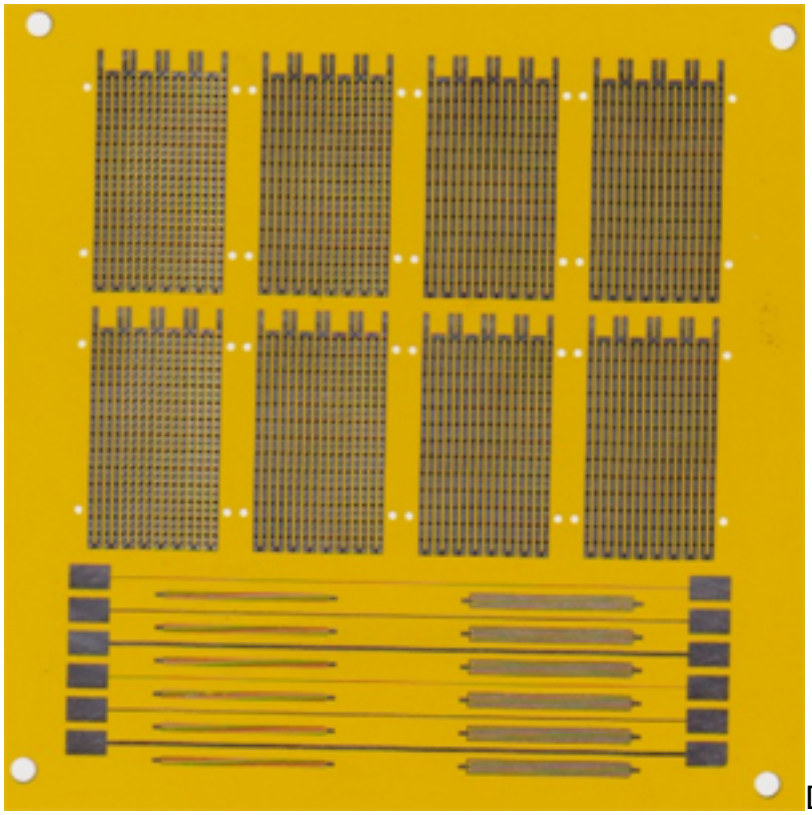
Ultra thin copper-free flexible circuit ideal for medical applications



DKN Research now carries ultra thin copper-free flexible circuits with reliable via holes. The Haverhill Massachusetts based firm developed a series of processing technologies to generate thin nickel traces on both sides of thin polyimide film specifically targeting those scientific and medical applications that require the elimination of copper metals from electronic devices. It also provides a wider range of design flexibilities for packaging and termination in special electronic circuits. DKN Research continually develops a wide range of packaging technologies for flexible & printable electronics.

Virtually all printed circuit boards use metal copper for their conductive material because of its high conductivity and reasonable cost. Unfortunately, several electronic devices designed for scientific and medical equipment can not have metallic copper in the circuit because of its physical properties and chemical instability. There are a few metal foils such as aluminum and stainless steel that can serve as the conductor material, but they cannot be thinner than 10 microns. Another problem with these metals and alloys is the difficulty in via hole formation for double side and multilayer circuits.

DKN Research partnered with Pyramid Technical Consultants, Inc, a specialty electronic module manufacturer from Lexington Massachusetts, and co-developed many kinds of copper-free flexible circuits combining various technologies such as sputtering, plating, chemical etching and laser abrasion & drilling. The team recently announced the success in establishing a new manufacturing process to

generate ultra thin nickel traces down to 0.2 microns thick on both sides of thin polyimide film with small via hole connections down to 80 micron diameters. Special polyimide etching process and laser drilling process were employed to generate tiny holes on thin polyimide films. A new electroless nickel plating process was developed to make uniform conductive layers on the surface and inside the polyimide film holes. A set of chemical etching process and laser abrasion process were furnished to make fine traces down to 50 microns line and space. The small via holes formed by this new process are very reliable, and remained intact during the heat cycle and flexing endurance tests.
DKN Research and Pyramid Technical Consultants agreed to disclose all the information pertaining to their new technology and share the unique process with other researchers and engineers. This unique circuit manufacturing can work with other circuit processing technologies such as copper etching and screen-printing to enhance the capabilities of any special application. Technical reports are available by requests, and the two engineering teams can support both prototype trials and volume productions.

DKN Research

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