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Invited Speech: A Comprehensive Infrastructure for Test Productivity and Yield Improvement across the Manufacturing Product Lifecycle

Dr. Kenneth Harris

Director of Marketing in the Volume Manufacturing Services group, PDF Solutions, Inc

About the Speaker

Ken received his BS degree in Chemical Engineering from University of Washington, and went on to earn a PhD in chemical engineering, focused on process control, from University of California, Davis. He then worked in yield enhancement at Advanced Micro Devices before joining PDF Solutions in 2000. At PDF, he worked on yield ramp projects for customers in the US, Asia, and Europe, focused on the analysis of CV test chip data and product test data. Ken then joined the Volume Manufacturing Solutions (VMS) business unit within PDF, and holds the position of Director of Product Management. His current assignment is defining the strategic direction and management of PDF Solutions' software products, including PDF's test solutions.

Abstract

Today's networks of devices, driven by the IoT, rely more and more on larger numbers of semiconductor components. However, the quality and reliability requirements of these chips, varies widely by application, even within the same product. Components used in automobiles, often have extremely low PPM defectivity requirements, while components used in consumer electronics, may have more lenient PPM requirements. In the current state of the art, driving and maintaining low PPM parts is largely achieved through the application of maverick lot detection, outlier detection, and other adaptive test methodologies. However, today there is little understanding and diagnosis (let alone control) within the manufacturing factory of what is driving this defectivity, as manifested in the application of adaptive test algorithms. In the current work, we present an infrastructure linking these traditionally separated domains, enabling the capability to understand how manufacturing events and data are influencing the PPM levels observed and controlled at test. This infrastructure is based on several Big Data technologies, which are required to successfully analyze the many data types, structures, and volumes, involved across the product manufacturing lifecycle. Utilizing this infrastructure, it then becomes possible to feed-forward and model information from manufacturing, to improve yield, productivity, and the overall quality, at test.