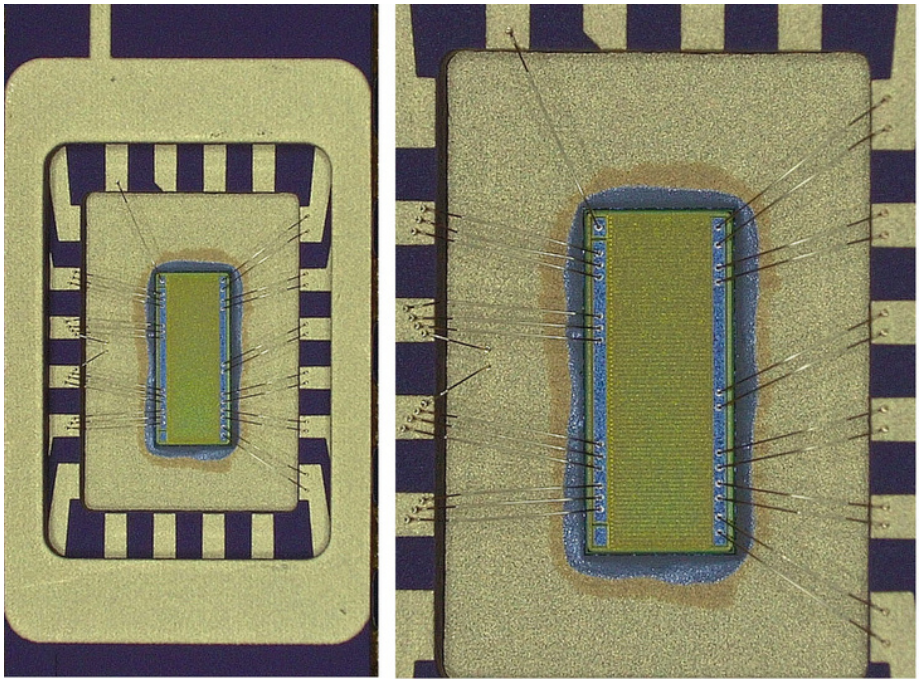
QPTECHNOLOGIES

Winter 2022

Technology Focus:

Compound Semiconductors Enable Advancements in Power, RF and Other Applications



Substrates built on compound semiconductors are a fast-growing market. Yole Intelligence projects that by 2027, compound semiconductors will be a US$2.4 billion market, growing at around 16% annually. Primary compound technologies associated with this increase include silicon carbide (SiC), gallium nitride (GaN), gallium arsenide (GaAs), Graphene and indium phosphide (InP). SiC and GaN, in particular, have seen key gains in power, RF and photonics due to its wide bandgap capabilities which enables much higher speeds, power and smaller form factors than silicon-based chips.

Compound semiconductors are valued for their ability to support new circuit designs that help improve overall system performance and reduce costs. Packaging and assembly solutions that capitalize on these characteristics are essential to taking advantage of these capabilities while mitigating some of the challenges that packaging these devices present due to their unique physical properties. When working with GaN, for example, which operates in the 40-60GHz range, our engineers have worked to shorten wirebond lengths and loops using ribbon wirebonding, which is far more effective for these bandwidths.

QP Technologies has a wealth of demonstrated expertise in collaborating with our customers to formulate packaging solutions for compound semis, initiated with our design and engineering service. We consult with you to determine the right approach for your device, design and fabricate custom prototype packages to meet your specifications, and then complete the assembly process using your die. This encompasses a variety of materials and processes.

For example, some materials pose unique leadframe challenges that we have experience in mitigating. Graphene requires nickel-free plating, as the two materials react negatively, which can cause device failures. We've created a special wirebonding process to address this issue. Dicing, another process that we provide, is more complicated when it comes to SiC, GaN and other compound semi materials as they're harder and more brittle than silicon, and thus easily damaged. We address this by utilizing advanced dicing processes developed internally on state-of-art dicing equipment.

Our experience with this wide range of materials enables us to pursue solutions for unique technologies such as the one addressed in our new white paper detailing our collaboration with Ideal Power, Inc. Ideal Power has designed and patented an exciting double-sided bidirectional power switch technology, called B-TRAN™. Ideal Power came to QP Technologies to work with them on a robust packaging approach that will enable high-volume manufacture of B-TRAN devices. To download our new white paper, click the button below.

DOWNLOAD OUR WHITE PAPER

Employee Spotlight

Jill Pepper, Purchasing Agent

QP Technologies' success is built on the efforts of our stellar team, many of whom work behind the scenes to help ensure things run smoothly and keep projects on track. One such vital, longtime member of our QP Tech family is Jill Pepper. Jill joined the company back in 2012 to provide her accounting expertise, and she served in that capacity for nearly 10 years.

In early 2022, Jill was made purchasing agent for QP Tech – a role in which she is responsible for sourcing vendors to obtain quotes and submit orders for all the supplies we require to develop customer solutions. Reporting to Mel Cruz, our director of materials, Jill interacts with virtually every facet of the company – from manufacturing and materials to sales and accounting. What Jill enjoys most about her role is that she's "basically Santa Claus. I get to give people what they asked for, so pretty much everyone's happy to see me" – a nice position to be in! She also acknowledges the impact that supply chain shortages have had: some orders that used to arrive in a matter of weeks would take months. Admittedly, this created some difficulties that Jill notes are beginning to ease. She also appreciates the closeness and camaraderie she enjoys with her fellow team members.

Jill's experience owning her own bookkeeping business translated well to her work at QP Technologies. While her clients were largely in the construction industry, the lengths and number of project phases and accounts structures were similar to those of the semiconductor business – and materials shortages had a similar impact. Working in the tech sector is exciting, and handling the purchasing enables her to gain a glimpse into the customers and projects that QP Tech is working on.

When Jill isn't on the job, she enjoys painting, playing the piano, and spending time with her college-age daughter and their pets, which include two cats and a snake!

Promex News

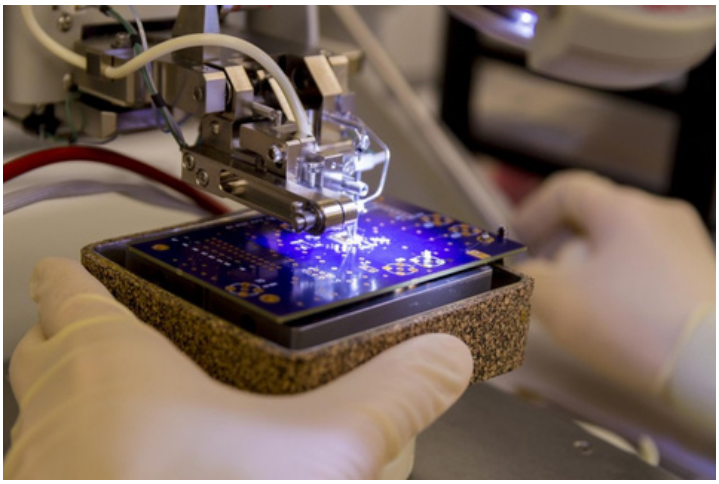
In October, Dick Otte, CEO of QP Technologies and our parent company, Promex Industries, was featured in two videos sharing his perspective on the evolution of heterogeneous integration (HI) and chip development.

Semiconductor Engineering: Editor in Chief Ed Sperling conducted a video interview in which Dick shared how he defines heterogeneous integration and what differentiates it from traditional devices. During the 15-minute tutorial, Dick touches on chiplets, new materials, and other advances that play into HI. To view the video, click here.

HI Webinar Series: Promex rolled out the first in a series of webinars, developed in conjunction with Biopharma Connections, focusing on manufacturing challenges and demands associated with HI. As the primary presenter, Dick provides a high-level overview of the current HI environment, including the convergence of medtech and biotech with electronic and non-electronic content and how to pursue manufacturing and assembly of converged devices. The hourlong webinar goes on to look at Promex's approach, some case studies, and factors to consider when selecting a contract manufacturer. To view the webinar, click here.

Did you know..

That QP Technologies has a wide range of wirebonding capabilities? Using advanced automated wirebonding equipment from K&S and Hesse, we can handle wire diameters ranging from 0.6 mil to 2.4 mils for gold and aluminum. In addition, we offer silver and copper wirebonding, ribbon bonding, wedge and ball bonding, and heavy-wire bonding. For more on our wirebonding capabilities, be sure to read the feature in the next issue, or if you need immediate assistance, you can contact us.



Contact Us

About Us

QP Technologies is a leading provider of microelectronic packaging and assembly, wafer preparation, and substrate design and development services. We leverage proven technologies developed by our skilled staff, and we work closely with you to get your products to market quickly, with the highest quality prototype and production volumes.

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