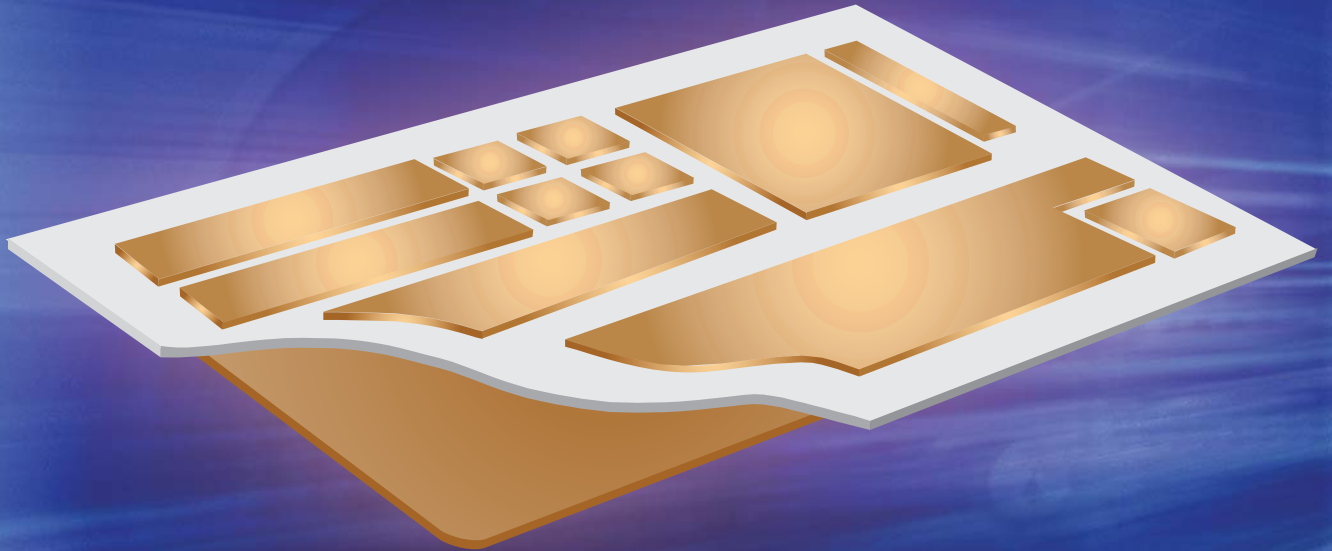
Heraeus



Thick Print Copper System

Heraeus Materials Technology has developed a thick printing Cu conductor paste system for power electronic applications where excellent print quality, thermal conductivity and soldering properties are required. Heraeus' thick print copper system has been developed to be applied on alumina and some aluminum nitride substrates. Heraeus paste has been optimized for 75 micron fired thickness, with one Print-Dry-Fire (PDF) cycle. Thick Print Copper is an attractive alternative to Direct Bond Copper (DBC) based products.

Power Dissipation and Demanding Thermal Shock Application

- IGBT (Insulated Gate Bipolar Transistors) Modules where AC to DC and DC to AC conversion is required
- High Brightness LED Packaging
- Solid State Power Circuits
- Battery Chargers
- Electronic heating devices
- High frequency

Design Guideline for Thick Print Copper

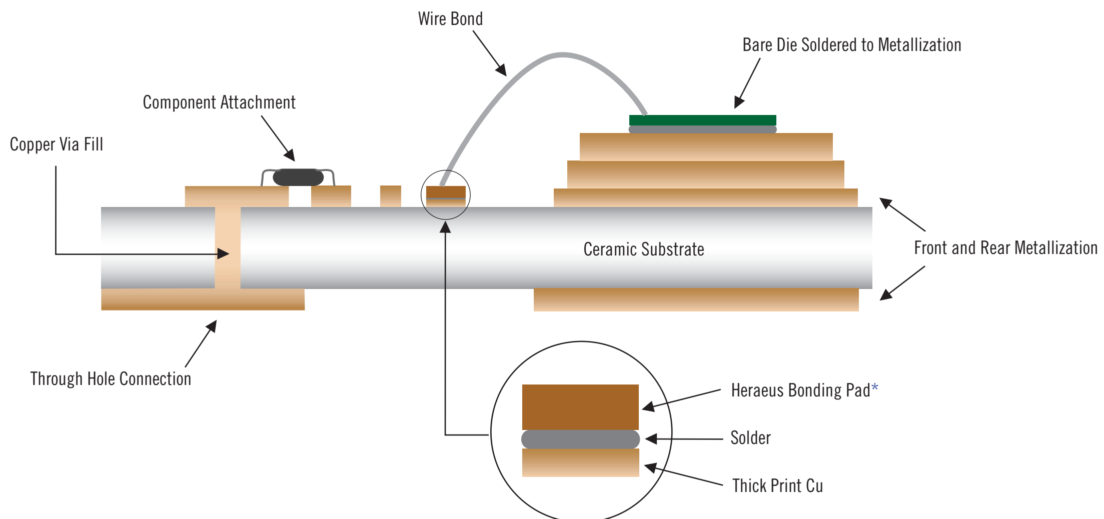
Dimension	Thick Print Copper	DBC on Alumina/AIN
Min. width of Cu Pattern	0.15 mm / 6 mil	0.5 mm / 19.7 mil
Min. spacing between Cu patterns	0.15 mm / 6 mil	0.5 mm / 19.7 mil
Min. spacing between Cu pattern and ceramic edge	0.15 mm / 6 mil	0.35 mm / 13.8 mil

Thick Print Copper Advantages

- Thermal Cycling:
  - Heraeus: > 1000 cycles with zero failures
  - DBC tends to fail after several hundred cycles
- Additive process (screen printing) vs chemical, plating process (no chemical residue)
- Improved line resolution
- Ability to print up to 75 microns fired thickness, with one Print-Dry-Fire cycle
  - Can print varying layer thicknesses where necessary
- Improved versatility – vias, varied fired film thickness (10 – 350 microns)

Materials

Item	Description	Resistivity	Adhesion	Solderability
C7300 (CL81-10100)	Thick bonding layer	< 1.5 mΩ/□ @ 25 µm FFT	> 6 lbs on 80 x 80 mil pads	N/A
C7301 (CL81-10101)	Top, fritless layer. provides solderable/plateable top layer	< 1.5 mΩ/□ @ 25 µm FFT	> 6 lbs on 80 x 80 mil pads	> 95% coverage w/ SAC 305 @ 245°C, 10 sec dip, RMA flux
C7229V	Mixed bond via fill	≤ 15 mΩ/□ @ 25 µm FFT	N/A	N/A



*http://heraeus-packaging-technology.de/en/produkte_2/bondpads_2/Bond_pad.aspx

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