ClassOne
TECHNOLOGY

Technical Data Sheet
TDS104

High-Aspect-Ratio Copper TSV Fill Plating Using the Solstice® CopperMax™ Reactor

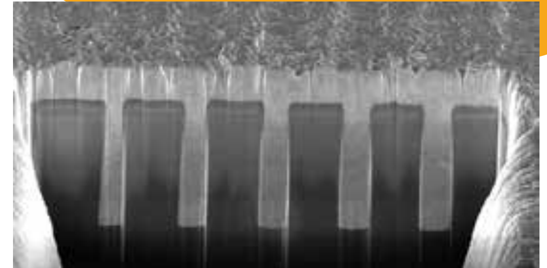
Modern semiconductor copper plating chemistries include expensive, highly engineered organic additives that enable void-free, bottom-up fill. These additives, however, are readily destroyed when they come in contact with the copper anode of the plating system. This necessitates ongoing replenishment of additives and significantly increases process costs.

Our proprietary Solstice® CopperMax™ reactor integrates a cationic exchange membrane that separates organic additives from the anode while still allowing high-speed copper cation movement to the wafer. This enables higher plating rates while routinely reducing user chemistry costs by more than 95%—and also delivering excellently plated feature uniformity.

Applications

- Wafer-level packaging
- 3D ICs
- Image sensors
- And more...

The single-wafer processing Solstice Platform is available with 8, 4, 3 or 2 chambers in customizable configurations, depending on the applications you require.



High-aspect-ratio copper through-silicon via (TSV) fill from the Solstice CopperMax reactor

Features

- Cation exchange membrane to reduce additive use
- Continuously filtered chemistry, optional carbon filtration
- High-precision wafer rotation
- Adjustable diffuser
- Dry-contact, low-maintenance plating rotor
- Customized seal reach
- Levitronix® pump with LeviFlow™

Benefits

- Additive costs reduced >95%
- Maximized bath life
- Extremely uniform field profile
- Seal reach aligns to existing integration
- Continuously cleaner chemistry
- Precise, consistent flow rate control

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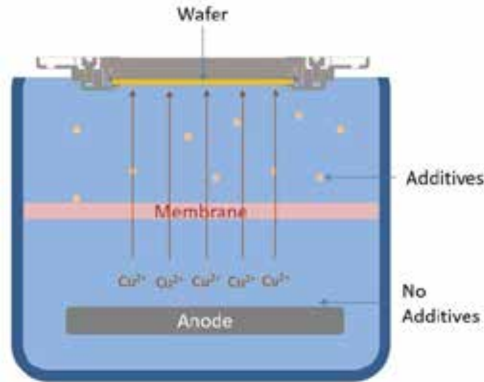
Eliminating Additive Breakdown

The proprietary design of the Solstice CopperMax reactor dramatically reduces the deterioration of organic additives by using a cationic exchange membrane to keep additives from contacting the anode. This significantly reduces chemistry costs while enhancing copper plating quality.

In other reactors, the plating behavior shifts rapidly as additives break down. The bath metrology begins to return inaccurate readings, which leads to erroneous dosing.



Technical Data		
Wafer Sizes	75-200mm	Configurable to non-standard sizes, e.g., 160mm
Wafer Thickness	150µm to >6mm	
Wafer Materials	Silicon GaAs GaN on Si, GaN on Sapphire Sapphire Transparent substrates and more	
Flow Rate	30 - 60 lpm	Dependent on wafer size
Fill Rates	<1 hour for 10x100µm <20 minute for 5x50µm	Dependent on feature
Within-Wafer Uniformity	<5% 3-sigma	
Wafer-to-Wafer Uniformity	<1% (mean-to-mean)	
Fill Quality	Void-free	
Bath Life	>40 amp-hours per liter	With proper chemistry management

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