Printed circuit boards for Power Electronics

Serigroup

Fields and Applications

Discrete Components Power Electronics

- High current - High voltage - Heat dissipation.

Bare dies Power Electronics

- Al_2O_3 DBC replacement with IMS in Power Semiconductors Electronics.

High current applications & Bus Bar Replacement

- Heavy copper PCBs single side, double side, and multilayer.

Batteries Connections & Management

- Battery pack connection and monitoring by means of PCBs.
- BMS (Battery Management System) PCBs, even with thick copper.

Instruments, Control and Radio Frequency Electronics

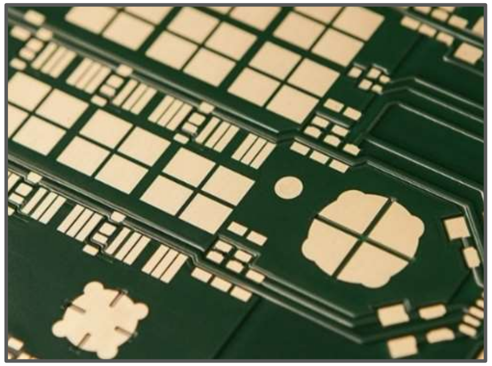
- Single side, double side and multilayer FR4/RF PCBs

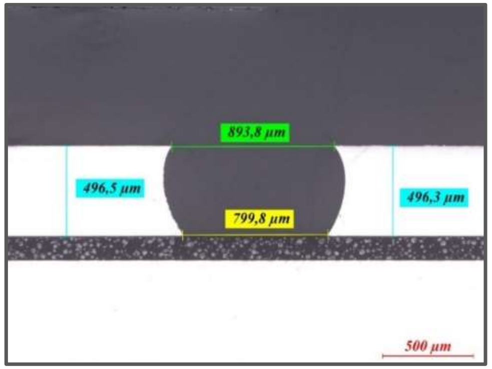
IMS - Insulated Metal Substrate

Discrete Components Power Electronics

High thermal and electrical performances substrates used for Power Electronics applications and Power Lighting

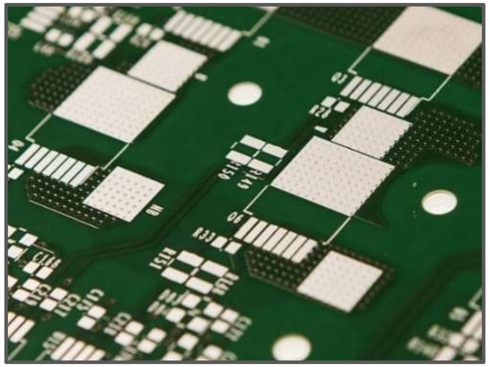
Single-Layer IMS

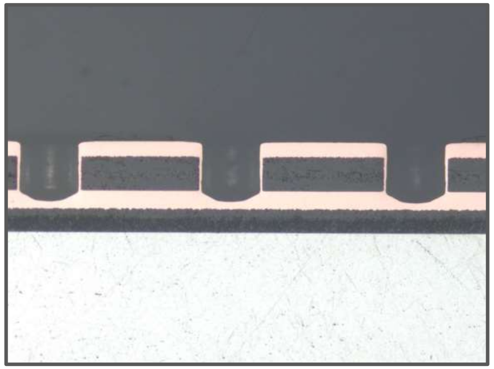




Top copper
Thermally Conductive Insulation
Baseplate (Al or Cu)

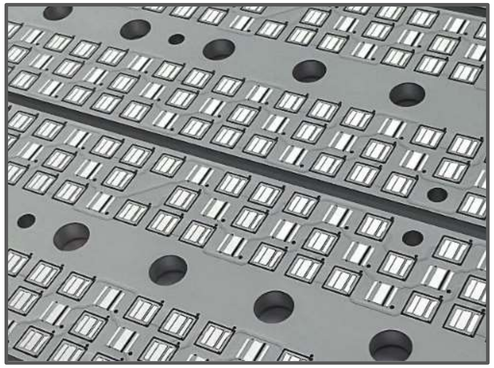
Multi-Layer IMS

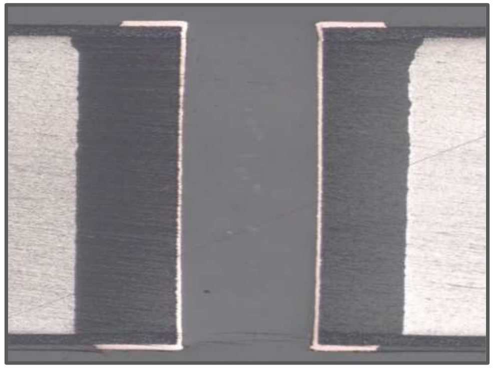




Multilayer section
Thermally Conductive Insulation
Baseplate (Al or Cu)

Metal-Core IMS





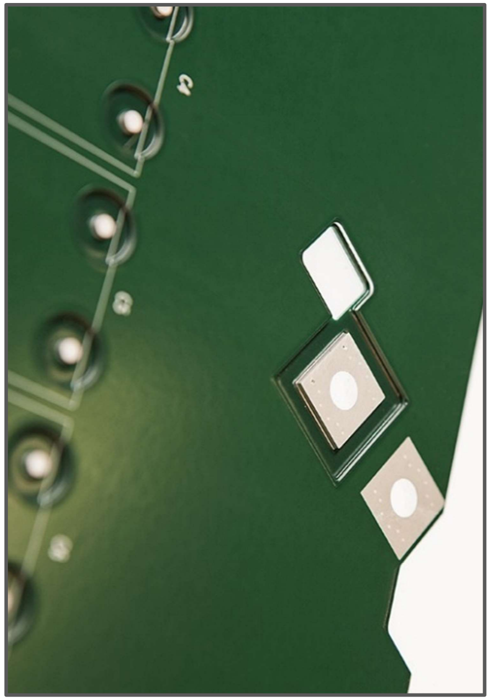
Top copper
Thermally Conductive Insulation
Metal core (Al or Cu)
Thermally Conductive Insulation
Bottom copper

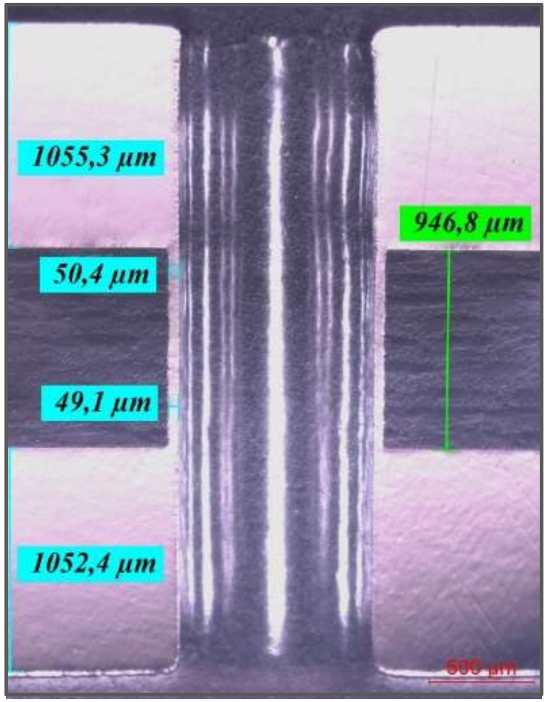
Heavy Copper PCBs

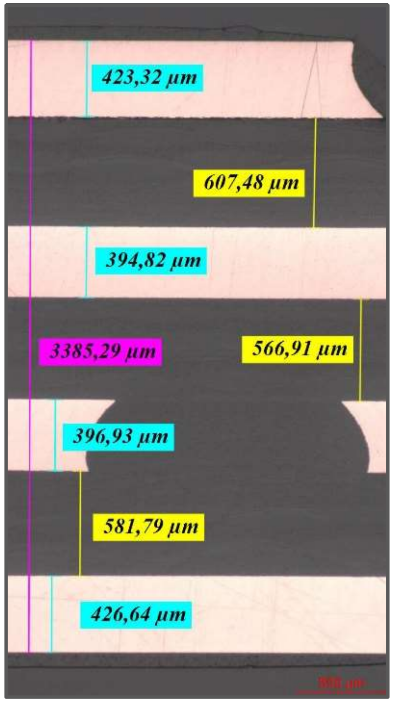
High current applications & Bus Bar Replacement
Batteries Connections & Management - BMS PCBs
RF & Microwave Electronics

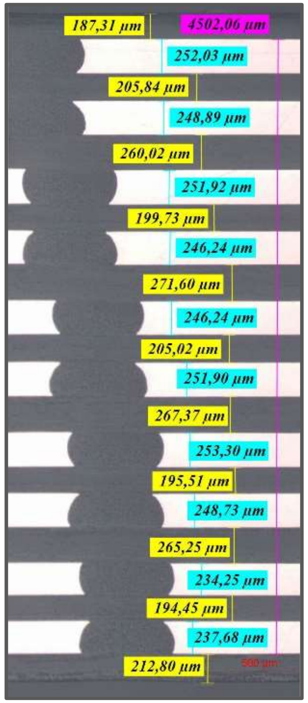
Heavy copper PCBs either single side, or double side, or multilayer, can be used:

- **As Bus Bar replacement → possibility to place components on the Bus Bar (e.g. Resistors and Capacitors).**
- **To produce DC-Link boards → lower inductance and “skin effect”.**
- **To produce windings for planar transformers.**
- **To produce Battery Management System PCBs → possibility to integrate the power conversion unit and/or switches of the main current path.**
- **For any application which involves high electric currents.**









Heavy Copper PCBs

High current applications & Bus Bar Replacement
Batteries Connections & Management - BMS PCBs
RF & Microwave Electronics

In order to integrate Power and Control, Hybrid Copper thickness PCBs are also available:

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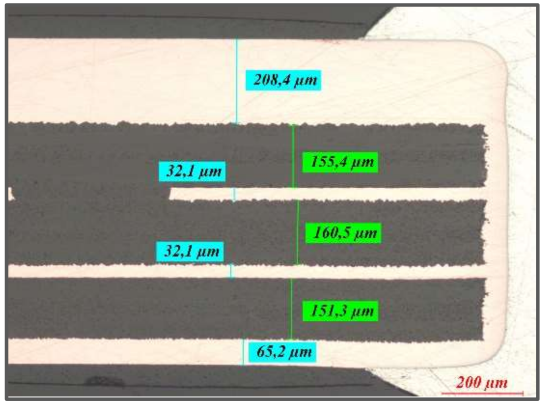
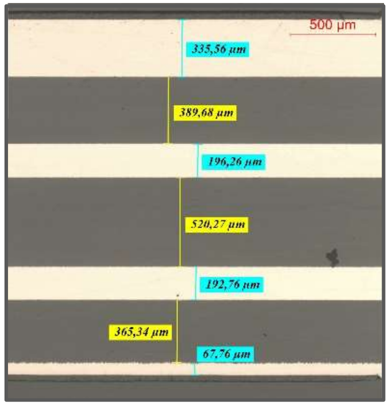
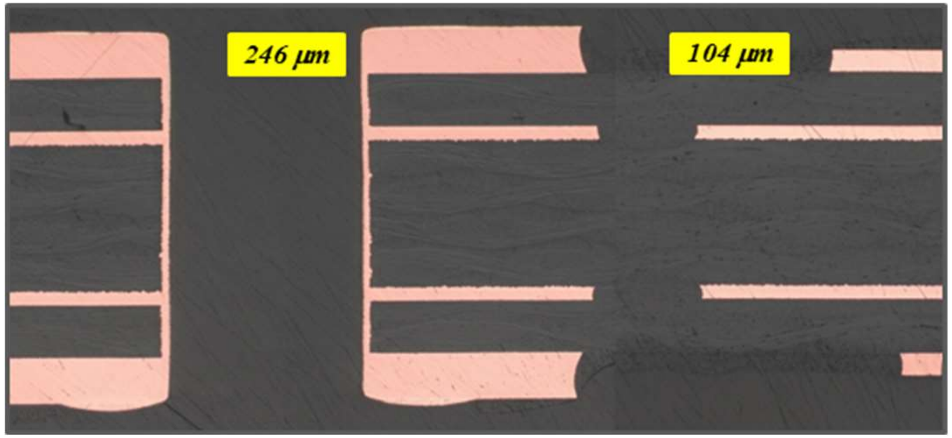
Mixed copper on DIFFERENT LAYERS:
Control layers (standard Cu) + Power layers (heavy Cu)





Mixed copper on the SAME LAYER:
Control areas (standard Cu) + Power areas (heavy Cu)



Copper inlay PCBs

Discrete Components Power Electronics
High current applications & Bus Bar Replacement
RF & Microwave Electronics

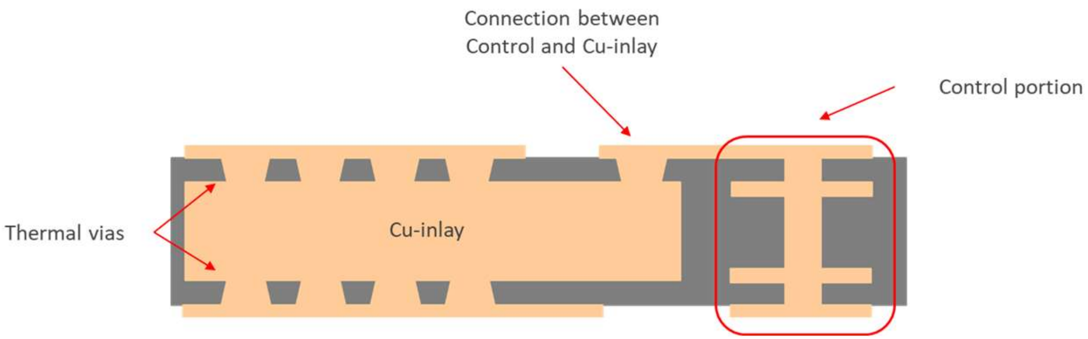
Cu-inlay technology is a really efficient way for integrating very high power and control on the same board.

Two configurations are possible:

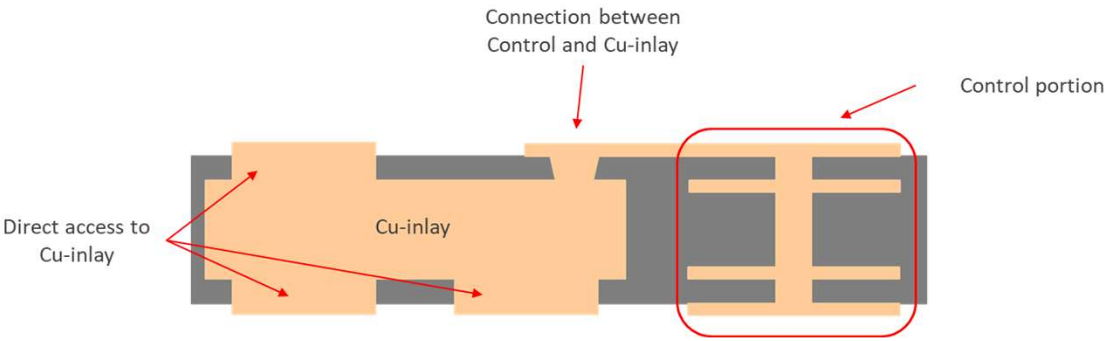
- **Totally embedded Cu-inlay**
  (easier manufacturing)
- **Directly accessible Cu-inlay**
  (higher performance)

Cu-blocks can have custom shape for both configurations

Totally embedded Cu-inlay



Directly accessible Cu-inlay



FR4 PCBs

Instruments, Control and Radio Frequency Electronics

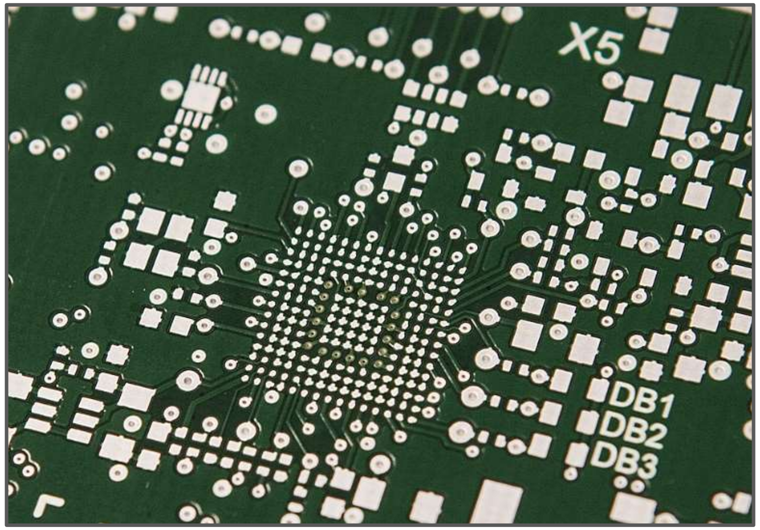
Serigroup can offer almost all the types of FR4/RF PCBs manufactured with cutting-edge technology equipment.

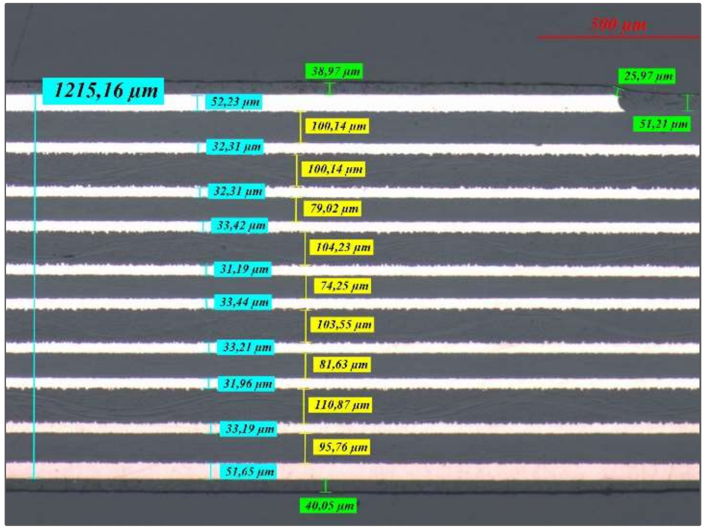
Features:

- ML up to 12 layers
- Blind and buried vias
- Laser microvias
- Line and space down to 75 µm
- Serialization with data matrix

Materials:

- Medium high Tg FR4 (up to 300 °C)
- High CTI FR4 (up to 600 V)
- High thermal conductivity FR4 (up to 8 W/mK)
- RF materials (low Dk and Df)
- High MOT PI materials



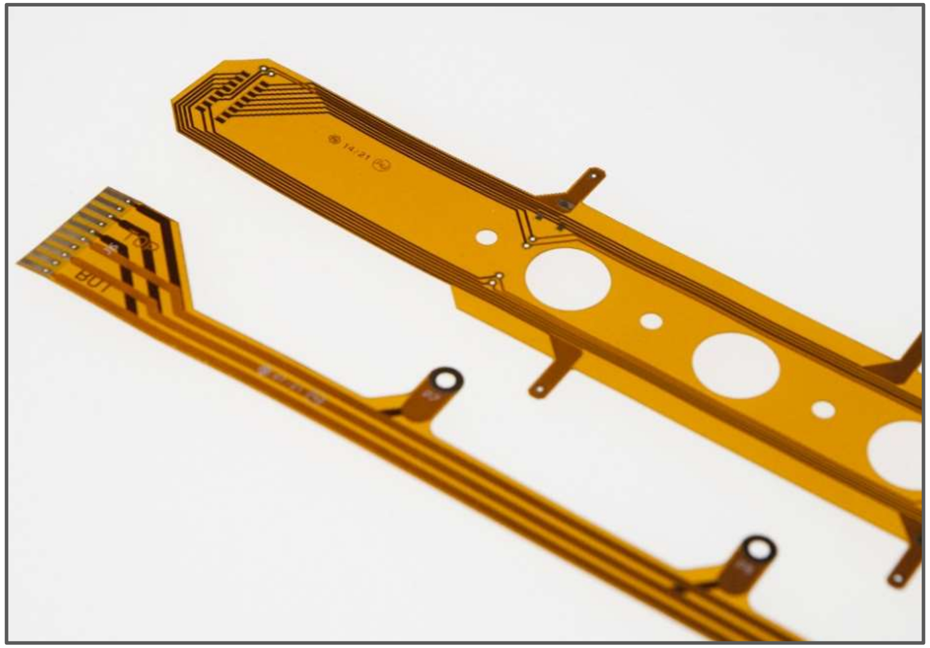


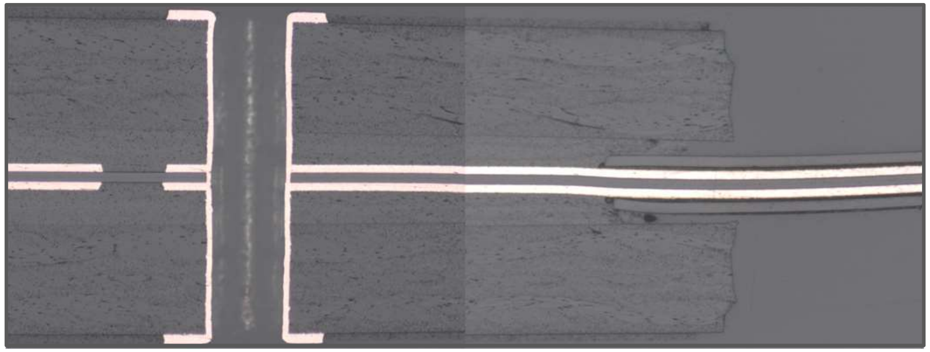
Flex and Rigid-Flex PCBs

Discrete Components Power Electronics
Batteries Connections & Management
Instruments, Control and Radio Frequency Electronics

Flex and Rigid-Flex PCBs, both "flex to install" and "dynamic flex", includes different applications such as:

- Power Electronics
- Lithium ions cells connection and monitoring
- Power Lighting
- Connectors and Controls





Features:

- Acrylic-adhesive or adhesive-less materials.
- High MOT materials (above 200 °C)
- PI thickness 0,025 – 0,200 mm
- Cu thickness 17 – 140 μm
- Rigid-Flex FR4+PI, or fully PI

Investigation Capability

Fischerscope™ XDAL
(Surface Finish measurements)

Werth Scope Check™
(Dimensional measurements)

Digital microscope
(Cross-Section investigations)

ZMETRiX™ ST600
(Impedance measurement)

Fischerscope™ MMS
(Dielectric thickness measurements)

Hi-Pot Test
(IMS 100% EOL insulation test)

Roughness tester
(for Wire Bonding and
sintering application)

Thermal Impedance ASTM D5470-17
(IMS laminates characterization)

Certifications

ISO 9001

IATF 16949

EN 9100

ISO 14001

ISO 45001

ISO 50001

Thanks for your attention!

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