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Fast High Voltage Solid State Switch Using Insulated Gate Bipolar Transistor for Discharge-Pumped Lasers

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Abstract : A novel method to produce a fast high voltage solid states switch using Insulated Gate Bipolar Transistors (IGBTs) is presented for discharge-pumped gas lasers. The IGBTs are connected in series to achieve a high voltage rating. An avalanche transistor is used as the gate driver. The fast pulse generated by the avalanche transistor quickly charges the large input capacitance of the IGBT, resulting in a switch out of a fast high-voltage pulse. The switching characteristic of fast-high voltage solid state switch has been estimated in the multi-stage series-connected IGBT with the applied voltage of several tens of kV. Electrical circuit diagram and the mythology of fast-high voltage solid state switch as well as experimental results obtained are presented.

Keywords : high voltage, IGBT, solid state switch, bipolar transistor
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