Failure analysis - a brilliant tool

A component fails. What is the reason? Who is to blame?

Has the component been used in an incorrect manner by the constructor? Has it been mistreated during the mounting process? Has it been misused by the customer or is the problem simply that the manufacturer has delivered a poor component?

It is often important to clear up the reason and responsibility in a quick and reliable way. In this situation you will find failure analysis a brilliant tool.

Efficiency

A professional failure analysis is one of the most effective means to identify the basic physical reasons for a failure in an electronic system. Is it in an ASIC/IC, passive component, a connection, or in an insulation area?

The well established test methods based on environmental exposure and electrical parameter test - combined with statistical tools - are certainly necessary for a general quality evaluation of components. However, when the thorough knowledge about the failure cause is needed, a professional failure analysis is the only effective solution.

DELTA - an advanced analysis laboratory

From the view of the electronics engineer electronic components and structures are black boxes with specified external parameters. In fact such items are extremely complicated chemical and physical structures with failure mechanism, which require experts for identification.

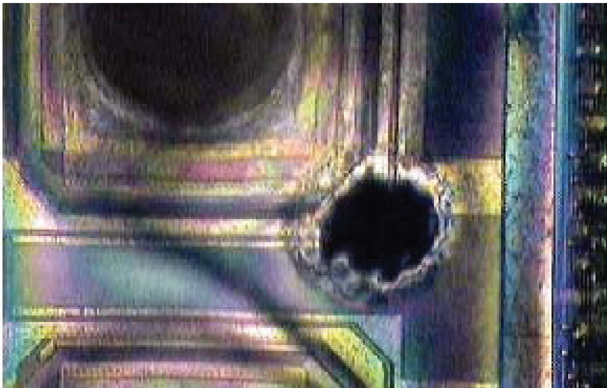
With our many years of experience in test and quality evaluation of components DELTA realises this fact and hereby presents a well equipped analysis laboratory to our customers and a professional team of chemical and electronics specialists.

We are ready to help our customers with

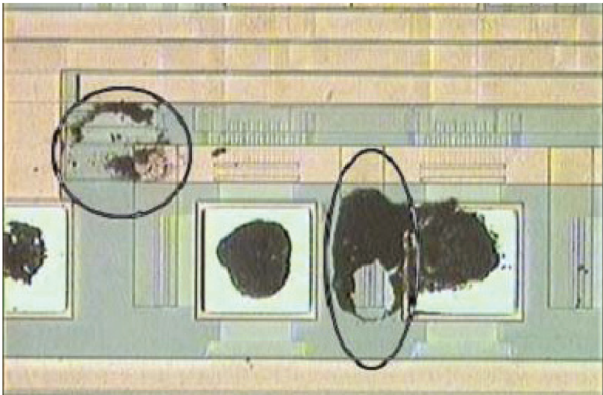
- Failure analysis
- Production problems
- Complaints
- Placement of responsibility
- ASIC/IC - debugging and troubleshooting

Inspection

- Bright field, dark field, differential interference, light sectioning, and stereo microscopy.



Location of degraded protection circuit by use of hot spot analysis.



Removal of encapsulation material reveals carbonised material at two areas associated with data pins. Failure sites are located.

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- Real time X-ray (radiographic analysis), test object sizes from extremely small up to 60 x 90 cm, enlargement up to 100X and 2-5 mm resolution.
- SEM microscopy (Scanning Electron Microscope) 10-100,000X, macro and micromanipulator, resolution 2-5 nm.
- Microsectioning instrumentation for metallurgical and microstructural examination.

Special tests and chemical analysis

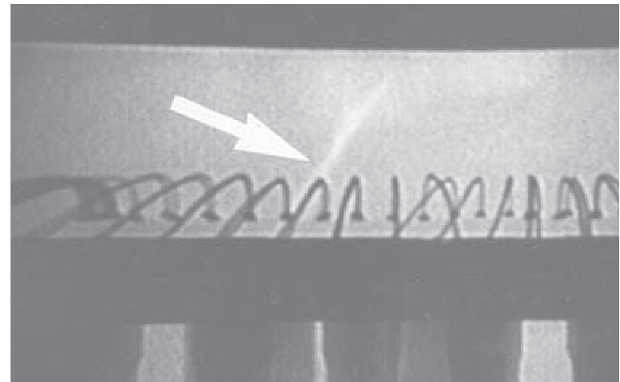
- EDX analysis (Energy Dispersive analysis of X-ray) of low element type for elements down to and including Boron
- Fully equipped chemical laboratory for sample prearation, etc.
- Plasma etching for delamination of ASIC/IC P
- Hot spot analysis
- Voltage contrast analysis
- Sub-micron probe station, 0.2 µm precision across 200 mm, down to 0.6 micron needles
- Flip chip assembly of prototypes
- Wire bonding of prototypes
- Gross and fine leak hermeticity testing
- Solderability tests, "dip and look"
- Complete environmental test facilities including heat, cold, temperature shock, humidity, atmospheric corrosion, mechanical vibration, etc.

A flexible partner in co-operation

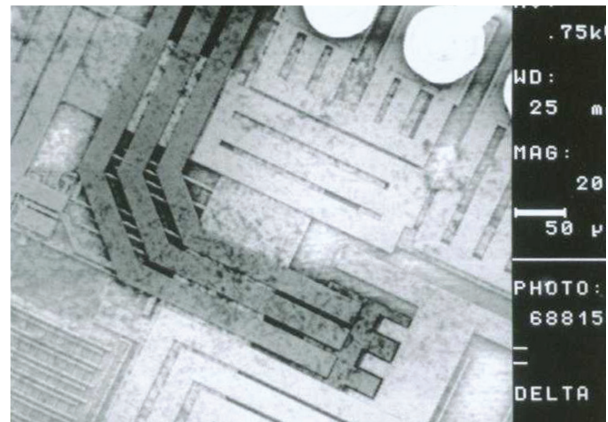
DELTA's team does not only comprise experienced experts. We have many years of experience in co-operating efficiently and in a flexible manner with the customer.

We can make the assignment at a firm offer, an estimation, or rate per hour. We can co-operate with the customer where the test methodology is planned and the results are analysed in common.

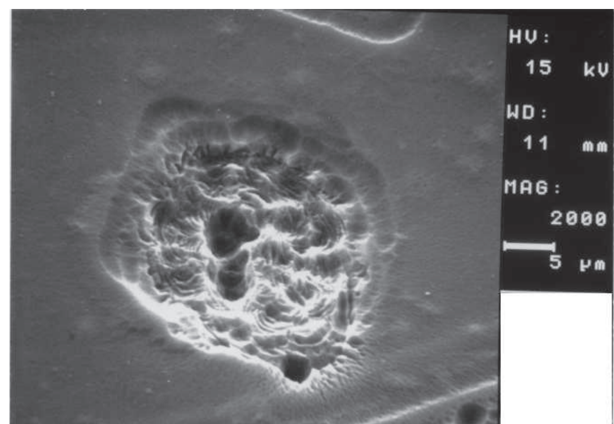
We can perform the tests in accordance with the customer's instructions - and the work can be made at DELTA's test laboratory, at the customer's place, or as a combination of both.



Void and microcrack encapsulation defects detected by non-destructive real time X-ray examination.



Low potential is visualised by voltage contrast. Dark conductor has low potential.



ESD failure on a FET observed by scanning electron micropcopy after deprocess of the die (enlargement is 2000X).

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