

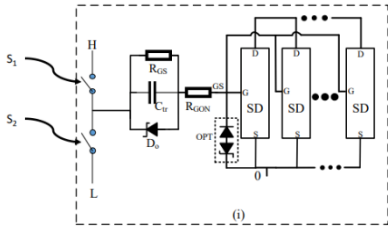
GaN GIT driver circuit

GaN GIT PowerGaN Gate Drive semiconductor components

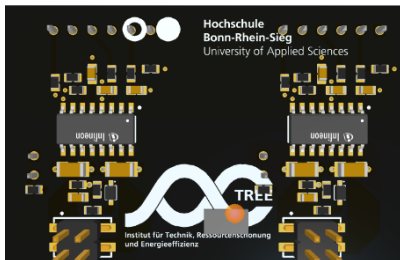
Invention

Power electronics use rapid-switching electronic components in such assemblies as inverters, frequency converters, and switching regulators to convert electrical energy. These electronic components must cost as little as possible, and some applications require very high power density or low weight. In addition to standard silicon (Si) semiconductors, there are silicon carbide (SiC) and gallium nitride (GaN) conductors that feature a wide band gap and allow very high switching

frequencies. A new invention from the Bonn-Rhine-Sieg University of Applied Sciences is now using a new electronic circuit to control these GaN GIT semiconductor components. It involves at least one capacitor and a Zener diode connected in parallel. The advantage is that this driver circuit can control power semiconductors at high frequencies (in the megahertz range). The circuit wave shape improves control, reducing the number of components, including parasitic ones. It also allows negative gate control, even if unipolar supply is used in the gate driver circuit. Other advantages include reduced losses, increased power density, and a simpler circuit design.



Circuit principle examples with one or more circuit breakers



Gate driver circuit with Zener diode (GaN High Power Technology inside)

Current Status

Initial laboratory samples that demonstrate functionality have been produced. The technology has been registered with the German Patent and Trade Mark Office. Other national patents can be obtained with a PCT application.

Relevant Publications

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An invention from the Bonn-Rhine-Sieg University of Applied Sciences.

Competitive Advantages

- Very high switching frequencies (MHz range)
- Driver circuit for GaN components
- Simple switching concept
- Allows symmetrical current distribution

Technology Readiness Level

1 2 3 4 5 6 7 8 9

Technology validated in lab

Industries

- Semiconductor circuits
- Power electronics

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6670

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