

Multi-Mode Process Metrology Solution

ZETA-500/580



The **Zeta-500** series profilers are **fully automated 300mm capable** metrology tools that can address a variety of applications such as **bump height, roughness, etch depth, film thickness as well as wafer bow**. Based on Zeta's revolutionary **multi-mode** approach to measurements, the Zeta-500 series profilers pack the power of 3 separate tools into one compact platform.

Zeta-580: Automated 300mm Metrology



SIMPLE

The Zeta3D software has a **simple and intuitive user interface** for data acquisition and analysis. A short learning curve for engineers and operators leads to better productivity.

VERSATILE & FAST

The high resolution 3D optical profiler takes **less than 30 sec per measurement**. Bump height, roughness, film thickness (or reflectivity) and wafer bow can be measured without the need for unloading the wafer and moving it to a new tool

FAB READY

The Zeta-500 series meets Class 100 standards and can be equipped with a **300mm EFEM** with **pre-aligner** and **ionizer**. The multi-functional **Zeta 3D software** completes the fab ready package.

Multi-Mode Optics for any type of measurement

The **Zeta-5XX** is available with several advanced imaging techniques:

- **ZDot™** innovative 3D imaging is standard on all our optical profilers. The Zdot technology enables **True Color imaging** and a **13nm step resolution**.
- **ZiC** enhanced differential **Interference Contrast imaging** is great for **nanometer level** surface roughness even over a 4.5mm field of view.
- **ZSi Shearing Interferometer** provides **Angstrom level vertical resolution** on the smoothest of surfaces over a large field of view.
- **ZX5 Vertical Scanning Interferometry** is ideal for measuring **nanometer heights** over 4.5mm field of view.
- **ZFT** Visible range integrated **Spectroscopic Reflectometer** for thin film thickness, reflectivity and refractive index measurements.

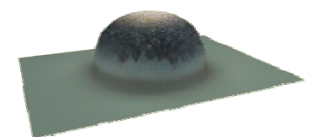
Shorter Process Feedback Cycle

Multi-Mode Optics means shorter lead time for process feedback, saving valuable time. Having multiple measurement capabilities within one system eliminates wafer transfer steps between several metrology and review tools. In one process step, the **Zeta-500** series profilers can perform height, dimensions, roughness, bow, reflectivity and thickness measurements.

The **high resolution 3D images** and analysis from the **Zeta-500** series profilers also provide the answers for most defects and process excursions. This reduces the number of wafers or sites that need to be reviewed by the time-consuming and expensive AFM or SEM analysis. **Zeta-500** is capable of measuring from nanometers all the way up to millimeters.



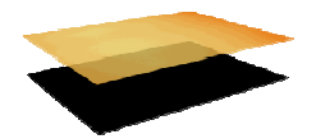
Photo-resist roughness
Nanometer scale PR Roughness



Solder bump metrology
Bump height and dimensions



Under Bump metrology
Bump dimensions & roughness



Thick Photo-resist
Multi-layer analysis

System Information

Zeta-500
300mm/450mm metrology

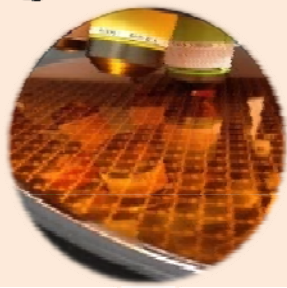
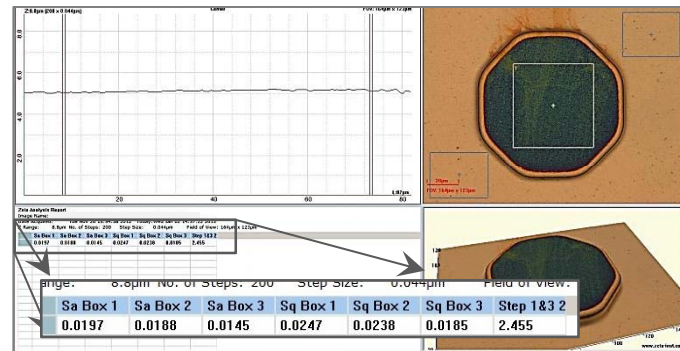
Full Wafer Mapping

The **automated wafer deskew and pattern matching** capability in the Zeta3D software can be used to set up a **multi-site sequence**. Typical 9-site and 49-site maps can be easily created and executed. Data is stored in text or csv format, making it easy to export.

Wafer Bow & Film Stress

Semiconductor fabs have typically relied on a line scan approach to measure 2D bow of wafers, either with laser based or with stylus profilers. Now, with the Zeta-500 series profilers, the process engineer can program in an array of measurements across the wafer and get the **complete 3D wafer warp profile**. Pre and Post film deposition measurements are used to calculate the Film Stress.

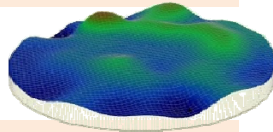
Automated Bump Height and Roughness



Copper Reflectivity Mapping
Cu reflectivity at 480nm on a patterned 300mm wafer

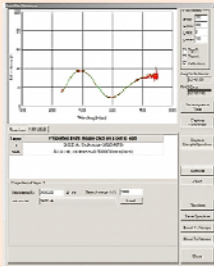
Poly-imide Film Thickness

PI thickness distribution over 49 sites on a 300mm wafer



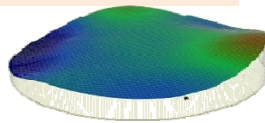
Oxide Film Thickness

The integrated spectrometer can be used for process development



Wafer Bow

Wafer Bow can be measured and plotted in 2D or 3D.



Technical Specifications

Dimensions (mm)

System (width X depth X height):

Zeta-500: 1003 X 1003 X 1667

Weight: 700lb (318kg)

Zeta-580: 1425 x 2290 x 1905

Operating Specifications

Voltage: 100 - 230 VAC

Current: 4A

Op. Temp.: 18-30° C, non-condensing, ±1° C per hour

Performance Specifications (Zeta-580)

Metrology :

~ 30 sec/site (ZDot™)

Film :

~ 3 seconds per site (ZFT)

Full wafer¹ Metrology: ~ 9 site pattern in 7 minutes

Full wafer Film: ~ 49 site pattern in 4 minutes

Pixel Resolution:

0.09 µm

Min Z-Step:

2 nm with available piezo stage

13 nm with standard Z drive

Z-Resolution:

1Å with ZSi option

13 nm with standard ZDot

Z Accuracy²:

±0.75%

Repeatability²:

±10 nm (1σ)

¹ Full wafer metrology includes deskew, pattern rec and reference std. measurements

² Static repeatability and accuracy based on a nominal 1.0 µm VLSI step-height standard, 100x/0.9NA objective, piezo stage, and standard ZDot imaging mode

System Features

Camera options: 1024x768, 1280x960, 1920x1440

Magnification: 35,000x combined optical & digital

Illumination: Two (2) Ultra-Bright White LEDs

Motorized Stage: 300mm x 300mm XY travel

Z Travel: 40mm

Vibration Isolation: Built-in

Wafer Size: 300mm (200mm bridge option available)

Factory Automation: GEM/SECS option

ZETA Instruments

2528 Qume Drive Suite 12 • San Jose CA 95131

Tel +1.408.573.7285 • Fax +1.408.573.7627

Actual features included will depend on final configuration
Specifications subject to change without notice