Mixed Thickness Board Stacks up Tanaka's Optimal PWB Solutions

Banking on its achievements and know-how accumulated from more than 40 years' experience in the printed wiring board business, Tanaka Kikinzoku Kogyo K.K. provides the optimal solutions for its customers' specific requirements.

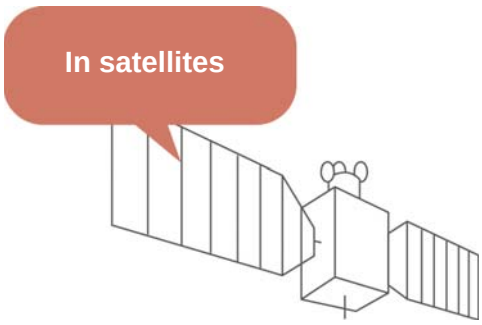


Photo 1: Printed wiring boards used from the ocean bed to the outer space

Printed wiring boards are used in a wide variety of electronic devices, including optical electrical signal converters, aircraft instruments, and semiconductor inspection equipment. Tanaka's PWBs are used in various areas from the ocean bed to the outer space (Photo 1).

Latest PWB Technology: T-SEC-BOARD

The T-SEC-BOARD or the TANAKA Step Card Edge Connector Board is a mixed thickness wiring board that Tanaka has developed to meet customers' demand (Fig. 1). The board thickness at the terminal area complies with the Peripheral Component Interconnect Express (PCIe) standard and can fully support the increase in the number of layers resulting from the increase in the number of component pins to be mounted.

Features, Specifications of T-SEC-BOARD

With the new printed wiring board technology, the number of layers can be increased in accordance to the number of pins of components to be mounted. Control of wiring characteristic impedance is also improved with the T-SEC-BOARD. The inner layer copper thickness can be increased to improve heat radiation, while the metal core can be used to increase heat radiation.

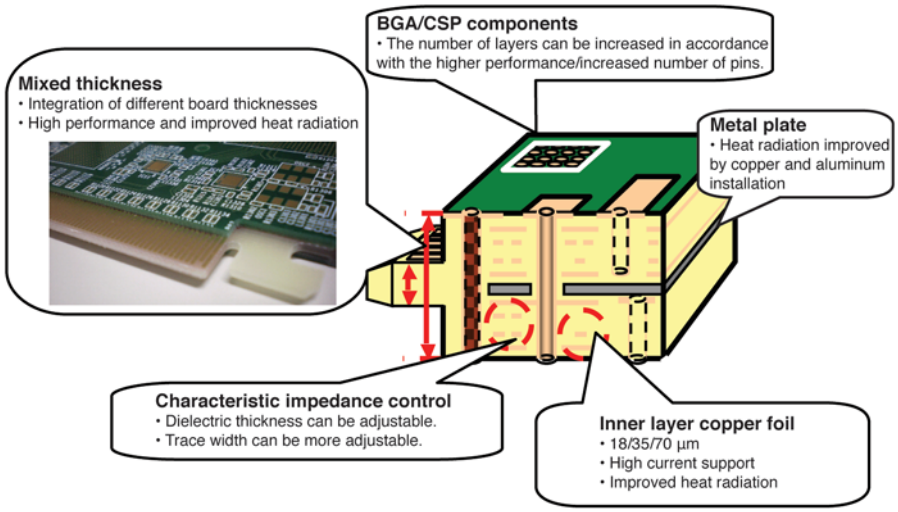
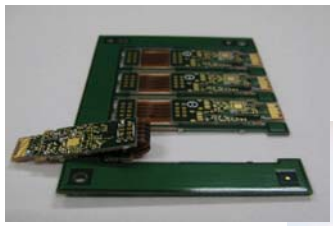


Fig. 1: Features of the T-SEC-BOARD

Two-layer F/R wiring board



F/R Multilayer (inner) wiring board

Photo 2: Two-layer flex-rigid wiring board (left); Flex-rigid multilayer (inner) wiring board

T-SEC BOARD consists of at least four layers and more, with the inner layer's conductor thickness of 18µm, 35µm, and 70µm. Meanwhile, the product board thickness can range from 2.0 to 6.5mm and the board thickness difference measures 0.5mm or more.

Specific board issues can be addressed by the new PWB technology depending on the priority characteristics that manufacturers want to achieve.

Solutions to Increase Speed, Frequency

For users who wish to control characteristic impedance (Z_0) with constraints in the number of layers and specifications, Tanaka offers the layer-to-layer differential Z_0 control as well as other types of control in various configurations.

For those who wish to evaluate waveform quality and transmission characteristics, the company conducts evaluations using a complete set of evaluation equipment.

For circuit designers who wish to improve the quality of via waveforms, the company proposes improving signal reflection through via Z_0 control and elimination of unwanted substances.

Flex-Rigid Solutions

Specifically for board manufacturers who want to eliminate the problems related to connector joints between wiring boards, Tanaka has developed two

to eight flexible layers, supporting Z_0 control (Photo 2).

These layers eliminate connection failures, connector contact resistance, spatial implementation restrictions, problems with the number of man-hours required for mounting connectors as well as the need to secure connector space.

Solutions for Large current, Heat Radiation

For users who wish to mount components supporting large current and high heat generating components, such as wiring boards for electric vehicles, Tanaka proposes various types of heat-radiation structures, which support large currents and are suitable for individualized applications (Fig. 2).

Other PWB Offerings

Also included in Tanaka's board portfolio are wiring boards, which support high frequencies that correspond to various low dielectric materials; high-thickness, high-multilayer wiring boards for semiconductor tester; fine-pitch, large evaluation boards for burn-in tests; countersink boards, which allow for size reduction and improvements in heat radiation; quality control systems that enabled Tanaka's plants to be certified by the Japan Ministry of Defense and the Japan Aerospace Exploration Agency (JAXA). Evaluation and analysis of various printed wiring boards is also available. ❑

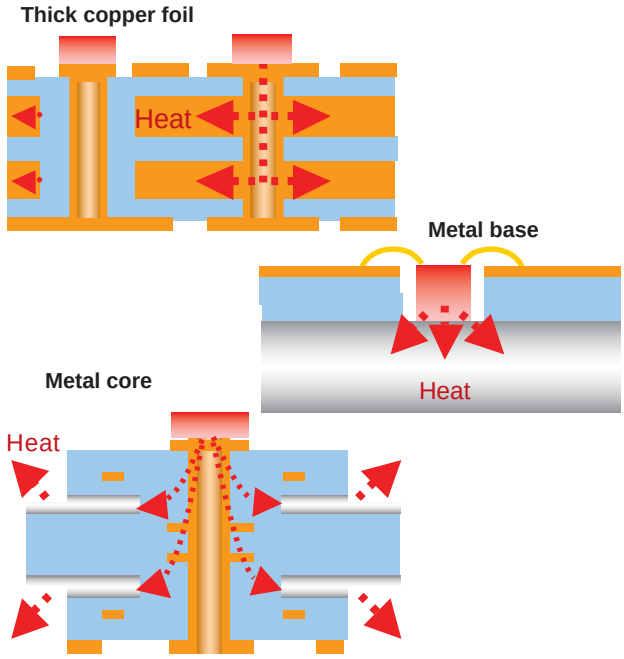


Fig. 2: Images of the thick copper foil, metal base, and metal core

Tanaka Taps Taiwan for Copper Wire Production

Tanaka Denshi Kogyo K.K. established a manufacturing subsidiary for copper bonding wire in Taiwan, and started production last February 1. The new manufacturing center of newly established Tanaka Electronics Taiwan Co., Ltd. is located in Zhongli City in Taoyuan County, and is Tanaka Denshi Kogyo's fourth copper wire production center worldwide, following plants in Japan, Singapore, and Hangzhou, China.

Tanaka Denshi Kogyo has the world's leading share in gold bonding wire. Through the establishment of Tanaka Electronics Taiwan, Tanaka Denshi Kogyo aims to expand its share in copper wire, and to gain the world's leading share in copper wire by 2014.

Major Source of Copper Wire

Tanaka Electronics Taiwan was established to expand the company's sales channels amid the acceleration of copper wire adoption in Taiwan. In addition to being able to establish a speedy product supply system more deeply rooted in local customers, this will also enable the company to strengthen its Business Continuity Plan for dealing with emergencies, such as natural disasters and damage to social infrastructure, by dispersing risk throughout the supply chain.

With the rapidly increasing demand for copper wire in Taiwan, business with semiconductor manufacturers, such as subcontractors in the semiconductor assembly process, are increasing. On the back of this trend, the company aims to ship 100 million meters of wire per month by 2014.

Replacement for Gold Wire

As the price of gold continues to increase, there is a growing trend to use copper wire as a substitute for gold wire, which has been widely used as bonding wire for connecting semiconductor integrated circuits and external electrodes. It is estimated that approximately 1 billion meters of bonding wire are produced per month worldwide. Copper wire already accounts for around 20 percent of all bonding wires at present, and as its adoption as a substitute for gold wire mainly in emerging economies in Asia began to accelerate in 2010, this may increase to around 40 percent by 2013.

Tanaka's copper bonding wire

Tanaka Denshi Kogyo has previously established production centers in China and Singapore to meet the demand for copper wire. Until now, only product sales and technical support functions were established in Taiwan, and bonding wires manufactured in Japan and Singapore were supplied to Taiwanese customers. ❑

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