An interleaved structure for a high-voltage planar transformer for a Travelling-wave Tube

Fully interleaved structure can significantly reduce leakage inductance in transformers. However, it is hard to apply them into high-voltage applications due to the electric insulation. In this paper, a partially interleaved structure that is suitable for high-voltage high frequency applications is proposed to reduce leakage inductance and the insulation's thickness is adjusted to optimize the electric isolation. In addition, the resistance and parasitic capacitance are investigated. With this method, a planar transformer used for a Travelling-Wave Tube Amplifier (TWTA) is designed. Calculations of leakage inductances and experimental results validate the effectiveness of the proposed method.