curamik®
ENABLING POWER EFFICIENCY

curamik® CERAMIC SUBSTRATES

Product Information

curamik® Power

Al_2O_3 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 Al_2O_3 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 Si_3N_4 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

ROGERS CORPORATION

curamik®
ENABLING POWER EFFICIENCY

curamik® high temperature/high voltage substrates consist of pure copper bonded to a ceramic substrate such as Al_2O_3 (Alumina), AlN (Aluminum Nitride), HPS (ZrO_2 doped) or silicon based Si_3N_4 (Silicon Nitride).

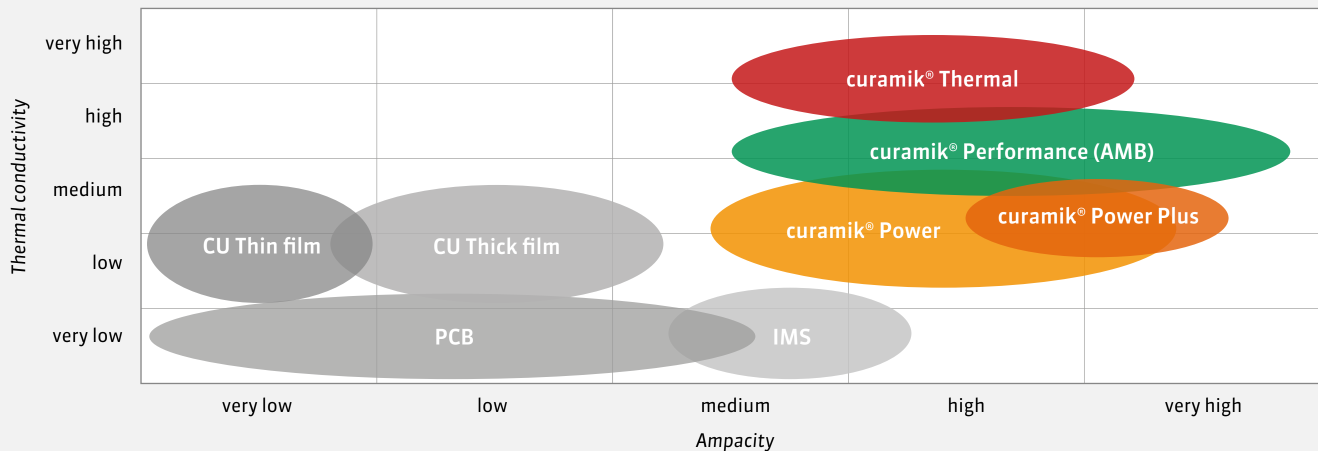
curamik provides two technologies to attach the substrate with the copper. DBC (direct bond copper) – a high temperature melting and diffusion process where the pure copper is bonded onto the ceramic and AMB (active metal brazing) – a high temperature process where the pure copper is brazed onto the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

The high heat conductivity of Al_2O_3 (24 W/mK), AlN (170 W/mK) and Si_3N_4 (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 compared 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

The information contained in this document is intended to assist you in designing with Rogers' Power Electronics Solutions Materials. It is not intended to and does not create any warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown in this document will be achieved by a user for a particular purpose. The user should determine the suitability of Rogers curamik products for each application. The Rogers logo, the curamik logo and curamik are trademarks of Rogers Corporation or one of its subsidiaries.
© 2016 Rogers Corporation. All rights reserved. Publication # 135-003. Version 2.16 en.