Tanaka's High Thermal Conductivity Adhesives Fit Die Bonding Process

Tanaka Kikinzoku Kogyo K.K. supplies a wide array of materials, such as platinum, palladium, gold, silver and other precious metal pastes, powders, and conductivity adhesives (for semiconductor die bonding). These materials are extremely versatile for various applications, including industrial products and electronic parts or components. Among others, silver (Ag) paste, a high thermal conductivity adhesive, is drawing attention as a die-bonding material for a number of applications, including power semiconductor devices and light-emitting diode (LED) lighting devices. The features of the Ag paste are as follows: 1) low cost and stable supply are realized by the integrated production from Ag powder material to paste production and recycling; 2) thanks to its low elastic modulus, high reliability is guaranteed; and 3) paste that meets each individual customer's requirements can be supplied through the company's well-thought-out technical services in which development, manufacturing, and sales are integrated.

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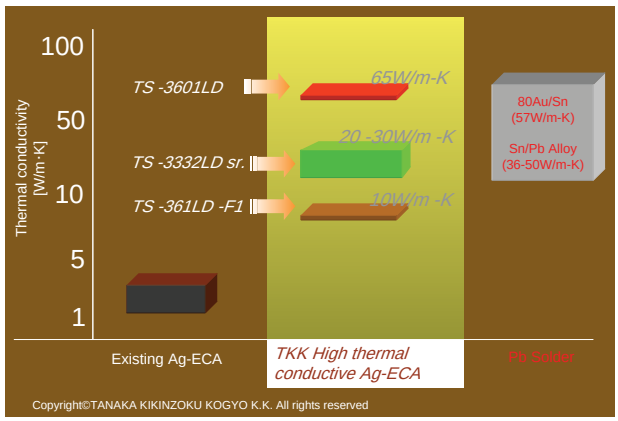
Appearance of Ag adhesive paste products



High thermal conductive adhesion

*Representation value

Name	TS3332LD	TS3334LD-40	TS3601LD-35	TS361LD-F1
	Commercial Product			
Thermal Conductivity	23 W/m.K	20 W/m.K	65 W/m.K	10 W/m.K
E-Modulus 1) / at RT	9,000MPa	7,900MPa	20,000MPa	11,000MPa
at 250C	690MPa	980MPa	3,900MPa	360MPa
Viscosity 2)	30 Pa.s	40 Pa.s	35 Pa.s	50 Pa.s
Viscosity 3)	11 Pa.s	15 Pa.s	15 Pa.s	25 Pa.s
Volume Resistivity	25 μΩ.cm	17 μΩ.cm	10 μΩ.cm	15 μΩ.cm
Tg 4)	84 C	96 C	61 C	
CTE α1	27 ppm/C	28 ppm/C	28 ppm/C	35 ppm/C
CTE α2	19 ppm/C	25 ppm/C	58 ppm/C	94 ppm/C
DSS 5)	27 N/mm²	17 N/mm²	15 N/mm²	22 N/mm²
Hot DSS 6)	1.4 N/mm²	2.2 N/mm²	2.1 N/mm²	1.1 N/mm²
RF DSS 7)	24 N/mm²	16 N/mm²	14 N/mm²	23 N/mm²

1) SII, DMS6000 2) BF, RVT 10rpm 3) HAAKE, 10/s 4) by TMA
5) Si chip □2mm/ Ag LF 6) On hold 260C, 1min 7) 260C, 1min. → RT

Technical data sheet

With Low Volume Resistivity

The company's high thermal conductivity Ag adhesive paste products come in three series: the TS-361LD Series with a thermal conductivity of 10 W/m·k; the TS-333LD Series with that of 20 to 30 W/m·k; and the TS-3601LD Series with that of 65 W/m·k. All of these series feature lowest volume resistivity ranging from 10 to 25 μΩ·cm. Furthermore, Tanaka Kikinzoku Kogyo also adds a low elasticity modulus Ag adhesive paste product that has an elastic modulus of 100 MPa to the product line.

For various types of die bonding processes, paste viscosity is optimized by controlling the distribution of Ag metal particles and adjusting the adhesive composition, ensuring a high operating rate. In addition, the company also offers high heat resistant products that can be applied to the reflow process of substrates.

Stringent Process Control

At the company's Shonan Plant that manufactures the Ag paste, the production is performed under strict control of the processes in terms of temperature, humidity, and cleanliness and the product quality, so as to be able to supply stable products whose quality will not vary from one production lot to another. As regards the durability of the products, Tanaka Kikinzoku Kogyo conducts 1000-cycle heat shock tests at temperatures ranging from minus 50ºC to plus 150ºC in order to guarantee their high reliability.

When a user uses the Ag paste, the paste is defoamed so that no air bubbles or voids may be generated in an adhesive layer after bonding. In addition, preventing impurities and foreign materials from entering the paste will contribute to boosting yield.

In order to reduce the quality variation during transfer, the company adopts dry ice packing and monitors a temperature profile all the way from the plant to a user, thereby ensuring low-temperature delivery.

As mentioned above, Tanaka Kikinzoku Kogyo maintains high quality and high reliability of its products by meeting each individual customer's requirements meticulously through a concerted effort. ❑

Precious Metals Technology : Your Gateway to the Future.

Technology to develop new forms of energy and products is the key to solving a variety of the problems faced around the world today.
Established in 1885, Tanaka Precious Metals Group has contributed to the development of a wide range of industries through its precious metals technology.
Adhering to the beliefs we have held since our inception, we continue to lead the way in green technology innovation by realizing the full potential of precious metals in order to realize an affluent society.

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