

curamik® CERAMIC SUBSTRATES

Product Information

curamik® Power



Al₂O₃ ceramic based substrates are standard products with the best price performance ratio. They are mainly used in applications of medium and lower power ranges, such as

- // General Power Electronics
- // Concentrated Photovoltaics (CPV)
- // Peltier Elements

curamik® Power Plus



HPS substrates are enhanced in robustness through Zr doped Al₂O₃ ceramic. They are mainly used in applications of medium power ranges, such as

- // Advanced Industrial Applications
- // Automotive Power Electronics

curamik® Thermal



Substrates based on AlN ceramics are used in applications with very high operational voltages and highest power density, such as

- // Traction
- // Smart Grid
- // Industrial High Power Modules
- // Energy

curamik® Performance



Substrates based on Si₃N₄ ceramics are produced in an AMB process. They are mainly used in applications where a long lifetime, high reliability, and robustness are required and partial discharge should not occur, such as

- // Automotive Power Electronics
- // High Reliability Power Modules
- // Renewable Energy

curamik® high temperature/high voltage substrates consist of pure copper bonded to a ceramic substrate such as Al₂O₃ (Alumina), AlN (Aluminum Nitride), HPS (ZrO₂ doped) or silicon based Si₃N₄ (Silicon Nitride).

curamik provides two technologies to attach the substrate with the copper. DBC (direct bond copper) – a high temperature melting and diffusion process where the pure copper is bonded onto the ceramic and AMB (active metal brazing) – a high temperature process where the pure copper is brazed onto the ceramic substrate.

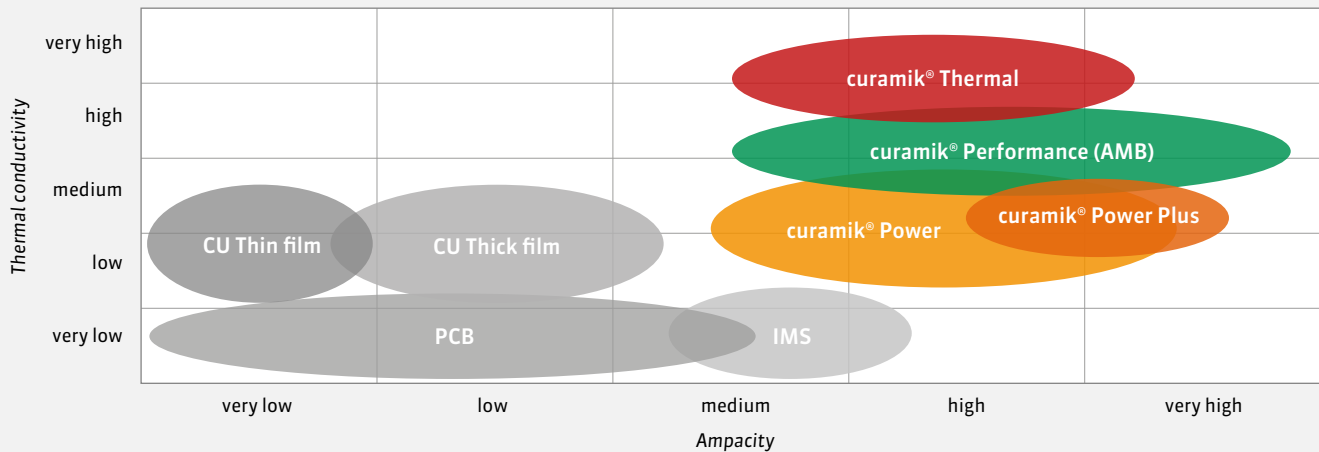
The high heat conductivity of Al₂O₃ (24 W/mK), AlN (170 W/mK) and Si₃N₄ (90 W/mK) as well as the high heat capacity and thermal spreading of the thick copper cladding (127 – 800 μm) makes our substrates indispensable to power electronics. The mechanical stress on silicon chips mounted directly on the substrate (Chip on Board) is very low, since the coefficient of thermal expansion (CTE) of the ceramic substrate is better matched to the CTE of silicon compa-

red to substrates using a metal or a plastic basis. curamik produces high temperature/high voltage substrates in a master card format that measures 5" x 7" and 5.5" x 7.5". The individual parts can be left in the master card format to support more efficient assembly and mounting of components before being separated into individual pieces. We also offer single pieces for single piece assembly.

Advantages:

- // Great heat conductivity and temperature resistance for high performance and high temperature applications
- // High insulation voltage
- // High heat spreading
- // Adjusted coefficient of thermal expansion between chip and substrate
- // Efficient processing of master cards and single pieces

Performance overview



designhouse

Rogers Corporation

www.rogerscorp.com/pes
www.curamik.com