SESSION 6b:
MANUFACTURING: TEST & CHARACTERIZATION

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This Test and Characterization Session includes five papers covering a diverse range of measurement topics. We start with a paper from Skyworks which describes the electrical characteristics of a new Schottky diode implemented in their HBT and BiFET processes. Using TaN for the anode contact they are able to achieve a significantly lower turn-on voltage than with traditional Ti/Pt/Au contacts. A thorough characterization of this new device will be presented. Staying with the characterization theme, the authors of our second paper have employed both electrical measurements and infrared (IR) microscopy to compare the thermal performance of flip-chip assembly to traditional backside die-attach in an HBT process. This paper from WIN Semiconductor shows roughly a 25% reduction in transistor self-heating when using copper pillars connected directly to the emitter fingers. The next three papers focus on improving production test effectiveness. Paper three of the session comes from Avago, and describes how the correct choice of DC probe hardware has resulted in both reduced probe damage of copper pillar bumps, and a reduction of false test failures during DC die sort testing of these circuits. The next paper in the session, also from Avago, presents a technique for assessing the level of probe contact resistance during PCM testing. An existing TLM structure is used to determine whether a specific probe card is capable of providing valid, low contact-resistance measurements. This in situ measurement validation technique eliminates questions of whether poor probe contact is the cause of wafer PCM test failure, thereby reducing the need for engineering intervention and re-testing of wafers. The final paper in this session comes from TriQuint Semiconductor, and offers a technique for dynamically setting pass/fail limits during final product test. This approach uses a robust moving mean and standard deviation to identify parts that meet the device specification limits, but are clearly outside the distribution of the tested population. Identifying an outlier immediately after it is tested allows the device to be sorted to the correct output bin, where it can be later analyzed to offer greater understanding of the cause for variation.