



» Perfection is finally attained
not when there is no longer anything to add
but when there is
no longer anything to take away «

Antoine de Saint-Exupéry, French aviator and writer 1900 – 1944

Wirelaid® PCB



The concept. Discrete wiring enables this innovative PCB to carry high currents. It allows for easy combination of power and signal processing electronics, and even three-dimensional boards.

Expensive thick copper technology or connectors are unnecessary. Wires can be adjusted in width to match that of the board and are attached onto the top and/or bottom copper foil.

The PCBs are manufactured fully automated and CNC controlled, using commercially obtainable semi-finished parts only and can be smoothly integrated in any product line of multilayer PCBs.

The technology. Following the layout for high current conductors, silver-coated copper wire is attached to a copper foil, e.g. 35 µm in width, and then fixed using resistance welding. Pre-treatment of the join partners copper foil and wire is unnecessary.

As a result, copper foil with discrete wiring forms the external layer in the stack up of a multilayer PCB. After lamination the wires are embedded in the prepreg of the board.

The planar external layers are SMT-compliant. The board can now be structured for micro-conductors as well as high current conductors via welded junction areas. The PCB is completed using established processes.

Wirelaid PCB designed by IUMATECH GmbH.

Technology and applications are protected by patent.



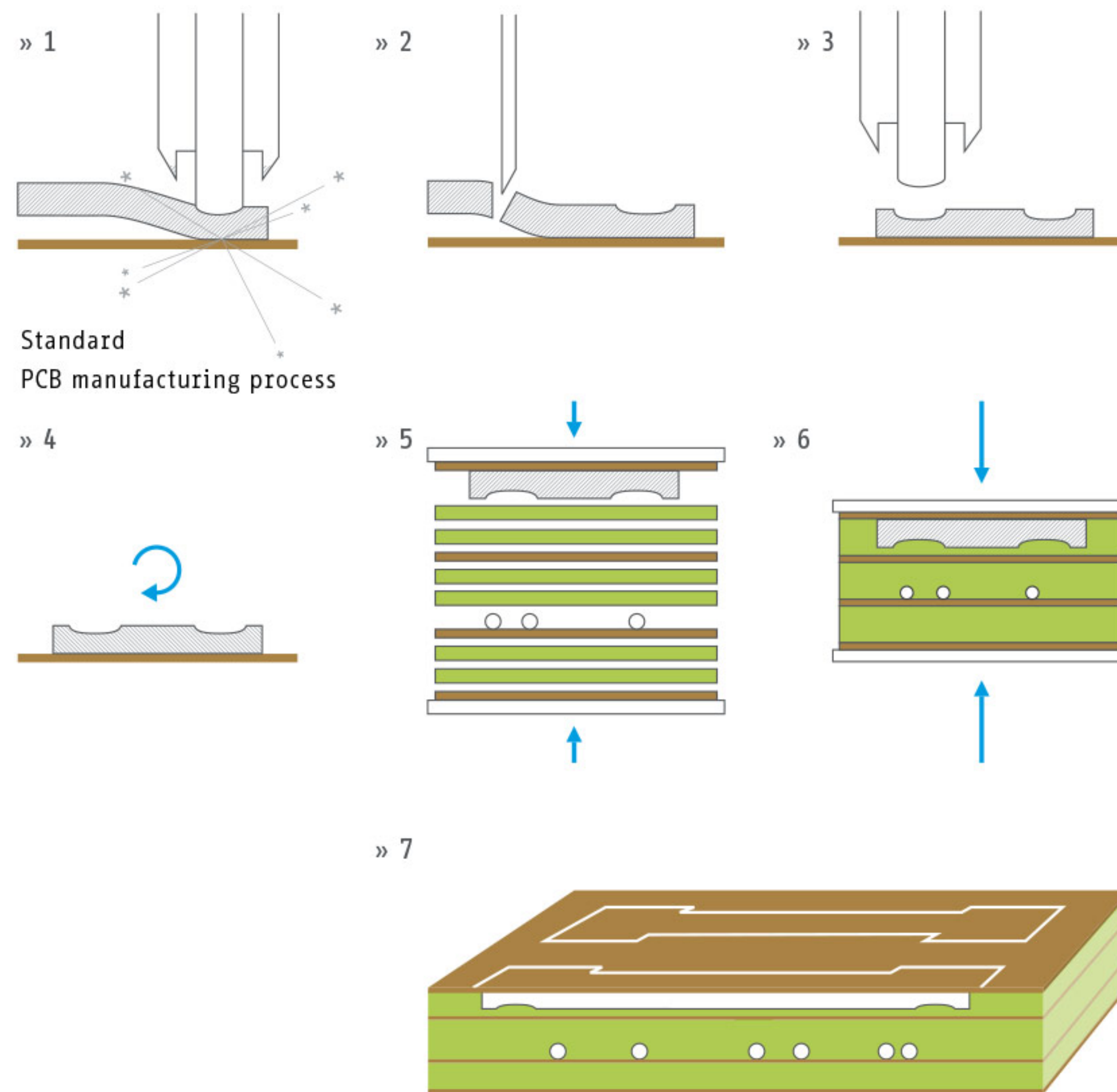
Technical overview

copper foil	(IPC Grade) > 35µm width
wiring	flexible silver-coated copper wire
	round 0,1 mm; 0,3 mm;
	flat 0,8 x 0,25 mm²; 1,4 x 0,35 mm²;
join method	resistance welding on treatment side

pre-treatment	not necessary
manufacturing	fully automated laying and welding of the wiring. CNC controlled
semifinished parts	copper foil with high current conductors attached to treatment side
subsequent treatment	established PCB industry processes and materials

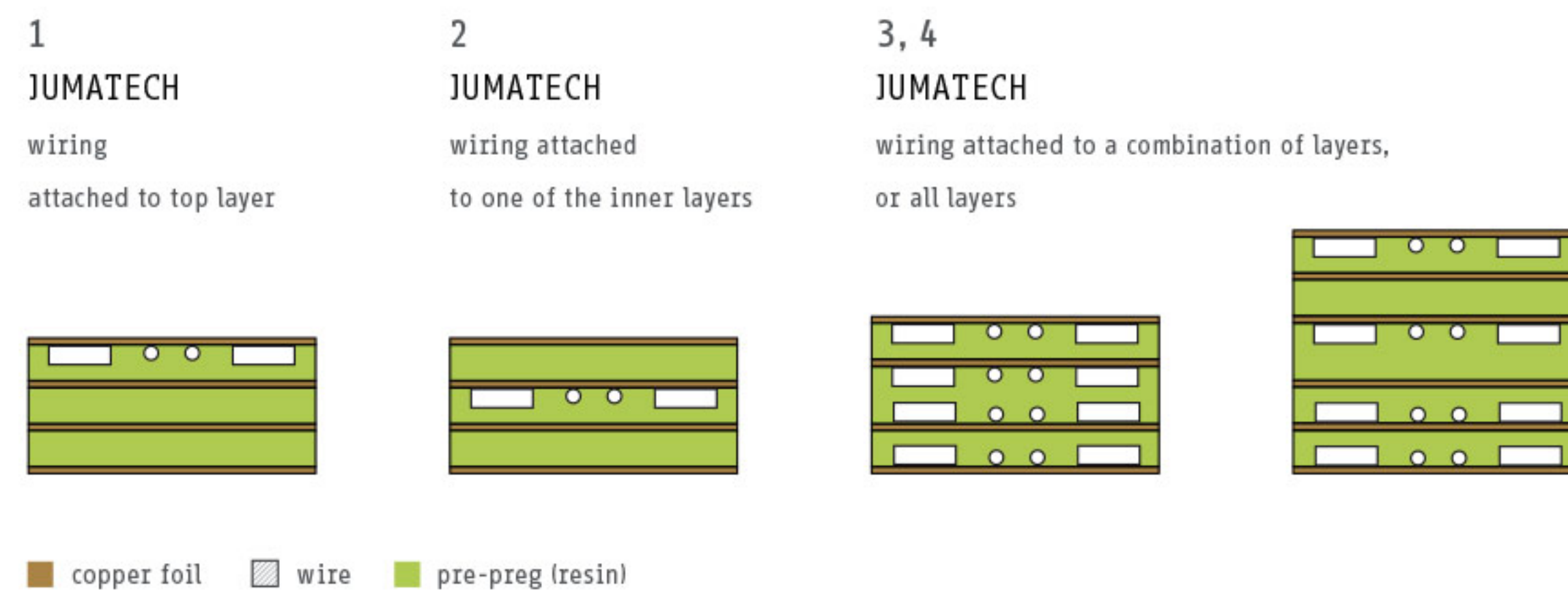
Wirelaid manufacturing process

Preceding Jumatech Wirelaid process steps



Laminated high current conductors

Possible plating arrangements with Wirelaid technology



Development and Design Advantages

Power and signal processing electronics built into one PCB

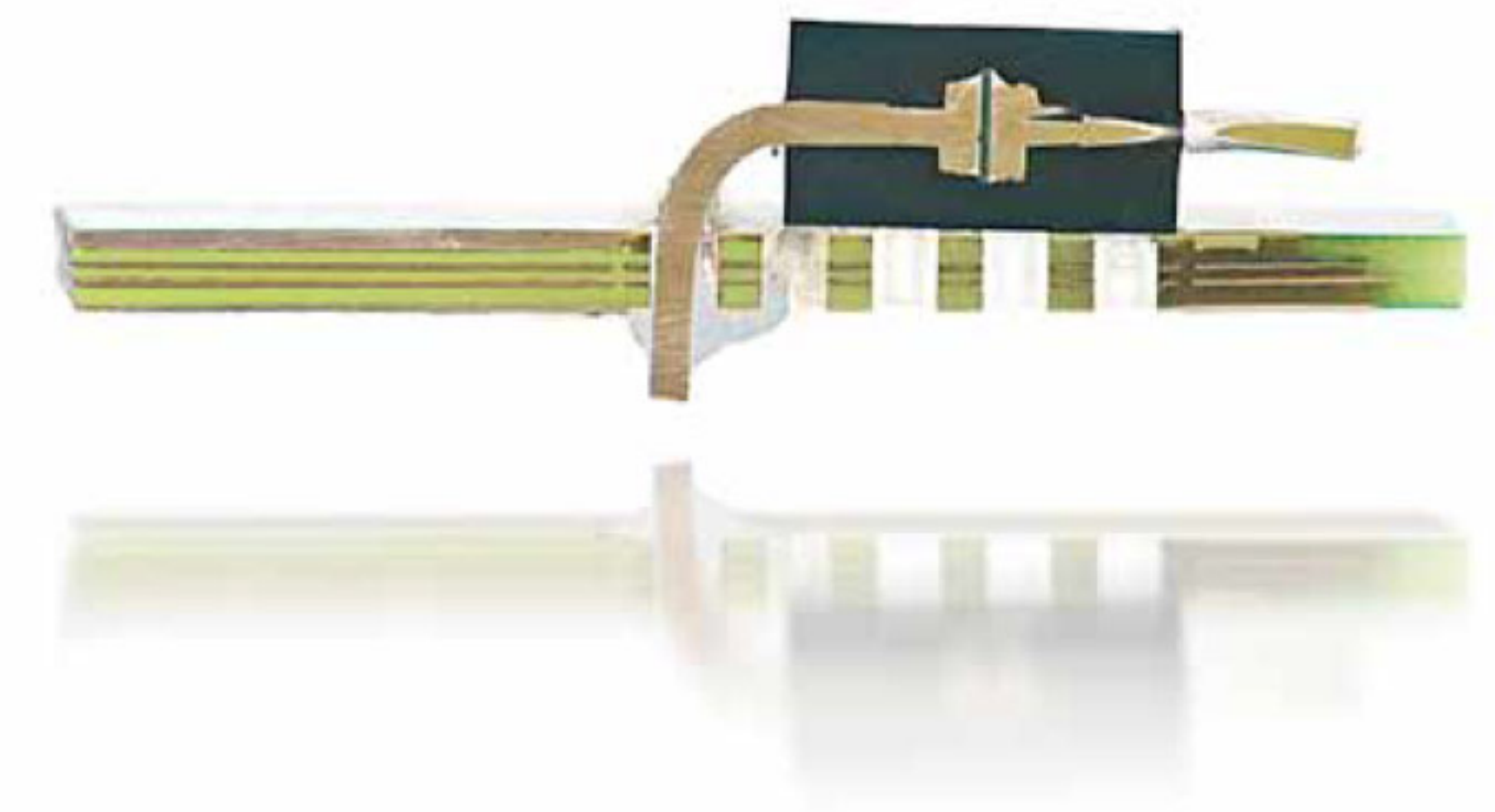
- reduced number of components
- reduced dimensions
- non connectors needed
- full heating control
- increased operation reliability
- reduced costs
- more design possibilities

Allows for three-dimensional design

- precision bending of mounted assembly
- alternative solution for expensive flex-rigid technology
- reduced costs
- more design possibilities

Discrete wiring replaces thick copper technology

- purchase of high current conductors saves copper and etching chemicals
- commercially obtainable copper foil and wiring
- well-proven resistance welding
- subsequent treatment with established processes and materials
- fully automated laying and welding of the wiring





Assembly specifications

Wirelaid technology was subject to strict endurance testing at the Zentrum für Aufbau- und Verbindungstechnik (ZAVT), Lippstadt. On top of that, PCB manufacturers have proven that the wirelaid technology can be seamlessly integrated in their product line. All the characteristics of wirelaid PCBs meet existing standards and policies, guaranteeing stable and reliable operation. JUMATECH Wirelaid PCBs are UL Listed. The fully automated manufacturing uses well-proven processes and materials and opens up more design possibilities, which can result in cost reduction.

high-temperature storage	IEC Norm 60 068-2-3	1000 hours at 125°C	passed
moisture storage / climate storage	IEC Norm 60 068-2-3	1000 hours at 85°C 85% RH	passed
thermo shock test of bending edge	ingress /diffusion of moisture into bending edge is tested	after 1000 hours at 85°C, 85% RH the sample is shocked to –40°C	passed
thermo shock storage	DIN 60068, part 2-14	1000 cycles –40°C / 150°C	passed
current carrying capacity of PCB	refering to IPC-D-275		determined
vibration restistance / broadband noise	DIN EN 60068-2-64(EC68-2-6)	slanted severity 1 (VW-norm)	passed
continued shock test	EN 60068-2-29	100.000 impulses (11ms) with peak acceleration of 50g	passed