The role of plasma DC inverters

Can a high-frequency power inverter control plasma generation?
Abstract: This paper presents a discrete power control of a high-frequency power inverter system for plasma generation. Plasma generation requires a high-frequency dc-ac inverter to rapidly adjust the output power in step changes within a few microseconds such as the pulsed plasma in semiconductor processing.

How do DC-AC inverters affect the performance of a plasma generator?
The DC-AC inverters are connected in input-parallel and output-series configuration,by transformers,and each inverter performs phase-shift control with a high switching frequency,such as 400 kHz. Among these PCSs,DC-AC inverters which are directly connected to the plasma chambermainly affect the performance of the plasma generator.

How does a power conversion system work in a plasma generator?
In this paper,a control method for the power conversion system (PCS) of plasma generators connected with a plasma chamber has been presented. The PCS generates the plasma by applying a high magnitude and high frequency voltage to the injected gasses,in the chamber.

Which inverter stage should a plasma generator be operated at?
The DC-AC inverter stageof the plasma generators should be operated at high output voltage and high switching frequency (fsw) to satisfy the plasma generation/maintenance condition [6,7,8,9,10].

What are the requirements of DC-AC inverter for plasma generator?
The requirements of the DC-AC inverter for plasma generator are as follows. (1) As inverters operate at a high switching frequency,a zero voltage switching(ZVS) operation is necessary. (2) After the ignition of injected gases,the equivalent impedance of the chamber decreases sharply.

How to reduce power losses of inverter stage?
There is an attempt to apply a phase shedding control methodto reduce the power losses of the inverter stage,such as switching loss (psw(MOSFET)),conduction losses of channel and anti-parallel diode (pcon,sw(MOSFET),pcon,d(MOSFET)) in the light and intermediate load condition .

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