

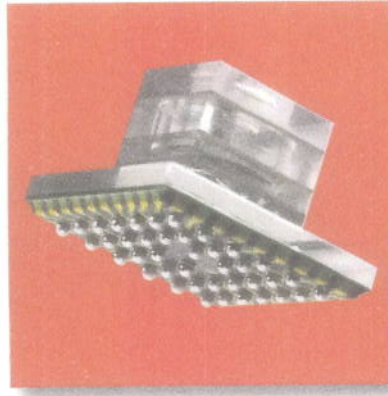
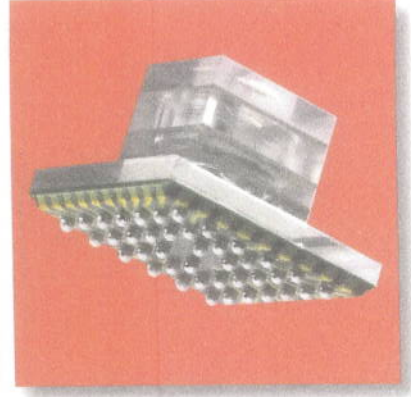
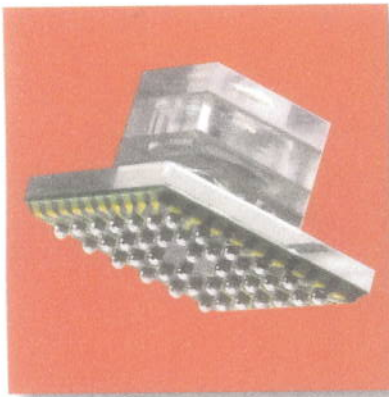
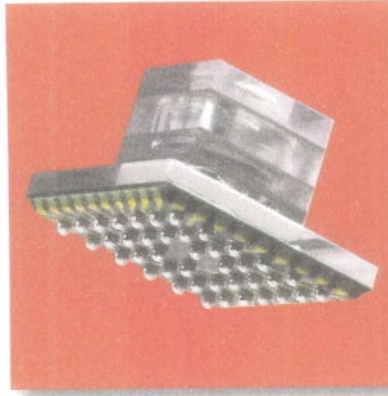
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MOBILE LIFE

## Buggin' Out

Tiny Wafer-Level Cameras Taking Flight



# How Small Can They Get?

**The miniaturization of camera modules continues. What's it all mean?**

**By CAMERON SCOTT**

Of the many new and interesting announcements made at the 2010 PMA, perhaps none will have quite as dramatic an impact on the industry as the presentation Liam Goudge of Tessera made at the InfoTrends breakfast on the second day of the show.

Tessera's wafer-level camera technology (WLC) appears ready to make a big splash in the camera phone market—and perhaps beyond. The company announced development of the technology about two years ago and, according to Goudge, the mobile imaging world will begin feeling a major impact before the end of this year.

“Along with the advancements this technology can be responsible for in the camera phone market, it can also be responsible for opportunities in entirely new categories,” began Goudge, who is Tessera's Senior Vice President and General Manager. “Our vision is that image capture becomes ubiquitous. Cameras can be embedded in TVs, Web books, gaming devices and even children's toys. The sky is the limit.”

Goudge had given a similar presentation at last year's 6Sight Conference in Monterey, Calif., as momentum for WLC tech continues to grow.

The technology Tessera produces is essentially all about applying semiconductor processes and techniques to the optics industry. The wafer-level-manufacturing approach basically allows the company to simultaneously manufacture thousands of lenses on a single wafer compared with traditional

optics manufacturing, which is low volume. In addition, the process of increasing the number of lenses per wafer as wafer size decreases, which helps to reduce manufacturing and development costs, allows true chip-size camera modules to be assembled directly on the board using reflow processes.

Tessera is not the only manufacturer in wafer-level technology as companies like Aptina Imaging, Nemotek, Kaleic and SUSS MicroTec among others are moving to varying degrees.

## **Flexibility Trumps Quality**

While no one is saying these optics will match the quality level of a DSLR, the quality level can currently extend to a much wider range—and that's not saying the other interesting part of this equation is that the technology will allow manufacturers to produce cameras in a wider range of device form factors. In fact, it drastically reduces the size and material cost of camera modules.

“Consumers will always turn to their camera when they want to capture a special memory like a special event,” explains Jervis, a mobile industry blogger. “Today's consumers are more into capturing digital photos to post online or share wirelessly.”



“This isn’t as much about quality as it is about ubiquity.” While the quality-level can reach a very point, this technology is about the ability to produce a very good camera module inexpensively that can go in just about anything. It opens up some amazing markets...many we’re not even thinking about yet.”

— Stan Jervis, a mobile industry blogger



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this is happening to me right now and I want you to check it out. This technology speaks directly and extremely effectively to that trend.”

Reflowable WLCs will certainly play a major role in the future mobile phone camera market. It will dramatically change the supply chain. It makes sense, however, to focus on the low-resolution camera markets first, and not try to implement WLC megapixel technology too early. These first steps will be small but the tech has far reaching possibilities.

“This isn’t as much about quality as it is about ubiquity,” added Jervis. “While the quality level can reach a very adequate point, this technology is about the ability to produce a very good camera module inexpensively that can go in just about anything. It opens up some amazing markets...many we’re not even thinking about yet.”

To get an idea of how far the technology behind camera miniaturization has come, Goudge likes to relay a telling story.

“I saw a demonstration at Carnegie Mellon University where a professor was doing something called Bug Cam with a bunch of cockroaches scrambling around with tiny cameras on their backs,” he recalled. “Unfortunately, the cameras weren’t that tiny as he had to use those large Madagascar roaches. So my vision is that I’d like to do better than that with WLC. We can graduate to ladybug cameras.” 📷

## Expo Focuses on Nanotech

You had to figure there was an event dedicated to the companies and innovators behind everything in the world that is “nano” and the appropriately named Nanotech Conference & Expo is exactly that.



They have dubbed themselves “the world’s largest nanotechnology explain that the five-day conference “delivers application-focused research from the top international academic, government and private industry labs, leading researchers, scientists, engineers and technology developers to NSTI Nanotech to identify new technology trends, development tools, opportunities, R&D collaborations and commercialization partners.”

They are convening in Anaheim from June 21-25 in the Anaheim Convention Center. Of note to the imaging world is the fact Kodak, Samsung, Panasonic are among the companies from the imaging industry that are participating in the 2010 show. Check out [www.techconnectworld.com](http://www.techconnectworld.com) to find out more.