

## REPORT: 300mm Si wafer downsizing test by Laser-MicroJet®

for Anonymouse

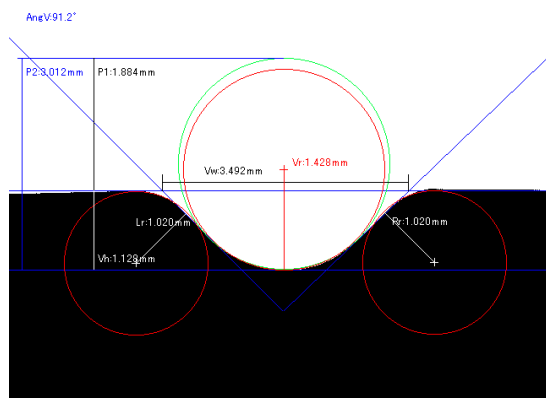
by Masaki Takano, Synova Japan

### TASK

The Laser-MicroJet® technology has been tested for 300mm wafer downsizing to evaluate the quality and how to make the alignment position of the notch.

Downsizing from 300mm wafer to 200mmwafer, the notch shape and the alignment position is very important to make the crystal orientation.

### <Drawing for Notch>



### SAMPLE DESCRIPTION AND PREPARATION

<b>SAMPLE</b>	Material	300mm Si wafer
	Dimension	300 mm
	Thickness	775 µm
	Quantity	3 pcs

Release of application report			
Project Leader		Responsible Application Group	
Name:	Masaki Takano	Name:	D <sup>r</sup> Benjamin Carron
Date:	2012.03.09	Date:	2012.03.14
Visum:		Visum:	



**SYNOVA**

Ch. Dent-d'Oche  
CH-1024 Ecublens  
Switzerland  
[www.synova.ch](http://www.synova.ch)

# APPLICATION REPORT

Report No: 123-10

Sample No: <<box>>



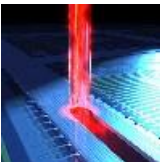
**CONFIDENTIAL**

## PROCESS: INSTRUMENT & TEST PARAMETERS

For these experiments, the LDS300M equipped with a green laser has been used as the machine configuration in our lab.

We tried to cut the Si sample with multi pass condition and single pass condition.

In the table below, the optimized processing parameters used in the experiments are summarized:

	<b>SYSTEM</b>	Machine type	LDS300M
	<b>MICROJET<sup>®</sup> PARAMETER</b>	Nozzle diameter MicroJet <sup>®</sup> diameter Water pressure Assist gas	50 $\mu m$ 41.5 $\mu m$ 100 <i>bar</i> He
	<b>LASER PARAMETER</b>	Laser type	L101G
		Wavelength	532 <i>nm</i>
		Pulse frequency	15 <i>kHz</i>
		Average power	30 <i>W</i>
	<b>CUTTING PARAMETER</b>	Cutting speed	*1) <i>mm/s</i>
		Number of passes	*1)
		Fixture	Vacuum chuck

Step	Geometry	Cutting speed	Number of passes
1	Notch	0.1	1
2	Circle $\phi 200mm$	25	5
3	Circle $\phi 200mm$ last pass	1	1



**SYNOVA**

Ch. Dent-d'Oche  
CH-1024 Ecublens  
Switzerland  
www.synova.ch

# APPLICATION REPORT

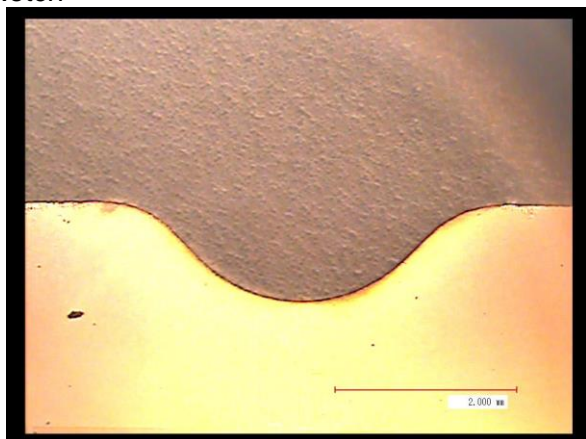
Report No: 123-10

Sample No: <<box>>

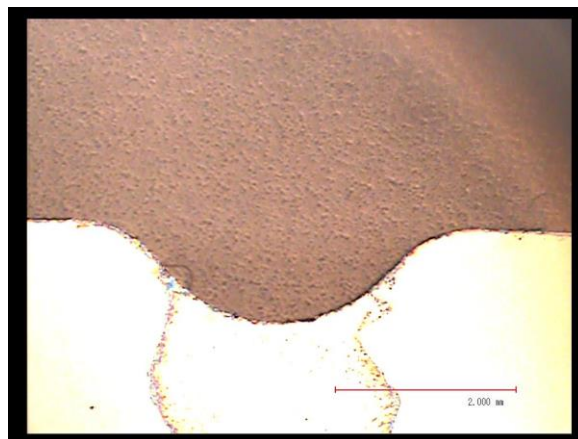
**CONFIDENTIAL**

## RESULTS

### Notch



**PICTURE:** Microscope image of the wafer edge after processing (bright field illumination; top view)



**PICTURE:** Microscope image of the wafer edge after processing (bright field illumination; back view)

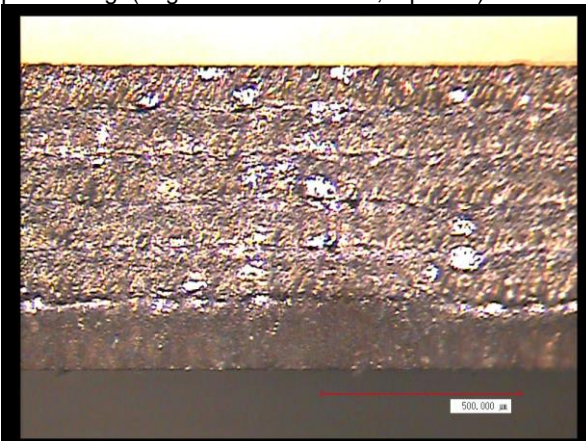
### φ200mm edge



**PICTURE:** Microscope image of the wafer edge after processing (bright field illumination; top view)



**PICTURE:** Microscope image of the wafer edge after processing (bright field illumination; back view)



**PICTURE:** Microscope image of the wafer wall after processing (bright field illumination; side view)

- The table below summarized the customer requirements and our expectations.

	What are your priorities? (please put a cross)	Quantified expectations or improvements
• Chipping/Cracks:	2	
• Other1	Alignment positioning to make notch.	Manual mode is no problem at MMC.
• Other2	Notch shape	We followed the SEMI standard.

## CONCLUSION

The Si samples were investigated on SYNOVA LDS300 machine. This machine is based on the MicroJet<sup>®</sup> technology and combines the advantages the high energy pulsed laser with a hair-thin water jet.

We could obtain very good quality for Si downsizing.

- Chipping: We didn't see any serious chipping on front and back side.
  - Notch shape : very good
  - Process time : 15min / wafer
- If you provide more wafers, It could be optimized the process speed.

For alignment positioning to make notch

We showed you the following procedure by manual operation on MMC demo machine.

1. Centering with  $\phi 300\text{mm}$  wafer edge .
2. Alignment the angle with scribing street on the wafer
3. Confirmation of the special pattern

We thank you for your interest in our technology and we hope our results meet your requirements. Our sales will contact you soon to obtain a feedback about the analysis of these results and to discuss with you the further steps.