

LTCC 高周波デバイスにおける空芯コイルの電気特性の解析

林 克彦*, 渡辺 一宏**, 越地 耕二**

Analysis of Electric Characteristics of Air-Core Coils in LTCC RF Devices

Katsuhiko HAYASHI*, Kazuhiro WATANABE** and Kohji KOSHIJI

*TDK株式会社基礎材料研究所 (〒272-8558 千葉県市川市東大和田2-15-7)

**東京理科大学理工学研究科 (〒278-8510 千葉県野田市山崎2641)

*Material Research Center, TDK Corporation (2-15-7 Higashi-Ohwada, Ichikawa-shi, Chiba 272-8558)

**Tokyo University of Science (2641 Yamazaki, Noda-shi, Chiba 278-8510)

Abstract

Design guidelines for air core coils in LTCC RF devices have been equivocal, because coils have the RF magnetic flux not only inside but also outside. In order to make a design rule for LTCC devices, the magnetic fields of coils and the influential traits from the adjoining components in the devices was analyzed. Consequently, the analysis results showed that the outside flux mainly exists within $200\mu\text{m}$ around the coil electrode and that the adjacent components make coil's impedance higher. The effects of the serial connection of air core coils with smaller number of turn on the self-resonance frequency were studied. The simulation results showed that the self-resonance frequency dose not shift higher.

Key Words: LTCC, Air Cored Coil, High frequency, Simulation, S-parameter