

Failure Risks for Silicon and Non-Silicon Transistors

Marius BĂZU, Titu-Marius I. BĂJENESCU

National Institute for R&D in Microtechnology – IMT-Bucharest, Romania; C.F.C., La Conversion,
Switzerland
marius.bazu@imt.ro, tmbajenesco@bluewin.ch

Abstract

The transistors could be manufactured by two basic technologies: bipolar and MOS, respectively. Also, the basic material for transistors could be silicon (still, the most used at world level) or other materials (gallium arsenide, indium phosphide, silicon carbide, etc.). In order to cover all the possibilities, in this paper, four families of transistors will be analyzed: bipolar silicon / nonsilicon transistors and MOS silicon / non-silicon transistors. In each case, first, a short description of the design and characteristics is supplied, and the main applications are described. Then, the typical failure mechanisms are detailed, the main factors that influence the failure risks are identified and some methods for diminishing their action are proposed.

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