Automatic

LASER DICING SYSTEM

Incorporating the Technology of Water Jet Guided Laser (Microjet®)

200 series

LDS 200 M

LDS 200 C

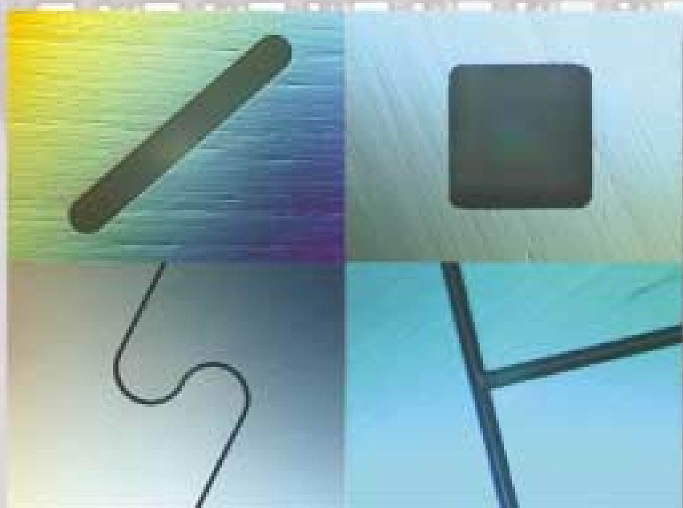
LDS 200 A

Expand your capabilities with the latest development in laser technology

The LDS 200

Ease of use
A large color TFT flat screen with touch panel allows comfortable operation of all machine functions. Using the latest generation of real-time processors creates an entirely new concept in CNC control and man-machine communication.

Low Cost of Ownership
The LDS incorporates the combined technology of water jet guided laser to eliminate time and money spent on conventional saws: no blade change, no blade dressing. The LDS has only negligible need of consumables. In fact, the laser beam has no wear.

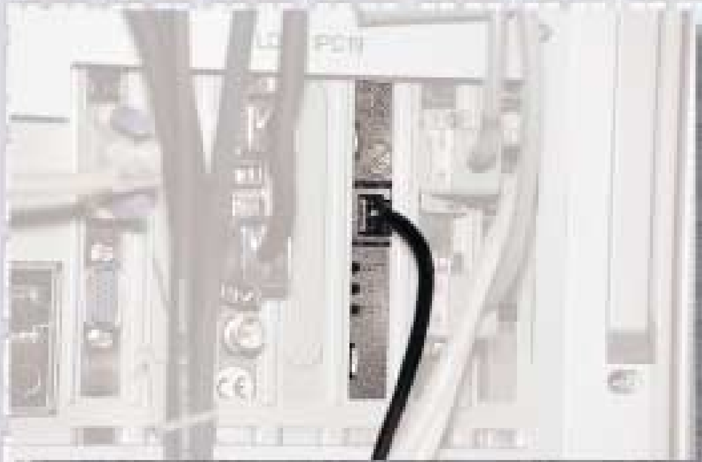


New Capabilities
The laser allows multi-directional cutting, a totally new feature, allowing new designs in chip geometry. Holes, slots, T-cuts, round chips, any contour is cut with the same precision as in standard patterns.

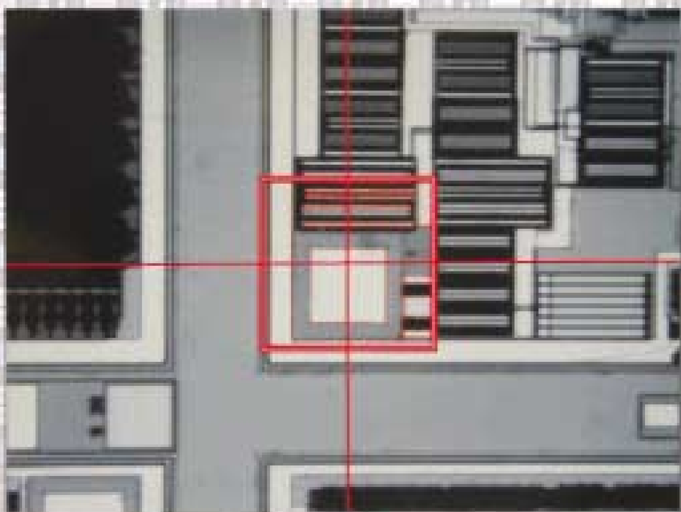
Flexibility
The LDS is available with a Megasonic-cleaning station and cassette loading unit, to tailor the LDS to your demands of automation. The basic version is easily upgradeable to a fully automatic, from-cassette-to-cassette dicing system.

0 at a glance

High Accuracy
A stable structure made of granite is the key for high precision, ensuring an outstanding, dynamic response. Linear motors are used in achieving high speed and accuracy. Furthermore, the system is designed for future cutting speeds made possible by new laser sources.



Reliability
Component parts for the LDS are backed by the reliability of our carefully chosen suppliers, each one a market leader within their own field. In addition, a vast array of sensors provides constant control and allows continuous diagnostic transparency thru a modem connection.



Fast Process Control
Due to the integration of the latest software in image processing, nothing is faster in the market for alignment and quality control. Wafer alignment and kerf check is executed in milliseconds.

High Processing Speed
Especially in the case of thin wafers, unprecedented speeds have been achieved resulting in a significant increase in throughput. In addition, throughput becomes faster and simpler due to no tool change.

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Specifications LDS 200

AXES	
Type	XY-Table with separate axes on granite base
Drive	Linear motors
Useable working area	240 x 240 mm
Maximum stroke (X x Y)	600 x 400 mm
Accuracy	< 3 µm
Repeatability	< 1 µm
Maximum axis speed	600 mm/s
Maximum acceleration	20 m/s^2
Index	0.1 µm
LASER	*can be installed outside of clean room*
Type	Solid state Nd:YAG, pulsed
Wavelength	1064 nm
Average power	200 W
Laser beam transmission	Optical fiber, length 10 m
WATER PUMP	*can be installed outside of clean room*
Type	Two-cylinder pressure amplifier
Water flow	Average 0.05 l/min
Water pressure	50 to 500 bars
Pressure transmission	Flexible water hose
OPTICAL HEAD	
Type	Projection of fiber exit into water jet nozzle
Image ratio	4:1, 6:1 or 8:1
Nozzle diameter	50 µm, 75 µm or 100 µm
Alignment	Vision controlled
VISION SYSTEM	
Type	Pattern matching
Magnification	Two-level (high/low magnification)
Optical magnification	x 0.5 to x 5.0
Illumination	Coaxial and ring light, fiber-coupled
Automatic alignment	by image processing, alignment time < 5 s
Quality control	Kerf check by image analysis
WORKPIECE	
Wafer size	25 to 203 mm (1″ to 8″)
Applicable tape	LaserTape®
Applicable tape frame	Standard frame types (5″, 6″ or 8″)
CLEANING STATION LDS 200 C/A	
Cleaning	Megasonic water jet
Drying	Front and back side
LOADING STATION LDS 200 A	
Cassettes	Max. 3 cassettes (5″, 6″ or 8″)
Frames	Single frame drawer
UTILITIES	
Electrical power	3 x 400 V or 3 x 200 V, 50/60 Hz
Total power consumption	20 kVA
Air pressure	5 – 6 bars, oil free
Laser cooling water	Max. 25 l/min, max 16°C, industrial water
DI-Water flow for cutting	Average 0.05 l/min, < 0.3 µm, degasified
DI-Water flow for cleaning	Max. 1 l/min, DI-water, < 0.3 µm
DIMENSIONS/WEIGHT	
Basic machine (W x D)	LDS 200 M: 1140 x 820 mm, 800 kg LDS 200 C: 1140 x 1100 mm, 900 kg LDS 200 A: 1560 x 1100 mm, 950 kg
Laser (W x D)	2550 x 650 mm, 900 kg
Water pump (W x D)	1300 x 700 mm, 350 kg

Options

Transformer 200 V/400 V
Vacuum pump
De-ionization
Fiber length 20 m
Uninterruptible Power Supply
Bar code recognition on cassettes or frames

The above specifications are subject to changes due to technical improvement.
The Laser Dicing System incorporates the worldwide patented technology of water jet guided laser.

This machine conforms to CE and CDRH regulations.

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COMPARISON of DICING by SAW and LASER-Microjet®

	Abrasive Sawing		Laser-Microjet® Cutting	
Cost of Ownership :				
Principal Consumables of machine	Blades		Laser lamps or diodes	
	DI-water		Water jet nozzles	
			Electricity	
Costs of machine consumables		9 :	1	
Dicing tape	Saw Tape		LaserTape®	
Costs of tape		1 :	1	
Investment costs	Fully automatic system	1 :	1.6	Fully automatic system
Clean room space		1 :	1.1	
Operator assistance		1.6 :	1	
Throughput :	Wafer thickness 50 microns	1 :	5	
	Wafer thickness 300 microns	1 :	1	
	Wafer thickness 700 microns	3 :	1	
Dicing quality :				
Consistency in dicing quality	Limited because of blade wear		Excellent because of no tool wear	
Chipping	Yes		No	
Fracture strength for thin wafers	Low		High	
Minimum kerf width	25 microns		40 microns	
Particle contamination	Partial		Partial	
Processing capabilities :				
Cutting	Only straight cuts		Multi-directional cuts	
Scribing	Only straight lines		Multi-directional lines	
Drilling	Not possible		Holes, slots	
Marking	Not possible		Any contour	
Inking	Not possible		Possible	
Chip geometries	Only rectangular, hexagonal, one size on wafer		Round, hexagonal-compact, rectangular with different sizes on wafer, L-shape, ... any imaginable 2D-contour	

Summary :

- Although the investment costs are higher for the laser than for the saw, the savings gained in consumables is huge, resulting in an economizing of up to $ 1.5 Million (over 5 years).

- The advantage in high throughput in the case of thin wafers allows the laser to replace several saws. In addition, the indicated laser dicing speeds in the table do not represent process-limited restrictions. The Laser Dicing System is prepared for new generations of lasers.

- The benefits in dicing quality of a non-mechanical ablation by the laser are significant, the kerf width may be reduced in the near future so that narrow street widths of 50 microns are possible.

- The point-shape tool laser allows multi-directional processing. This present "nice-to-have-feature" will become in the future all the more important. The chip designer will benefit of totally new possibilities with the laser. Chips can be adapted to an optimal implementation, for example round chips, L-shape chips, hexagonal chips, etc. Holes and slots can be drilled on the same machine and defective chips can be definitively destroyed by the laser.

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