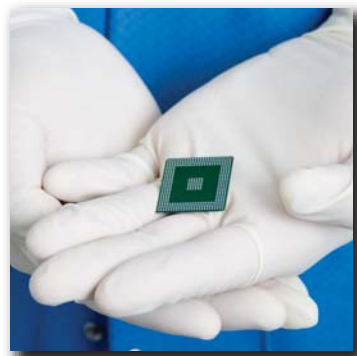


# Best-in-Class Services

## ESD and Latch-Up Services



ESD and Latch-Up testing of electronic components is an expensive part of the design and manufacturing of new products. Increased integration and smaller device geometries increase the risk of device failure due to ESD (Electrostatic Discharge). If those failures happen in the field it will significantly effect customer satisfaction and reliability.

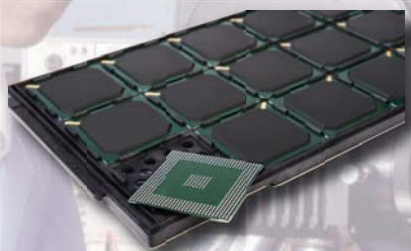
EAG has deep knowledge in providing quality and fast support for your ESD and Latch-Up testing needs.

## Reliability Qualification Services

Reliability qualification demonstrates the fitness of a product for use in the field and helps our clients better understand the fundamental wear-out mechanisms, detect design marginality combined with parameter drift and determine failure rates due to latent manufacturing defects. EAG provides stress based reliability qualification and knowledge based reliability qualification based on industry standards. EAG's experienced Reliability Engineers can create qualification plans and perform testing to meet our client's requirements.



## ATE Services



Whether you want a single product tested or you are considering outsourcing all of your testing services, as a full turn-key solutions provider EAG will meet your requirements.

EAG's professional Development Services are comprehensive and utilize standardized test development modules providing cost effectiveness, efficiency and fast development times. What's more, EAG is committed to giving our clients as much flexibility in their service options as they have in developing your products. EAG offer you a full portfolio of choices, ranging from Test Program Development, Electrical Characterization, Test Limit Evaluation, Test Cost Reductions and Multi-site Conversions.

Whatever solution you choose, you'll receive services closely attuned to your requirements, from a provider known for delivering technical excellence and top-flight value. When it needs to be done right, you can count on ATE Services from Evans Analytical Group.

Visit [www.eaglabs.com](http://www.eaglabs.com) for more information about all of EAG's services and solutions.

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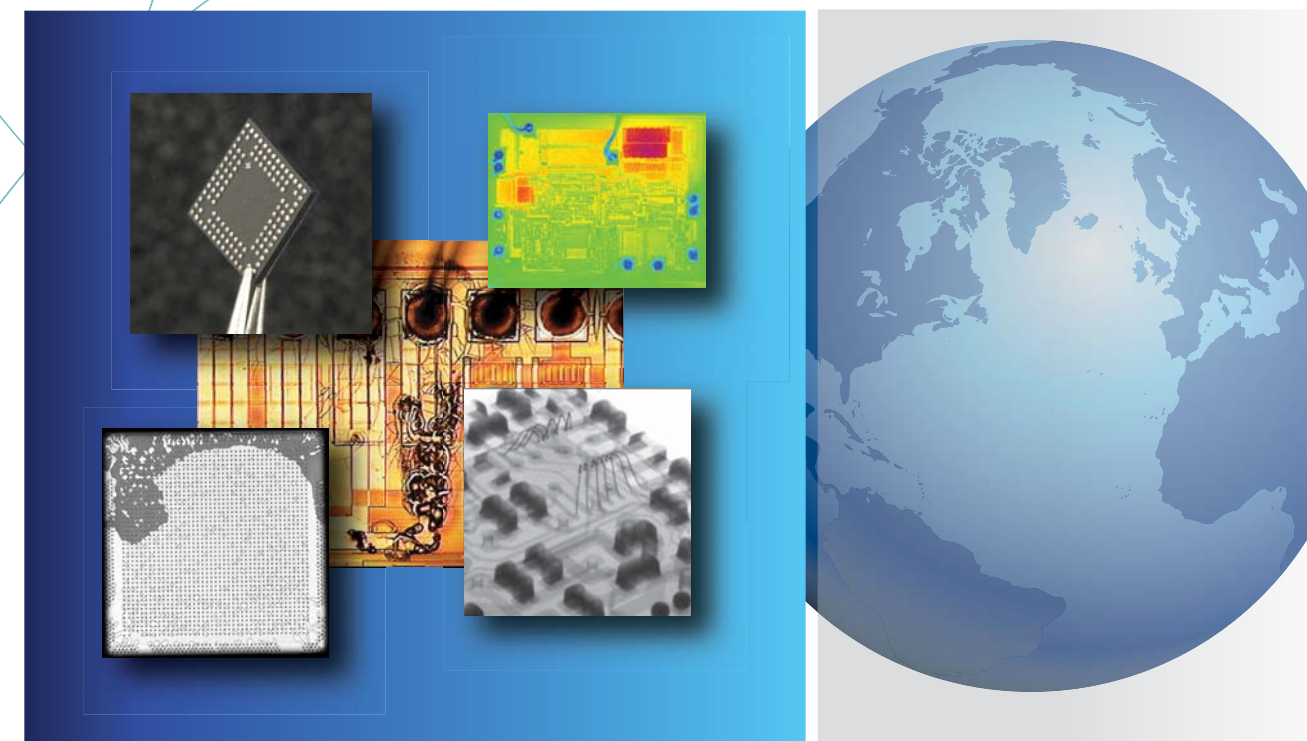
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## Failure Analysis Services

# Failure Analysis Services

Evans Analytical Group® (EAG), is a leading independent provider of integrated testing services and materials characterization. Our services support clients in the development of semiconductor integrated circuits and the development of new materials. With over three decades of supporting clients, EAG is at the forefront of innovation in working with a wide range of newly emerging materials and innovative new products.

## Failure Analysis

EAG provides failure analysis services within the context of our client's commitment to achieve high quality and reliable products at a reasonable cost. Our commitment to achieving this goal has been repeatedly demonstrated in providing testing services that are designed to compliment your internal lab capabilities or to provide full outsourced failure analysis. EAG has optimized service offerings to provide you with the maximum value, fast response, extensive product and system level knowledge, and the widest array of analytical tools. EAG is an integrated laboratory with an unmatched knowledge base that is accessible to all of our clients through our engineering staff. When it needs to be done right, you can count on EAG.

## Failure Analysis Tools and Techniques

EAG builds strong relationships and confidence with our clients and starts with engineer-to-engineer interaction to discuss and understand your goals, objectives and urgency. Beginning with failure verification, EAG has a wide range of tools available for examining the failed device.

### Electrical Analysis

- Fine pitch BGA and high pin count capability
- Curve Trace
- Parametric and functional test
- Device characterization
- Time Domain Reflectometry (TDR)
- Transmission Line Pulse (TLP)

### Package Integrity

- External optical examination
- Scanning Acoustic Microscopy (CSAM)
- Real Time X-ray
- Thermal resistance measurement

### Decapsulation

- Jet etch/chemical
- De-lid
- Oxygen plasma

### Optical Inspection

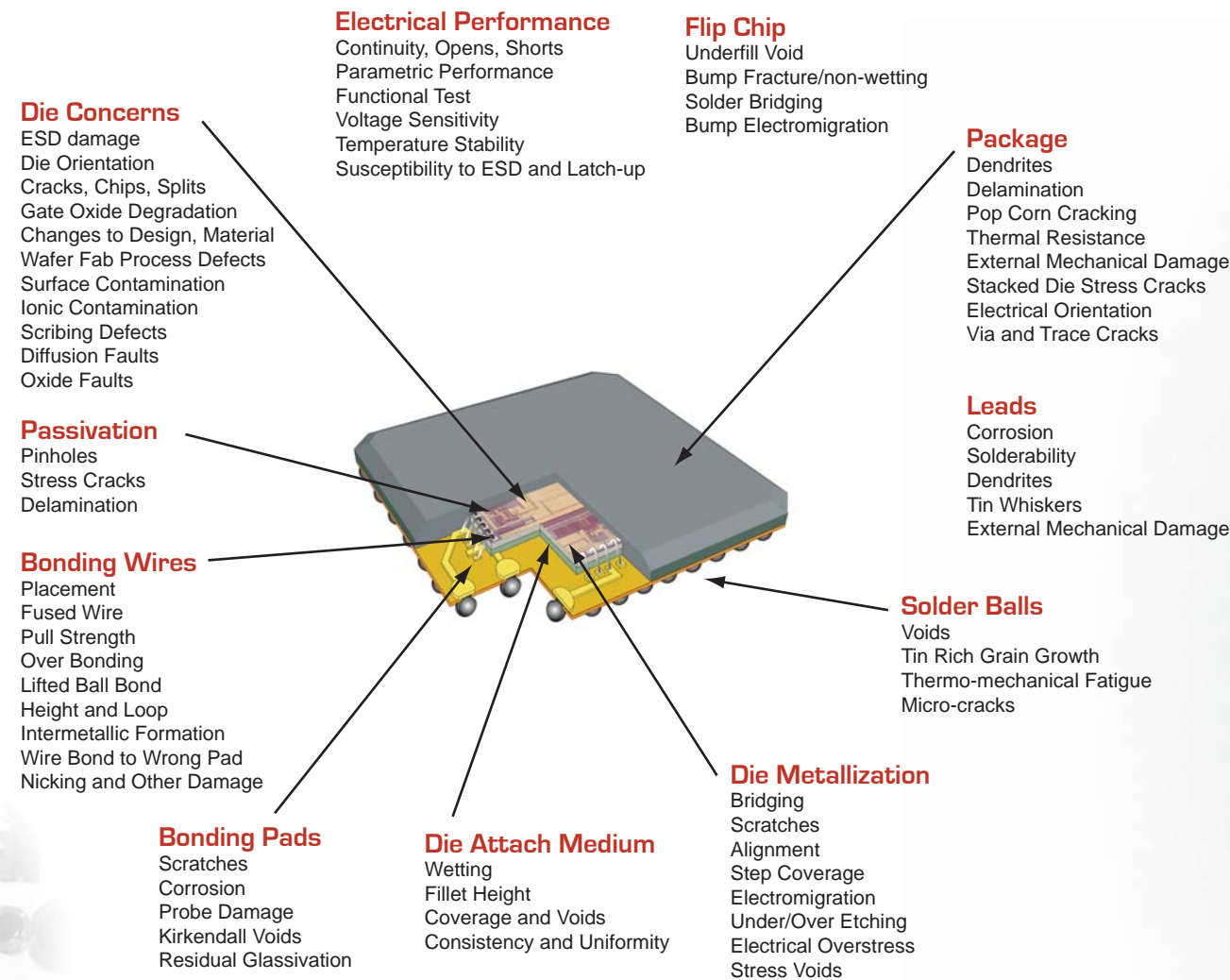
- Bright and dark field
- Nomarski Differential Interference Contrast (DIC)

### Fault Isolation

- Frontside and Backside analysis
- Laser Signal Injection Microscopy (XIVA and OBIRCH)
- Infrared (IR) Thermography - hot spot and temperature mapping
- Light Emission Microscopy (LEM)
- Micro and Picoprobng
- Nanoprobng (AFM based)

### Physical Analysis

- Reactive Ion Etch (RIE) - wet and parallel lap deprocessing
- Scanning Electron Microscopy (SEM) / Energy Dispersive Spectroscopy (EDS)
- Scanning Transmission Electron Microscopy (STEM)
- DualBeam™ Focused Ion Beam (FIB)
- Metallurgical cross sectioning



## Comprehensive Outsourced Failure Analysis Services

EAG understands the challenges, difficulties and the costs of having a leading edge Failure Analysis laboratory. We know our clients are faced with decreasing budgets, increasing device complexity and the need to use the most up to date analysis tools. These are only a few of the reasons why many of our customers rely on EAG as their outsourced provider for failure analysis services. Our engineers are knowledgeable in many of today's leading product technologies and we are experts in failure analysis.

### Levels of Service

The ultimate goal in failure analysis is to arrive at an accurate determination of the cause of failure. EAG has developed a proven process of failure analysis that is efficient but can be customized for the needs of our clients. For all levels of effort, EAG uses advanced tools and techniques coupled with expert interpretation to provide our clients with significant insight into the investigation and product failure.

#### Level 1

A majority of package defects and electrical over stress (EOS) mechanisms can be identified during this fast, comprehensive initial investigation. The scope of the analysis includes electrical failure verification (curve trace, bench testing, TDR, etc), non-destructive package integrity examination (X-ray and CSAM), package decapsulation, and internal visual examination. Results will identify observable failures and can help eliminate other possible causes and sources.

#### Level 2

This stage of the investigation is used to isolate and localize the failure or defect site. Typical fault isolation techniques such as LEM, LSIM, XIVA, and IR help pinpoint the fault to a specific site, circuit, or device on a sample, providing valuable failure information to a design, product, or package engineer. EAG's experienced engineers develop creative ways to mitigate challenges in advanced IC packaging (flip chips, modules, CSP, stacked die, etc.) in order to utilize the most effective FA techniques available.

#### Level 3

Level 3 is a comprehensive analytical evaluation which utilizes the appropriate techniques and is designed to determine the root cause. Defined as a 'full' analysis, our FA experts follow a proven methodology to properly identify and characterize the failure mechanism. Specific analysis is determined by the failure modes, IC construction and previous data collected in earlier investigations.

#### Additional Services

- Single Technique Analysis
- Construction Analysis and Reverse Engineering
- Wire pull and ball shear testing
- System level Analysis
- Technical Consultation
- Materials and Surface Analysis
- Dye and Pry solder joint integrity

Advancing Technology through Leadership in Testing