



**Lasered sizes  
up to 260 x 350 mm**

# **Lasering of Ceramics**

**Solutions for miniaturizing trends in microelectronics**

# Lasering – go for highest precision

Doing more with less: The ongoing miniaturization drives us to the next generation of electronic components. CeramTec has over 40 years experience in laser machining and is one of the biggest laser-houses worldwide. This allows us to produce a wide range of contour geometries, drill hole combinations, through holes and break lines without the need for time-consuming and costly tooling.

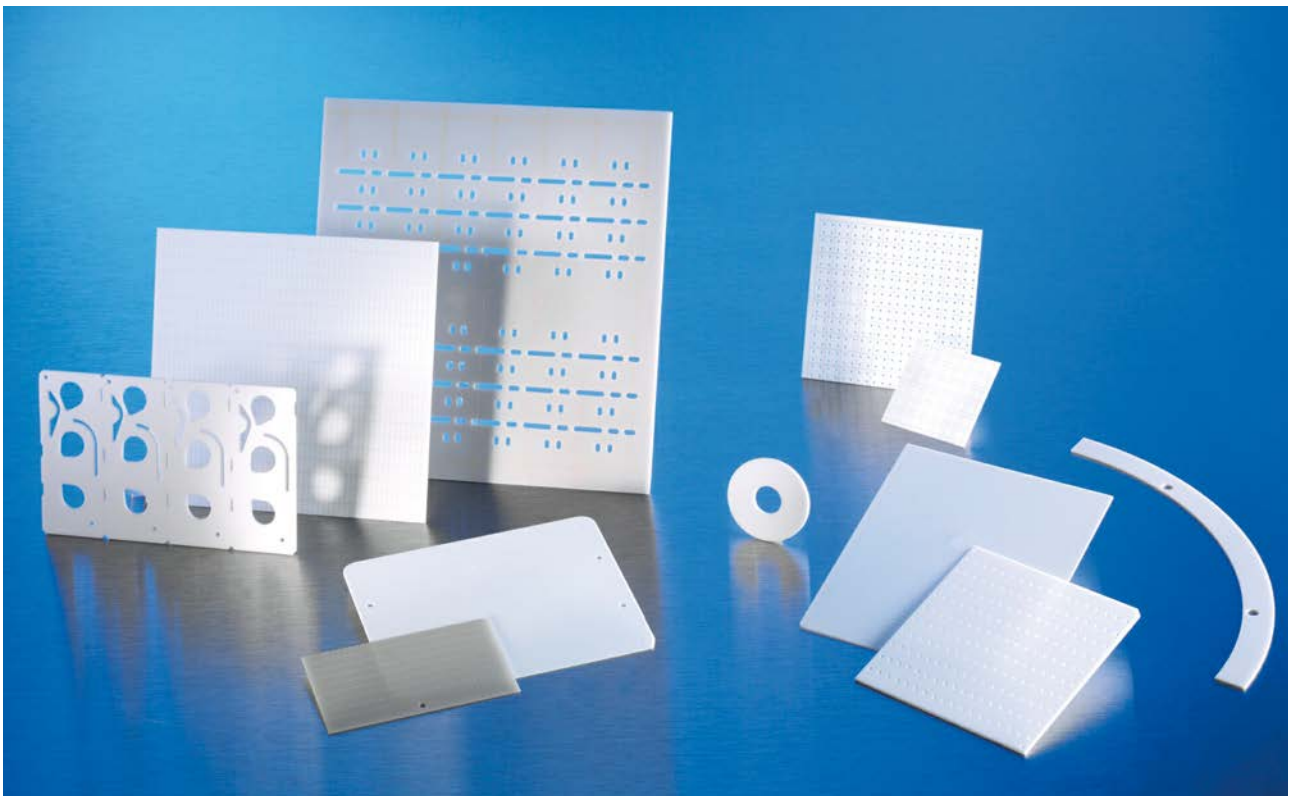
Computer-controlled lasers are used for scribing, cutting, drilling and structuring of ceramic substrates to extremely small tolerances.

## CeramTec's lasering-capabilities:

- complex geometries
- drilling for through-hole metallization,
- smallest cut-outs and diameters,
- double shots on crossing points,
- individual laser pitch and depth within the same scribe-line.

## Optimized Laserlines for small chip resistor sizes

- Substrates from 50 µm to 3 mm thickness (standard)
- Dimensions up to 260 x 350 mm<sup>2</sup> (other dimensions on request)
- Drilling diameter down to 40 µm
- Drilling holes up to 40.000/2x2 inch<sup>2</sup>
- Laser ridge < 5 µm



Lasered substrates

### WHY LASERING?

- high dimensional accuracy
- fast deliveries
- economical for small and large volumes
- fast design changes on demand
- flexibility for samples and prototyping
- no tooling

### Materials and surface quality

Material	Typical R <sub>a</sub> Value	Content
Rubalit® 708 S	< 0.6 µm	96%, Al <sub>2</sub> O <sub>3</sub>
Rubalit® 708 HP	< 0.6 µm	96%, Al <sub>2</sub> O <sub>3</sub>
Rubalit® 710	< 0.1 µm	99.6%, Al <sub>2</sub> O <sub>3</sub>
Alunit®	< 0.6 µm	Y-stabilized
Zirkonoxid®	< 0.6 µm	Y-stabilized

# CeramTec – your qualified partner for the electronics industry

CeramTec is one of the world's biggest international manufacturers of ceramics for advanced applications. The company has an over 100-year history and specializes in the development, production and customer support of innovative products made from ceramic materials. It is also a systems integrator for customers from the fields of electronics, medical engineering, automotive engineering, energy and environment and mechanical engineering. More than 3,600 Employees are worldwide active at production sites in Europe, USA and Asia.

## CeramTec Facts

- ISO-certified
- More than 100 years of experience
- Worldwide sales organization and manufacturing sites
- Biggest ceramics laser facilities in the world
- Laser express service

## CeramTec Contacts

### Electronic Applications

Try our products and solutions – see what we can offer you!

Email: [lasering@ceramtec.de](mailto:lasering@ceramtec.de)



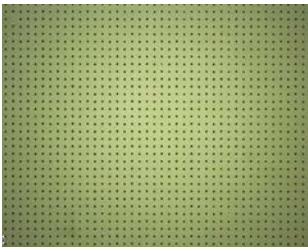
# Miniaturising – Applications & Trends

## Miniaturising Applications

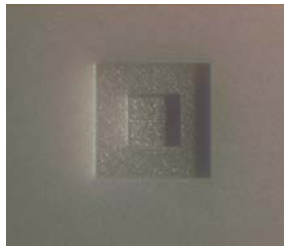
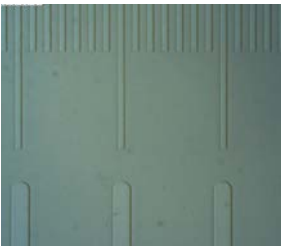
- High Power/Thin film Chip Resistor
- LED Packages
- Sensors

## 3D Structuring

- Micro holes

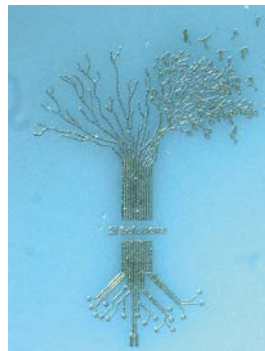
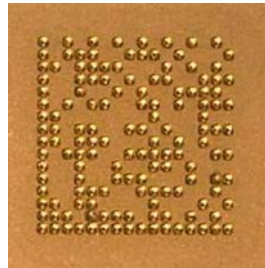


- Cavities
  - Complex structures
  - No residues on the surface (no glass)
- $R_a \leq 1 \mu\text{m}$  surface roughness

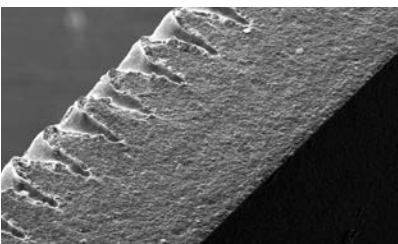


## Marking

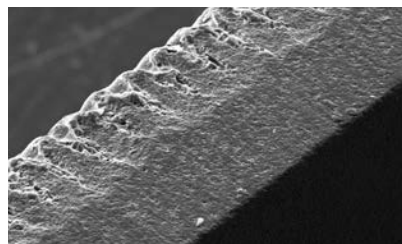
- Data Matrix Codes
- QR-Codes
- Symbols and Graphics
- Plain text



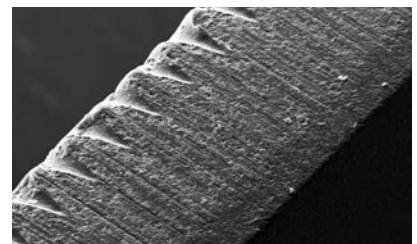
## Edge finished:



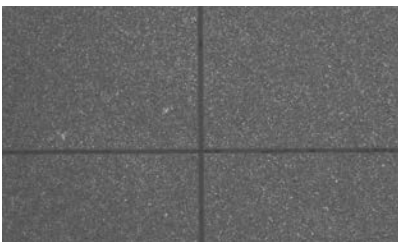
*Laser scribed Edge*



*Edge treated*



*Perfect Edge*



*Continuous groove*

## Tolerances for lasered substrates

Specification	Standard	Edge-treated	Perfect-edge
<b>Length and width</b>			
at nominal thickness ≤ 0.635 mm	+ 0.20 mm – 0.05 mm	+ 0.15 mm – 0.05 mm	+ 0.10 mm – 0.05 mm
> 0.635 mm ≤ 0.76 mm	+ 0.25 mm – 0.05 mm		
> 0.76 mm ≤ 1.27 mm	+ 0.30 mm – 0.10 mm		
Perpendicularity	within outside dimension tolerance	0.015 mm/ 25.4 mm	0.0125 mm/ 25.4 mm
Parallelism	within outside dimension tolerance		
<b>Distance from edge to snap-line/hole center</b>			
at nominal thickness ≤ 0.635 mm	+ 0.15 mm – 0.05 mm	+ 0.10 mm – 0.05 mm	+ 0.075 mm – 0.05 mm
> 0.635 mm ≤ 0.76 mm	+ 0.20 mm – 0.05 mm	+ 0.10 mm – 0.05 mm	
> 0.76 mm ≤ 1.27 mm	+ 0.25 mm – 0.10 mm	+ 0.10 mm – 0.075 mm	
Distance between snap-lines/hole center	± 0.05 mm		
<b>Hole diameter</b>			
at nominal thickness ≤ 0.63 mm: Ø ≤ 3 mm	± 0.05 mm		
≤ 0.63 mm: Ø > 3 mm	± 0.075 mm		
at nominal thickness > 0.63 mm: Ø ≤ 3 mm	± 0.075 mm		
> 0.63 mm: Ø > 3 mm	± 0.10 mm		
<b>Overall camber (measured between parallel plates, 45°)</b>			
at nominal thickness > 0.63 mm	Standard: 0.3% of length Premium: 0.2% of length		
at nominal thickness ≤ 0.63 mm	quoted upon request		
Thickness	± 10% <sup>1</sup>		

<sup>1</sup> but not less than +/- 0.05 mm



All herein aforementioned measured values were determined for test samples and are applicable as standard values. The values were determined on the basis of national or international standards and if these were not available, on the basis of Ceramic internal specifications standards. Statements regarding the suitability of products for certain types of applications are based on knowledge of typical requirements that are often placed on Ceramic products in generic applications and must not be transferred to specific applications. The same applies to the indicated values. The information contained herein does not constitute a guarantee for certain properties. Ceramic and its affiliates do not assume any responsibility for the correctness of such information nor for damages consequent to its use. Please note that all product, product specifications and data detailed in this media are subject to changes.

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