

# XACT-810

## Electromigration (EM)

## Test System

### High Performance Electromigration System

#### Key Features

- Perform tests for all types of metallization interconnects
- Oven temperature range: 100°C to 400°C
- Ultra stable and accurate Current Sources:
  - 30uA to 300mA @ 16V
  - 30uA to 150mA @ 40V
  - 100uA to 1A @ 10V
  - 300uA to 3A @ 8V
- Internal stress current monitoring with continuous calibration
- System Diagnostics software to help determine both hardware and DUT position failures
- Maximum capacity:
  - 128 DUTs or
  - 92 DUTs with Extrusion Monitoring
- Automatic Temperature Co-efficient of Resistor, TCR and Joule Heating , JH determination
- Extended data analysis software
- Error calculation on reliability parameters

#### XACT-810 EM Test System Basic Features

The XACT-810 test system is a high performance EM system for evaluation the quality and reliability of all types of interconnects in semiconductor products, under temperature and current stress. This system is an in-situ test system, where the resistance change is monitored continuously with a high measurement resolution.

#### Environmental "ECO-GREEN" Chamber with Burn-In Boards

The newly developed ECO-GREEN chamber is build using high quality insulation material within the chamber to prevent heat lost to the environment. This resulted in energy saved on the air conditioning to cool down the room to obtain optimum room temperature. Besides being environmental friendly, we made sure we do not compromise on the temperature stability and uniformity of the chamber.

The system holds four pieces of the BIBs. The BIB comes with fixed path up to the package pins. For temperature range below 250°C, the multi-layer Polyimide BIB is used and comes with the Zero Insert Force, ZIF sockets. For temperature range above 250°C, the Porcelain On Steel, (POS) BIB is used. The sockets type is used a Ceramic Socket with Spring Contacts.

In order to achieve flexibility of the system, the key-card concept is used for connecting the stress current source to the DUTs. This means the customer can bond his devices to any pins on the package. The system can be easily configured to link to the appropriate connections of the DUTs.



## Stress Current Card

Each Stress Current Card produces 4 separate stress current source and can be programmed individually. The fact that an individual stress current source can be set at different current level makes it possible to determine the electromigration behaviour of different current stresses in one test run. The stress current sources are developed for high stability and low temperature sensitivity. In addition, it do not require yearly calibration as it continuously update itself due to the Close-Loop design.

## High Resolution Measurements

Chiron is the exclusive licensee of a package of five patents granted by IMEC and the Limburg University Centre (LUC). These patents cover the rights to use the methods for accelerated aging of one or more elements with an electromagnetic aging parameter. All the test equipment is designed to do these tests.

The high measurement resolution of the XACT-830 is obtained using intelligent hardware and software solutions, accurate measurement equipment and an outstanding temperature control. The crucial advantages of these high-resolution measurements are;

- early failure detection,
- individual failure detection of via's put in series and
- test time reduction.

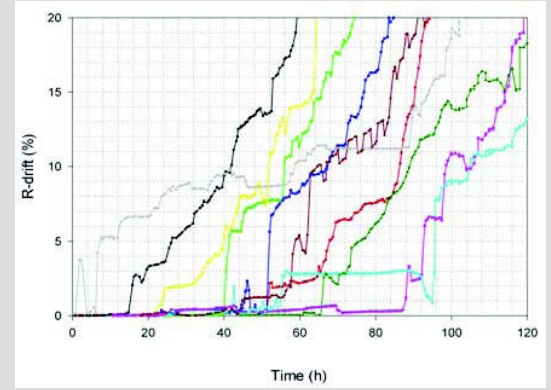
## Data Management and Analysis

The XACT reliability test systems consist of two computers. The slave computer is invisible to the customer but performs the measurement and keeps the raw data. The master computer is a normal desktop and is used to do the test set-up, monitor the status of the test and to perform the data analysis and report. The system can run without the master computer, so when the test is running; this computer can be used for other purposes.

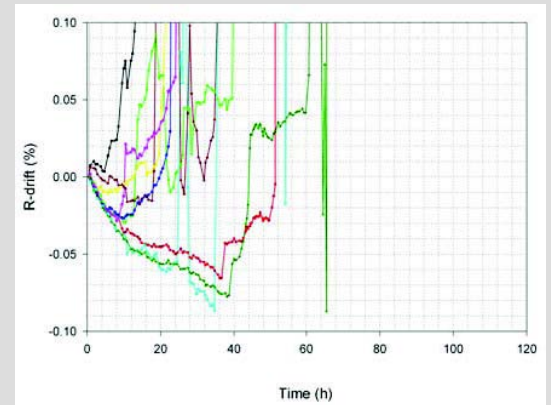
A time/resistance file for each individual interconnection is created and stored together with a time/temperature file for each chamber. These files can be interpreted by our data analysis software which is installed on the master computer that is delivered together with the system.

## Measurement Service and Consultancy

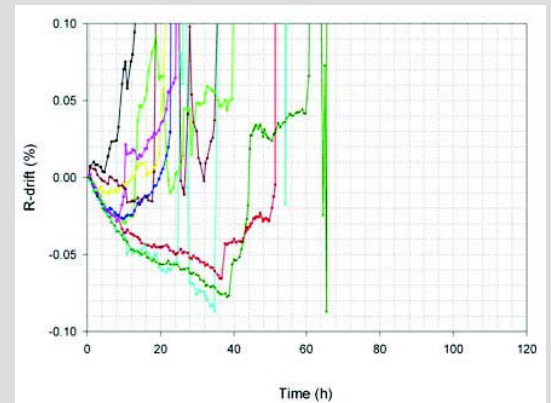
All XACT Reliability Test Systems are available at our sister company, Chiron Semilab Pte Ltd, to perform in-house measurements and to provide consultancy on the specific application of the customer.



Drift curve for EM, Drift vs Time



Drift curve for EM, Drift vs Time-Zoomed illustrate low instruments noise and low thermal noise. Repeatability below 0.05%.



Resistance vs Temperature. Automatically determine R@25°C, TCR and Joule Heating.



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**Reliability & parametric solutions**