PRESS RELEASE

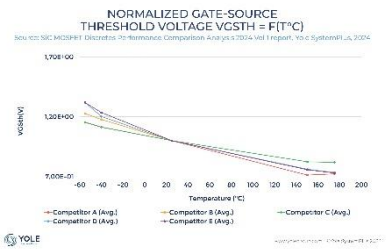
What differentiates the SiC MOSFETs from Infineon Technologies, STMicroelectronics, and others?

Yole Group and SERMA Technologies team up to analyze the performance of five SiC MOSFETs from leading manufacturers and understand their technology choices.

OUTLINE:

- The SiC[1] device market is expected to reach nearly US$10 billion by 2029, at a 25% CAGR[2]$_{23\text{-}29}$.
- SiC's market share in the global Power Electronics is forecast to double in the next 5 years, to 26%.
- Yole Group and SERMA Technologies are combining their expertise to provide a thorough analysis of the SiC MOSFET [3] industry. Together, they compare the performance of five SiC MOSFETs: Wolfspeed (C3M0075120D), ROHM (SCT3080KLHR), Infineon (AIMW120R080M1), STMicroelectronics (SCTW40N120G2VAG), and Anbonsemi (AS1M080120P).
- One of the major highlights observed is that SiC devices may compete in performance, if used in their optimal mode or under specific conditions as identified by the performance test, over various temperature ranges…

Lyon, France, July 22nd, 2024 – 1200V SiC MOSFET is the enabler of the BEV transition to 800V system. Indeed, SiC MOSFETs have become pivotal in power electronics, transforming numerous applications with their exceptional performance traits. SiC MOSFETs offer impressive attributes, including high breakdown voltage, low on-state resistance, and excellent thermal conductivity, positioning them as ideal choices for power-switching devices in high-frequency and high-temperature settings. Yole Group forecasts that the SiC device market will hit US$10 billion by 2029.



According to **Amine Allouche, Senior Technology & Cost Analyst, Semiconductor Substrates & Materials at Yole Group**: *"The increasing demand for efficient and reliable power electronic systems in industries like electric vehicles, renewable energy, and industrial automation has heightened the necessity for a thorough analysis of SiC MOSFETs."*

In this context, in addition to its annual market and technology reports, Power SiC and Power SiC – Manufacturing 2024, and its quarterly Monitor, Power SiC/GaN Compound Semiconductor Market Monitor, Yole Group, the market, technology, performance, reverse engineering and costing analysis company, has teamed up with SERMA Technologies, which brings its expertise in electronic technology performance testing, to present the first volume of their new SiC MOSFET Discretes Performance Analysis report.
The two companies have combined their expertise to release this first volume, which evaluates and compares five 1200V-class discrete SiC MOSFETs (along with a reference Si IGBT device) from global manufacturers under identical test conditions. Key parameters and characteristics are assessed to offer valuable insights for engineers, researchers, and industries aiming for optimized power solutions.

This new SiC MOSFET Discretes Performance Comparison Analysis 2024 Vol 1 report thoroughly examines the static performance of selected SiC MOSFETs to provide a comprehensive understanding of their advantages.

[1] SiC: Silicon Carbide
[2] CAGR: Compound Annual Growth Rate
[3] MOSFET: Metal-Oxide-Semiconductor Field-Effect Transistor(s)

Indeed, this first volume provides a performance analysis and comparison of 5 discrete SiC MOSFETs of 1200V-class from worldwide players: Wolfspeed (C3M0075120D), ROHM (SCT3080KLHR), Infineon (AIMW120R080M1), STMicroelectronics (SCTW40N120G2VAG), Anbonsemi (AS1M080120P), and a reference Si IGBT device from Infineon (IKW15N120CS7).

The comparative analysis includes the evaluation of key metrics such as on-state resistance, drain-to-source voltage, threshold voltage, breakdown voltage, and leakage currents under various operating conditions. The report also presents data and graphs of important parameters of the devices tested, including RDS(on)(VGS), RDS(on)(IDS), VDS, VGS(th), VBR(DSS), IDSS, IGSS, QG, IDS(VDS), and ISD(VSD) tested at various temperatures (from -55°C up to 175°C).
For example, the temperature evolution of the Vgs(th) and the breakdown voltage Vbr were characterized to assess the temperature stability behavior of the compared devices all over the temperature range.

Pierre-Emmanuel Blanc, Power Component Test Manager at SERMA Technologies, explains: *"Performance tests are conducted at various temperatures (-55°C, -40°C, 25°C, 150°C, 175°C) and adhere to JEDEC norms and standards, such as JESD 24 and JEP 183. The test protocol, outlined in the report, involves testing three DuT[4]s for each reference".*
This third-party objective analysis, conducted under identical test conditions, offers a more reliable performance comparison than device datasheets typically provide.

Additionally, Yole Group has conducted a physical analysis of all devices, including optical and SEM images and detailed measurements for package opening and die cross-section. These parameters are compiled to facilitate a comprehensive analysis of their impact on device performance. The report also includes the final component cost for each device and compares them based on their "performance versus cost" tradeoff.

Yole Group's compound semiconductor team invites you to follow the technologies, related devices, applications, markets, and players on www.yolegroup.com.

Stay tuned!

Product availability

This press announcement is fully dedicated to the SiC MOSFET Discretes Performance Comparison Analysis 2024 Vol 1.
Related products: Power SiC - Manufacturing 2024 - SiC Transistor Comparison 2023 (2024 version coming soon) - ROHM 4th Generation SiC MOSFET – Power SiC 2023 - Status of the Compound Semiconductor Industry 2024 - Power SiC/GaN Compound Semiconductor Market Monitor

About Yole Group

Yole Group is an international company recognized for its expertise in the analysis of markets, technological developments, and supply chains, as well as the strategy of key players in the semiconductor, photonics, and electronics sectors.
With Yole Intelligence and Yole SystemPlus, the group publishes market, technology, performance, reverse engineering and costing analyses and provides consulting services in strategic marketing and technology analysis. The Yole Group Finance division also offers due diligence assistance and supports companies with mergers and acquisitions.
Yole Group benefits from an international sales network. The company now employs more than 180+ people.
More information on www.yolegroup.com.

About SERMA Technologies

[4] DuT: Devices Under Test

Created in 1991, SERMA Technologies offers consulting, expertise, analysis, control, and testing activities on materials, electronic components, cards, complete electronic systems, battery technologies, and photovoltaic modules. With more than 200 engineers and technicians, 7,000m² of laboratory space, and a presence at four sites in France, SERMA Technologies supports its customers throughout the industrial cycle by advising them on the development, manufacturing, maintenance in operational conditions, HM/PHM (Health Monitoring/Prognostic and Health Management) and reliability of their products (maintainability, availability).
More information on www.serma-technologies.com.

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