

# Heraeus



## Condura<sup>®</sup> Metal Ceramic Substrates

Choose the right base for your power electronic module



# OPTIMAL **GROUND CONDITIONS** FOR SPECIFIC REQUIREMENTS

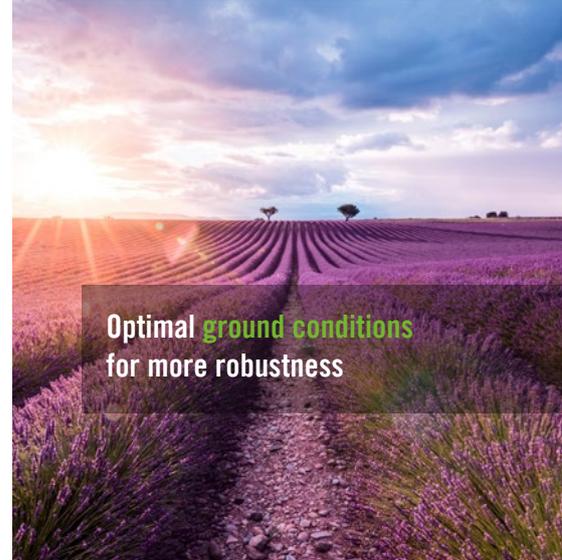
Heraeus Electronics offers a comprehensive portfolio of metal ceramic substrates to address the diverse needs of the power electronics segment, ranging from low-power application up to the most demanding industries. The Condura® portfolio consists of Condura®.classic (DCB- $\text{Al}_2\text{O}_3$ ), Condura®.extra (DCB-ZTA), and Condura®.prime (AMB- $\text{Si}_3\text{N}_4$ ).

As we seek to better support our customers, we have introduced Condura®+ which is designed to enhance your productivity in substrate functionalization as well as to simplify your assembly process.

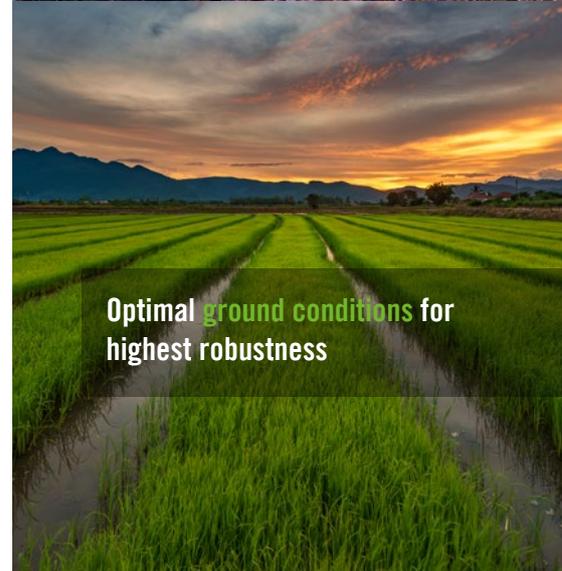
For your specific needs, we can assist you to identify and match the optimal material combination from our broad product portfolio ranging from metal ceramic substrates, sintering, soldering and bonding.



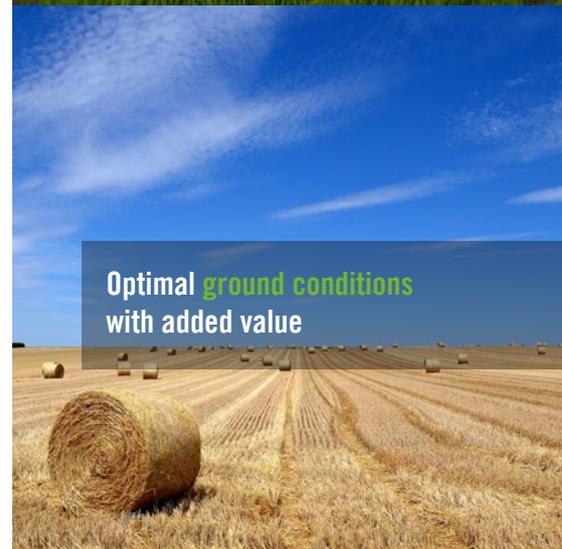
Optimal **ground conditions**  
with time-tested standards



Optimal **ground conditions**  
for more robustness



Optimal **ground conditions** for  
highest robustness



Optimal **ground conditions**  
with added value

## Condura<sup>®</sup>.classic

### DCB Al<sub>2</sub>O<sub>3</sub> substrates

DCBs consists of a ceramic substrate such as Al<sub>2</sub>O<sub>3</sub> (aluminium oxide) serving as an insulating layer, and copper connections to ensure the electrical conductivity at high temperatures. Its' thermal conductivity of Al<sub>2</sub>O<sub>3</sub> (24 W/m.K), as well as the high heat capacity, makes Condura<sup>®</sup>.classic irreplaceable in power electronics. The thick copper foils offer high electrical and thermal conductivity and form an outstanding base for the soldering and wire bonding processes.

Industrial Market



## Condura<sup>®</sup>.extra

### Zirconia-toughened Al<sub>2</sub>O<sub>3</sub> substrates

Condura<sup>®</sup>.extra with a bending strength of higher than 500MPa, which is higher than aluminum oxide ceramics (about 400MPa), is able to achieve higher reliability and improved mechanical robustness. As an aluminium oxide based material, it contains up to 30% of ZrO<sub>2</sub> in the ceramic matrix, which enables the connection of the electrical conductivity at high temperatures in the ceramic substrate of power electronics modules' that serves as an insulating layer and copper connections.

Higher Industrial Market

Automotive



## Condura<sup>®</sup>.prime

### Active Metal Brazed (AMB) Si<sub>3</sub>N<sub>4</sub> substrates

For optimal combination of material performance and properties, silicon nitride (Si<sub>3</sub>N<sub>4</sub>) offers excellent bending strength, fracture toughness and thermal conductivity of more than 80 W/m.K. The outstanding mechanical robustness of Si<sub>3</sub>N<sub>4</sub> enables brazing with thick Cu layers (up to 1000 µm) offering the additional thermal capacity to dissipate load peaks. AMB-Si<sub>3</sub>N<sub>4</sub> substrates combine the best mechanical robustness with excellent heat dissipation properties and high power densities. Optimal performance and reliability can be achieved by using silver sintering, Die Top System (DTS<sup>®</sup>) and Cu bonding technology. This setup also enables utilizing the full potential of wide bandgap (WBG) semiconductors (SiC, GaN).

Automotive

Energy

Traction



## Condura<sup>®</sup>.+

### Features and Services

For more customization, choose your PLUS and maximize your success in power electronics module production. Condura<sup>®</sup>.+ is a comprehensive portfolio of features and services to functionalize your substrates, simplify your process, enhance your productivity and support your product development cycle.

Automotive

Energy

Higher Industrial Market

Traction



# HERAEUS GROUP THE GLOBAL TECHNOLOGY COMPANY

A globally leading technology group, Heraeus is headquartered in Hanau, Germany. Founded in 1851, it is a family-owned portfolio company which traces its roots back to a pharmacy opened by the family in 1660. Today, Heraeus combines businesses in the environmental, energy, electronics, health, mobility and industrial applications sectors.

In the 2018 financial year, Heraeus generated revenues of €20.3 billion with approximately 15.000 employees (including staff leasing) in 40 countries. Heraeus is one of

the top 10 family-owned companies in Germany and holds a leading position in its global markets.

With technical expertise, a commitment to excellence, a focus on innovation and entrepreneurial leadership, we are constantly striving to improve our performance. We create high-quality solutions for our clients and strengthen their long-term competitiveness by combining unique material expertise with leadership in technology.

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