Power module packaging performance is now essential for power electronics industry

Power Packaging Technologies Trends & Market Expectations Report

LYON, France – March 17, 2015 – The power packaging market is growing, pulled by the interconnection and substrate segments, respectively +14% and +13% between 2014 and 2020. And global growth for raw material is expected to reach +12% between 2014 and 2020, with a global market of $1.7B for 2020...

After Status of the Power Electronics report (March 2015), Yole Développement (Yole), the "More than Moore" market research and strategy consulting company pursues its investigation in the Power Electronics industry and announces its new technology and market analysis: Power Packaging Technologies Trends & Market Expectations report (April 2015).

Under this new report, Yole’s analysts propose a deep understanding of the power module packaging design especially at the substrate, thermal interface materials, baseplate, encapsulation, die attach and interconnection levels. With an approach mixing technologies trends and market needs, the Power Electronics team, managed by Dr Pierrick Gueguen, reviews the technical issues and analyzes the market evolution.

In order to increase power module yield and reliability, companies are working on new products for power packaging, especially for the common failure locations, die and substrate attach, interconnection and encapsulation. Both new designs and new materials can be used, whether to eliminate levels of connection or to improve interfaces. In die attach, for instance, soldering is progressively losing market share, which benefits silver sintering. Although the basic material is more expensive, taking into account cheaper equipment and manufacturing
costs and improved reliability, this technology is seducing ever more players. Standard wire bonding is evolving as well, with solutions increasing contact surface, such as ribbon or ball bonding. Encapsulation technologies must evolve to handle high operating temperatures: standard silicone gel or epoxy are limited in terms of temperature, and so new materials such as parylene are being developed.

“Developments for power packaging are needed because power electronics is facing many challenges, due to both environmental and technical requirements”, says Coralie Le Bret, Technology & Market Analyst, Power Electronics and Compound Semiconductors technologies at Yole. “Increasing power density and power conversion optimization for CO2 emission reduction are key”, she adds. To achieve ambitious governmental targets and to respect volume constraints, technology breakthroughs are needed at device and module level. Moreover, the growing and important role of Wide Band Gap (WBG) semiconductors makes efficient packages mandatory, so that devices’ high frequency, high voltage or high temperature capabilities can be best exploited.

“Growth of electric vehicles and hybrid electric vehicles (EV/HEV) will drive the power electronics market in the coming year”, announces Dr Pierrick Gueguen, Business Unit Manager at Yole. That brings particular requirements, like size and cost constraints, large production volumes, and ability to automate assembly. Packaging improvements will go with these specific requirements.

Applications also increasingly need to work at high voltage or high temperature. Innovations are also needed so that system packages can support harsh working conditions.

And what about the supply chain? “Vertical integration is progressing”, confirms Yole. In order to increase performance and to reduce losses, more and more power electronics applications choose to use power modules instead of discrete components. In this context mastering power module assembly is mandatory for manufacturers. Power module manufacturing becomes a key step and a hotly contested area between device makers and inverter makers. The main trend for power module makers is sourcing package materials from specialized companies and to assemble the module in-house.

Developing new designs is also a good business development opportunity for small companies or start-ups, even if for many fields regional preferences still exist.

Different types of business model are presented in Yole’s report, as well as specialized companies for each part of the final package.
About Power Packaging Technology Trends & Market Expectations report:

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  **Dr Pierric Gueguen** is Business Unit Manager for Power Electronics and Compound Semiconductor activities at Yole Développement. He has a PhD in Micro and Nano Electronics and an master degree in Micro and Nanotechnologies for Integrated Circuits. He worked as PhD student at CEA-Leti in the field of 3D Integration for Integrated Circuits and Advanced Packaging. He then joined Renault SAS, and worked for 4 years as technical project manager in R&D division. During this time, he oversaw power electronic converters and integration of Wide Band Gap devices in Electric Vehicles. He is author and co-author of more than 20 technical papers and 15 patents.

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- **Companies cited in the report:**

- **Rates:** Euros 5,990.00 (Full report - Multi user license). For special offers and the price in dollars, please contact David Jourdan (jourdan@yole.fr or +33 472 83 01 90).

  *Power Packaging Technology Trends & Market Expectations report from Yole Développement will be available on April 7, 2015.*

About Yole Développement

Founded in 1998, **Yole Développement (Yole)** has grown to become a group of companies providing marketing, technology and strategy consulting, media in addition to corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, Yole has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semi., LED, Image Sensors, Optoelectronics, Microfluidics & Medical, Photovoltaics, Advanced Packaging, Manufacturing and Power Electronics. We support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to develop their business.

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