KOARTAN
MICROELECTRONIC INTERCONNECT MATERIALS
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Preliminary Technical Information

5816 Cross-Over Dielectric for Aluminum Nitride

The 5816 dielectric composition was developed to provide a 850℃ firing, smooth, and bubble-free isolation layer between two similar conductor layers on most brands of aluminum nitride substrate. It is not recommended as an isolation layer between different metallizations (e.g. gold and silver-based conductors) or for construction of circuits with more than two conductor layers. Its coefficient of thermal expansion is matched to that of AlN. It does not contain cadmium, lead, nickel, or highly toxic organic solvents. Key features include:

- RoHS and REACH Compliant
- Wide Latitude in Firing. May be fired from 825℃ to 875℃.
- Sufficient thickness in two layers
- Good Via Resolution.
- Compatible with Silver, Gold, and Alloyed Conductors.
- Dense, Hermetic Composition.
- Firing in 36-60 Minute Profiles.

TYPICAL FIRED FILM CHARACTERISTICS(1)

Fired Thickness	36-48 µm
Via Resolution(2)	250 µm (0.010")
Dielectric Constant(3)	12-16
Dissipation Factor @ 1KHz	≤ 3%
Insulation Resistance (IR) Ohms @ 100VDC	≥ 10^{12}
Dielectric Strength VDC	≥ 2000

(1) Typical properties are based on testing of several batches under various processing conditions. They are not intended as specification limits.
(2) Using 325 mesh screen.
(3) The electrical results are based on 0.350" x 0.600" capacitors fabricated with 5816 dielectric and 6122 silver pastes on KOAR-COOL aluminum nitride substrate.

COMPOSITION PROPERTIES

Viscosity: 170 ± 30 Kcps, when measured with Brookfield HBT viscometer, Spindle #14, utility cup, 10 RPM, 25°C

Specific Gravity: 1.60 – 2.00 g/cm³

Recommended Thinner: KOARTAN A-1039

RECOMMENDED PROCESSING PROCEDURE

Printing: For best results, three separate print/dry/fire operations with 325 mesh stainless steel screen using 10-15 µm emulsion and 45 degree angle is recommended. Other mesh counts, 200-280, and emulsion thicknesses, 5-25 µm, may be used for special applications. A class 10,000 or better clean room is required if only two layers of dielectric are to be used.

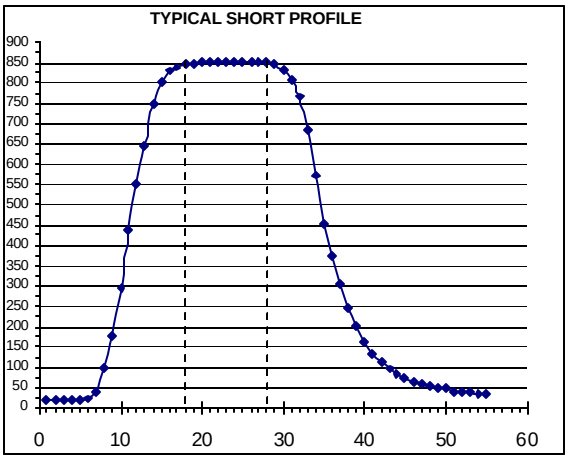
To ensure excellent via resolution and good leveling, the 5816 possesses a special rheology. Use a screen with good tension and allow at least 45 mils of break away to avoid screen popping. Depending on the print area, squeegee speeds of up to 6 inches/sec may be utilized.

Coverage is approximately 140 cm^2/g per layer, when utilizing 325 mesh screen and a wet print thickness of about 35 µm.

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°C-150°C.

Firing: Firing in air using a belt furnace and a 36-60 minute profile, with 10 minutes at a peak temperature of 850°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. Thorough mixing of the paste before each use is recommended. Under ordinary conditions of storage and use the product should not require thinning. However, solvent lost during extended printing runs may be replaced by incorporating up to 0.5% of Koartan A-1039 thinner.



Temperature (°C) vs. Time (minutes)

Other System Components:

Silver Conductor	6122
Silver-Palladium Conductor	6292
Low Temperature Gold Conductor	4906
Low Temperature Overglaze	5652
Acid Resistant Overglaze	5660
Pd-Ag Power Resistors	7961, 7981