IEEE Transactions on Instrumentation and Measurement. Volume:47. Number: 5. Pages: 1187-1190. October 1998

True constant temperature measurement system for lifetime tests of metallic interconnections of IC's

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Abstract— The design and principle of operation of a measurement system for performing reliability tests on integrated circuit metallic interconnections is presented. The instrument is controlled by a personal computer which sets the test conditions (current and temperature) and acquires the data during the entire duration of the lifetime test. Unlike traditional systems designed for this application, an independently controlled microoven is provided for each sample under test. This solution compensates for the effect of the Joule heating of the samples which is not constant during the test and slightly different from one sample to another. This approach will allow, probably for the first time, such tests to be performed under ideal conditions of constant current and temperature for all the samples.

Index Terms— Electromigration, metallization, microcomputers, reliability testing, temperature control.

Citation:
Ciofi, C.; Giannetti, R.; Neri, B. "True constant temperature measurement system for lifetime tests of metallic interconnections of IC's", IEEE Transactions on Instrumentation and Measurement, vol.47, no.5, pp.1187-1190. October, 1998.