150mm Thin Wafer Handling Upgrade for GSD Platform

GSD 200E², HE/VHE
Power Devices, 3D Packaging Application Specifics
Axcelis Thin Wafer Solution

- GSD Platform with Axcelis Thin Wafer Handling Options
  - 150mm thin wafers in production has increased significantly in past 10 years
  - New generation upgrade enables wafer thickness of 215 um (without tape) and down to 55um with annulus ring and protective tape

- GSD wafer handling system automatically handles both thin and standard wafers
**Technical Challenges Being Addressed**

- Causes of mechanical stress on thin wafers
  - In-air locations at robot level, flat aligner
  - During transition from in air to vacuum
  - In vacuum:
    - Transfer arm
    - Wafer holder and disk
  - Combination of hardware and software features
Eliminate Unwanted Forces With Innovative Robot End-effector

- Optimization of in-air wafer contact: new vacuum channel geometry
- Minimal deflection on thin substrate
- Low contamination wafer pan: carbon fiber, teflon cover

New End-effector Design with Material Designed for Low Metal Contamination

Optimize Deflection, Minimal Contact

Old End-effector – Creates Deflection

NEW End-effector – No Deflection
Innovative Solution for Disk Clamping

FORMER VERSION
Bowing of wafer on pad

INNOVATIVE SOLUTION
For Perfect Wafer Positioning
Current Capabilities on 150mm Thin Wafers

Currently in Manufacturing Environment

<table>
<thead>
<tr>
<th>Si Wafer Design</th>
<th>Wafer Thickness (μm)</th>
<th>Disk spin speed (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Flat</td>
<td>675 - 300</td>
<td>1210</td>
</tr>
<tr>
<td></td>
<td>300 - 250</td>
<td>815</td>
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<tr>
<td></td>
<td>250 - 215</td>
<td>613</td>
</tr>
<tr>
<td>Thin with outer ring (*)</td>
<td>&gt; 200 - 120</td>
<td>815</td>
</tr>
<tr>
<td>ring thickness 625um, 2mm wide</td>
<td>120 - 50</td>
<td>613</td>
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<tr>
<td>Thin with outer ring (*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ring thickness 450um, 7mm wide</td>
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(*) protective tape