

Development of SiC static induction transistors (SiC-SITs) with ultra-low power loss

A SiC-static induction transistors (SiC-SITs) with buried p+ gate regions by using hexagonal silicon carbide (4H-SiC) has been fabricated. The new SiC-SIT has breakdown voltage V_{BR} 700 V and specific on-resistance R_{onS} $1.01 \text{ m}\Omega\cdot\text{cm}^2$, which is the smallest R_{onS} in the world for switching devices of V_{BR} 600 V~1.2 kV class. The SiC-SIT will reduce power loss extensively to 1/12 that of silicon insulated gate bipolar transistor (Si-IGBT).

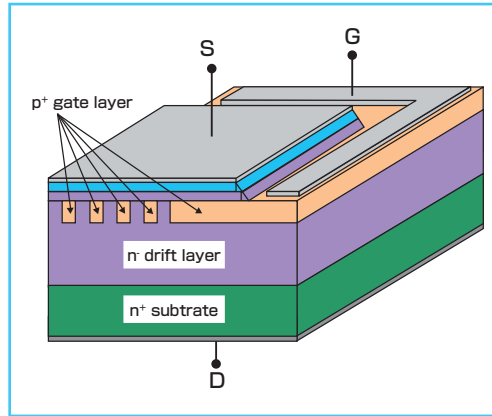


Fig 1: A schematic diagram of newly developed buried gate type SiC-SIT.

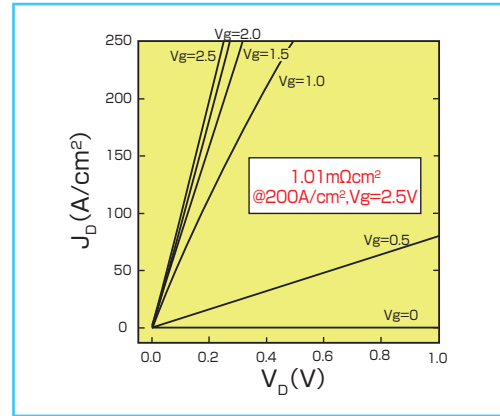


Fig 2: A voltage-current curve of newly developed buried gate type SiC-SIT.

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Development of a new calorimeter for accurate absolute calibration of laser energy

In order to establish a national standard of laser energy for single laser pulses, we have developed a calibration system for laser energy meters used in industry. A reference calorimeter for measuring the absolute laser energy is composed of Bismuth Telluride semiconductor-based thermocouples and a high absorption optical cavity. To calibrate the sensitivity of devices under the test, we have adopted a simultaneous measurement method by splitting an optical laser pulse into two branches. Based on this measurement system, we will soon supply the energy standard.

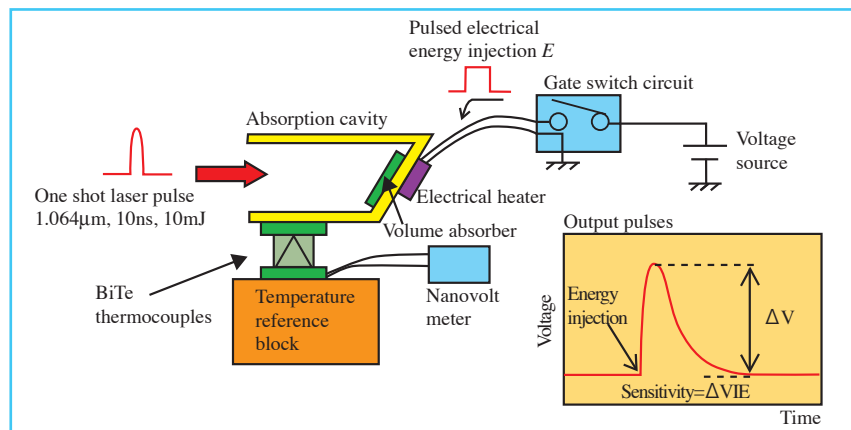


Figure: Schematic drawing of the measurement method of the absolute laser energy.

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