Application Report
Laser Direct Patterning (LDP) of thin metallic or organic layers for the production of ultra-fine conductor lines <15 µm
Laser Direct Patterning (LDP)
Production of ultra-fine conductors with structure sizes <15 µm by laser ablation in mask projection technique with excimer laser sources: The MicroLine technology replaces the complex photo-lithography and guarantees highest throughput especially in reel-to-reel processing.

LDP-Process

Process principle LDP

Thin metallic (Cu, Au, Al, Pd, Pt, ...) or organic layers (conductive polymers, organic dielectrics, ...) with thicknesses up to approx. 200 nm on flexible or rigid substrates are ablated and thus structured by using the mask projection technique. The UV-laser beam is expanded to an area through special optics. The layout to be structured is on a quartz mask. It is scaled down onto the substrate by means of special projection lenses. The laser ablation guarantees highest throughput.

LaserMicronics – your service partner
Benefit from the possibilities opened up by LaserMicronics: we produce small runs at attractive conditions for your application. Our system engineers are happy to answer all questions regarding your specific application.

Applications
The LDP process can be successfully used wherever ultra-fine conductors are required, in high-volume production in particular. Possible applications are:
- Sensor technology (e.g. interactive electrodes, temperature-sensors, bio-sensors, incremental pick-ups etc.)
- Medical sensors (e.g. Electrodes, connectors for medical sensors etc.)
- Semiconductor technology (e.g. OLED-displays, polymer electronics)
- Safety technology (e.g. inductive/capacitive elements for identification/protection)
- Electronic packaging (e.g. CSP-, BGA-package technologies)
- Telecommunication (cell phones)
- Consumer-electronics (digital CAM-corders, cameras)

Advantages of LDP Process
- No photo-lithography
- Reduction of technology steps
- High throughput especially in reel-to-reel process
- No aggressive etching process
- No chemicals
- Environmentally friendly
- Installation in existing production lines possible
- Yields >90%
- Recovery/Recycling of ablated material possible
- High resolution, precision and process speeds

Our systems: LPKF MicroLine Laser
- Excimer-laser sources operating at 248 or 308 nm
- Beam homogenisation
- Beam attenuator for control of laser energy
- High-precision, high dynamic x-y-tables
- Reel-to-reel handling for highest throughput (e.g. up to 300 sensor elements per second)
- Automatic substrate handling
- Automatic alignment
- Clean room processing
- Debris extract during processing
- Processing with assist gases possible

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