

Mitsubishi Electric targets European markets

Medical Design Technology

On November 30 2010, Mitsubishi Electric announced that it had agreed to purchase German power electronics group Vincotech. At first glance, the deal might look curious. Why is the Japanese semiconductor giant interested in a comparatively small manufacturer and distributor of power modules? The answer is perhaps the best one possible for such an acquisition: the two companies have highly complementary businesses.

“Mitsubishi Electric is currently working to strengthen its business in the European markets, particularly in the fields of low power industrial equipment and renewable energy such as photovoltaics,” a spokesperson for the company told Power Dev'. *“Vincotech has strong capabilities in these fields, which we believe will greatly contribute to the implementation of our business strategy.”*

For photovoltaics in particular, Europe has seen a boom in solar power installations that has swept across Germany and Spain, and which is now steadily spreading into Italy. Europe added around 15 GW of photovoltaic power generation capacity in 2010, out of a global annual total of 18 GW, according to Yole Développement. Germany alone installed more than 7 GW photovoltaic capacity in 2010, essentially matching the total installation figure for the entire world in 2009. So, for any power electronics company seeking to take advantage of rapid growth in the photovoltaics market, investing in a German base looks a very shrewd move.

Vincotech boasts at least nine different solar inverter formats, all of which exploit insulated-gate bipolar transistors (IGBT) that are a particularly strong focus of Mitsubishi Electric's semiconductor technology. In fact, Mitsubishi Electric has been shipping its sixth generation IGBT chips since 2009 which, at the time, it claimed allowed it to produce IGBT modules with the lowest switching power loss in the industry.

This was possible because the sixth generation IGBT has a trench interval of 2.4 μm pitch, narrowed from the 4 μm pitch in the previous generation. Having more transistor cells integrated into an IGBT chip allows electrical current to flow more easily. Shrinking the IGBTs' trench intervals allows more transistor cells to fit into a given area, therefore reducing on-resistance by approximately 20 percent. However, narrowing the trench interval also raises the threshold voltage, which is linked to the transistor's ability to withstand shortcircuits.

However, Mitsubishi Electric introduced high-energy ion implantation technology in its sixth generation device. In this way it was able to improve the consistency of its manufacturing and therefore retain the same safe current density characteristics as its fifth generation devices.

Historically, Vincotech has used IGBTs from Infineon in its power modules, which

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might now be expected to change. Yet, at the moment, the Japanese owners are prepared to let its latest subsidiary keep a measure of its independence.

"There are no plans for Vincotech to become a manufacturing facility of Mitsubishi Electric brand products yet, but all kinds of possibilities will be considered," the spokesperson said. The Japanese power device producer and its German acquisition's diverging focuses on different areas of the industry demonstrate an especially key difference between them. Mitsubishi Electric has been almost exclusively focussed on middle and high-power markets. Meanwhile, Vincotech has specialised in niches, the Japanese company's

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