

MEMS and Reliability

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Abstract

MEMS technology could possibly enable in the next 10-15 years various space mission applications – a driver in future MEMS development; the microsystem is a „smart“ sensor, also able to actuate. The number of microscale sensors in our environment is set to increase. The fabrication techniques are essentially two dimensional while the third dimension is created by layering. MEMS components by their very nature have different and unique failure mechanisms than their macroscopic counterparts. In MEMS, there are several failure mechanisms that have been found to be the primary sources of failure within devices. In comparison to electronic circuits, these failure mechanisms are neither well understood nor easy to accelerate for life testing. This paper is intended to inform the non-MEMS technologists, researchers and decision makers about some not yet solved problems.

Keywords: MEMS, NEMS, reliability, failure modes and mechanisms, packaging, CNT-FETs, RF-MEMS.