COPPER DAMASCENE PROCESS

DESCRIPTION:

Transene Damascene Copper Electroplating Solution provides consistent, reproducible, void-free filling of features through the 45 nm technology node. This process is capable of producing copper film deposits of extremely high purity and low stress. The organic additive system is engineered specifically for bottom-up filling at a variety of copper and acid concentrations.

PROPERTIES:

Temperature (° F)	70-120
Current Density (A/ft^2)	20-50
Anode	Copper
Anode to cathode ratio	1:1
Agitation	Mechanical
Voltage (V)	4-6
Filtration	Continuous
Tank	Glass, fiberglass, pvc, ceramic, rubber
pH	< 1
pH control	Sulfuric Acid
Deposition rate @ 20 asf	0.5 mil/hour
Copper concentration (oz/gal)	6
Resistivity	< 1.8 meg-ohm-cm (post-anneal)
Stress	< 50 MPa (post-anneal)
Via Fill	65 nm, > 5:1 AR
Trench Fill	50 nm, > 10:1 AR
Surface Smoothness	< 5 nm (@ 1 µm) across blanket wafer
Reflectivity	>135% @ 1 µm (@480 nm vs. polished silicon)
Leveling (over plating)	< 1,000 angstroms over dense arrays
Dual damascene	65 nm > 5:1 AR

APPLICATIONS:

The copper damascene system consists of Electrolyte catholyte and anolyte or any other electrolyte with various acid concentrations. Additives include accelerator, suppressor, and leveler.

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