

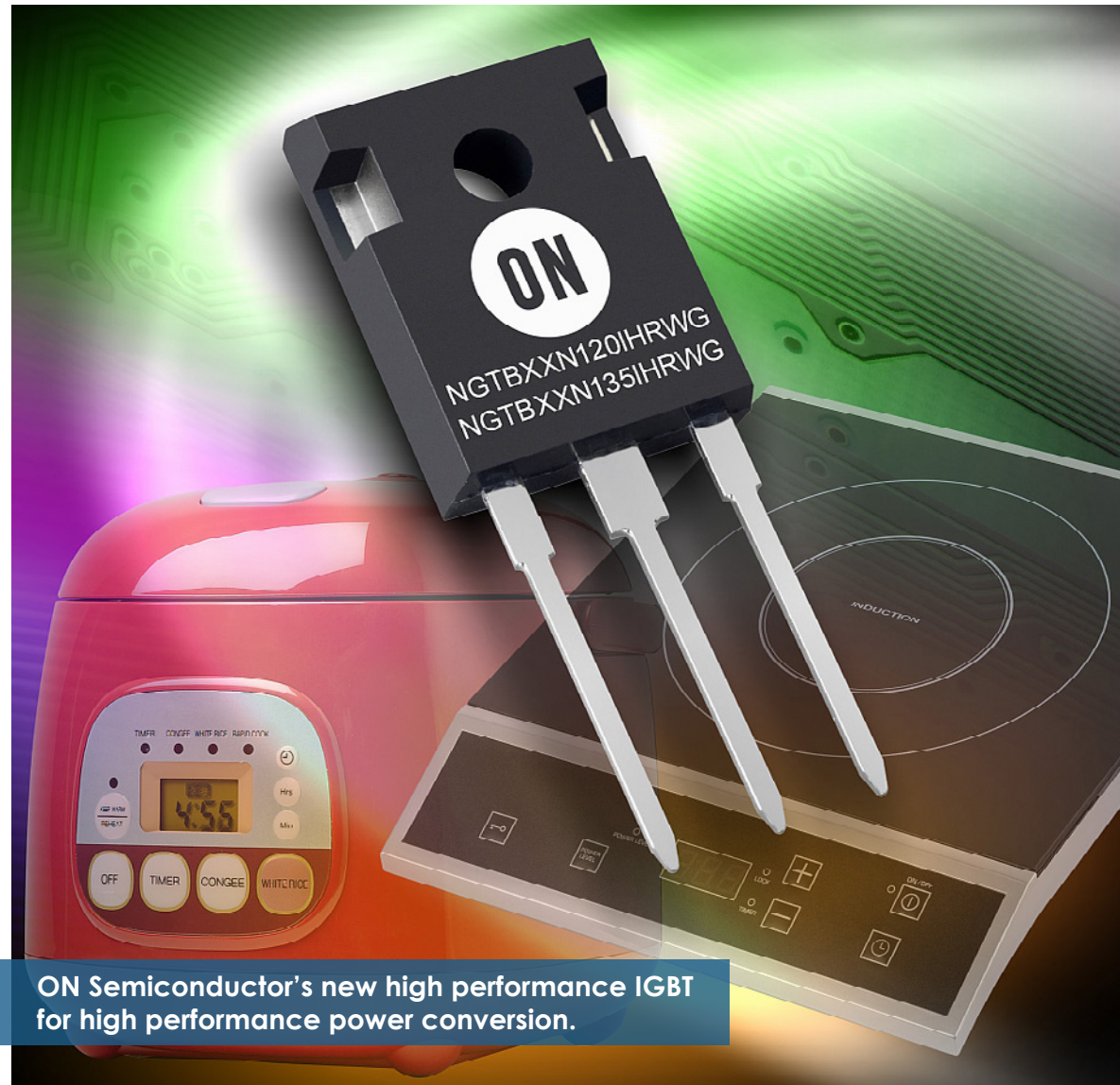
ON



SEMICONDUCTOR

BRINGS OPTIMIZED APPLICATION SOLUTIONS TO THE IGBT MARKET

We spoke with Asif Jakwani, BU Director of Power Discretes at ON Semiconductor regarding ON Semiconductor's past and present portfolio of energy efficient IGBTs as well as their standard process of providing application-specific optimized devices.



ON Semiconductor's new high performance IGBT for high performance power conversion.

IGBT LEGACY

"ON Semiconductor's first IGBT portfolio was in the late 1990s, while it was still part of Motorola," said Mr. Jakwani. "Looking at our product portfolio, we started with AEC-Q qualified, automotive ignition IGBTs and expanded into other industrial applications. Although the company exited the industrial segment in early 2000s, throughout these years, we maintained our automotive ignition IGBTs, providing our customers with high quality and reliability products."

A NEW PORTFOLIO

In 2010, ON Semiconductor took up a renewed focus in the IGBT market which was growing tremendously driven by need for high energy efficiency in server, UPS, industrial motor drives, and expansion in solar and wind power.

Because of the strong innovation history in IGBTs from Motorola, ON Semiconductor had the intellectual property, design, and processes needed to provide highly reliable and quality devices to the growing market. In 2012, the first generation portfolio, with 28 orderable part numbers was introduced; targeted at induction heating, industrial motor control, uninterrupted power systems (UPS), solar inverters, and power factor correction applications.

"ON Semiconductor is always looking for growing markets where our core competencies in device, process and packaging can provide customers with innovative and high performance solutions; we saw a need from our customer's to develop high power and best in class IGBT portfolio to meet their requirements," said Jakwani. "This competitive

portfolio of devices that we were able to develop very quickly given our background, and receive extremely good reception when benchmarked against the market leaders in IGBTs"

Need and competency continue to drive ON Semiconductor's strategy, as the cloud computing, renewable solar energy systems, industrial motor drives and wireless markets continue to grow, so does the need for highly efficient VF drives, inverters and UPS infrastructure. The company's second generation IGBT devices, to be released later this year, should put the company in a market-leading position based on system level performance.

"This second generation portfolio of devices will be the company's second proof point of our capabilities," said Jakwani. "Our understanding of system level efficiency requirements gives us the ability to provide these next-generation IGBTs optimized for their end application."

APPLICATION SPECIFIC OPTIMIZATION

According to Jakwani, an important aspect of ON Semiconductor's IGBTs is optimization according to application.

"We tell our customers that there is no standard IGBT," Jakwani said. "Every IGBT is optimized with tradeoffs around three key variables, the VCE (sat), which is what the voltage drop is when it is on, the turn-off loss also known as the energy loss (EOFF), and the third variable is the short circuit robustness of the device."

ON Semiconductor optimizes IGBTs based on the end application, Jakwani continued, there is always a trade-off between the three variables. On a given technology node, ON develops an application specific portfolio optimized for end application resulting in high efficiency solutions for our customers. For example, he pointed out, "In high frequency UPS solar applications, which typically operate at 40khz, the more important parameters are EOFF and short circuit robustness, so we optimize the device around those two parameters. But if you look at a motor control application in a room air conditioner or an industrial motor which typically operate at 8 to 12 khz frequencies," he continued, "the frequency is lower, which means you optimize your devices for lo Vce(sat)."

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In every generation of product the IGBT is optimized for a given application. That's what we do -- we have different process tweaks that we can dial-in, so to speak -- and our design engineers do that by working closely with our systems applications designers."

Before sending parts to customers, ON Semiconductor does its own testing to decide how the part works best for a particular application and the trade-offs. All of these best practices can be found in the company's IGBT Applications Handbook that outlines IGBTs, their customization, and application, which you can view by clicking [here](#).

IGBT TRIANGLE

