

Modeling of the Dual-Output Piezoelectric Transformer Operating at Thickness Shear Vibration Mode

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ABSTRACT

In our previous study, dual-output piezoelectric transformers operating at thickness shear vibration mode were proposed and experimentally investigated. By designing a new construction of support and lead wire connection, a power density of 52.7 W/cm^3 and a total output power of 169.8 W were attained at a temperature rise less than $20 \text{ }^\circ\text{C}$. In this paper, equivalent circuit parameters of the dual-output piezoelectric transformers operating at thickness shear vibration mode were derived. Based on this the impedance characteristics, equivalent inductance, voltage gain and other characteristics of the piezoelectric transformers were calculated. Validity of the method was verified by experimental results.

Keywords: Dual-output piezoelectric transformer, Thickness shear vibration mode, Equivalent circuit parameters