SCIENCE CHINA
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• Supplementary File •

2.5 kV/674 MW/cm^2 or 100 A/2 kV β-Ga_2O_3 Heterojunction Diodes with Large Surge Current and Small Recovery Time

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Appendix A Importance

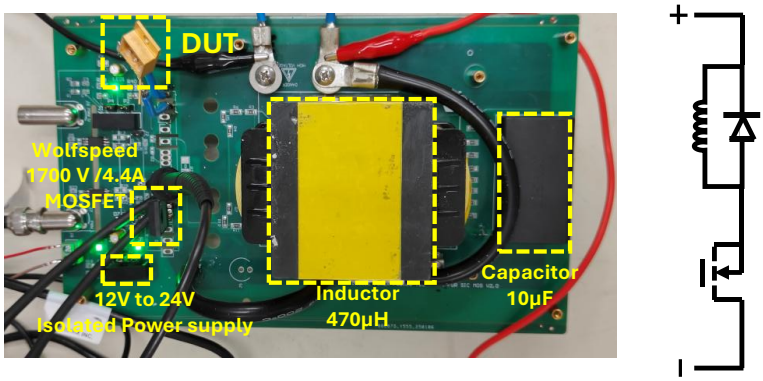

Figure A1 (Color online)Photograph of a board-level double-pulse test circuit and its corresponding circuit schematic.

Figure A1 shows a photograph of a board-level double-pulse test circuit alongside its corresponding circuit schematic. In the test circuit, a SiC MOSFET serves as the switch to control pulse on/off states. A large inductor is employed as the load to store energy during the first pulse. When the switch turns off, this inductor delivers current to the diode, driving it into forward conduction where it sustains a forward voltage drop. Subsequently, the SiC MOSFET switch abruptly applies reverse voltage to the diode. Ideally, the diode should turn off instantaneously. However, due to the presence of internal charge carriers, immediate turn-off is unattainable. Under reverse bias, the forward current rapidly decays to zero, followed by a reverse current spike that gradually decays to zero. The duration of this transient process defines the diode's T_{rr}.

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