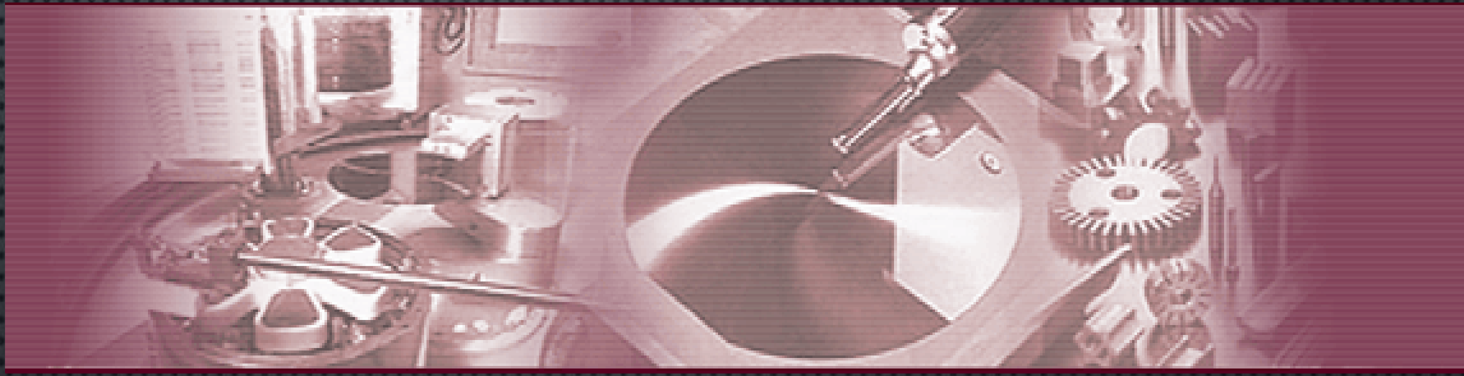
# SUPPLYING PRECISION TECHNOLOGY



Okamoto

OKAMOTO MACHINE TOOL WORKS, LTD
SEMICONDUCTOR EQUIPMENT DIVISION

# GRINDING AND POLISHING TECHNOLOGY FOR VARIOUS MATERIALS

OKAMOTO MACHINE TOOL WORKS, LTD.

# OKAMOTO SOLUTIONS

Booth no. 60
IMAPS 2022

InP

Panel Grinding

Ge

PLP

FOWLP

MEMS

LT/LN

Si

TSV

Hard Materials

Bumped Wafers

SiC

GaAs

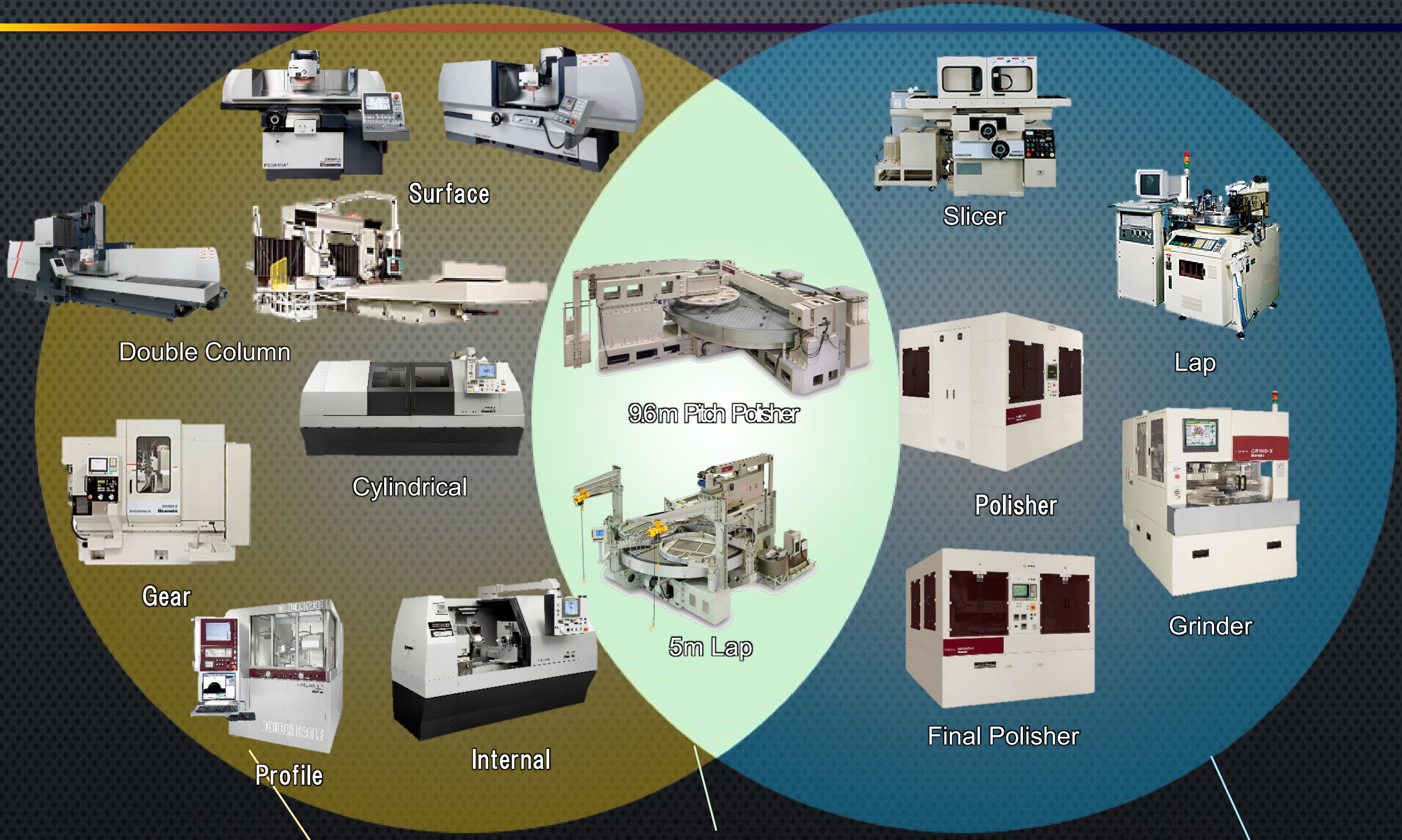
SOI

Soft Materials

Tape Grinding

Okamoto

# OKAMOTO PRODUCT LINE-UP



**Metal Process = Machine Tools**

**Pitch Polisher**
**Large Lap**

**Brittle Material = Semiconductor**

# GRINDING WHEEL DIAMOND EXPOSURE

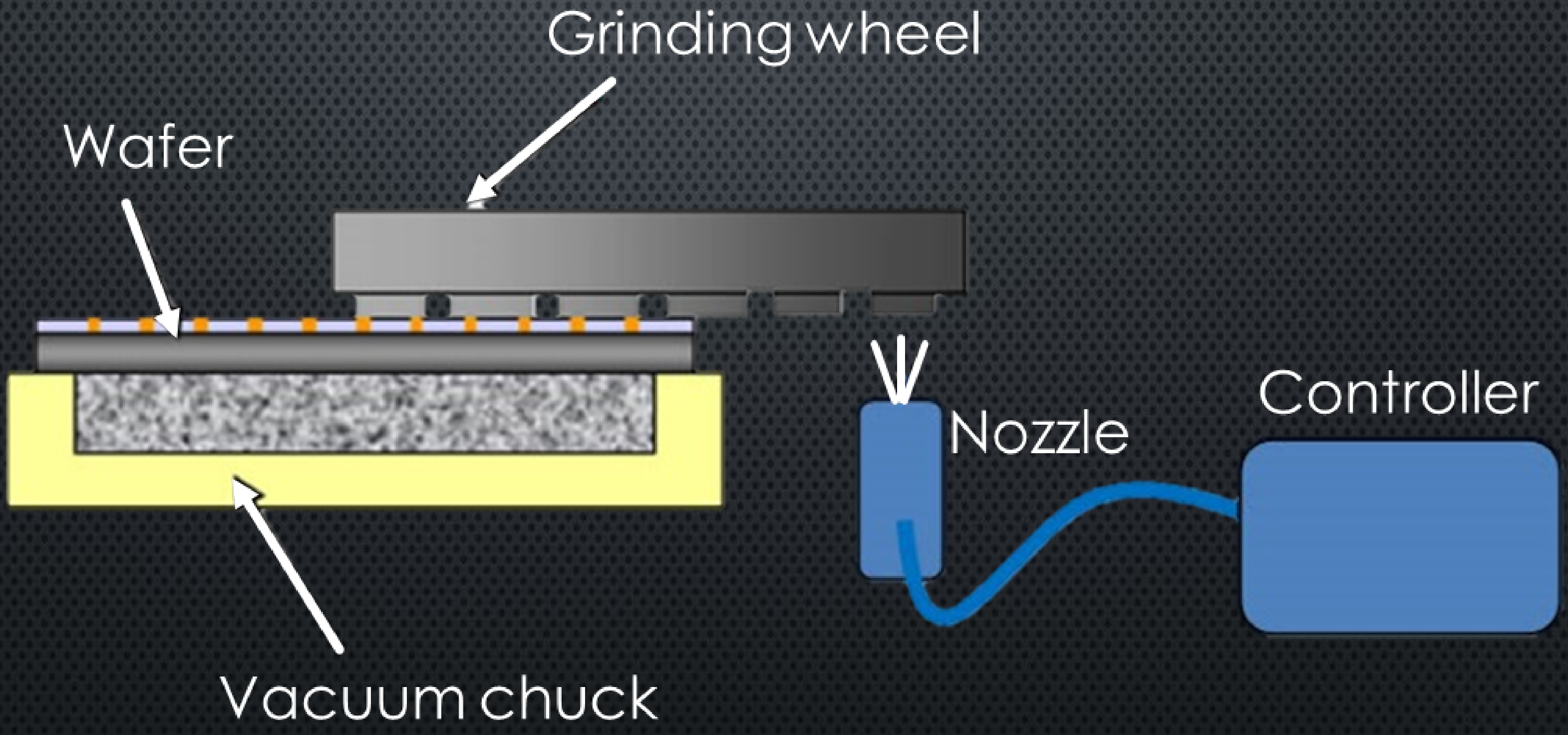
Normal

Clogged/Loaded

Confidential

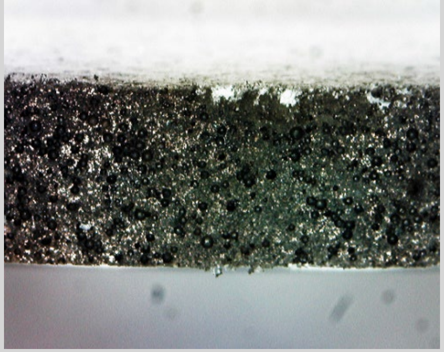
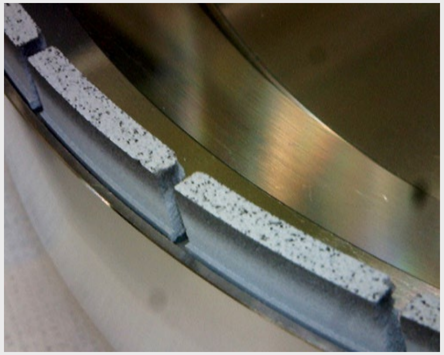
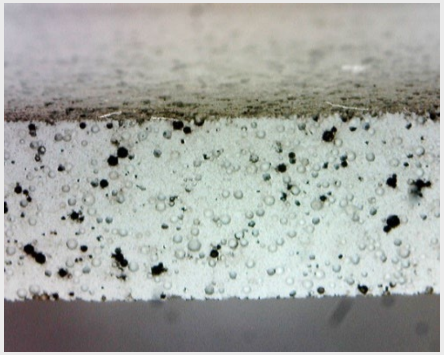
# GRINDING OF VARIOUS MATERIALS

HPD – High Pressure Dressing



PATENT PENDING

# GRINDING OF VARIOUS MATERIALS

| Condition | Over angle view | Grid view | Grid surface |
|---|---|---|---|
| **Vitrified #8000 (Without HPD)** |  |  |  |
| **Vitrified #8000 (With HPD)** |  |  |  |

# GRINDING OF VARIOUS MATERIALS

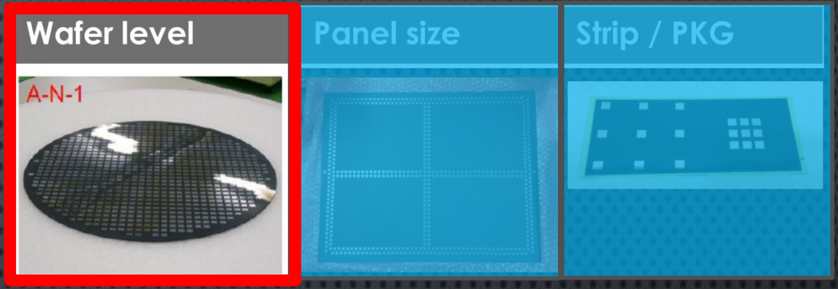
## HPD – HIGH PRESSURE DRESSING

TSV
Backgrind Tape
Panel Grinding
Strip / Package Grinding
Soft Materials

SiC
GaN
Glass
Sapphire
AlTiC

PATENT PENDING

# OKAMOTO GRIND SOLUTION – FOWLP



| GNX300B main spec. | |
|---|---|
| Spindle | 2 axis |
| Wheel | Φ300mm |
| Chuck Table | 3 axis |
| Chuck Size | Max Φ300mm |
| Size | 1550 x 3176 x 1933 |

# FOWLP/PLP/STRIP PACKAGING MACHINES

Machines available with HPD:

**GNX200B**

**GNX200BP**

**GNX200BH**

**GNX300B**

**GNX300BP**

**GNX212**

**GNX312**

**GDM300**

**VG401MKII**

**VG401H**

Okamoto

# PANEL LEVEL PACKAGING MACHINES

Machines available with HPD:

**GNX800**
**VG401**

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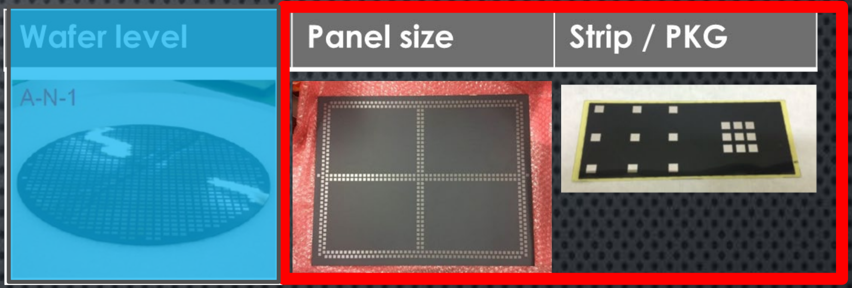
# OKAMOTO GRIND SOLUTION – STRIP/PKG



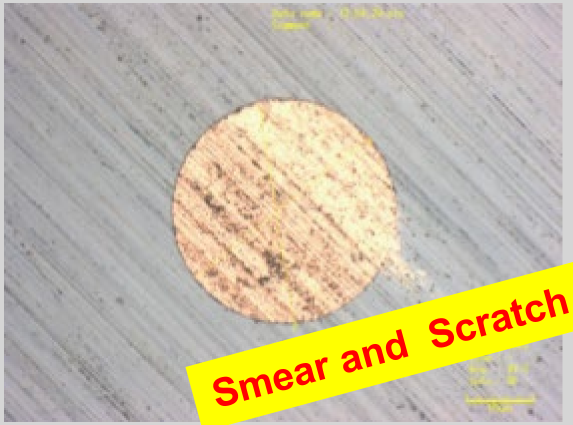
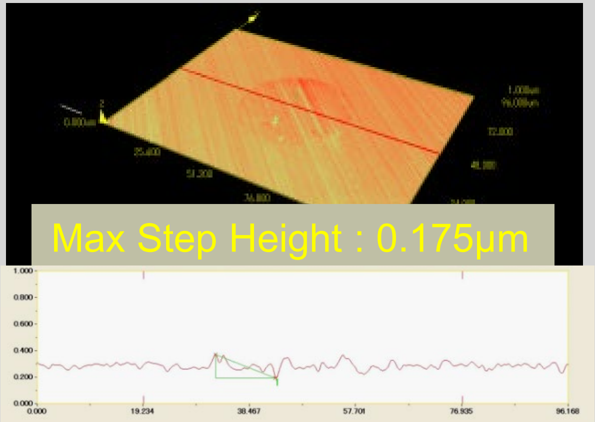
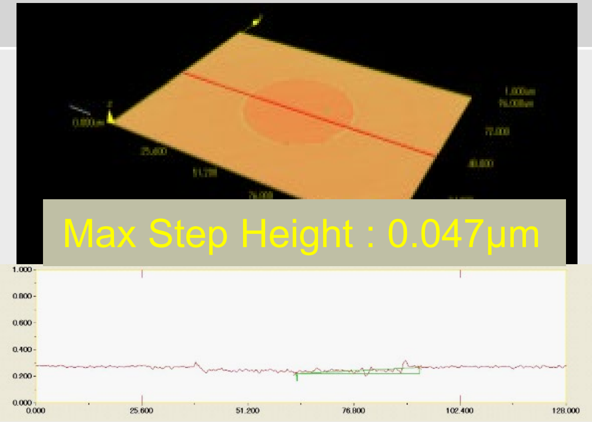
| VG401MKII Main Spec. | |
|---|---|
| Spindle | 1 axis |
| Wheel | Φ350mm |
| Chuck Table | 1 axis |
| Chuck Size | Φ400-500mm |

| GNX800 main spec. | |
|---|---|
| Spindle | 1 axis |
| Wheel | Φ500mm |
| Chuck Table | 1 axis |
| Chuck Size | Φ870mm |
| Size | 2005x2990x 2200 |

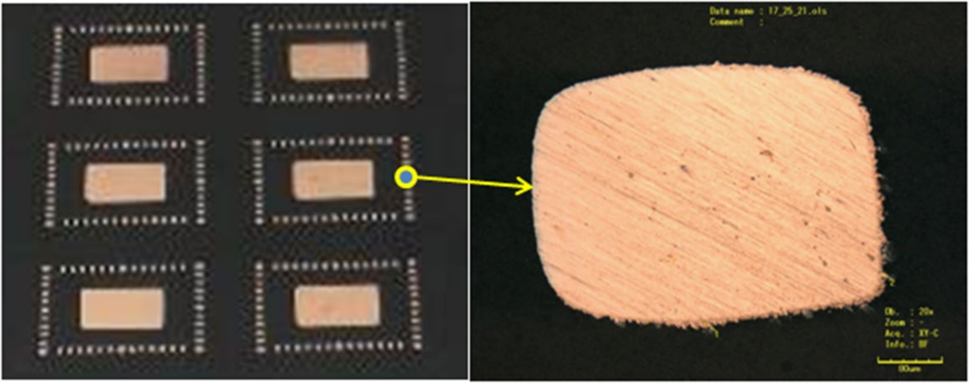
# HPD BENEFITS

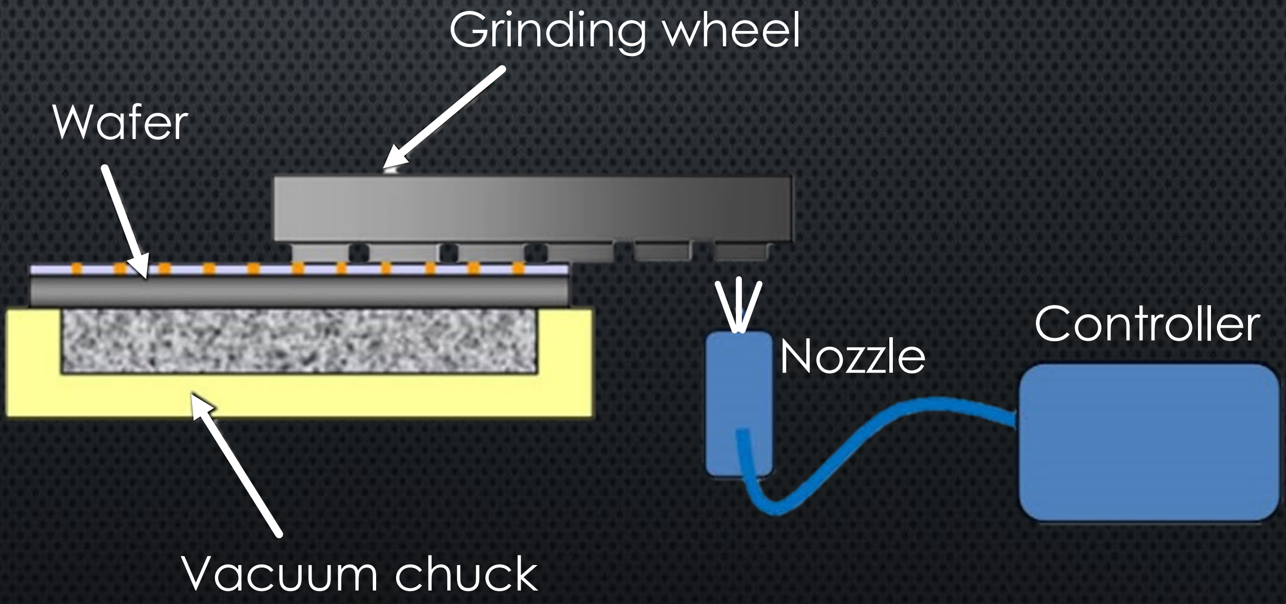
- No Wheel Loading/Clogging
- Insitu-Wheel Dressing
- Hard Material Grinding
- Soft Material Grinding
- No Smearing
- No Scratching
- Reduced Machine Down Time
- Able to Activate/Deactivate

# GRINDING OF VARIOUS MATERIALS

| Condition | 2D Image | 3D Image |
|---|---|---|
| **Conventional**<br>**Vitrified #8000 (Without HPD)** |  **Smear and Scratch** |  Max Step Height : 0.175µm |
| **New Process**<br>**Vitrified #8000 (With HPD)** |  **W/O Smear and Scratch** |  Max Step Height : 0.047µm |

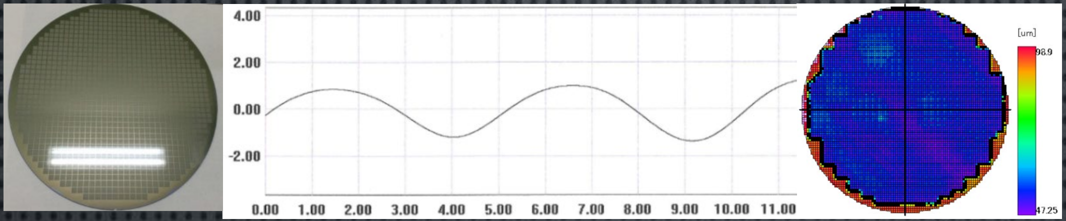
# GRINDING OF FOWLP/PLP





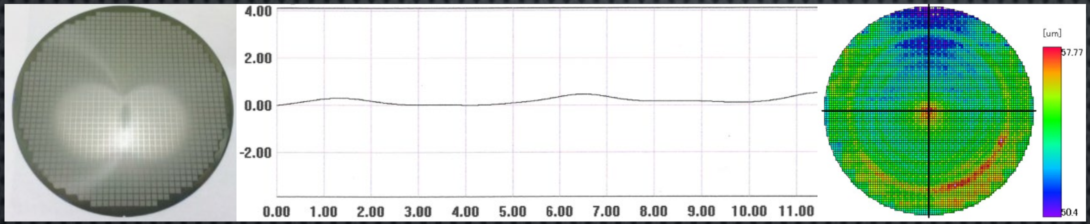
# TAPE GRINDING FOR TTV IMPROVEMENT

Before BG tape grinding

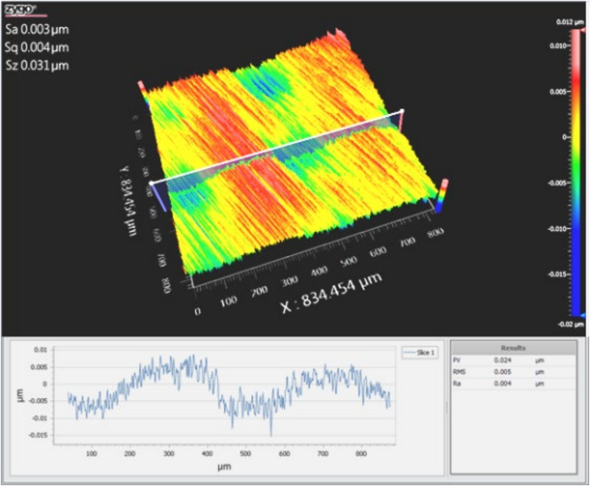


Thickness: 56µm
TTV: 51µm

After BG tape grinding

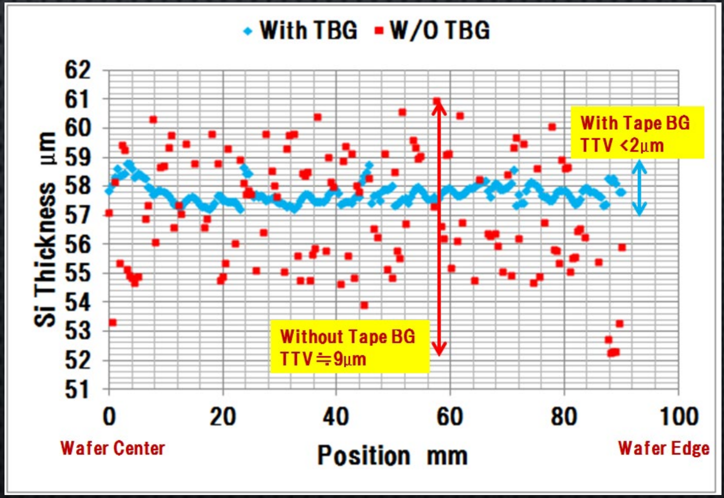


Thickness: 54µm
TTV: 7µm



Sa 0.003µm
Sq 0.004µm
Sz 0.031µm

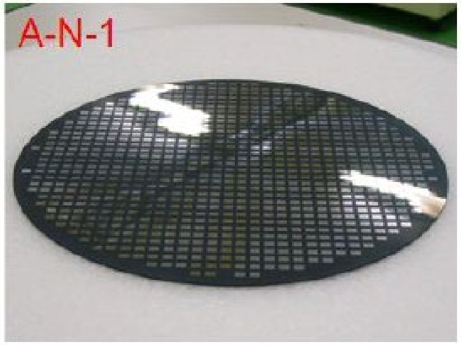
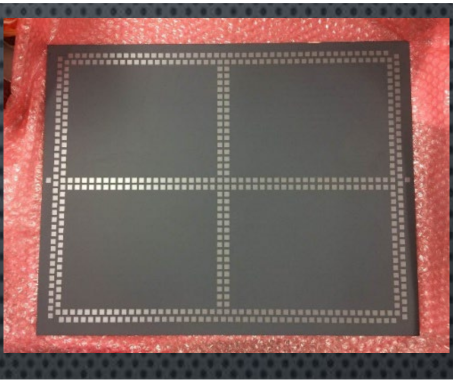
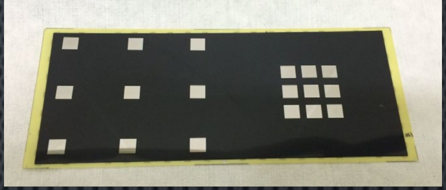
| Results | | |
|---|---|---|
| PV | 0.024 | µm |
| RMS | 0.005 | µm |
| Ra | 0.004 | µm |



# TAPE GRINDING TECHNOLOGY

- Tape planarization before backside grind
- Excellent solution for bumped wafers
- Automatic double-side grind
- HPD system eliminates wheel clogging and dressing

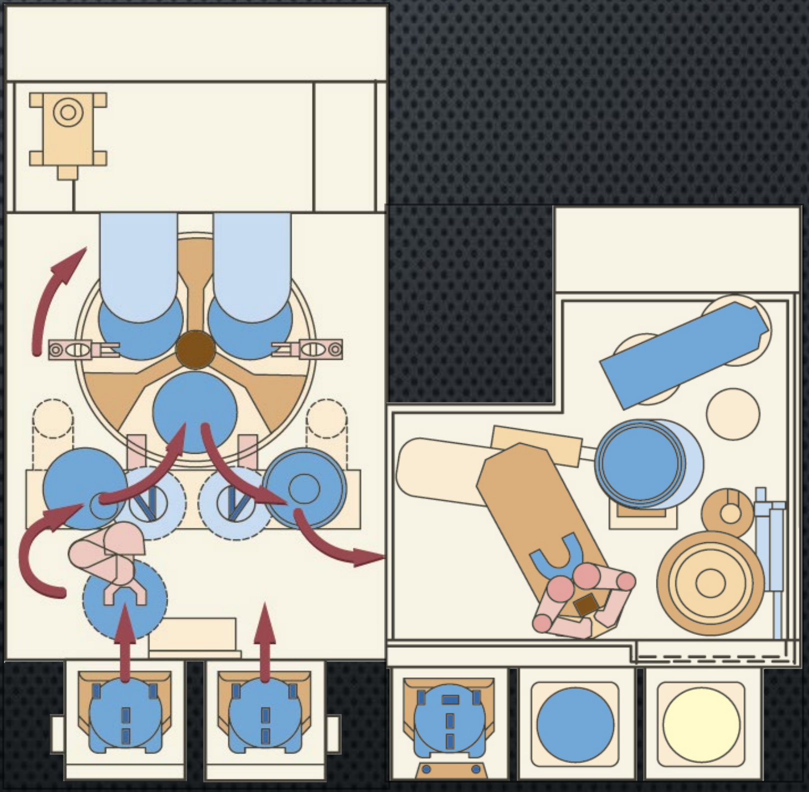
# CHIP SCALE PKG GRINDING SOLUTIONS

| Wafer level | Panel size | Strip / PKG |
|---|---|---|
|  |  |  |

| | GNX300B | GNX800 | VG401 |
|---|---|---|---|
| Chuck size | Φ300mm<br>(□212mm) | Φ850mm<br>(□601mm) | Φ500mm<br>(□353mm) |
| Load/un-load | Fully auto | Manual | Manual |
| Chuck table | 3 | 1 | 1 |
| Spindle | 2 | 1 | 1 |

# GNX300BP

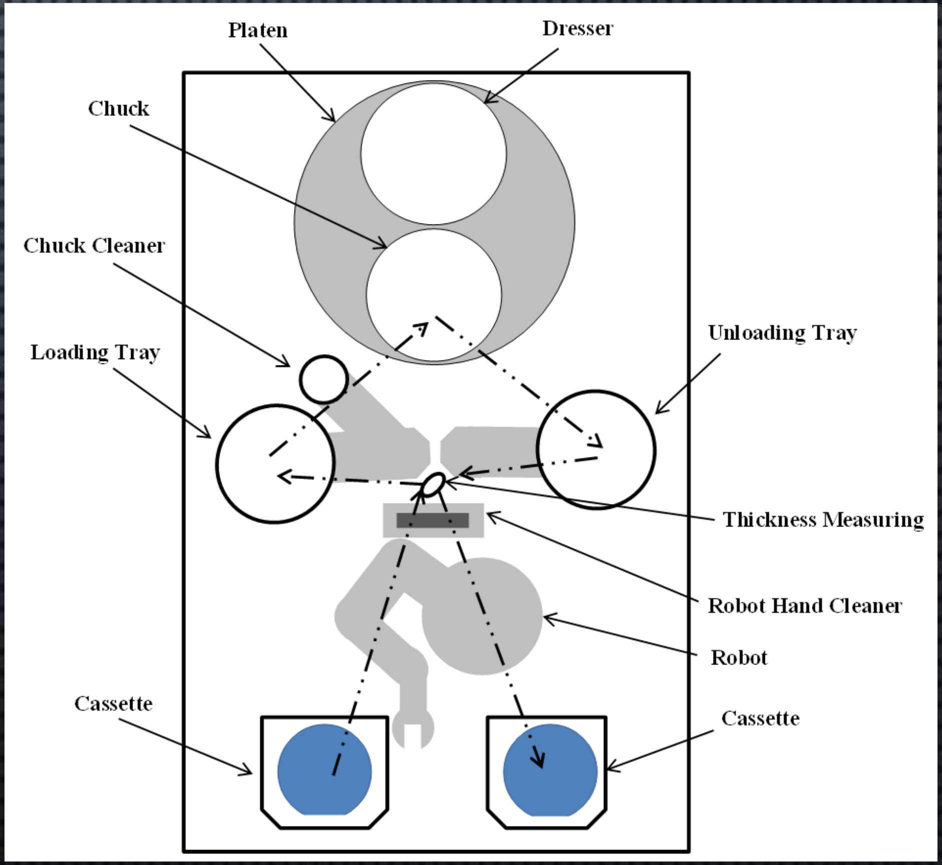
GNX300BP



# LT/LN POLISHER -- PNX200L

- 1 head and 1 table high accurate polisher
- 8 cassettes/200 wafers continues handling

W1190 x D1950 x H2118



# WWW.OKAMOTO-SED.COM

Booth no. 60
IMAPS 2022

InP

Panel Grinding

Ge

PLP

FOWLP

MEMS

LT/LN

Si

TSV

Hard Materials

Bumped Wafers

SiC

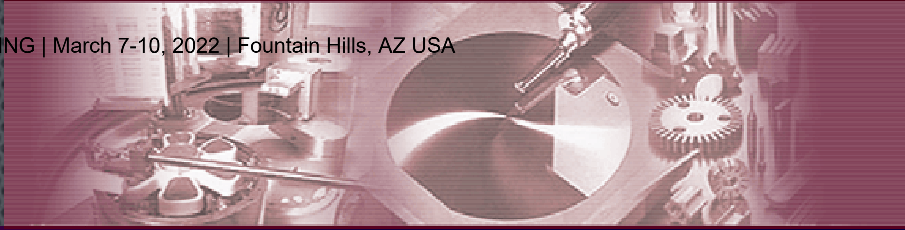
SOI

GaAs

Soft Materials

Tape Grinding

Okamoto



# Contact Information

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