Market for GaN and SiC Power Semiconductors to Top $1 Billion in 2020

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LONDON, U.K. (9 March 2016) – The emerging market for silicon carbide (SiC) and gallium nitride (GaN) power semiconductors is forecast to pass the $1 billion mark in five years, energized by demand from hybrid and electric vehicles, power supplies and photovoltaic (PV) inverters. Worldwide revenue from sales of SiC and GaN power semiconductors is projected to rise to $3.7 billion in 2025, up from just $210 million in 2015, according to IHS Inc. (NYSE: IHS), the leading global source of critical information and insight. Market revenue is also expected to rise with double digit growth annually for the next decade.

SiC Schottky diodes have been on the market for more than 10 years, with SiC metal-oxide semiconductor field-effect transistors (MOSFET), junction-gate field-effect transistors (JFET) and bipolar junction transistors (BJT) appearing in recent years, according to the latest information from the latest IHS SiC & GaN Power Semiconductors Report. SiC MOSFETs are proving very popular among manufacturers, with several companies are already offering them, and more are expected to in the coming year. The introduction of 900 volt (V) SiC MOSFETs, priced to compete with silicon SuperJunction MOSFETs, as well as increased competition among suppliers, forced average prices to fall in 2015.

“Declining prices will spur faster adoption of the technology,” said Richard Eden, senior market analyst for power semiconductor discretes and modules at IHS Technology. “In contrast, GaN power transistors and GaN modules have only just recently appeared in the market. GaN is a wide bandgap material offering similar performance benefits to SiC, but with greater cost-reduction potential. This price and performance advantage is possible, because GaN power devices can be grown on silicon substrates that are larger and less expensive than SiC. Although GaN transistors are now entering the market, the development of GaN Schottky diodes has virtually stopped.”

By 2020, GaN-on-silicon (Si) devices are expected to achieve price parity with -- and the same superior performance as -- silicon MOSFETs and insulated-gate bipolar transistors (IGBTs). When this benchmark is reached, the GaN power market is expected to surpass $600 million in 2025. In contrast, the more established SiC power market -- mainly consisting of SiC power modules -- is expected to surpass $3 billion in the same time period.

By 2025, SiC MOSFETs are forecast to generate revenue exceeding $300 million, almost catching Schottky diodes to become the second best-selling SiC discrete power device type. Meanwhile, SiC JFETs and SiC BJTs are each forecast to generate much less revenue than SiC MOSFETs, despite achieving good reliability, price and performance. “While end users now strongly prefer normally-off SiC MOSFETs, so SiC JFETs and BJTs look likely to remain specialized, niche products,” Eden said; “however, the largest revenues are expected to come from hybrid and full SiC power modules.”

Hybrid SiC power modules, combining Si IGBTs and SiC diodes, are estimated to have generated approximately $38 million in sales in 2015 and full SiC power modules are only two or three years behind in the ramp-up cycle. Each module type is forecast to achieve over $1 billion in revenue by 2025.

The IHS SiC & GaN Power Semiconductors Report is based on more than 50 semiconductor supply chain and potential end-user interviews. It provides detailed global analysis of this fast-moving market and explains growth drivers and likely adoption rates in major application sectors. Ten-year price projections for various power devices, giving mid-case, optimistic and conservative scenarios, are also provided. For information about purchasing this report, contact the sales department at IHS in the Americas at (844) 301-7334 or AmericasLeads@ihs.com; in Europe, Middle East and Africa (EMEA) at +44 1344 328 300 or technology_emea@ihs.com; or Asia-Pacific (APAC) at +604 291 3600 or technology_APAC@ihs.com.

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