Multi-Mode Defect Inspection Solution

ZetaScan

The ZetaScan series are fully automated 300mm capable defect inspection tools that can address a variety of substrates such as opaque and transparent wafers as well as touch panels, rough ground, polished or unpolished substrates. Based on Zeta’s revolutionary multi-mode approach to inspection, the ZetaScan series defect inspectors provide high defect sensitivity at high throughput.

Scanning Beam Optics

- Scanning Beam Optics combines the strong signal from a small spot beam (higher intensity than a line focus beam) with the speed of the scanning laser
- ZetaScan allows for any sample shape up to 370mm X 470mm, very thin samples, and other delicate samples, such as thin glass or bonded wafers
- 405nm laser diode with the latest technology in beam shaping optics

Multi-Mode Optics

- ZSP – Zeta Specular measures reflectivity
- ZTP – Zeta Topography measures surface topography
- ZTS – Zeta Top Scatter measures scattering signal above the sample
- ZSS – Zeta Side Scatter measures scattering signal to the side of the sample
- Other … give us your inspection challenge.

The Zeta team is continuously developing new modes of defect detection.

Automated Defect Classification

The multiple-mode optics can be used for easy defect classification. In the glass wafer inspection example shown on the right, surface particles and interface particles can be separately classified based on the differences in the ZTP, ZSP and the ZSS images. ZetaScan’s innovative optical design also allows the user to simultaneously detect and accurately classify the bottom surface particles based on their optical signature. This unique capability is unmatched in the defect inspection industry.

Comprehensive Full Wafer Inspection
Defect Map on a 300mm Glass wafer

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**System Information**

**Fast Full Wafer Defect Mapping**

The linear scanning motion of the incident beam is combined with the lateral motion of the wafer to quickly generate the full wafer defect map. This type of scan is faster, more stable and less sensitive to vibration as compared to other 'helical' or 'spiral' scan based tools.

**ZetaScan Features & Benefits**

- Thin and transparent substrates – new detection optics design does not degrade signal as the substrate becomes thinner
- Multiple channel detection provides the necessary signals to separate pits from particles down to submicron in size
- New light collector design capable of detecting defects on rough surfaces or films.

**Performance Specifications (ZetaScan)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle</td>
<td>0.13µm PSL on polished Si</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>0.13µm – 20µm</td>
</tr>
<tr>
<td>Pit, Scratch</td>
<td>0.1µm deep, &gt;3µm in diameter/length</td>
</tr>
<tr>
<td>Other defects</td>
<td>Stains, Micro-waviness, Epi defects</td>
</tr>
<tr>
<td>Classification</td>
<td>Separate Pit/Particle</td>
</tr>
<tr>
<td>Full wafer scan</td>
<td>&lt;120sec for a 300mm substrate</td>
</tr>
<tr>
<td>Rough Substrate</td>
<td>Can handle rough polish ~ 5µm RMS</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>Class 100</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±5% (1σ/Average)</td>
</tr>
</tbody>
</table>

**System Features**

- Illumination: 405nm (violet) Laser Diode
- Detectors: High resolution PMT detectors
- Detection Channels: Side Scatter, Top Scatter, Topography, Specular
- Scan Type: Linear scan
- Substrate Size: 50mm – 300mm diameter
- Motorized Stage: 300mm x 300mm XY travel
- Sample Thickness: Up to 25mm
- Sample Type: Polished/Unpolished, Opaque/Transparent
- Vibration Isolation: Built-in
- Factory Automation: Recipe & Data Upload/Download

**ZetaScan Series**

- **ZetaScan** Manual System Up to 300 mm
- **ZetaScan-AUTO** Open Cassette 150/200 mm
- **ZetaScan-EFEM** Auto System 300mm EFEM/FOUP

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Embedded Defect

Embedded defects cause a disruption in the film (seen in topography image).

Scratches

Scratches are visible in multiple channels and can be easily classified.

Stains on Glass

Randomly distributed stains can be seen in the specular channel.

Missing Film

A strong specular signal can help differentiate from particles.

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