The Challenge of Reliability in Future Complex Systems

Andrea Cuomo
Executive Vice President, Chief Strategy and System Technology Officer
STMicroelectronics
Andrea.Cuomo@st.com

Extended Abstract

The proliferation of new terminals represents a major growth factor for the semiconductor industry. Multimedia mobile phones, game consoles, digital TV sets combine previously separated products and functions into a single box, often built around a single chip.

This convergence of devices that integrate storage, security, multimedia, mobility, connectivity and computing on the same piece of silicon represents an enormous growth opportunity for the global semiconductor industry and is focused on consumer architectures.

In this scenario, the reliability of semiconductor devices represents a key issue, where the driving factors are the increasing miniaturization of process lithography, the mechanical shocks to which handheld terminals are subject, the usage of new materials due also to environmental regulations, the shorter time-to-market and the demand for low-cost components.

New issues come from the advent nanometric devices: defect and fault tolerance -at the physical, circuit and most importantly at the system level- is an enabling technology for building reliable nanoelectronic systems. Semiconductor manufacturers are responding to these challenges by introducing a variety of technical innovations, including new manufacture testing methodologies, virtual testing, prediction models, CAD targeting defect, fault-tolerant nanoelectronic architectures.