



# Advanced Broadband Optical Inspection on Complex Logic Structures using NanoPoint at 28nm Design Nodes

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## INTRO

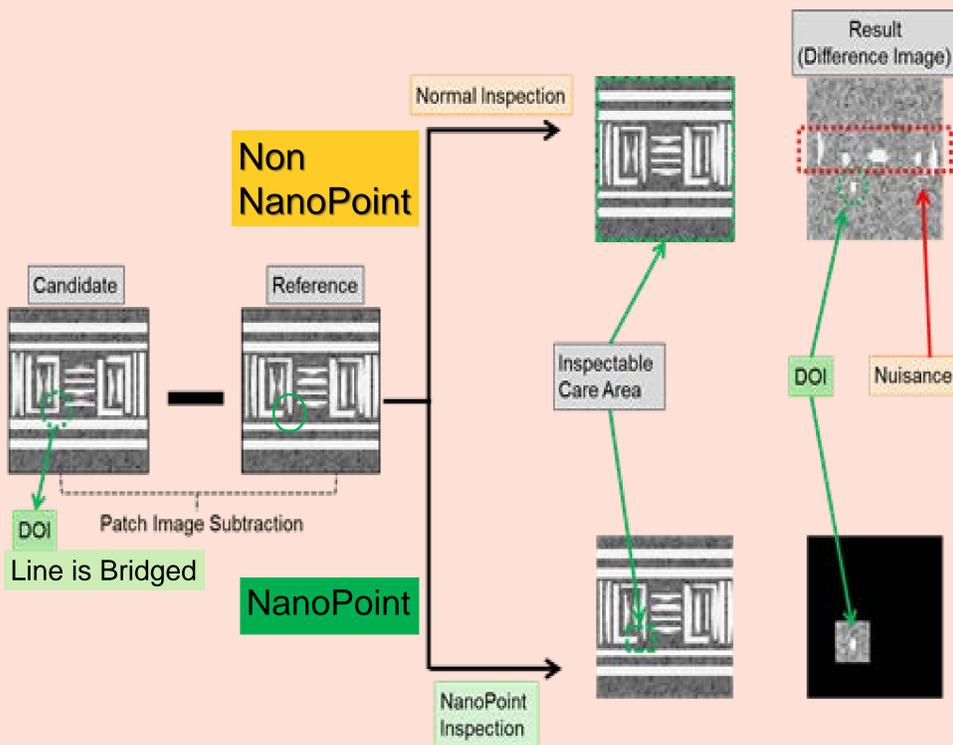
As design rules shrink, optical wafer inspection for detection of yield-killer defects has become more and more challenging. Detection of Defects of Interest (DOI) in logic structures is limited by strong wafer noise. A patented technology called NanoPoint (NP) from KLA-Tencor extends optical inspection, enabling IC manufacturers to perform highly sensitive optical patterned wafer defect inspections.

NanoPoint utilizes design information and optical properties to generate targeted inspectable locations (Care Areas) bounding critical structures. This enhances the optical inspection sensitivity to critical regions in logic.

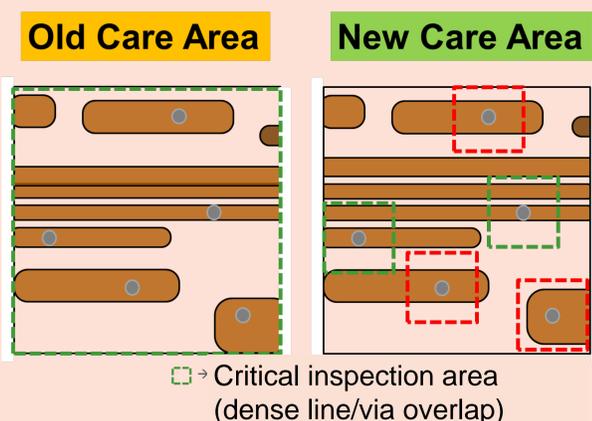
## METHODOLOGY

1. Original .oas (design) file provided by the fables company is transferred to Secure Design Environment (SDE).
2. In the SDE, use design verification rules on .oas file to generate Care Areas (CA). CA are generated in SDE from weak points, rule based search or pattern search.
3. CA are transferred to an inspection tool to create an inspection recipe.

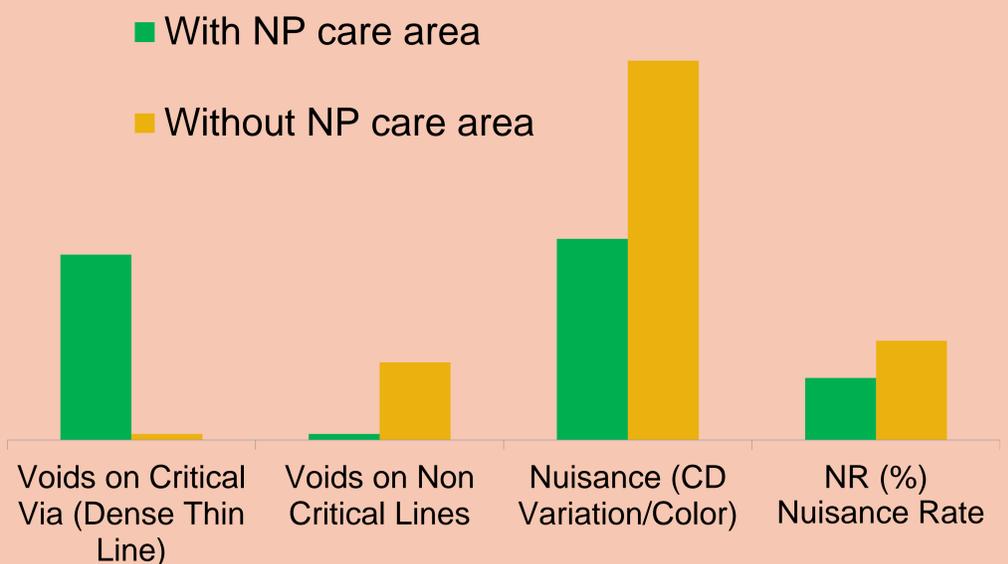
## THEORY



Optical inspection tool reports a defect by comparing candidate & reference die. The reduction of area defined for comparison in a NP inspection improves detection to critical areas only as shown above.



## DEFECT PARETO



## CONCLUSION

1. Single, multiple or no defects types can appear in inspected Care Area.
2. Reasons can be overwhelming of multiple defects/types, no signal, or noise from prior layers.
3. NanoPoint can fine tune inspection to specific areas for the following:
  - a. Noise reduction from previous layers to increase defect capture for a particular region.
  - b. Separation of dense quiet regions versus noisy sparse regions in current layer.
  - c. Prevent multiple defect types by reducing Care Areas to a specific area to capture defects on "Critical vs. Non Critical Lines" (See Defect Pareto).
  - d. Look for specific design structural issues.