## 2018 IEEE International Power Modulator and High Voltage Conference



Contribution ID: 214

Type: Poster Presentation

## An 8kV Series-Connected MOSFETs Module That Requires One Single Gate Driver

Tuesday 5 June 2018 13:30 (1h 30m)

In the Traditional series-connected MOSFETs circuit, each of MOSFET requires a separate external drive circuit, and every drive circuit must be isolated from each other magnetically or optically. This results in increased circuit complexity. Furthermore, the differences of drivers in transmission delay will cause overvoltage and overheating on semiconductor devices, which will threaten the safety of the devices and the entire circuit. In order to decrease the circuit complexity of the series-connected MOSFETs module, and improve the working stability, turn-on speed and portability of it, this paper has designed a new series-connected MOSFETs structure which only requires one single external gate driver to control it. The module consists of ten 1200V SiC MOSFETs. The function of the driver is to trigger and turn off the first MOSFET, and the rest of the MOSFETs are turned on and off by the trigger capacitors. The capacitances of trigger capacitors have significant influence on synchronization of the module, which have been researched through experiments and simulations. After the synchronization was improved, performance parameters of the module can reach to the following points: repetitive frequency over 10kHz, blocking voltage over 8kV, on-state current 20A, and rise time 15ns. The module is lightweight, reliable and easy to use, and has good application in the repetitive frequency pulse power system.

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Session Classification: Poster 2 - High Voltage Design and Power Modulator Components