

# Electromigration test system



## Electromigration

Electromigration is a process caused by the gradual movement of metal ions in a conductor due to the momentum transfer between conducting electrons and diffusing metal atoms. The result is an undesired material displacement inside the conductor. Material is removed from certain spots (voids) and deposited at other locations (hillocks). Ultimately this leads to a decrease of the conductor cross section (voids) and short circuits (hillocks). The speed of the electromigration process increases with temperature and current flow. The process is self energizing hence any reduction in conductor cross section (voids) will increase the current flow locally leading to even faster electromigration. Ultimately electromigration will lead to a destruction of the conductor and as a direct result to a failure of the chip.

## Electromigration test system

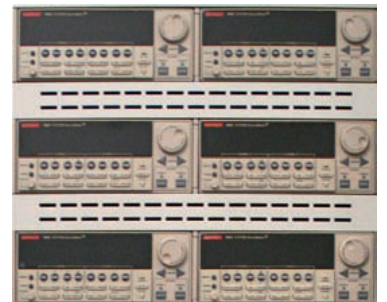
In order to ensure all requirements regarding the reliability of integrated circuits are met it is necessary to verify their susceptibility to the destructive effects of electromigration. To achieve this the process of electromigration needs to be sped up in order to gain statistically relevant results without needing to wait for too long.

The electromigration test system produced by the ATV GmbH uses heating chambers that work at up to 300° putting the devices under a thermal stress. Optionally the tests can be performed directly on the wafer, provided a probe stations with an integrated thermochuck is available. The electrical stress is imposed by high quality current/voltage sources.

To ensure maximum security of investment the system is vastly built up of standard components with an absolute minimum of proprietary hardware solutions. Current Sources and heating chambers can be exchanged separately. The system control software features a intuitive user interface allowing the setup of tests with minimal work.



Electromigration - Rack with PC and Flatpanel



Current source for stressing



Keithley SourceMeter 2602



Keithley Switchframes 3706

## Facts

- ▶ Testing of 40-200 test structures
- ▶ intuitive software user interface
- ▶ complete acquisition of all relevant data during the test
- ▶ customizebale to your needs
- ▶ modular system using components made by KEITHLEY instruments

