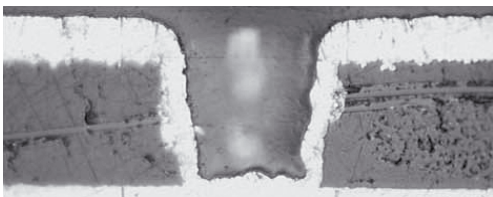
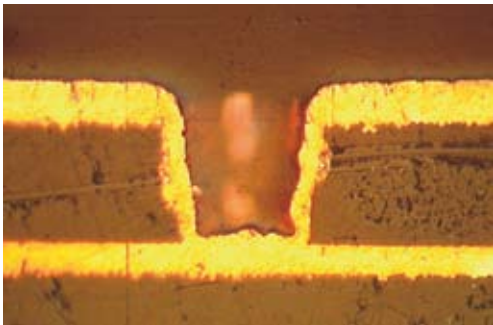


Application Report
LPKF MicroLine UV Laser Systems
Drilling Microvias in HDI circuit boards



Drilling of microvias in various materials with hole diameters down to 50 µm

Multilayer PCB technology requires reliable and economic production technology for through and blind holes to establish an electrical connection between the various layers of the multilayer board. High density interconnects (HDI) in particular are currently characterised by connecting holes with diameters down to 50 µm. Holes larger than 200 µm will continue to be created mechanically as before. Laser processing is an efficient technology for the series production of microvias with diameters smaller than 200 µm.

Drilling with a UV-laser involves only one sequence of operation to drill through the copper covering layer as well as the epoxy resin and glass fibres if present. When doing so, the laser energy is controlled so precisely that the lower conducting layer is only slightly roughened and cleaned at the same time. Unlike CO₂ and hybrid laser systems, the LPKF MicroLine UV laser system therefore does not require any upstream etching process or a second laser.

UV-laser processing is characterised by short pulse lengths in the nanosecond range with high pulse peak powers. Combined with a higher level of material absorption when compared to longer wavelengths, material ablation is carried out with considerably less thermal influence on the material. This avoids the delamination of copper and dielectric, the pink ring effect is significantly minimised as well. The laser processing therefore guarantees excellent hole quality combined with high throughput.

Microvias can be drilled in RCC, FR4 and FR5, as well as Teflon® and Thermount®.



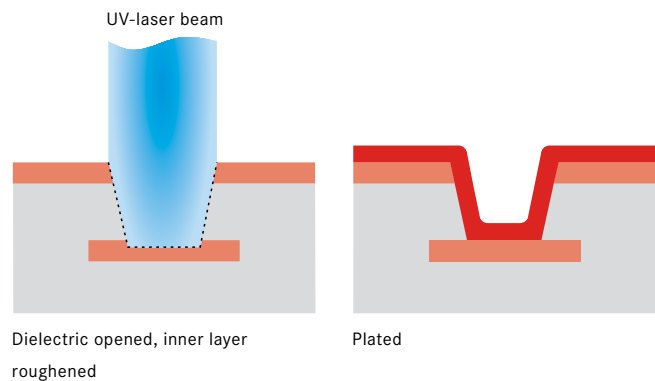
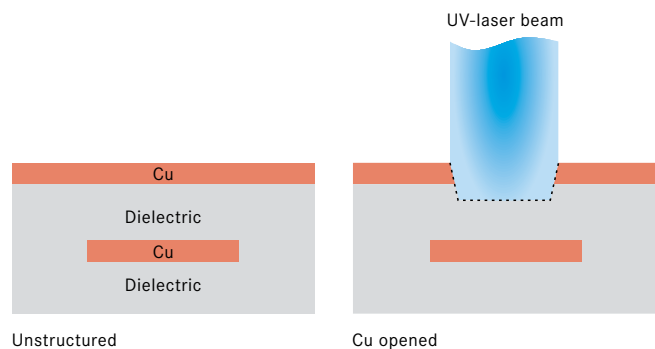
Microvia d=70 µm in 18 µm Cu and 50 µm RCC



Microvia d=75 µm, 18 µm Cu, 63 µm 1080

Advantages of UV laser drilling with MicroLine UV systems

- Various materials drillable
 - RCC
 - FR4 und FR5
 - Teflon®
 - Thermount®
- No delamination and reduced pink ring effect
- Automatic correction of position and material distortion by fiducial registration and online scaling
- High precision and position accuracy of holes
- Ideal hole geometry



LPKF MicroLine UV Systems

- Frequency-tripled Nd:YAG-laser operating at 355 nm wavelength for the production of ultra-fine structures
- Substrate dimensions up to 18" x 24"
- Scanner system for highest structuring speeds
- Telecentric optics for vertical edges
- High-precision, highly dynamic x-y table
- Automatic substrate handling
- Automatic alignment: camera-based vision system for fiducial identification and online scaling
- Automatic system calibration
- Input data formats: Gerber, HP-GL™, Excellon, DXF, etc.
- Debris extraction during processing

LPKF Laser & Electronics AG

Osteriede 7 D-30827 Garbsen Germany

Phone +49 (5131) 7095-0 Fax +49 (5131) 7095-90

info@lpkf.de www.lpkf.com