

DuPont 4093

Silver/Palladium/Platinum Conductor

Technical Data Sheet

Product Description

DuPont 4093 has been developed as a low cost alternative to solderable gold bearing conductors. DuPont 4093 is a mixed bonded conductor with superior performance over traditional Palladium Silver compositions with regard to solder leaching and silver migration.

Product Benefits

- Outstanding resistance to silver migration
- Very high solder leach resistance in 62Sn/36Pb/2Ag and 63Sn/37Pb solders
- High aged adhesion
- Sprint™ vehicle, permitting long production runs with squeegee speeds up to 30cm/sec
- Compatibility with Birox® and Certi-Fired® resistor compositions
- Compatibility with crossover and multilayer dielectric compositions

Processing

Printing

Print with 200 - 325-mesh stainless steel screens. DuPont 4093 may be printed at squeegee speeds of 5 - 30 cm/s (2 - 12.5 in/s) and at a rate of one substrate per second. At high printing speeds optimum results are obtained with a sharp squeegee, a 45° angle of attack, a force of 3 to 6N per cm (2 to 4 lbs per inch) of squeegee length and a snap-off ratio of 1/250 to 1/200 (off contact/screen width) depending on pattern size.

Drying

Allow prints to level 5–10 min at room temperature. Then dry 10–15 min at 150°C.

Typical Physical Properties

Test	Properties
Line Resolution (µm line)	150 - 200
Fired Thickness (µm)	15 - 17
Resistivity (mΩ/sq)	32 - 42
Solder Initial Acceptance ²	Excellent
62Sn/36Pb/2Ag	Excellent
63Sn/37Pb	Excellent
Leach Resistance ³	
62Sn/36Pb/2Ag	15 cycles (1.23 dips/µm)
63Sn/37Pb	11 cycles (0.9 dips/µm)
Adhesion ⁴	
Shipping Specifications	
Initial (N)	≥20
Aged 48 hr, 150°C (N)	≥17.7
Resistance to Silver Migration	
Failure Time in Water Drop Test, min ⁵	>20
Failure Time in 85% RH, 85°C, h ⁷	>300

Typical Data	1 Firing ⁵	5 Firing ⁵
Initial,	28 N 6.4 lb	26 N 5.9 lb
Aged 100 hr, 150°C	22 N 5.0 lb	23 N 5.5 lb

¹ Excellent characterized as complete wetting with smooth solder film after 5-sec dip at 220°C using mildly-activated flux (Alpha 611).

² Cycle consists of dip in mildly-activated flux (Alpha 611), 10-sec dip in solder at 220°C and washing off flux residue.

³ 90° wire peel test on 2 x 2 mm pads soldered with 62Sn/36Pb/2Ag solder at 220°C using mildly-activated flux (Alpha 611). See Wire Peel Adhesion Test Bulletin A-74672 for details.

⁴ 1 Firing Cycle: 60 min total firing time with 10 min at 850°C.

⁵ Space between conductor lines: 250 µm (10 mil). Bias Voltage: 5V.

⁷ Space between conductor lines: 250 µm (10 mil). Bias Voltage: 60 V.

This table shows anticipated typical physical properties for DuPont 4093 based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

Firing

Dried parts should be fired on a belt furnace. Use either 30 or 60 minutes profile with a peak temperature of 850°C for 10 minutes.

Storage and Shelf Life

Containers should be stored, tightly sealed, in a clean, stable environment at room temperature (<25°C). Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

Safety and Handling

For Safety and Handling information pertaining to this product, read the Material Safety Data Sheet (MSDS).

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