Evaluation of risks due to thermal stress before physical failure appearance

Avoiding failures due to thermal stress is an important part of the development and qualification procedure of new electronic components. Speeding up the development, thus reducing the time-to-market, needs a deep insight in the failure sources. However, currently used technologies for failure analysis are only operational in post-mortem condition, like detection of delaminations by SAM or analysis of BGA ball ruptures by X-ray imaging. In the present talk, we introduce TDM, Topography and Deformation Measurement, as a new technology for failure anticipation before the failure physically occurs. TDM, combining a powerful optical 3D topography measurement set-up with a unique heat control system, allows to visualize 3D deformations of components due to external (reflow process) or internal (On/Off cycles) heat. These deformations are an important source of information about possible CTE mismatch, solder risks, or potential heat sink problems. The TDM technology will be presented, together with application examples.