Introduction of Medium Current Ion Implanter EXCEED3000AH-8C

-New 200mm Tool-

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Nissin Ion Equipment Co., Ltd.
Contents

• History of Si Wafer Size and Related Architecture of Ion Implanters
• Outlook of 200mm Production
• Legacy Tool Issues in General
• Nissin Ion’s Solution EXCEED3000AH-8C
• Tool Layout, Specifications and Options
• Conclusion
Wafer Size and Beam Line Architecture

<table>
<thead>
<tr>
<th>Time Period</th>
<th>200mm Implanters</th>
<th>300mm Implanters</th>
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</thead>
<tbody>
<tr>
<td>1970~</td>
<td>ACS/SEN NV8200/8250</td>
<td>ACS/SEN OPTIMA MD/MC3</td>
</tr>
<tr>
<td>1980~</td>
<td>AM/V E220/E500</td>
<td>AM/V VIISta810/900</td>
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<tr>
<td>1991~</td>
<td>ULV IPZ9000</td>
<td>ULV IW630</td>
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<tr>
<td>2001~</td>
<td>200 mm</td>
<td>300 mm</td>
</tr>
<tr>
<td>20XX~</td>
<td>450 mm</td>
<td>450 mm</td>
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Adoption of Ion Implantation
- Raster Scan
- Parallel Beam
- Serial Endstation
- Tall Ribbon Beam

200mm Implanters:
- Nissin EXCEED2000/2000A
- ACS/SEN NV8200/8250
- AM/V E220/E500
- ULV IPZ9000

300mm Implanters:
- Nissin EXCEED2300/3000
- ACS/SEN OPTIMA MD/MC3
- AM/V VIISta810/900
- ULV IW630
Higher beam current and longer source life are constantly under development for ion implanters.

Typical Life time of ion source

- Freeman (-150mm): Few days
- Bernas (200mm-300mm): A couple of weeks
- IHC (300mm): 3 to 4 weeks
The IoT Rapid Growth, Early Production of 200mm Wafers is expected to be a key due to nature of required devices.

24% CAGR

3.3% of Semi

8.6% of Semi

Source: Gartner Semiconductor and Semiconductor Manufacturing Forecasts Webinar 4Q15
The Global 200mm Fab Outlook

200mm Fab Count and Capacity

- Capacity (blue)
- Count (red)

Source: Global 200mm Fab Outlook, preliminary Feb 2016, SEMI
The Global 200mm Fab Outlook

• 33Fabs closed from 2008 to 2014, and 15 Fabs switched their production to 300mm wafers.
• 200mm Fab closures declines after 2016.
• Estimated ~10 Fabs started production from 2015 to 2017. (Most of them are Power, Analog devices, and MEMS)
• By 2018, the production capacity of 200mm Fabs are expected to increase to their 2006 level (almost all time high!).
Legacy Tool Issues in General

• Many models and versions, difficult to support
  – Model XXX, XXXH, XXXHP, XXXHPX, over more than 20 years of period.
  – OEMs wanted to sell “upgrades” but there were certain limits and borders for certain models and could not keep up forever.
  – OEMs did not have control over discontinued parts.
    ex: PCs, Programmable Controllers, Motors, Scan Axes, Power Supply Units, Sensor Units, etc.
  – eBay is not the best place to find and obtain required parts - unknown part history, safety issue, DoA, etc.
  – Second source venders may be available, but how are they reliable and dependable?
Legacy Tool Issues in General (cont’d)

• Lower wafer output compared to that of 300mm tools.

• Typically they do not support the most advanced process requirements that were developed for 300mm (depends on design rule and device type).
  – Particles, Metals, Beam Angle Controls, etc.
Nissin Ion Implanters and their applications

Medium Current Implanter

EXCEED3000AH/9600A
- Ev, -Evo, -Evo2

Customized tools for 8 inch users

EXCEED3000AH-8C/9600A-8C

- 430WPH-E/S
- Field-Proven Performance
- Latest Parts

BeyEX/-H (Beyond EXCEED)

NIC's latest models

- 500WPH-E/S
- Higher Productivity Kits for Low Energy
- Precise Angle Control System

High Current Implanter

CLARIS
- Cluster ion implantation

Luxion
- Broad sheet beam

IMPHEAT

Power Devices

- 500°C Implantation system
- High current Al ion beam
- RT implant capability
Improved Throughput

- Much higher Throughput compared to existing tools in 8 inch wafer fabrications.

Reduced Cost of Ownership

- Specialized in the performance required in the 8 inch wafer lines and established high tool up time and reliability enables to reduce total cost of ownership with a vertically integrated service team controlled by the OEM.

Solution to Discontinued models and parts

- Capable of a continuous supply of models whose specification is the same as our basic one’s called EXCEED, and of their product parts.
- No need for customers to go to eBay or second source suppliers.
Tool Layout of EXCEED3000AH–8C

Foot print [m]
3.20W×6.33L×2.95H
(10.5’Wx20.8’Lx9.68’H)
Conclusion

- **EXCEED3000AH-8C**
  - is fully backed up by the OEM with a full factory warranty.
    - Supported with “award winning” vertically integrated support structure.
    - No third party support required.
  - can be easily optimized for a specific 200mm production requirement.
  - has field-proven reliability and high tool uptime of EXCEED series implanters.
  - offers significantly improved CoO.