

## Preliminary Technical Information

# 4906 GOLD CONDUCTOR PASTE

## 600°C Firing Composition for Aluminum Nitride Substrate

The thick film gold composition 4906 is a cadmium-free paste developed specifically for firing on aluminum nitride. Its low firing temperature of 600°C results in robust performance regardless of the source of the aluminum nitride or its processing history. The 4906 is also suitable for gold wire bonding. Key features of the product include:

- RoHS Compliant
- Good Adhesion to AlN
- High Film Density
- Good Electrical Conductivity
- Gold Wire Bondable
- Good Line Resolution
- Fires at 600°C

### TYPICAL FIRED FILM CHARACTERISTICS<sup>(1)</sup>

|   |   |
|---|---|
| <b>Fired Thickness</b>  | 9 - 12 microns                                  |
| <b>Line Resolution</b>  | 175/150 micron line/space using 325 mesh screen |
| <b>Resistivity<sup>(2)</sup></b><br>Milliohms/square at 12 micron fired thickness | ≤ 7   |
| <b>Wire Bond Strength<sup>(3)</sup></b><br>1 mil gold wire                        | > 7 grams                                       |

(1) Typical properties are based on testing of several batches under various processing conditions. They are not intended as specification limits. Data obtained on Koartan's Koar-Cool aluminum nitride substrate.

(2) Measured on a 20 mil wide track, 254 squares.

(3) Thermosonic gold wire bonding performed on plasma cleaned substrates. All wire breaks, at second bond.

### COMPOSITION PROPERTIES

**Viscosity:** 190 ± 40 Kcps, when measured with Brookfield HBT viscometer, Spindle #14, utility cup, 10 RPM, 25°C

**Specific Gravity:** 4.5 – 5.0 g/cm<sup>3</sup>

**Recommended Thinner:** KOARTAN B-1194

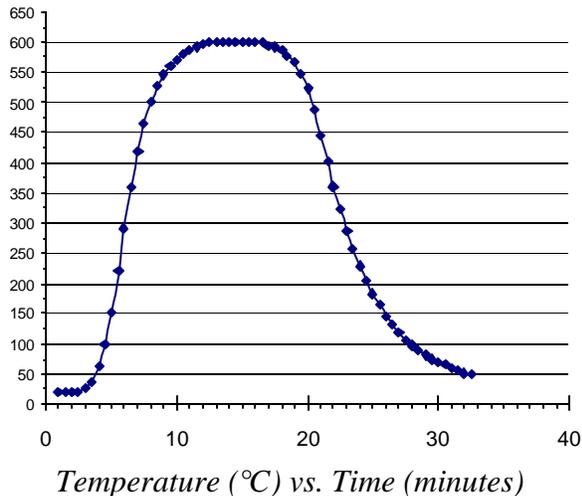
## RECOMMENDED PROCESSING PROCEDURE

**Printing:** Printing with 325 mesh stainless steel screen using 10-15 micron emulsion and 45 degree angle is recommended. Other mesh counts, 230-280, and emulsion thicknesses, 5-25 micron, may be used for special applications. Squeegee speeds of up to 6 inches/sec may be utilized.

Coverage is approximately  $60 \text{ cm}^2/\text{g}$ , when utilizing 325 mesh screen and a wet print thickness of about 38 micron.

**Drying:** Wet prints should be allowed to level for 5-10 minutes prior to drying. Dry for 10-15 minutes in a convection oven or belt dryer at  $125^\circ\text{C}$ - $150^\circ\text{C}$ .

**Firing:** Firing in air using a belt furnace and a 22-40 minute profile, with 10 minutes at a peak temperature of  $600^\circ\text{C}$ , is recommended. Air flow rates must be optimized to ensure that the products of binder burn-off discharge properly and create a fully oxidizing atmosphere in the muffle.



**Storage and Shelf Life:** Store in tightly capped containers at room temperature. Shelf life is 6 months for unopened jars. Under ordinary conditions of storage and use the product should not require thinning. However, solvent loss during extended printing runs may be corrected by incorporating up to 0.5% of Koartan B-1194 thinner.

### Other Pastes for Aluminum Nitride :

Koartan offers a number of other standard products specifically developed for aluminum nitride substrate. Please check [www.koartan.com](http://www.koartan.com) for the latest additions or contact us with your special requests.

- 6122 100% Silver Conductor Paste
- 6292 Silver-Palladium Conductor Paste
- 5652  $500^\circ\text{C}$  firing overglaze Paste
- 7961 Series Pd:Ag Power Resistors
- 7981 Series Pd:Ag Resistors for Heaters
- 5660  $600^\circ\text{C}$  firing Acid-Resistant Glaze
- 5662 Pd-Saver Overglaze Paste

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