Fan-Out Packaging Dispute Resolves in IP Licensing Deal

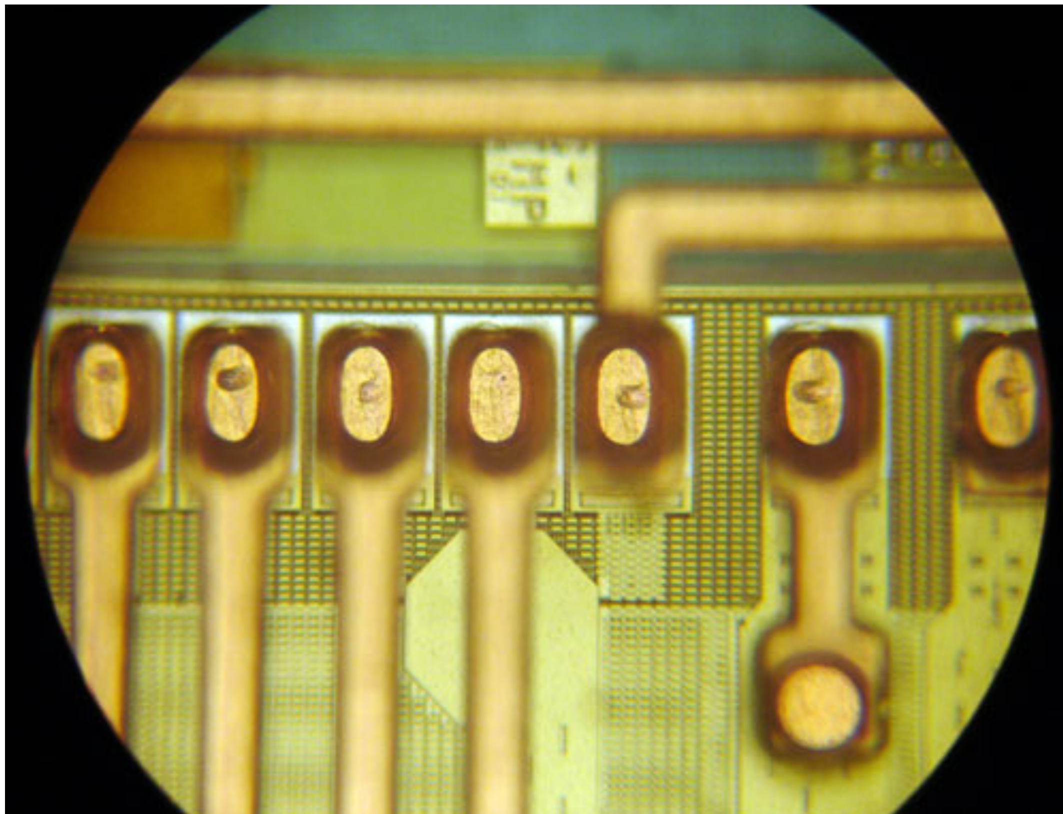
What began as a patent dispute over fan-out packaging technologies has resulted in an IP agreement that will ultimately make it easier for packaging subcontractors to license Epic's ChipsFirst and Freescale's RCP technologies in one step, said James Kohl, Epic's CEO.

By Sally Cole Johnson, Contributing Editor -- Semiconductor International, February 3, 2010

An intellectual property (IP) and licensing agreement between Epic Technologies Inc. (Woburn, Mass.) and Freescale Semiconductor (Austin, Texas) has brought an **end to litigation** over a fan-out type of packaging technology that promises to rival through-silicon vias (TSVs) — while also making it easier for packaging subcontractors to license it.

Epic did much of the work on its ChipsFirst technology back in the '90s and patented its efforts. The basic claims in the patents are quite broad, noted James Kohl, Epic's CEO, and the company holds eight chip-first-related patents.

ChipsFirst is a basic fan-out type of packaging, in which the chips are embedded in a reconstituted wafer, and then photopatternable dielectrics are deposited across the surface, with via hole formed directly down the IC bond pads. "We've been producing this technology and held patents on it for more than a decade," said Kohl.



Epic’s fan-out technology, ChipsFirst, eliminates wire bonds and bumps. (Source: Epic Technologies Inc.)

In 2006, Freescale introduced its **redistributed chip packaging (RCP) technology**. It's a chip-first technology that eliminates the substrates that die are mounted to in a standard wire bond of flip-chip BGA, because the package is built or integrated around the assembly or die. The technology instantly garnered industry attention because it's a solution that can eliminate wire bonds, package substrates and flip-chip bump interconnects.

The two technologies appeared similar enough that Epic filed an infringement suit. But rather than fight it out in court, the companies worked out a licensing agreement. They agreed to license each other's patents and also went a step further by agreeing to a combined patent licensing approach that will benefit packaging subcontractors. Epic's ChipsFirst technology is still independently and exclusively

licensed from Epic.

"This is more than just a license with Freescale; it actually establishes a way for packaging subcontractors to get access to the IP covered by Epic and Freescale patents in this general area," Kohl explained. "We are now a one-stop shop for both ChipsFirst and RCP technologies and patent portfolios." The technologies are each covered by product and process patents, as well as several pending patent applications at this time, so this move greatly speeds the licensing process along.

3-D stacking

Epic recently extended its technology to 3-D stacking of chip layers, which enables a single layer of the basic fan-out with vias going through the structural material in the same plane as the chips to provide connections from one side to the other. This addresses the same market that's being targeted by TSVs.

"The through-package vias that are possible with the 3-D second-generation ChipsFirst technology can address many of the same applications as TSVs — minus the cost concerns," Kohl stressed. "Think of it as through-package vias rather than TSVs. It's in the same plane as the chips, just separated out beyond the edge of the chips."

Basic reliability of the technology has already been reported by Freescale and others using fan-out technologies. It was initially a concern, but as Kohl put it, until it's been done in high-volume facilities, which are just now coming online, it's hard to say definitively that the requirements have all been met. Epic has been meeting stringent requirements at lower volumes, according to Kohl.

Drivers for fan-out technology are primarily wireless devices with a very strong need for everything to be small, compact and thin, but that also have aggressive electrical and thermal requirements. These are highly cost-sensitive applications, so the fan-out approach also boasts the cost advantages of wafer-level packaging.
"We've been trying to interest people in this technology for a very long time, so we're very excited to finally be gaining some traction," Kohl said.

« Back | **Print**

© 2010 Reed Business Information, a division of Reed Elsevier Inc. All rights reserved.