



**RoodMicrotec**  
powerful solutions

Engineering

Test/Programming

Supply Chain Service

Qualification

**Failure analysis**

Consultancy

# FAILURE ANALYSIS

## functional/electrical/physical

Reduced costs  
through quality  
assurance



From single  
component  
to production  
process



The root cause of failures that occur during production, field returns and qualification, can be identified by failure analysis. Failures can be eliminated to increase the reliability of your components and products.

**RoodMicrotec** failure analysis of components, modules, PBAs and systems help reduce your spendings for customers' warranty claims.

**RoodMicrotec** acts as an independent assessor for product failures or to confirm existing test results of customers.

Failures often can be localized and allocated to a sub-component by functional tests. But to define the failure mechanism in detail, we additionally perform physical analysis.

- from entire electronic systems down to the various types of single devices
- from highly complex ASIC up to printed circuit boards
- from packaged IC down to wafer level and bare die

**RoodMicrotec** offers longtime experience in interpreting various failure modi and specific know-how about a variety of components used in different electronic markets.

### Functional and electrical failure analysis of components and PBAs

- Verification of system functionality
- Circuit analysis
- Electrical failure analysis of components
- Failure simulation and reproduction
- Electrical and optoelectronic measurements
- Diagnostics
- Compliance tests

### Maximum stress conditions for reliable test results

During the functional or electrical failure analysis we evaluate functionality of PBAs, modules and systems. This is done by constantly increasing and modifying stress conditions to reproduce failures.

**RoodMicrotec** examinations are performed according to ISO/IEC 17025.

**RoodMicrotec** test labs are accredited by DAR (German accreditation body).

**RoodMicrotec** uses state-of-the-art equipment for various components and systems including high frequency and optoelectronic measure systems.

Our stress test equipment:

- Climate and temperature cycle chambers
- Shock and vibration facilities
- Infrared cameras for hot spot analysis
- Mobile data logging unit

### Physical examinations on wafer level

Focused ion beam (FIB) enables micro cross-sectioning and modifications on bare dies. By assessment of layer thickness e.g. quality within production process can be monitored. FIB is used not only in micro and nano production, but especially for failure analysis and verification of chip designs.

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### Reliable quality assurance



DAT-P-025/92-03  
DAT-PL-287/09-00

### Competence through experience

DIN EN ISO/IEC 17025  
DIN EN ISO 9001

#### Physical failure analysis on components and PBAs

- Focused-Ion-Beam (**FIB**) for modification on bare dies
- Non-destructive methods: **X-ray** and scanning acoustic microscopy (**SAM**)
- Light optical and scanning electron microscopy (**SEM**)
- Chemical and mechanical decapsulation of components
- Failure localization by emission microscopy (**EMI**) or liquid crystal thermography
- Reversed processing (dry and wet etching)
- Cross sections on wafer level and packaged device
- Mounting and material analysis
- Solder joint evaluation
- Risk analysis

Subsequent to the failure analysis our customers receive a list of recommended corrective actions followed by a check of effectiveness.

#### Analysis of mounting and interconnection technology

First we validate the PCB layout. In a

second step we perform evaluations of the solder joints and the board construction, material texture and acceptability as well as a metallographic analysis.

#### Additional equipment for physical analysis

- Grinding and polishing systems
- Fine and gross leakage test
- Thermographic analysis
- Ionograph
- Decapsulator
- Solderability test units

#### RoodMicrotec failure analysis for:

- Active components like ICs, transistors, diodes and sensors
- Passive components (R, C, I)
- Optoelectronic components like optical transmission systems, image sensors, LEDs and displays
- Fibre optical components
- Electromechanical devices like relays, engines, PCBs
- Connectors, cables and assembled cables
- PBAs and modules
- Electronic systems and subsystems

#### Reliability by quality assurance

Quality is our key competence. Our services are based on professional measurements including process definition and documentation.

**RoodMicrotec** is an acknowledged service provider in the industry for quality assurance of electronics and optoelectronics.

We stand for certified and independent results in test, qualification and failure analysis and therefore provide reliable technical consulting.

#### Rely on our experience

**RoodMicrotec** performed a large number of successful national and international projects and plays an active role in various standardization committees.

Our mission is to provide our customers with one-stop quality service.

#### Challenge us!

We look forward to your inquiry.