



DTIP Panel : Design for Reliability and Test of Microsystems

www.patent-dfmm.org & www.nexus-mems.com

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May-06

«Design for Micro & Nano Manufacture (NoE PATENT-DfMM)»
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Reliability & Test Workshop

DTIP Panel – Reliability & Test, Stress , April 2006

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- Advances in DfM (especially DfR) support in EDA tools
- New initiatives – eg. NEXUS MWG, MEMUNITY, Nova MEMS addressing Reliability & Test in MEMS
- One product, one process no longer true, efforts to build reliability and stability into key product and technology families becoming feasible
- How do we test low cost MEMS with deposited mono-layers that have to work and would be destroyed by testing?? Test before reliability analysis
- Can we obtain reliability and quality from low yield processes at reasonable cost??
- Need a tool to attach reliability numbers to a product
- Redundancy for test / self-repair??
- Need to understand "real" acceleration factors for MEMS
- Structural Testing for MEMS?? Follow microelectronics?

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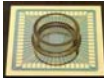


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- Nexus – New management (Sean Neylon – Colybris), new base – CSEM, MWG in Reliability & Test launched
- Strong links between NEXUS and MIG – within MIG
 - General view that MEMS is a mature technology
 - Emphasis on Reliability, test, integration, materials and packaging
 - Interest in more cooperation with Europe through NEXUS and others
- PATENT-DfMM : Key activities in DfT & DfR 2005
 - Electrical only Testing of MEMS
 - Characterisation & modelling of package – adhesive – device interactions (test structures and microphone)
 - Data-base of failure modes, packaging material properties, DfT solutions, characterisation and reliability analysis techniques
 - Test activities in Bio-MEMS and resonant structures

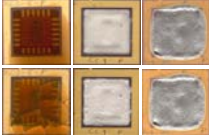
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- BioDROP: Addresses Health Monitoring, Test & Reliability in drug discovery and synthesis platforms
 - MESA+, ULAN, QinetiQ, CCLRC, LIRMM, Pepscan, MultiSynTech,

- Reliability Cluster : activities in accelerated ageing (RELMETH), Vibration & shock in harsh environments (VIBSHOCK) and humidity / hermeticity monitoring (HERMETICITY)
 - Tyndall, IXL, IEF, LAAS, LIRMM, QinetiQ,
 - BUTE, IMT, POLIMI, CEA-LETI, ULAN



- HUMS (Health and Usage Monitoring MicroSystems)
 - HWU, ULAN, LIRMM, BUTE, ISLI, BCF Designs

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Future Challenges

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- Testing Bio-MEMS – How do we verify the integrity of bio-chemical films together with MEMS and system infrastructure
- Cost acceptable MEMS test without the need for fluid, pressure, motion injection
- What are the ageing mechanisms, do we need to model failure modes or failure effects? How do we implement efficient FMEA
- Stacked & High complexity Systems – Health Monitor?? Extensive built-in test or statistical testing??
- Self-Repair, Design for Robustness

