RELIABILITY ASSESSMENT OF COMPRESSION CONTACTS FOR SOCKETABLE COMPONENTS

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Abstract: A feasibility study was performed to assess the reliability performance of a CPU packaging technology with a potential new compression socket technology. The feasibility study was based on a newly adopted mechanistic based methodology at Intel, called the Use Condition Methodology, for performing reliability evaluations.

In this study, the effects of the electronic package interconnect land gold thickness on the behavior of contact resistances through non-cyclic temperature & humidity and fretting motion are detailed. The initial assessment of field use conditions requirements for temperature, humidity, and fretting are described. Mechanical and Failure Rate modeling results are used to aid in assessing the possible fail mechanisms and to help identify possible solutions for these fail mechanisms. Accelerated testing data was then collected at multiple stress conditions: bake, temperature & humidity, and Highly Accelerated Stress Testing (HAST) to identify acceleration factors for temperature and humidity effects. Fretting evaluations were also performed to assess the performance and to estimate the life of the technology. A risk assessment is given on the feasibility of this type of technology for a specific computing environment using the Use Condition Methodology. Finally, the results of the feasibility assessment are compared and contrasted to the standards based methodology that was used at Intel for CPU package and associated enabling evaluations (where enabling includes items such as sockets and thermal solutions).