

# Recent progress of Ga<sub>2</sub>O<sub>3</sub> power technology: large-area devices, packaging, and applications

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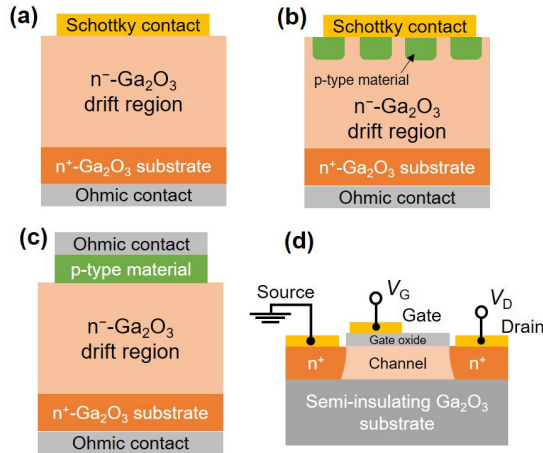


Fig. 1. Schematic of Ga<sub>2</sub>O<sub>3</sub> (a) Schottky barrier diodes, (b) junction barrier Schottky diodes, (c) hetero-PN diodes, and (d) MOSFETs that have demonstrated ampere-class performance [1].

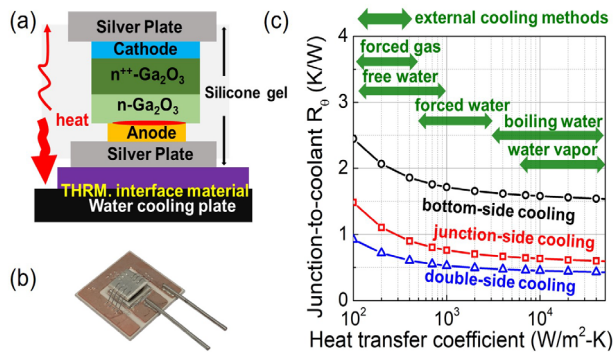


Fig. 3. (a) Schematic of the thermal characterization of a junction-side cooled, packaged Ga<sub>2</sub>O<sub>3</sub> Schottky barrier diode on a water-cooling plate [4]. (b) Photo of a fabricated double-side-cooling packaged Ga<sub>2</sub>O<sub>3</sub> diode [5]. (c) Junction-to-ambient thermal resistance as a function of heat transfer coefficient (i.e., representative of external cooling method) for bottom-side-cooled, junction-side-cooled, and double-side-cooled Ga<sub>2</sub>O<sub>3</sub> devices [5].

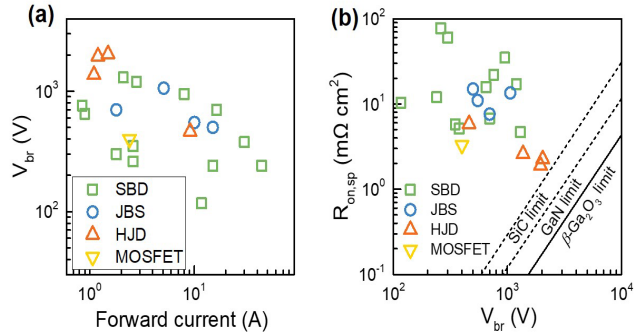


Fig. 2. Summary of (a) breakdown voltage versus forward current trade-off and (b) specific on-resistance versus breakdown voltage trade-off of the reported ampere-class Ga<sub>2</sub>O<sub>3</sub> devices [1].

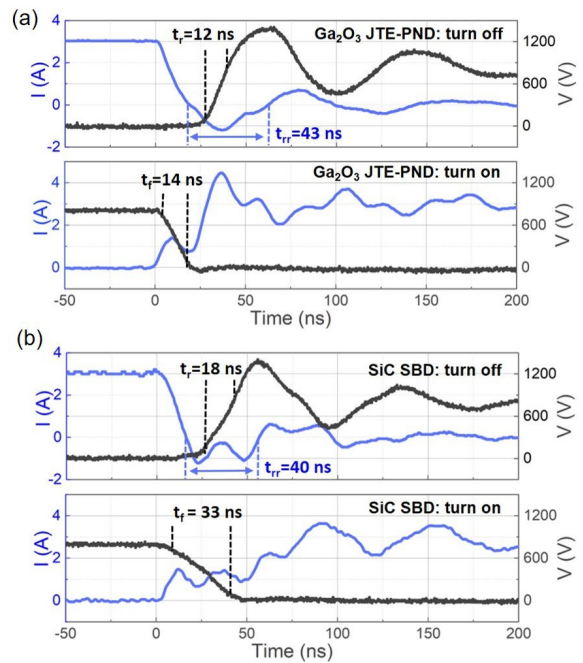


Fig. 4. Turn-ON and turn-OFF waveforms of (a) Ga<sub>2</sub>O<sub>3</sub> diode with NiO junction termination extension [2] and (b) similarly-rated, commercial SiC diode measured using a customized double-pulse test setup for on-wafer device characterizations.