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Using Universal Target Design in conjunction with accuracy and multiwavelength knobs for non-critical layer OV measurements on YS-S375

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ABSTRACT

Continued tightening of overlay control budget in semiconductor lithography drives the need for improved metrology capabilities. According to IRDS semiconductor roadmap, aggressive improvements are needed for overlay metrology in term of accuracy and precision to address below 5nm on product overlay specifications. However, cost reduction needs require a quick time to design target as well as a target reduction size without performance loss on the YieldStar YS-ASML metrology tools.

This study will present Overlay metrology results on a Universal target designed for the scatterometry based platform. A focus will be done on different KPIs (Key Performance Indicators): measurement accuracy and precision, residuals after a modeling applied and Mean Overlay on the wafer. The second main topic will be dedicated on the faster cycle time validation. This universal design (figure1) shows optimum performances with accuracy package-options and multiple wavelengths approach on YS-S375. The Universal design performance will be compared to the reference target and validated with an on-product measurement methodology (Holistic Metrology Qualification, HMQ) to deliver an optimized and accurate recipe to the production line. The metrology target could be used straight away on non-critical layers. To fastener the on-product target design validation and bypassing reticles fabrication, the metrology targets will be printed with e-beam lithography tool.

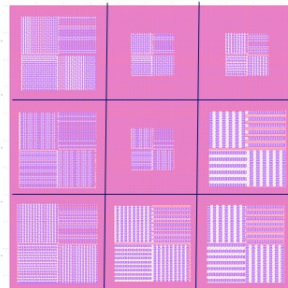


Figure1: Universal design including metrology targets with pitches varying from 600 nm (reference) to 2000 nm and size varying from 16x16 μm^2 to 30x30 μm^2

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