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5P56 - A METHOD OF ENERGY RECOVERY SWITCHING FOR PULSED POWER USING SIC-MOSFET

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There are develop pulse generator that are active in industry as drivers of excimer laser for semiconductor lithography light sources and pulsed power generation devices using magnetic pulse compression (MPC) circuits. Application studies such as shock wave generation using the same kind of pulsed power generator, biological application, chemically active species generation and the like are actively conducted. In these pulse power generators, not all of the input energy is consumed by the load. The energy remaining without being consumed by the load is consumed as heat in the pulsed power circuit. Effective utilization of this residual energy is necessary for high repetition pulsed power generator. We are conducting research on application to pulsed power switching circuit of SiC device, which is attracting attention as next generation power device. In this research, we describe a method of energy regeneration in pulsed power generation circuit using SiC-MOSFET. We succeeded in regenerating energy by turning-off the SiC-MOSFET at the timing when the forward current flows in the reverse parallel body diode connected to the SiC-MOSFET. Furthermore, we succeeded not only in energy recovery but also in turn-off surge voltage reduction.

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