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3300-V And 2300-V SiC MOSFETs Are Sampling In Module, Discrete And KGD Form

Navitas Semiconductor has announced the sample availability of its new 3300-V and 2300-V ultra-high voltage (UHV) products in power module, discrete and known good die (KGD) formats (see the figure). These 3300-V and 2300-V UHV devices are based on Navitas' fourth-generation GeneSiC platform which uses a TAP architecture to implement a multi-step e-field management profile that significantly reduces voltage stress and improves voltage blocking capabilities compared with trench and traditional-planar SiC MOSFETs.

This TAP architecture is therefore able to provide increased long-term reliability and avalanche robustness, says the vendor. Navitas' TAP technology also features an optimal source contact for superior cell-pitch density and enhanced current-spreading, which results in improved switching figures of merit and lower on-resistance at hot temperatures.

With this announcement, Navitas is expanding the 3300-V and 2300-V UHV SiC product portfolio in flexible packaging formats to meet diverse application requirements. For high-power density and high-reliability systems, these products are integrated into an advanced SiCPAK G+ power module package, offered in half-bridge and full-bridge circuit configurations.

The SiCPAK G+ power modules feature a unique epoxy-resin potting technology, which has been proven to deliver a >60% improvement in power cycling lifetime and a >10x improvement in thermal shock reliability over similar silicone-gel-potted power module technology.

Key features of the SiCPAK G+ power modules also include an AlN DBC substrate for superior heat dissipation and new high-current press-fit pins that double the current-carrying capability per pin. Discrete SiC MOSFETs are available in the industry-standard TO-247 and TO-263-7 packages.

Navitas has created what's described as an industry-first reliability qualification benchmark it dubs "AEC-Plus," indicating SiC products are qualified above and beyond the existing AEC-Q101 and JEDEC product qualification standards. According to the vendor, this benchmark reflects Navitas' deep understanding of system-level lifetime requirements, and a strong commitment to enabling rigorously designed and validated products for demanding mission profiles in grid and energy infrastructure applications.

The AEC-Plus grade qualification standards extend further into rigorous multi-lot testing and qualification. Key additions to the existing AEC-Q101 requirements include:

- Dynamic reverse bias (DRB) and dynamic gate switching (DGS) to represent stringent fast switching application mission-profiles
- Over 3x longer duration for static high-temperature, high-voltage tests (HTRB, HTGB, HTGB-R)
- HV-THB qualification for power modules and HV-H3TRB qualification for discrete and KGD products
- Longer power cycling and temperature cycling

By offering its latest-generation 3300-V and 2300-V SiC MOSFETs as KGD products, Navitas gives system manufacturers greater flexibility in building custom SiC power modules. To deliver the highest quality for bare die products and SiCPAK G+ power module family, Navitas devices pass through an advanced production screening process.

This process includes comprehensive room and hot temperature testing on singulated die (post-dicing) and a six-side optical inspection. This rigorous KGD screening protocol ensures that only thoroughly tested die are used, improving manufacturing quality and increasing the final module's performance and reliability for critical ultra-high voltage applications.

"Navitas' new 3300-V and 2300-V SiC product portfolio allows our customers to push the boundaries of efficiency and reliability in solid-state transformers for AI data centers, as well as utility-scale battery energy storage and renewable energy to define a new standard for such mission-critical system applications," said Paul Wheeler, VP & GM of SiC BU.

Wheeler added, "This line of reliable, high performance ultra-high voltage power semiconductors is expected to be a significant step in our roadmap to 10-kV SiC solutions. By combining our proprietary Trench-Assisted Planar SiC MOSFET technology with innovative power packages, we are able to extend reliability qualification and support more stringent production screening, to deliver industry-leading performance and robustness."

A white paper on the Trench-Assisted Planar technology is available for free download from the Navitas site. For further product information, see the SiCPAK Power Modules, SiC MOSFET Known Good Die (KGD), and SiC MOSFET Discrete pages. To request samples, contact a Navitas sales representative.

Figure. Navitas is sampling 3300-V and 2300-V SiC MOSFETs based on its latest GeneSiC Trench-Assisted Planar technology and packaging innovations to augment efficiency and lifetime for AI data center, grid and energy infrastructure and industrial electrification including energy storage, renewable, and megawatt-scale fast-charging applications.