

Parmod VLT Inks for High Density Interconnect

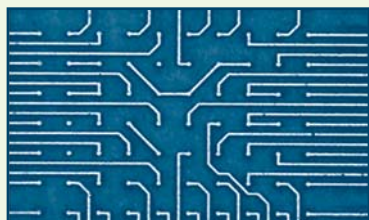
Parmod® VLT silver and copper conductive inks enable the patterning of fine line geometries at high speed and low cost. The unparalleled conductivity of Parmod VLT provides new design and miniaturization opportunities.

A high density interconnect is defined as any fine-line (≤ 50 microns) trace or via that acts as an electrical interconnect between two components in applications such as:

- Chip-scale packaging
- Micro circuit board patterns, such as lines, vias, base plates and pads
- Wafer-scale packaging
- Metal interconnect between processed silicon and first-or second-level packaging

Parmod VLT and High Density Interconnect

Parmod VLT can be used to metallize micro-vias and fine conductor lines in high density interconnect applications, such as build-up circuit boards and semiconductor packaging, enabling less than 50 micron lines and spaces.



Laser micro-machined array filled with Parmod VLT silver ink (50-um vias, 30-um lines in 3 mil Kapton®).



Laser micro-machined serpentine channels and bond pad filled with Parmod VLT copper ink (channels 12- μ m wide by 9- μ m deep in 3-mil thick Kapton® film).

Innovative semiconductor packaging designs require finer traces and microvias to meet the demands of silicon chip technology.



The Benefits of Parmod VLT

High Conductivity

Parmod VLT converts to pure metal without alloying elements. When cured, Parmod VLT provides metal with conductivity approaching that of etched or plated copper.

Solderable

Parmod VLT provides pure metal surfaces compatible with reflow techniques.

Printable

Parmod VLT inks and pastes — which include silver, copper and a variety of other metal compositions — are quickly and easily applied to industry-standard substrates such as silicon, polyimide and FR-4, by printing processes such as screen printing, laser mill and fill, computer-controlled micro-dispensing, and ink-jet printing. The result is fully additive circuits and interconnects.

Low Temperature Process Capability

Parmod VLT enables the formation of continuous-phase pure metallic conductors at a relatively low temperature, making them suitable for application to polymer surfaces.

Parmod VLT
PRINTED ELECTRONICS

Parmod® VLT Inks for High Density Interconnect

| | Parmod® Silver | Parmod® Copper | Etched Copper | PTF | Thick Film |
|----------------------------|----------------|----------------|---------------|----------|------------|
| Process Type | Additive | Additive | Subtractive | Additive | Additive |
| Cure Temp. °C | 135 | 300 | N/A | 150 | 650 |
| Resistivity, m-ohms/sq/mil | 2 | 2.8 | 0.7 | 20-30 | 2 |
| Substrate Solderability | Yes | Yes | Yes | No | Yes |
| Wet Processing Waste | No | No | Yes | No | No |

Parmod VLT inks and pastes out-perform the competition.

About Parelec

Parelec develops and markets Parmod® VLT inks and other innovative materials for the electronics industry. Parmod VLT can be printed onto paper or polyester substrates in high volume circuit applications with three to ten times greater performance than traditional polymer based metal inks. Parmod VLT inks provide solderable circuits when printed on high temperature substrates. Parmod VLT inks help create cost-effective, mass produced circuit components ranging from higher cost durable consumer devices, such as cellular phones, home electronics, appliances, automobiles and computers, to less expensive high volume disposable products, such as RFID smart labels, product identification tags, and intelligent packaging. Parelec's headquarters is in the high-tech corridor near Princeton, New Jersey. For more information visit www.parelec.com



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