CeramCool® 3D Products

New possibilities with three-dimensional metalized substrates featuring structured copper technology (SCT) for high-performance electronic circuits.

Materials and surface quality

Material	Typical R_a Value as fired	Content
Rubalit® 708 S	≤ 0.8 µm	> 96% Al_2O_3
Rubalit® 710	≤ 0.55 µm	> 99%, Al_2O_3
Alunit®	≤ 0.6 µm	Y-stabilized
ZrO_2	≤ 0.45 µm	Y-stabilized

Parameters and tolerances

	Standard tolerances	Special tolerances
Length and width (as fired)	± 1%[1]	± 0.7%[2]
Thickness	± 10%	± 7%
Hole diameter < 2 mm	± 0.05 mm	± 0.05 mm
Hole diameter 2 – 10 mm	± 0.10 mm	± 0.076 mm
Hole diameter > 10 mm	± 1%	± 0.7 mm
Distance between holes (center distance)	± 1%[1]	± 0.7%[2]
Overall camber	0.4% of length	0.3% of length
Perpendicularity	± 0.5%[1]	
Parallelism	Quoted upon request	
Radii and corners	≤ 0.2%	

[1] but not less than +/– 0.1 mm
[2] but not less than +/– 0.05 mm
[3] but not less than +/– 0.076 mm

Please see our data sheets for further information
Indexes and parameters for ceramic substances: In order to profile ceramic substances certain parameters are indicated. The crystalline nature of these substances, statistical fluctuations in the composition of the substances and in the factors that impact on the production processes indicate that the figures quoted are typically mean values and hence the substance parameters quoted in this brochure are only standard, recommended or guide values that might differ given dissimilar dimensions and production processes.

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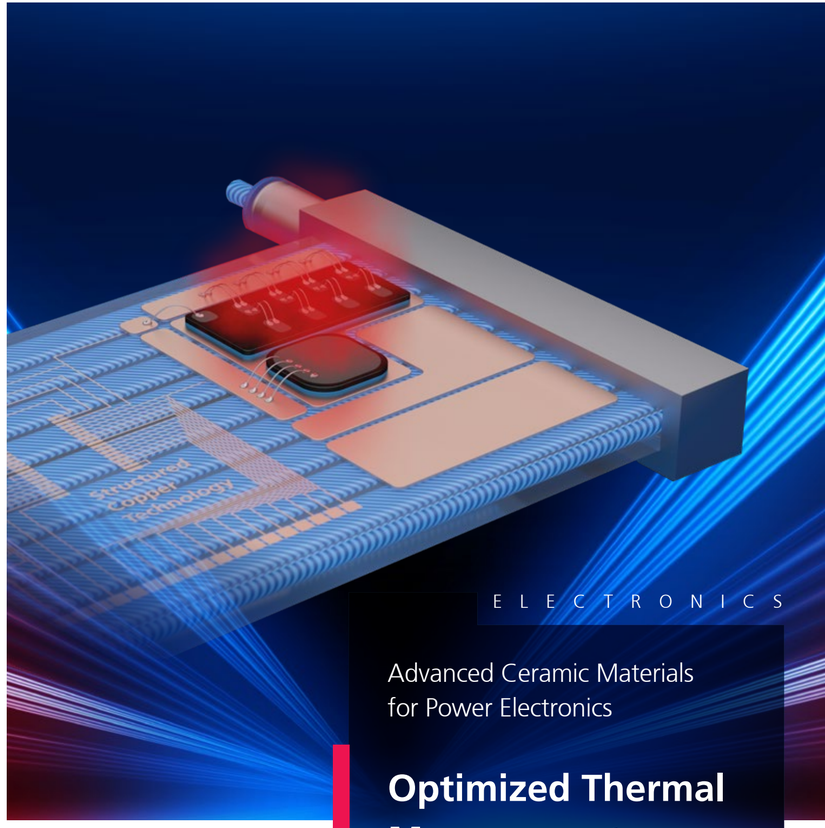
CeramTec



ELECTRONICS

Advanced Ceramic Materials for Power Electronics

Optimized Thermal Management

THE CERAMIC EXPERTS

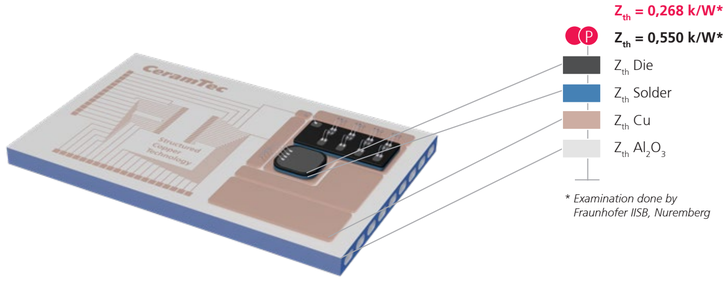
Ceramic Base Materials for the Electronics Industry

We offer the full range of ceramic base materials for the electronic manufacturers:

- **96% Alumina – Rubalit®708S**
  For thick- and standard thinfilm applications
- **96% Alumina – Rubalit®HP**
  For high thermal cycling performance
- **99% Alumina – Rubalit®710**
  For highest quality thinfilm applications
- **Aluminiumnitride – Alunit®**
  For high thermal power applications
- **Zirkolit**
  For extremly high mechanical strengh requirements
- **Rubalit® ZTA**
  With higher bending strength and better durability (thermocycling)

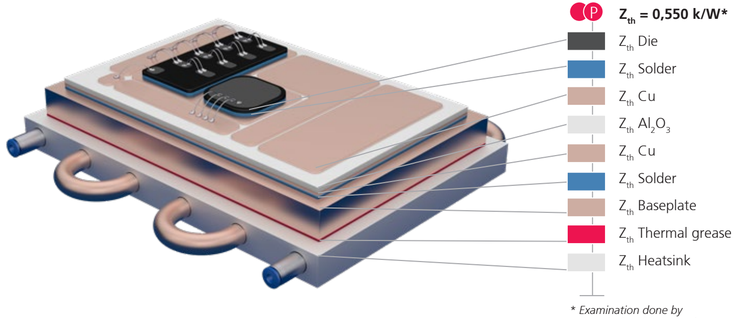
Heat-sensitive semi-conductor components are often mounted onto standard substrates. They need to offer suitable thermal conductivity in addition to electrical insulation. The result is often an assembly with multiple layers made of different materials. Each layer introduces its own set of risks, thereby restricting thermal conductivity. Chip on Heatsink on the metalized surface of CeramCool® heatsinks makes it possible to achieve an extremely compact design for the entire cooling system.

CeramCool® Chip on Heatsink Technology



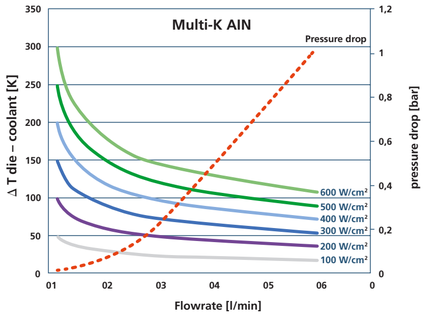
** Examination done by Fraunhofer IISB, Nuremberg*

Conventional Heatsink Structure



** Examination done by Fraunhofer IISB, Nuremberg*

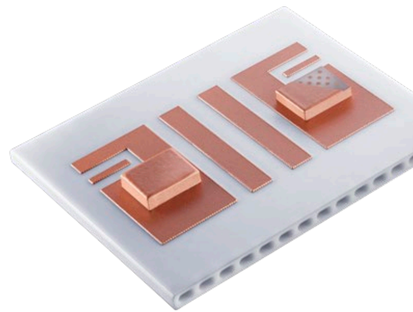
Comparison: Conventional Heatsink Structure vs. CeramCool® Chip on Heatsink Technology



CeramCool® Sandwich Cooling

Sandwich design for double-sided cooling
The power semi-conductor can be cooled from the bottom and top to reduce thermal resistance even further. In this sandwich design the semi-conductor chip is mounted between two ceramic heatsinks. The necessary clearance is achieved by means of via-filled, metalized ceramic cuboids that are highly conductive, both electrically and thermally, and have a thermal expansion coefficient very close to that of silicon.

The cooling capacity can be increased by up 50% depending on the construction.



Optimized Thermal Management with CeramCool® Sandwich Cooling