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Simultaneous Switching of Multiple GaN Transistors in a High-Speed Switch

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A fast travelling wave kicker operating with 80 MHz repetition rates is required for the new PIP-II accelerator at Fermilab. We present a technique to drive simultaneously four series-connected enhancement mode GaN-on-silicon power transistors by means of microwave photonics techniques. These four transistors are arranged into a high voltage and high repetition rate switch. Using multiple transistors in series is required to share switching losses. Using photonic signal distribution system is required to achieve precise synchronization between transistors. We demonstrate 600 V arbitrary pulse generation into a 200 Ohm load with 2 ns rise/fall time. The arbitrary pulse widths can be adjusted from 4 ns to essentially DC.

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