

Full-automatic Laser Stealth Dicing Machine for Silicon Wafer



目录

CONTENTS



Introduction



Specifications



Workflow



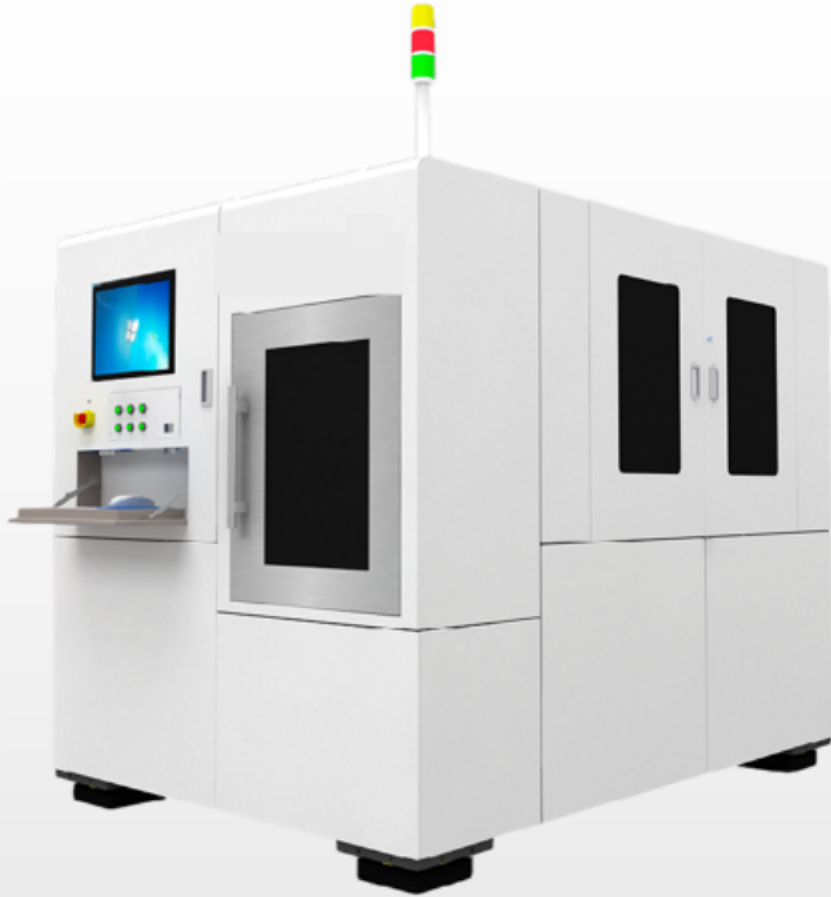
Featured Functions



Process Flow



Product Quality



dicing solution for silicon wafers of MEMS, RFID sensors. Its Product includes microPhones, Pressure sensors, thermal sensors, accelerometer,gyroscopes and gas sensors etc.

Features:

- **Advanced laser engine specially developed for microphone MEMS;**
- **Exceptional dicing quality with excellent particle control;**
- **High-precision optical recognition system providing automatic positioning and focusing;**
- **High-precision moving platform;**
- **Zero-kerf dicing;**
- **Compatible to full-automatic process for 6inch, 8inch, 12inch wafer;**



Item	Details
Component	Full-automatic load/unload system
	High-precision optical recognition positioning/focusing system
	Real time laser auto-focusing system (AF System)
	Laser and optical system
	High-precision X/Y linear platform system
	High-precision DD rotation axis system
	ESD protection systems
	Marble base
Emergency off	Equipped with EMO(Emergency Off)
Product protection	Collision protection; drop protection during power outage
SECS/GEM	Support
Focusing	Auto-focusing
Aligning	Auto-aligning
Calibration	Auto-calibration
Authorization	Three-class authorization(Admin, Engineer, OP)
Logging	Alarm logging, operation logging
Recipe	Recipe editable; multi-pitch product supported;
Dicing mode	Full-automatic/manual
Kerf check	Viewable via image
Power check	Manual/auto check
Focus position monitoring	Equipped with AF system; traceable focus position log
Code scanning	Auto/manual



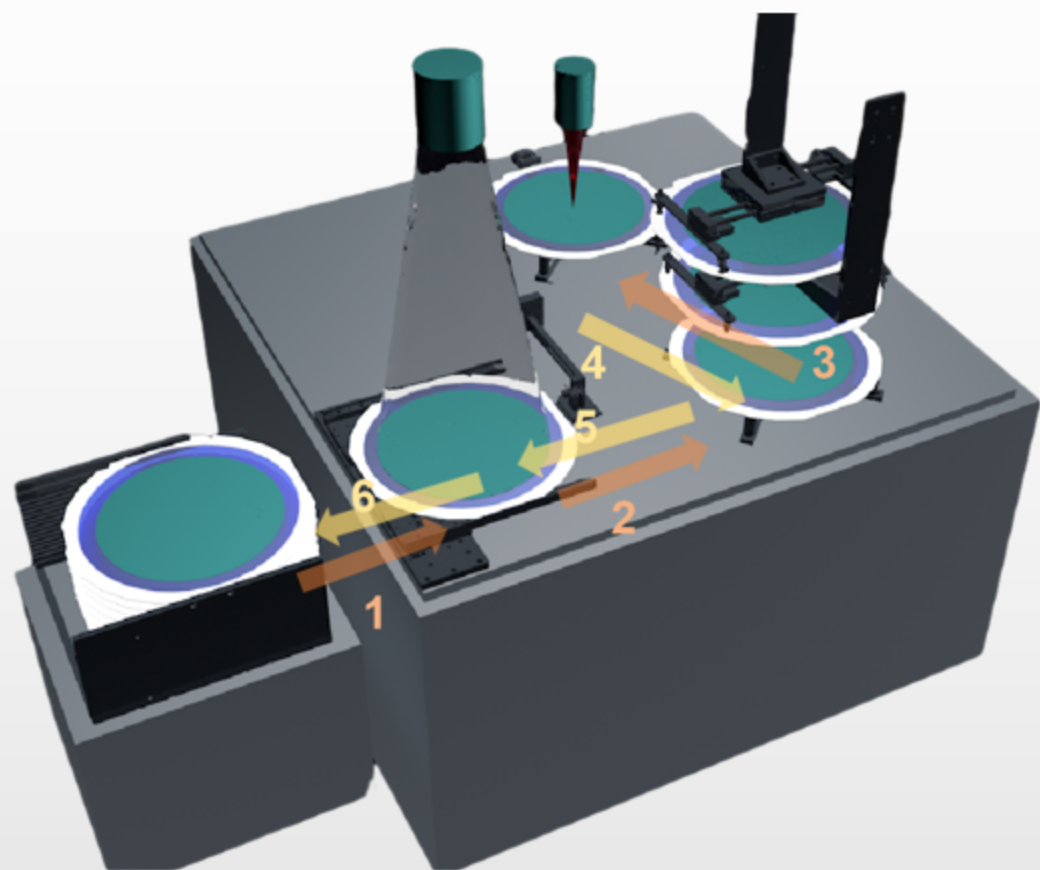
Specifications

SPEC	
Item	Specification
Operation mode	Manual/auto
X-axis travel distance	380mm
X resolution	0.5um
X-axis velocity	MAX1000mm/s
Y-axis travel distance	550mm
Y resolution	0.1um
Y-axis repeatability accuracy	±1μm
Z-axis travel distance	15mm
Z resolution	0.1um
Z-axis repeatability accuracy	±1μm
Rotation resolution	5036000ppr
Rotating axis travel range	300°
Rotating axis repeatability accuracy	±2 arcsec
Low-power CCD	1.25 megapixel
High-power CCD	1.25 megapixel
Focus CCD	0.30 megapixel
Wide-angle CCD	5 megapixel



Specifications

NO	Item	Details	Note
1	Environ. temp.	20°C~25°C	
2	Environ. humidity	40-60%	
3	Air cleanliness class	Class 1000 or above	
4	Air pressure(CDA)	0.5-0.8MPa, reserve Φ12mm interface	
5	Power supply	220VAC±10%, 50/60Hz, 10A	
6	Ground grid	Comply to GB standard	
7	Power fluctuation	<5%	
8	Machine dimension	2070mm×1420mm×2238mm (including stack light)	
9	Machine weight	Net weight 2.7 ton	
10	Area to avoid	• Area close to wastes, dust or oil; • Area that vibration or shock exists; • Area where drugs or explosives is accessible; • Area close to high-frequency jammer source; • Area that temperature alters abruptly; • Area that contains high concentration of CO₂, NO_x or SO_x	

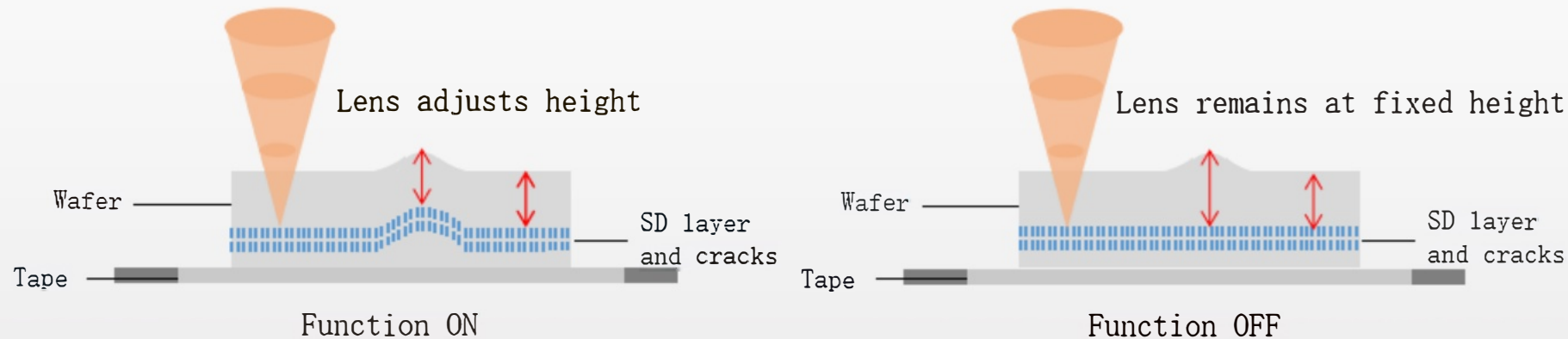


- ① The clamp carries a wafer ring from a cassette to Mid Point for alignment and contour recognition.
- ② The upper arm sucks the wafer ring and carries it to Loading Point
- ③ The chuck table moves to Process Point for laser process
- ④ The processed wafer is carried to Unloading Point
- ⑤ The lower arm carries the processed wafer to Mid Point for alignment
- ⑥ The clamp carries the aligned wafer back to the cassette

Featured Function - AF System

equipped with **Real Time Laser Auto-focusing System**(a.k.a. **AF System**).

The system uses non-contact distance measurement that ensures any laser focus position is adjusted according to thickness variation in real time, resulting in uniform depth in scanning direction for each laser scanning path.



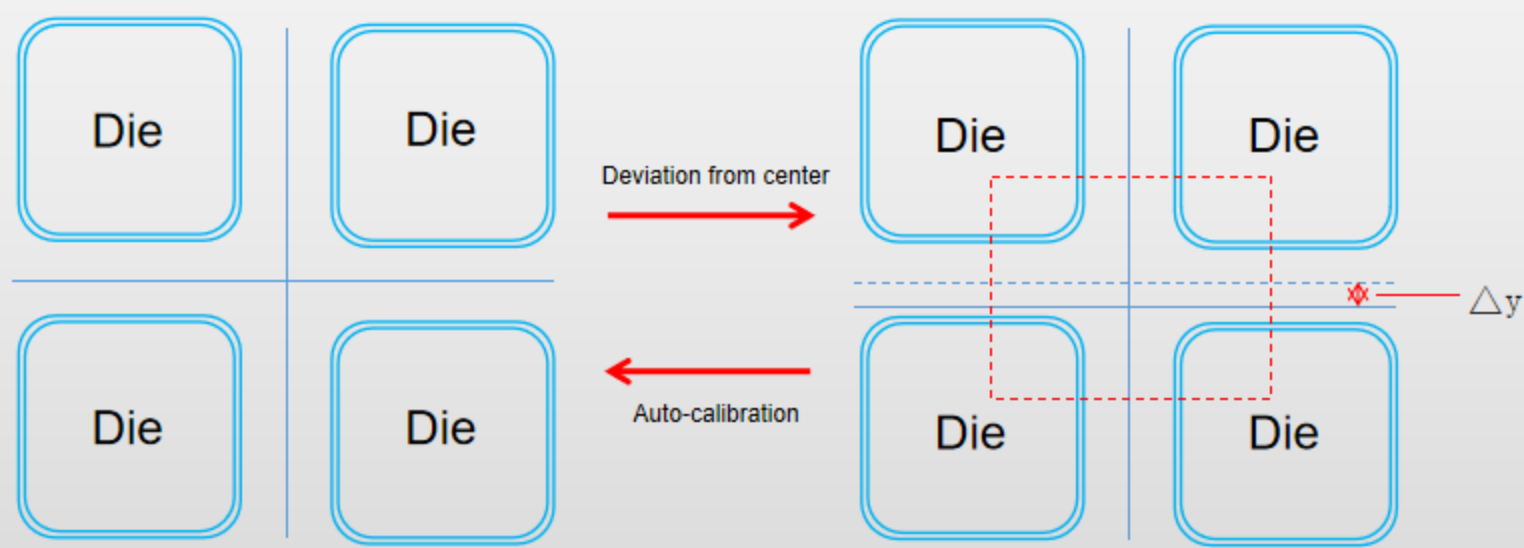
When operating under auto-mode, AF system records data which helps it constantly determines AF System operating status. Abnormal status would trigger alarm and stop any undergoing operation.

Featured Function - Auto-calibration

Auto-calibration function enables dicing process to pause for automatic position dicing adjustment ensuring kerfs to be in the middle of scribing lanes.

Details:

1. High positioning accuracy (within 1um) ensures the start dicing position in the center of scribing lane.
2. Due to dimension tolerance and error accumulation, dicing position occasionally deviates slightly from the middle line of scribing lane before being automatically calibrated . (See figure below.)
3. Number of processed lanes before every Auto-calibration process can be customized;
4. The configurable Δy is defined as calibration range. When deviation exceeds Δy , Auto-calibration demands manual operation.

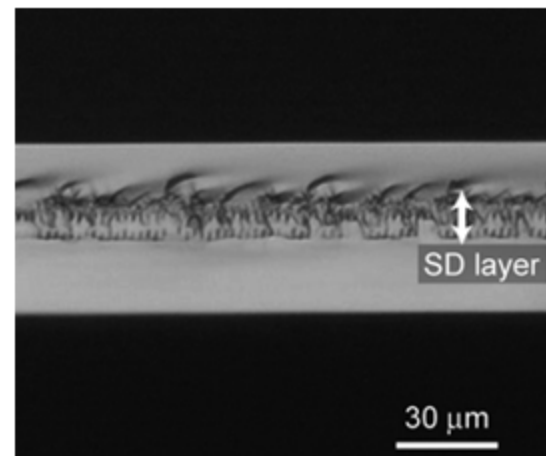
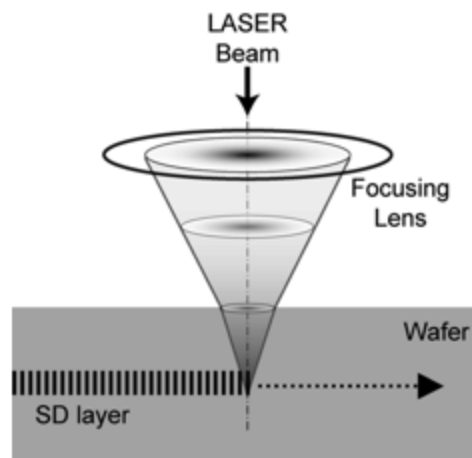




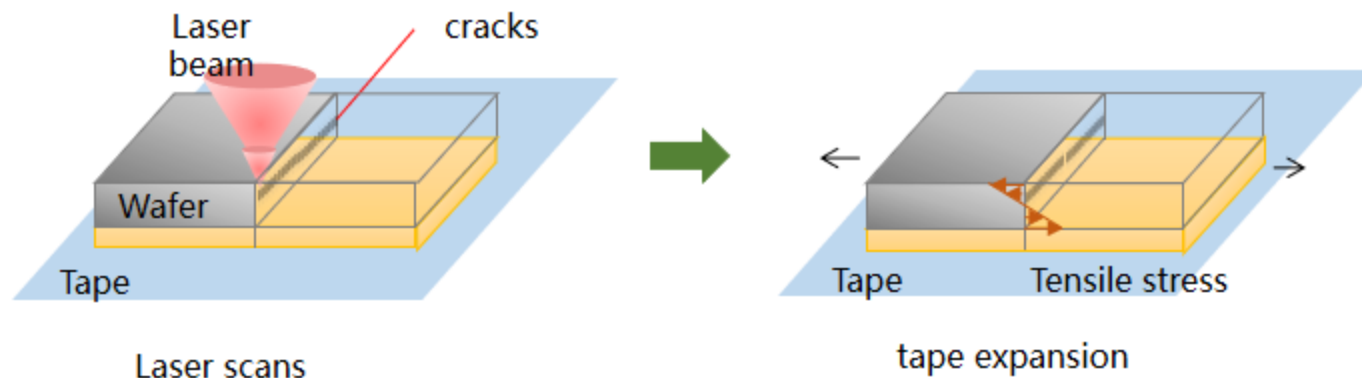
Process Flow

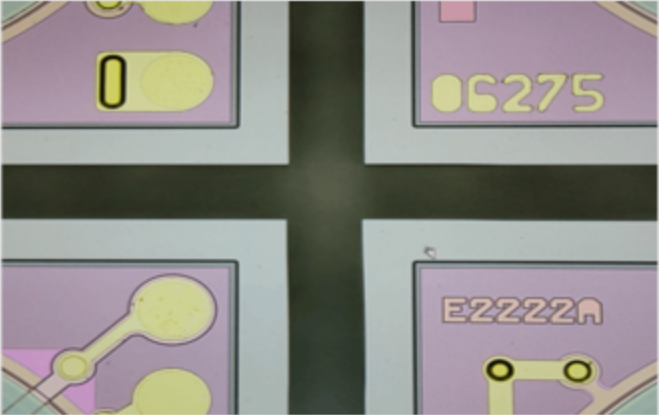
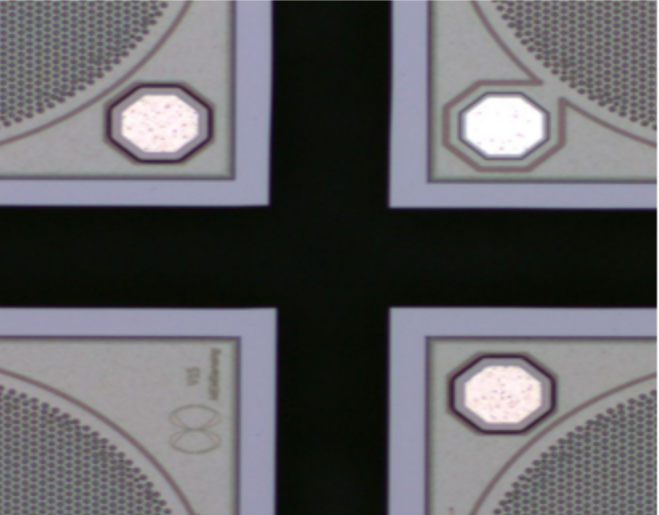
Stealth Dicing

Stealth dicing is a technique that focuses laser into material to form modification layer. The process makes scribing lanes become vulnerable to inner stress or outer force therefor separates processed wafers into single dies.



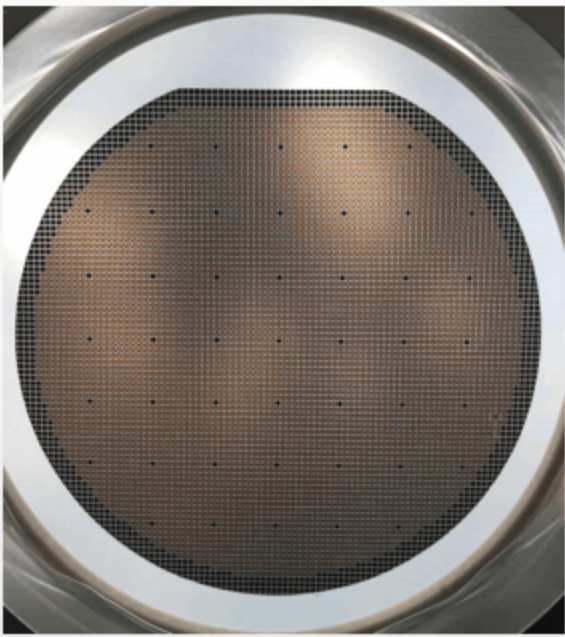
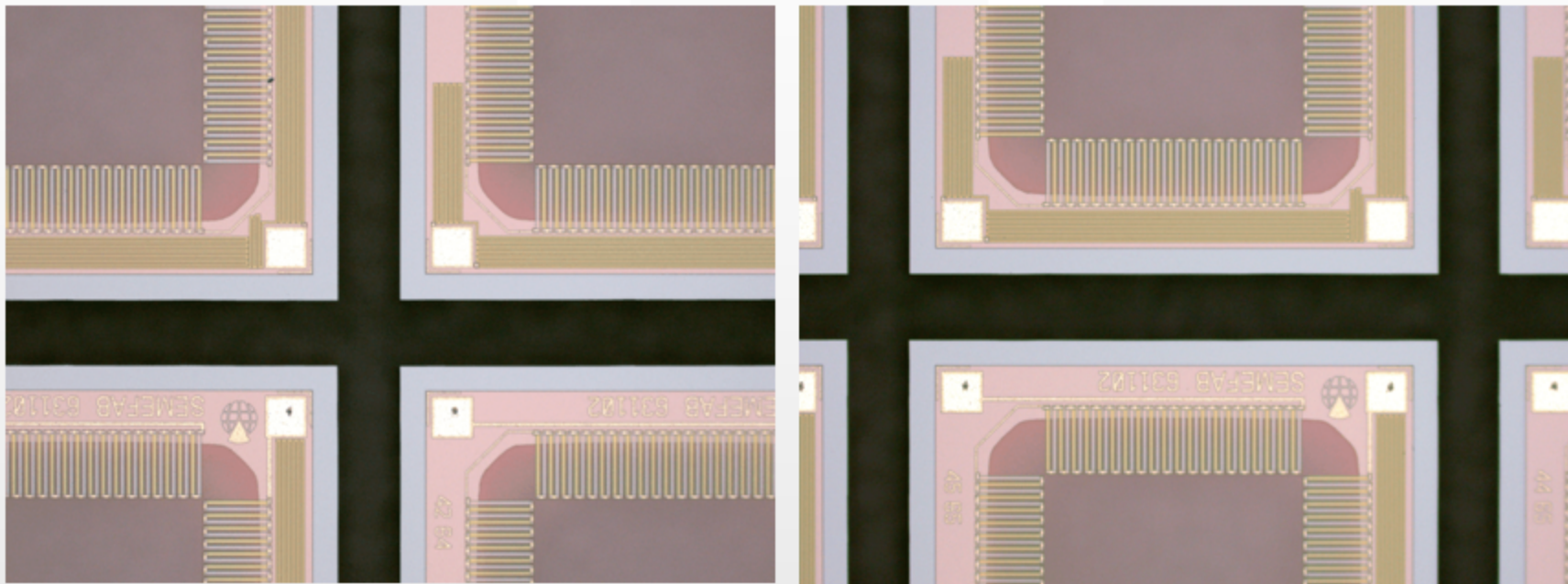
Process flow:



No.	Item	Inspection method	Result	Note
1	Si MEMS	Thickness:400μm; metalloscope 100X		No chipping, crack or meandering
2	Si MEMS	Thickness:400μm; metalloscope 100X		No chipping, crack or meandering



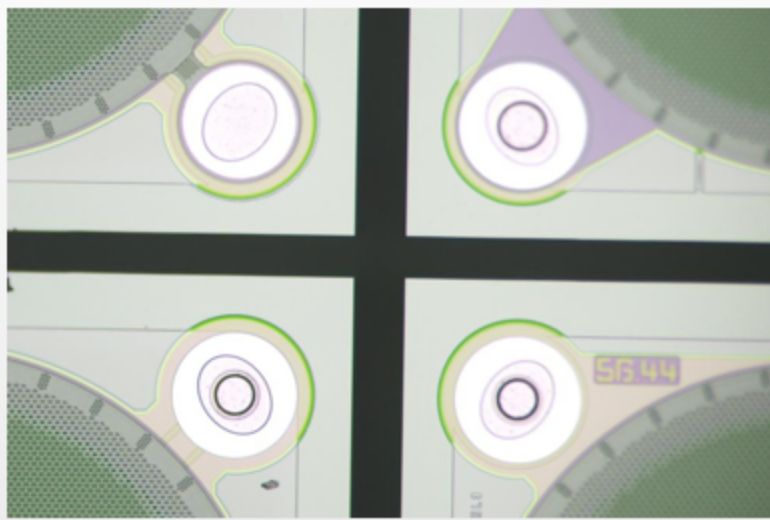
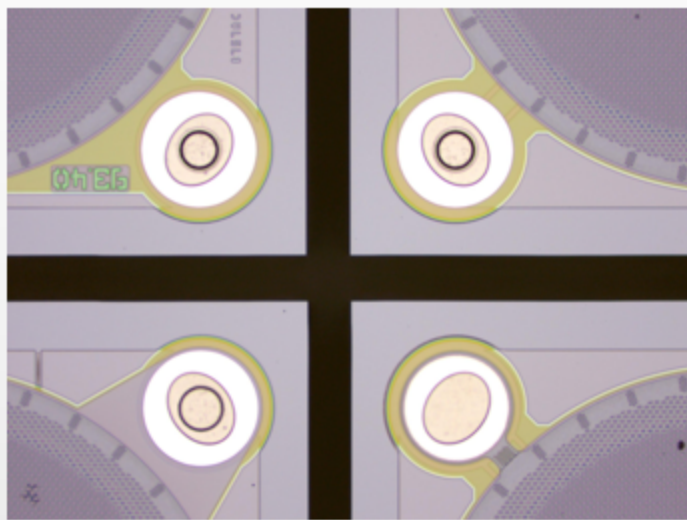
Thickness/ μm	Substrate	Size/inch	Die size/mm
400	Si	6	1.6 $\times$ 1.6



- No chipping
- No meandering
- No unseperated dies



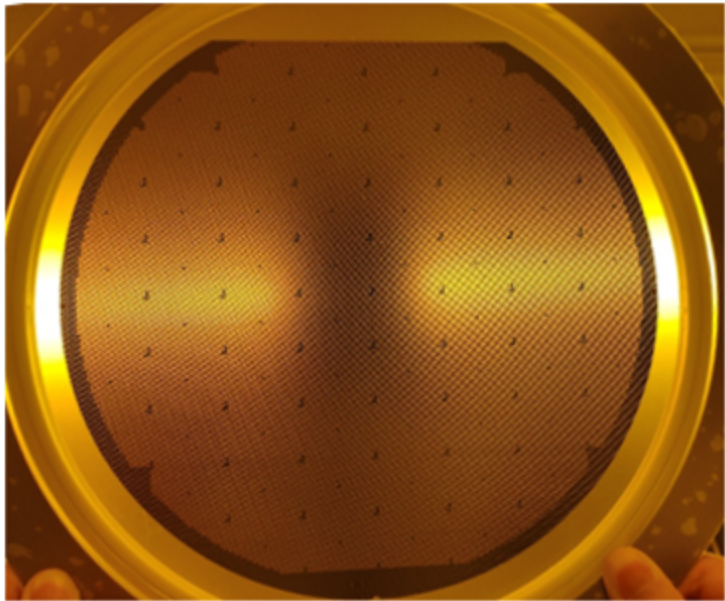
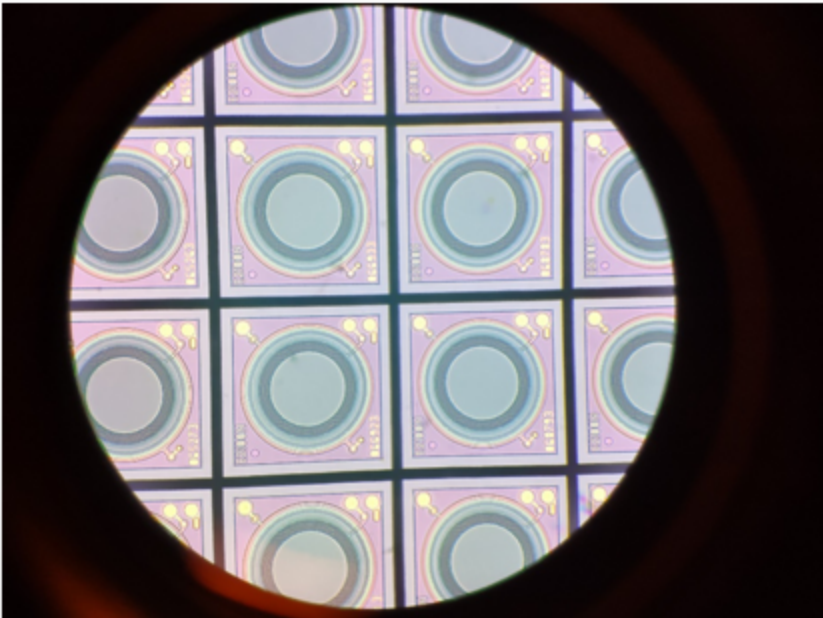
Thickness/ μm	Substrate	Size/inch	Die size/mm
400	Si	8	1.0 $\times$ 1.0



- No chipping
- No meandering
- No unseperated dies



Thickness/ μm	Substrate	Size/inch	Die size/mm
400	Si	8	1.0 $\times$ 1.0



- No chipping
- No meandering
- No unseperated dies

The background is a deep blue gradient. Overlaid on this are numerous thin, light blue lines that connect small, glowing white dots. These dots and lines are scattered across the frame, creating a sense of a vast, interconnected network or a complex data structure. The lines and dots are more concentrated in the lower right quadrant, while the upper left is mostly a solid blue gradient.

THANK YOU !