Contribution ID: **927** Type: **Oral**

A Novel High-frequency Pulse Generator Based on Bipolar and Marx Topologies

Wednesday 26 June 2019 16:45 (15 minutes)

With the in-depth application of pulse power technologies in the wide range of biomedicine, food processing, electromagnetic forming, plasma generation, etc., it has posed new requirements to pulse generatorsfor high-volt high frequency, bipolar, and all solid state,. In this paper, a novel bipolar high-volt pulse generator circuit topology is proposed for the needs. Theoretical analysis, simulation and experimental results show that it combines the advantages of solid-state Marx and bridge circuits including high voltage output through simple stacking of modules, flexible adjustment of output for polarity and pulse width by sequential logic control of the switch , and inherent high repetition rate with long lifetime. The experimental prototype has been developed with characteristic parameters following, an output voltage amplitude of ±5 kV, a repetition rate of 2.5 MHz in the pulse train, and a pulse width of 200 ns-10 μs.

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Session Classification: 8.2 Generators and Networks and 8.3 Repetitive Systems

Track Classification: 8.2 Generators & Networks