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5330

UV Laser µVia Drill

High Power Diode-pumped UV laser for high productivity

Repetition frequency of up to 70 kHz

High-quality vias as small as 25 microns

Higher accuracy for improved wiring density

Beam Shaping Capability

Automatic Mode Change

High accuracy ablation of soldermask resist

ESI's Model 5330 UV Laser µVia Drill is the premier choice for high-quality microvias in small-geometry circuit boards and electronic packages. The Model 5330 incorporates a new high power diode pumped laser with pulse repetition frequency of up to 70 kHz.

The system is designed with the capability to have various optical configurations to meet the needs of HDI and/or IC packaging markets. The combination of high power and high pulse frequency enables the system to cut copper with excellent quality and productivity rates of up to 15,000 vias per minute.

The optional shaped beam capability guarantees excellent quality and high productivity to improve registration and to do direct ablation of non-reinforced dielectric and soldermask material. The shaped beam is transmitted through an aperture that results in a highly circular beam of uniform intensity. It produces highly circular vias, high throughput, and excellent bottom copper quality with no resin residue. It can produce more than 30,000 vias per minute in single layer laminated materials up to 21" x 25". An optional feature, Mode Change, allows the system to automatically switch between the raw gaussian beam and the shaped beam. The Model 5330 comes with a high accuracy option of ± 10 µm over a 300 x 300 square mm field. No external water or gas is needed allowing for easy installation and low operating costs.

5330

SPECIFICATIONS SUMMARY

Laser Beam Positioning

Type: Cross-axis with galvanometer (Laser beam moves in XY, part moves in Y axis)

Panel Size: 21" x 25" (533 mm x 635 mm)

Resolution: < 0.00004" (1 µm)

Accuracy: ± 0.0008" (± 20 µm)

Maximum Average Velocity: 20"/s (500 mm/s)

Typical Point-to-Point Move Time: 1,600 points per second

Controller: DSP based, single-board 4 axis

Main Stage

Type: Cross axis

Motor Type: Brushless linear motors

Feedback: Incremental encoder

Secondary Stage

Type: XY deflection

Motor Type: Moving magnet galvanometers

Feedback: High resolution capacitance transducers

Lens Type: Flat field, telecentric

Beam Angle from Vertical: < 2°

Programmable Z Stage

Resolution: ± 5 µm

Accuracy: ± 25 µm

Maximum Average Velocity: > 10 mm/s

Repeatability: ± 25 µm

Type of Motor: DC Servo Motor

Travel: 1"

Laser Power Control

Long Term Stability: ± 2.5%

Repeatability: ± 2%

Feedback: Closed Loop

Automatic Alignment and Illumination

Camera Field of View: Coarse is 30 mm and Fine is 1.5 mm diagonal

Resolution: 570 x 485

Accuracy: ± 5 µm

Capture Time: < 500 msec

Monitor: 15" flat screen SVGA

Camera Type: CCD, monochrome

Illumination: Red LED ring

Laser

Type: High power diode pumped, repetitively Q-switched Nd: YAG

Operating Mode: TEM_{oo} (gaussian power distribution across the beam)

Wavelength: 355 nm

Pulsewidth: 60 nsec typical

Pulse Stability: > 90%

Pulse Rate for Via Formation: 30-70 kHz

Average Power: > 5.7 W @ 30 kHz at work surface

System Control Computer

Type: IBM® PC Compatible

Processor: Pentium® III 500 Mhz, MMX™

Memory: Minimum 64 Mbytes

Hard Disk: 4 Gbytes or larger

Flexible Disk: 1.44 Mbyte 3.5"

Backup Device: 1/4" tape drive

Monitor: 15" SVGA

Input devices: Keyboard and trackball

System Software

Operating System: Real-time UNIX (LynxOS)

Operator Interface: X-windows/Motif

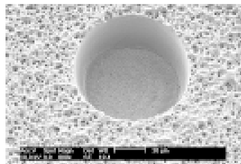
Network Compatibility: TCP/IP, NFS

Toolpath Generation Software: esiCAM

Drill File Formats: DXF, ASCII, Excellon I and II, Sieb & Meier and Gerber

Mode Change (Option)

The system automatically switches between the raw gaussian and shaped beam. This switch is programmable through the system software giving the versatility to drill through vias or cutting flex material using the guassian beam and blind vias through pure resin using the shaped beam



75 µm via in
45 µm epoxy resin

Shaped Beam and Imaging (Option)

Via Roundness: > 90%

Via Size: ≥ 25 µm

High Accuracy (Option)

± 0.0004" (± 10 µm) over (300 mm x 300 mm)

Roll-to-Roll Capability (Option)

Software, mechanical and electrical modifications provide the capability to attach and interface web handlers to the system with very little effort for continuous roll processing (web handler not provided by ESI)

Autoloader (Option)

Panel Exchange Time: < 10 seconds

Input and Output Stack Height: Up to 4" (102 mm)

Panel Size:
Maximum: 21.5" x 25" (546 X 635 mm)
Minimum: 10" x 12" (254 X 305 mm)

Panel Thickness:
Maximum: 0.1" (2.54 mm)
Minimum: 0.008" (200 µm)

Maximum Panel Weight: 5 pounds (2.3 kg)

Floor Space with Autoloader: 72 ft.^{2} (6.6m^2)

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