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Influence of properties of a material of skin-effect opening switch on its impulse characteristics

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One of the problems of powerful pulse technology is the use of transformer inductive storages (TINs) (at the time of energy storage $\tilde{1}$ -3sec) to generate high-power nanosecond pulses ($\tilde{1}$ 1012 -1015 Watt and more) [1, 2].

One of possible solutions was offered for consideration in articles [3-5]. The essence of this proposal is to use the well-known and studied phenomenon of the skin-effect to form pulses of the specified duration and power.

The indicated articles done the rationales:

- parameters of the high-resistivity layer covering the primary winding of TIN (thickness, resistivity, etc., depending on the load resistance);

- time parameters of the auxiliary opening switch (plasma opening switch (POS) and semi-conductive opening switch (SOS);

that allow make the best use of the skin effect as opening switch (SEOS).

In this paper, the effect of electrical properties of SEOS materials on the formation of a pulse, as well as the conditions for their cooling to stabilize the parameters of the pulse on the load, are considered. The purpose of this work is to show the possibility of generating a series of powerful nanosecond pulses by TIN-based generators.

Reference

1. "Energy storages" /Ed. D. But, M., Energy, 1991,400p.

2. "Opening switches" /Ed. A. Guenther, M. Kristiansen, and T. Martin PP, NY, 314p.

3. O.G. Egorov "Skin-Effect as the Opening Switch Phenomenon in Combination with the Semiconductor Opening Switch in High Power Generators Based on Inductive Storage" //Book abstract IEEE PMHVC 2016, San Francisco , CA, USA, p.54.

4. O.G. Egorov "Pulsed power generators based on inductive storage and skin effect opening switch (energy correlation and technical application)"// Proc. IEEE PPC, Brighton, UK, 2017, (to be published).

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