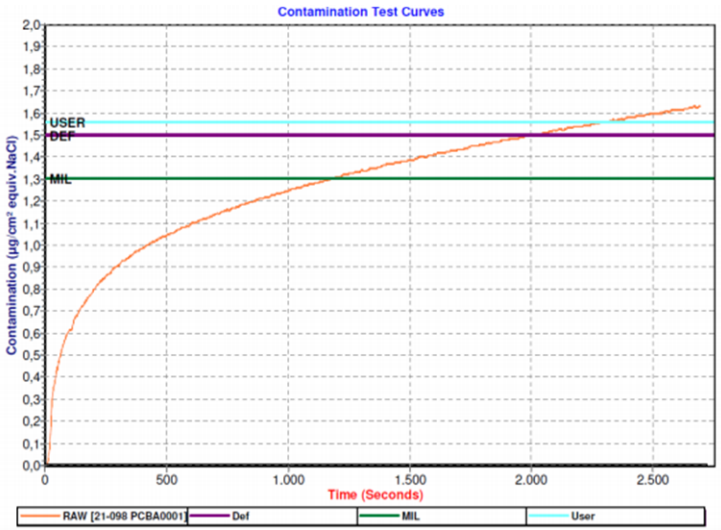
Technology Analysis – Material Analysis



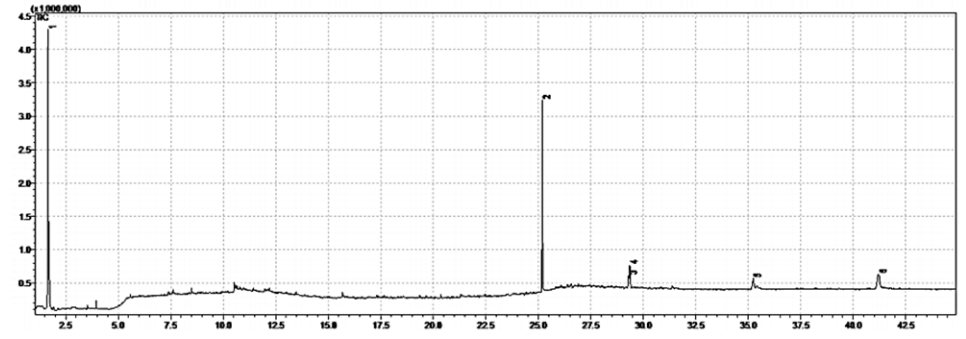
EDX-mapping - migration (copper and nickel)



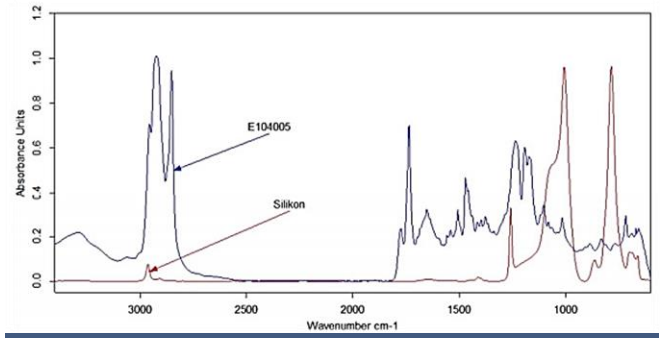
EDX-spectrum of anorganic contamination



Measurement of ionic contamination

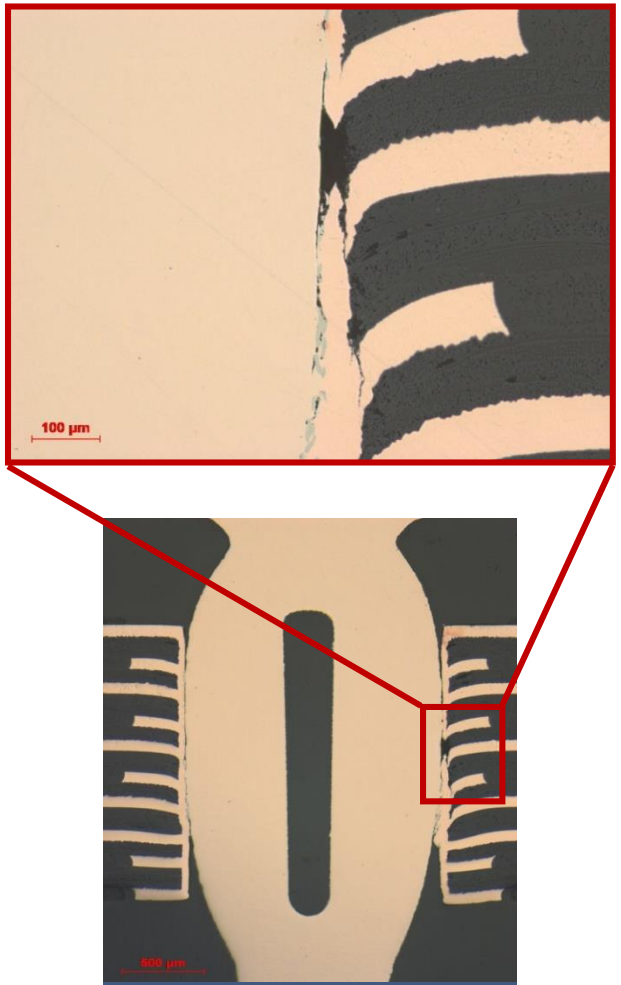


GCMS/TDS-spectrum of organic contamination

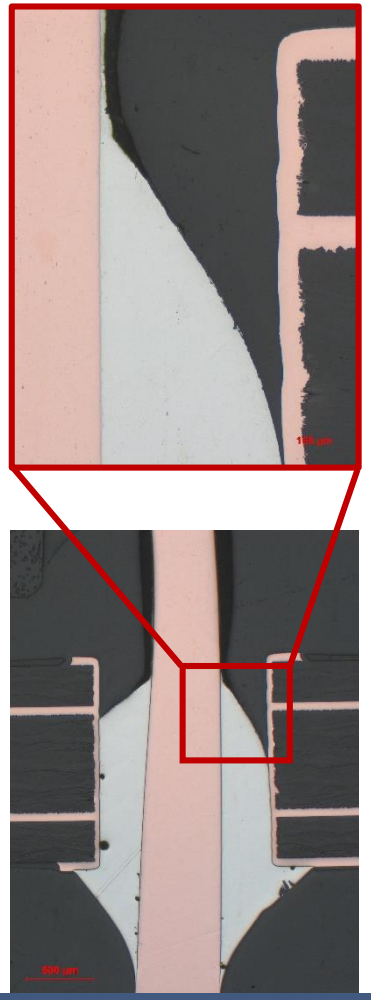


FTIR-spectrum (silicone detection)

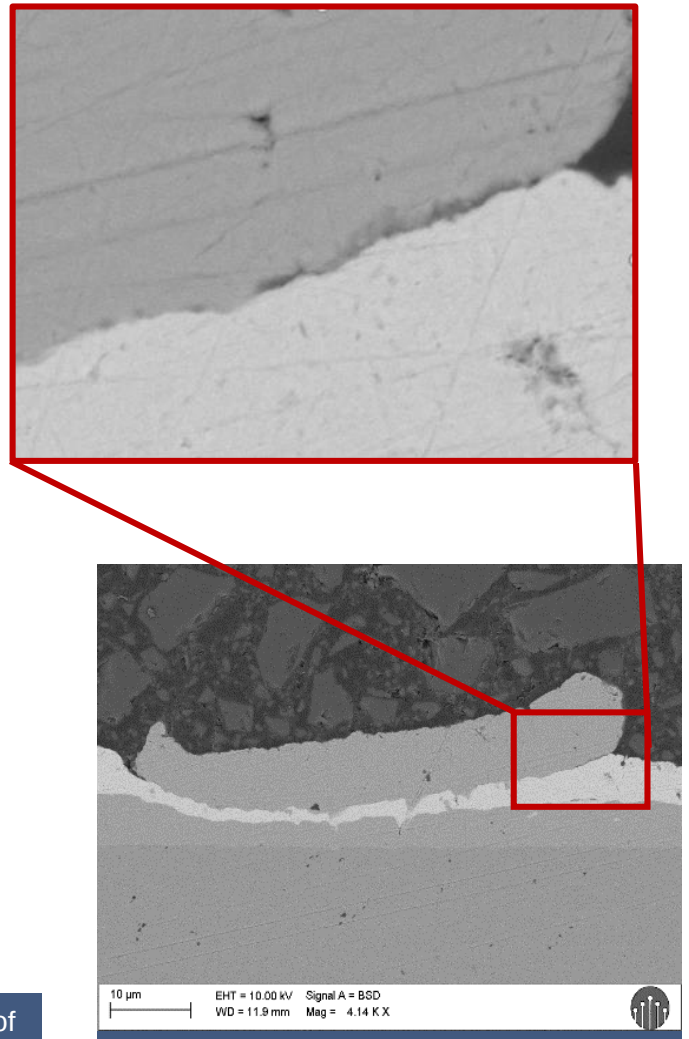
Technology Analysis – Metallography



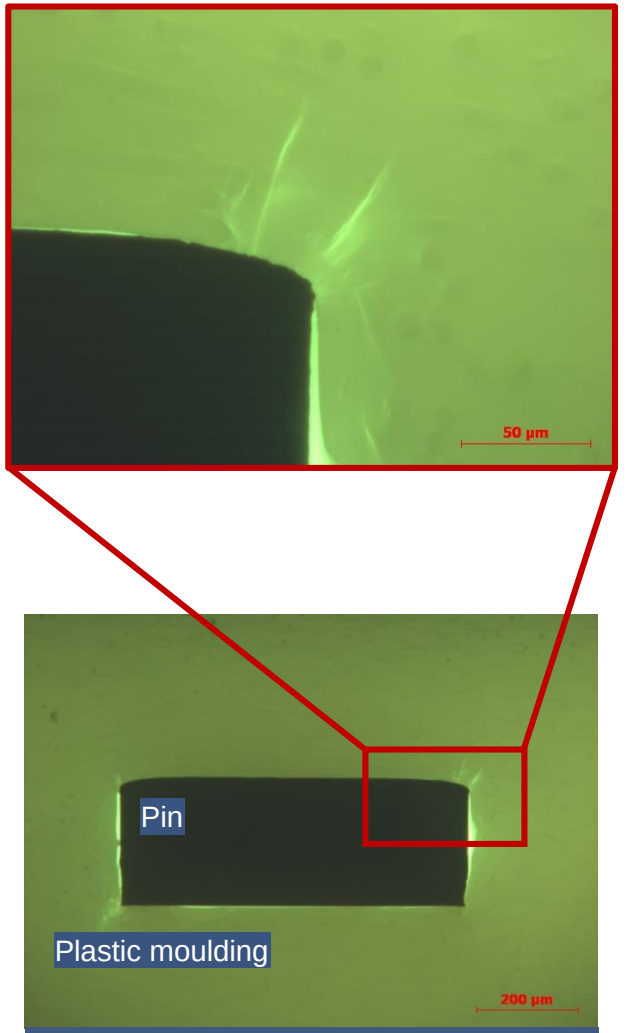
Pressfit pin creating jet effect
Destruction of the via metallization



Cross sectioning and optical microscopy of solder joints
Assessment according to standards

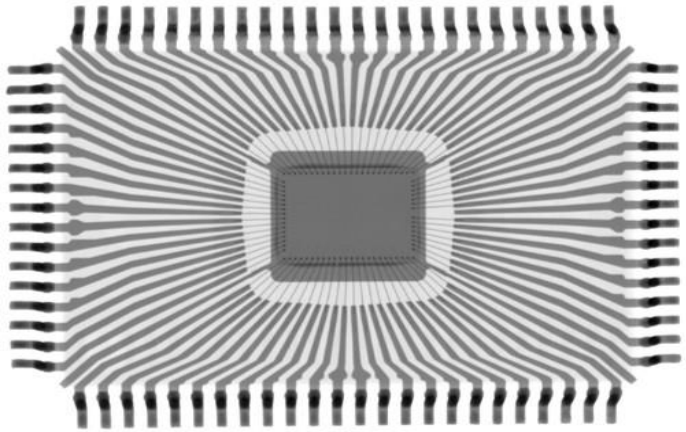


Failed stitch bonding
Disconnectivity of Cu-bond

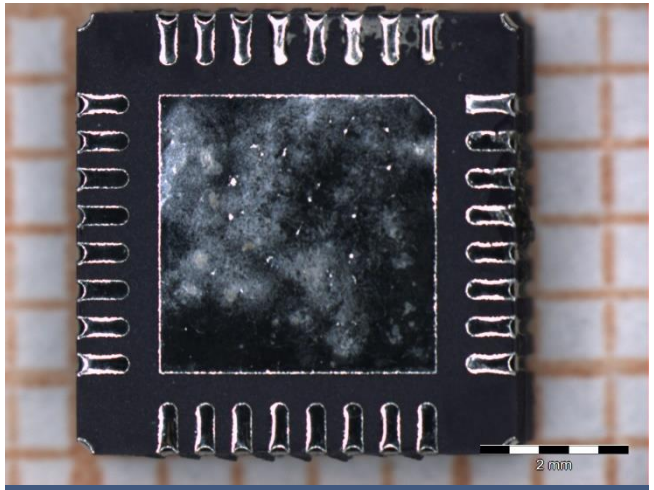


Optical microscopy in UV-light
Detection and analysis of cracks and gaps

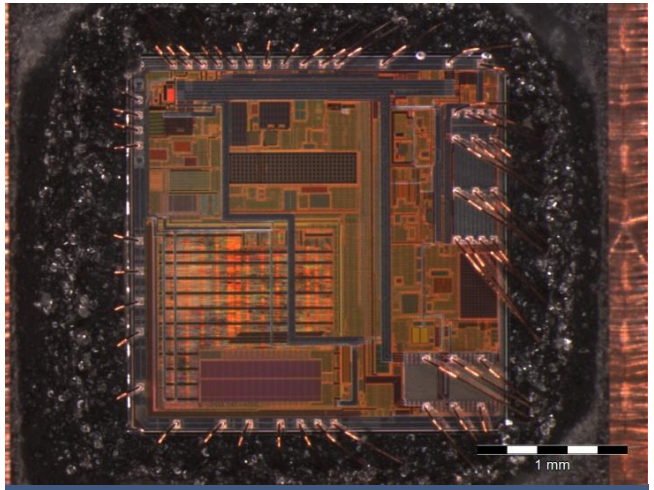
Destructive Physical Analysis (DPA)



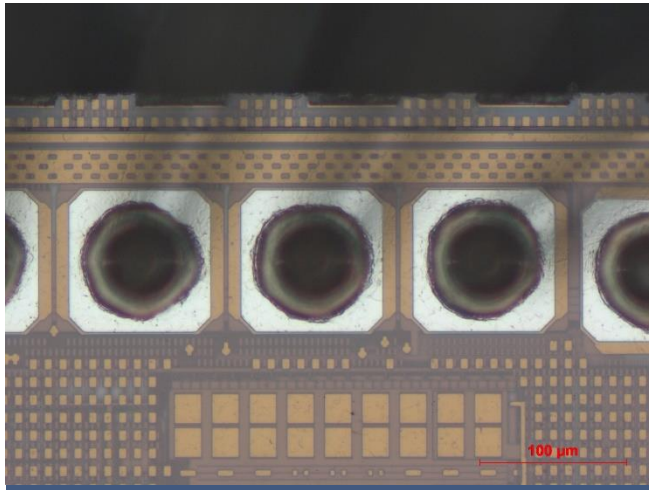
X-ray microscopy



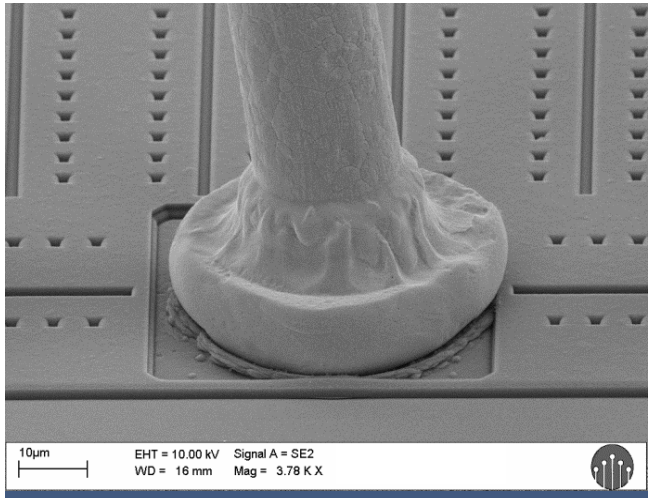
Solderability test



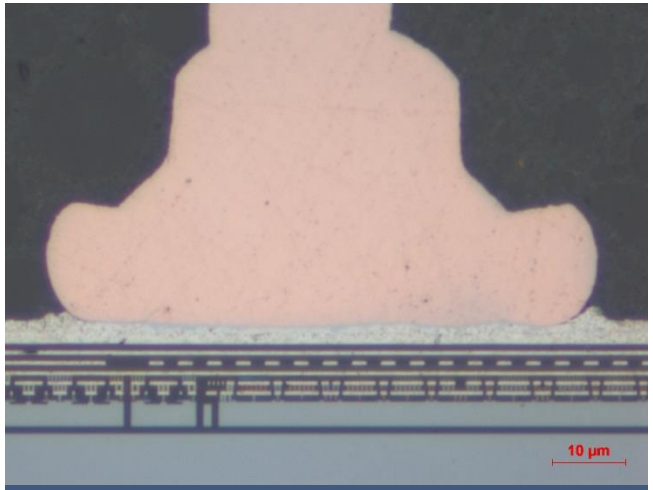
Chemical decapulsation



Internal visual inspection

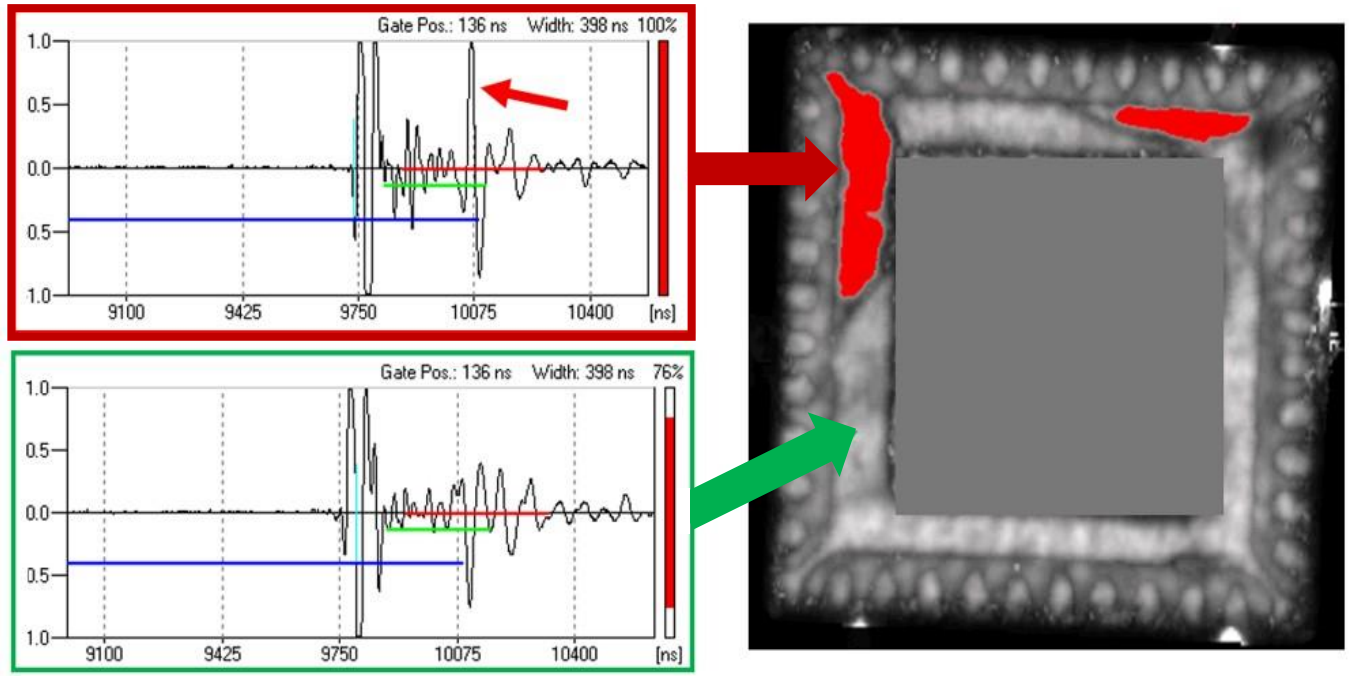


Scanning electron microscopy

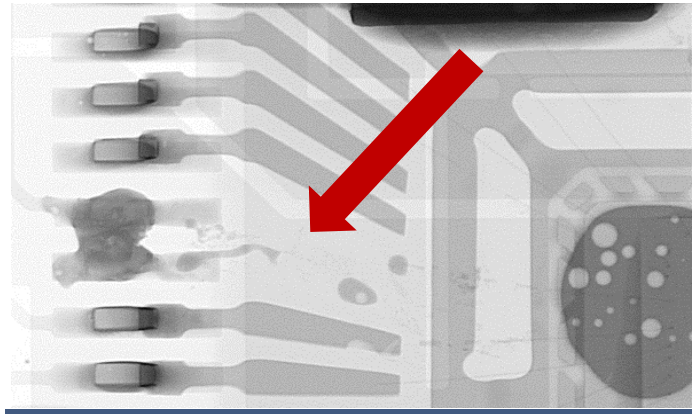


Bond characterization

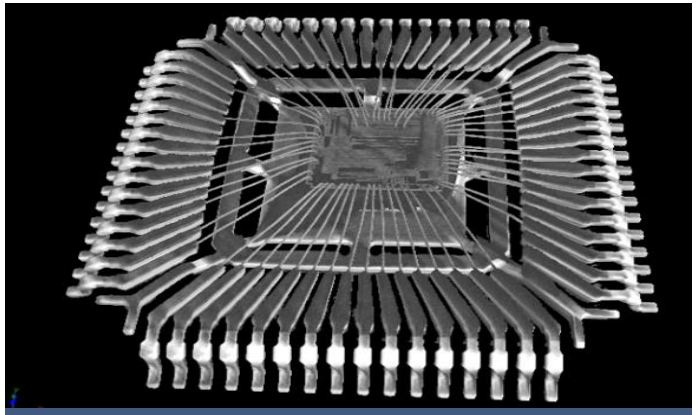
Non-Destructive Examination



Scanning acoustic microscopy (SAM)



X-ray microscopy (2D)

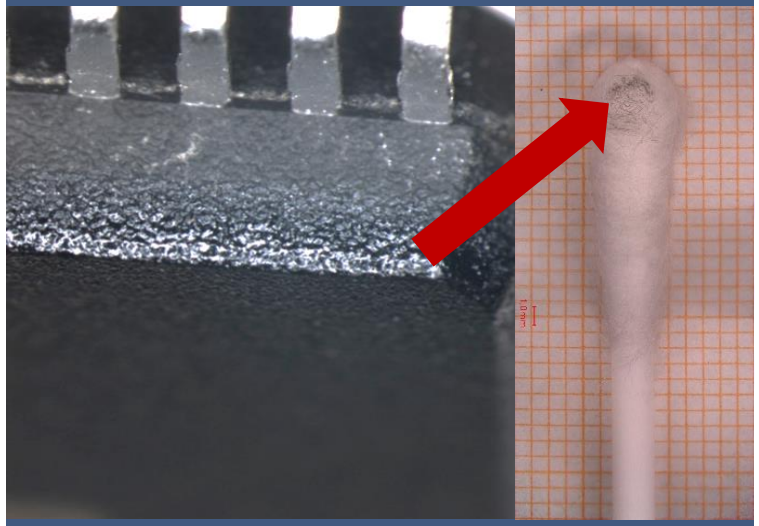


Computed tomography scan (3D)

Examination of test specimens without destruction, enables analyses without direct intervention on potential defect positions

Counterfeit Component Analysis

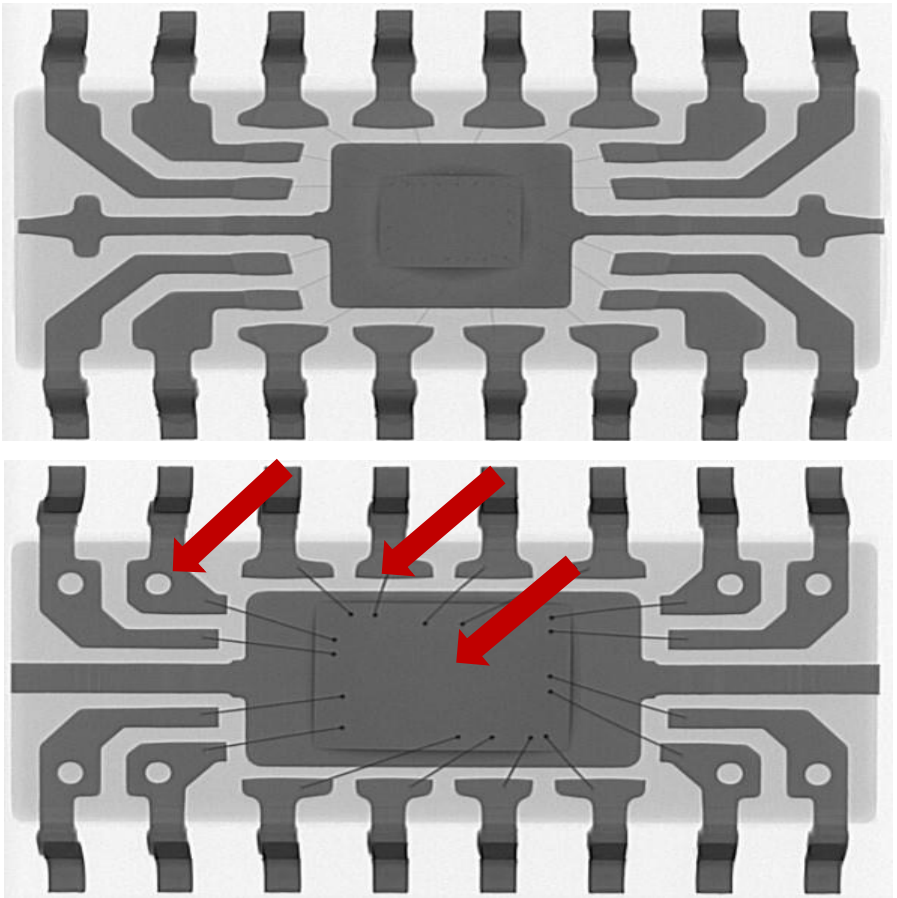
Black coating



Identification of duplicates, reworked or falsely declared goods

Inspection methods:

- Light-optical inspection of the housing and the terminal metallization
- X-ray microscopy to inspect the lead frame and bonding
- Solvent wiping test to identify blacktopping
- Wet chemical exposure of the die



Difference in lead frame, dice shape and bonding

Committed to Quality

Accredited and certified lab according to

The test laboratories are accredited according to DIN EN ISO/IEC 17025:2018 by the accreditation body DAkkS. The accreditation is valid only for the scope listed in the annex of the accreditation certificates D-PL-12120-01-02.

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